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HADIAH/BELI	
TGL. TERIMA :	5 - 12 - 2007
NO. JUDUL :	2698
NO. INV. :	5120002698001
NO. INDIK. :	002698

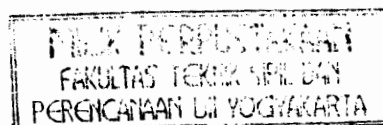
TUGAS AKHIR

**PERENCANAAN JEMBATAN BETON BERTULANG
TIPE GELAGAR LENGKUNG (ARCH BRIDGE)
DI ATAS SUNGAI KRETEK BANTUL**

Diajukan Kepada Universitas Islam Indonesia Yogyakarta Untuk memenuhi
Persyaratan Memperoleh Derajat Sarjana Srata Satu (S1) Teknik Sipil



**JURUSAN TEKNIK SIPIL
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
UNIVERSITAS ISLAM INDONESIA
YOGYAKARTA
2007**



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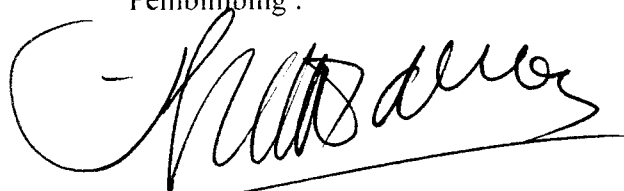
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Ir. H. Suharyatmo, MT

Tanggal :

MOTTO

“Allah SWT akan meninggikan orang-orang yang beriman di antaramu dan orang-orang yang diberi ilmu pengetahuan beberapa derajat”

(QS. AlMujaadilah : 11)

“Dan Allah menurunkan dari langit air (hujan) dan dengan air itu dihidupkan-Nya bumi setelah matinya. Sesungguhnya pada yang demikian itu benar-benar terdapat tanda-tanda kekuasaan Allah bagi orang-orang yang mendapatkan pengajaran”

(QS. An Nahl : 65)

“Apa saja yang di sisimu akan sirna, dan apa-apa yang di sisi Allah adalah kekal, dan sesungguhnya (Allah) akan memberi balasan kepada orang-orang yang sabar dengan pahala yang lebih besar dari pada apa-apa yang telah mereka kerjakan”

(QS. An Nahl : 96)

Sesungguhnya di dalam kesulitan pasti ada kemudahan

(QS. Asy Syarh : 5)

Barang siapa menempuh jalan untuk menuntut ilmu maka Allah akan memudahkan baginya jalan ke surga”

(Hadist Rasuullah SAW)

“Dan Kami jadikan di bumi gunung-gunung yang tegak berdiri agar tidak guncang bersama mereka, juga Kami jadikan di bumi jalan-jalan yang lebar agar mereka dapat petunjuk dan dalam perjalanan”

(QS. Al Anbiyaa' : 31)

'Kalau Anda ingin menyalahkan orang lain yang paling bertanggung jawab atas kegagalan Anda dalam hidup, maka Anda bisa mulai dengan menyalahkan diri sendiri ? Kenapa demikian ?? Karena Andalah sendirilah yang memutuskan, mengambil keputusan dengan penuh kesadaran, untuk gagal.

Sukses anda, bukan nasib. Sukses adalah sesuatu yang hanya dapat dicapai dengan harta, keringat, air mata dan kadang juga darah. Pada prinsipnya, tidak ada orang yang gagal. Yang ada hanya orang yang "memutuskan untuk berhenti" sebelum mencapai sukses"

"Kesuksesan itu hanya berjarak satu langkah dari orang yang mau belajar dari kesalahan, berani mencoba, pantang menyerah, tidak mudah putus asa, terus mencoba dan tidak takut gagal"

"Menjadi orang yang sukses itu sulit tapi lebih sulit lagi kalau tidak menjadi orang yang sukses"

"Genggamlah erat-erat mimpi-mimpimu

Karena jika mimpi-mimpi itu hilang

Kehidupan seperti seekor burung

Yang patah sayapnya

Dan tidak dapat terbang

Genggamlah erat-erat mimpi-mimpimu

Karena ketika mimpi-mimpi itu pergi

Kehidupan seperti ladang yang kering

Gersang dan dingin"

*"Aku tidak memilih menjadi insan biasa
Memang hak-ku untuk menjadi luar biasa
Aku mencari kesempatan bukan perlindungan
Aku tidak ingin menjadi warga yang terkungkung
Rendah diri dan terpedaya
Karena dilindungi fihak berkuasa
Aku siap menghadapi resiko terencana
Berangan-angan dan membina
Untuk gagal dan sukses
Aku menolak menukar insentif dengan derma
Aku memilih tantangan hidup dari pada derma
Aku memilih tantangan hidup dari pada
Kehidupan yang terjamin
Kenikmatan mencapai sesuatu,
Bukan utopia yang basi
Aku tidak akan menjual kebebasanku,
Tidak juga kemuliaanku
Untuk mendapatkan derma
Aku tidak akan merendahkan diri
Pada sembarangan atasan dan ancaman
Sudah menjadi warisanku
Untuk berdiri tegak, megah dan berani
Untuk berpikir dan bertindak untuk diri sendiri
Untuk meraih segala keuntungan
Hasil kerja sendiri
Dan untuk menghadapi dunia
Dengan berani dan berkata :
"Ini Telah Kulakukan"
Segalanya ini memberikan makna bagi seorang insan"*

Halaman Persembahan

Kupersembahkan Karya Sederhana ini Kepada :

Yang Terkasih Allah SWT

Serta Nabi Muhammad SAW

Dan orang-orang yang sangat kucintai dan kusayangi :

Ayahanda Arzi, Spd dan Ibunda Iskalil Mala

Nek di dusun

Kedua adikku Haris Alven dan Nicky Arzila

Seluruh Keluarga besar di Bengkulu

Kekasih hatiku

Dan

Sahabat-sahabatku

Yang senantiasa mencurahkan cinta dan kasih

sayangnya untukku

...dan lain-lain

...dan lain-lain

...dan lain-lain

dan sebagai tempat meminta

...dan lain-lain

...tercinta yang telah sabar

sentuhan kasih sayang dan doa

karena dengan cinta
menyelesaikan tugas akhir

Kedua adikku yang ku sayangi, ... dan

...dan lain-lain

...dan lain-lain

...dan lain-lain

diimpi-impikan n bisa jadi orang

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langkah-langkahku,

bisa berbahagia dan

telah dicitakan.

dank sih?? tapi ga

yang slama ini

akademik kebidanan ga? pokoknya

jadi

terjaga di hati dang...

...dan lain-lain

keluarga

dan

makasih juga dah ngumpul-ngumpul slama ini setiap dang mau

Juga buat smua adex-adex sepupuku...

serta kesabaran dan keramahan sewaktu konsultasi, tanpa

bimbingan bapak mungkin saya tidak dapat menyelesaikan tugas akhir

dan semangat saling berbagi informasi

...oh yah ntar klo dpt proyek kasih tau aku

yah atas pertemanannya slama ini..dah saling berbagi cerita...sering jalan-jalan..pokoknya kamu tuh orang asyik juga walaupun kadang-kadang sering nyebelin..makasih juga atas bantuannay,informasinya n dukungannnya

ku yang baru sekarang..maksih buat semuanya atas bantuan dan pertemanannya selama

pertemanannya slama kuliah...jaga terus kebersamaan kita yah..

yah atas semua bantuannya, aku minta maaf yah klo aku ada salah sama kalian...pokoknya teruskan perjuangan yah klo aku sering nyebelin tiap aku ngetik laporan tugas akhir ini,maaf juga aku sering ngalahin mu tiap main online

atas ilmu yang telah diberikan

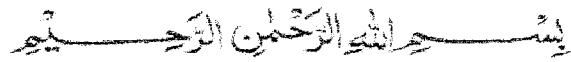
kasih atas semua bantuannya

atas kenangan yang tlah diberikan

atas cinta dan kasih sayangnnya untukku..maksih atas dukungan dan perhatianmu memberikan kesejukan didalam hatiku, Semoga Allah SWT mmeberikan sesuatu yang terbaik bagi kita. Amiin..

atas doanya untukku..moga suatu hari nanti kita bisa ngumpul lagi
Thanko for All...

KATA PENGANTAR



Assalamu 'alaikum Wr.Wb.

Alhamdulillah rabbil 'alamin, Puji syukur saya panjatkan kehadiran Allah SWT yang senantiasa melimpahkan nikmat, karunia dan rahmat-Nya kepada kita semua, khususnya kepada Penyusun sehingga dapat menyelesaikan Tugas Akhir ini. Tidak lupa sholawat dan salam senantiasa penyusun haturkan kepada junjungan Nabi Muhammad SAW beserta keluarga, sahabat serta pengikutnya sampai akhir jaman.

Tugas akhir ini dengan judul **Perencanaan Jembatan Beton Bertulang Tipe Gelagar Lengkung (*Arch Bridge*) Di Atas Sungai Kretek Bantul** diajukan sebagai syarat untuk menyelesaikan pendidikan pada jenjang Strata Satu (S1), pada Jurusan Teknik Sipil Fakultas Teknik Sipil Dan Perencanaan Universitas Islam Indonesia.

Penyusun menyadari bahwa dalam penulisan tugas akhir ini tidak lepas dari sumbangan pemikiran dari berbagai pihak yang sangat membantu, sehingga penulis dapat menyelesaikan semua hambatan yang terjadi selama penyusunan hingga terselesaikannya tugas akhir ini. Pada kesempatan ini dengan penuh rasa hormat dan kerendahan hati, penyusun mengucapkan banyak terima kasih kepada pihak-pihak yang telah membantu, yaitu :

1. Bapak Prof. Dr. H. Edy Suandi Hamid, M.Ec, selaku Rektor Universitas Islam Indonesia.
2. Bapak Dr.Ir.H. Ruzardi, Ms, selaku Dekan Fakultas Teknik Sipil dan Perencanaan UII.
3. Bapak Ir. H. Faisol AM, MS, selaku Ketua Jurusan Teknik Sipil, FTSP, UII.
4. Bapak Ir.H. Suharyatmo, MT, selaku Dosen Pembimbing dalam penelitian ini.
5. Bapak Ir. Fatkhurrohman.N. MT, selaku Dosen Penguji.
6. Bapak Ir. Helmy Akbar Bale, MT, selaku Dosen Penguji.
7. Bapak dan Ibu tercinta di Bengkulu, atas kasih sayang, kesabaran serta dukungan baik material maupun spiritual dengan iringan doa yang telah diberikan kepada ananda selama ini.
8. Kedua Adikku Haris Alven dan Nicky Arzila.
9. Semua keluarga di Bengkulu atas dukungannya kepada ananda.
10. Teman seperjuanganku Ricky Apriansyah yang sama-sama mengambil tugas akhir tentang jembatan, terima kasih atas sharingnya, masukan dan sesama koreksinya.
11. Teman-teman Civil 02 yang tidak bisa penyusun sebut satu persatu, terima kasih atas segala dukungan, informasi, dan segala perhatiannya.
12. Semua pihak yang telah membantu baik secara langsung maupun tidak langsung.

Semoga seluruh amal dan kebaikan yang diberikan dapat diterima dan mendapatkan ridho dari Allah SWT, *amiin*.

Penyusun menyadari bahwa penulisan laporan tugas akhir ini masih jauh dari sempurna, mengingat keterbatasan ilmu, kemampuan dan pengalaman penyusun dalam penyusunan dan penulisan. Oleh karena itu saran dan kritik yang bersifat membangun sangat penyusun harapkan guna perbaikan dan pengembangan selanjutnya.

Akhir kata, penyusun berharap semoga laporan tugas akhir ini bermanfaat dan memberikan tambahan ilmu bagi kita semua. Semoga Allah SWT meridhoi kita semua, *amiin*.

Wassalamu 'alaikum Wr.Wb.

Yogyakarta, April 2007

Penyusun

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DAFTAR NOTASI

A_g	= Luas bruto penampang.
A_s	= Luas dari tulangan tarik.
A'_s	= Luas dari tulangan tekan.
$A_{s\ min}$	= Luas tulangan minimum.
$A_{s\ susut}$	= Luas tulangan susut.
A_v	= Luas tulangan geser pada daerah sejarak s , atau luas tulangan geser yang tegak lurus terhadap tulangan lentur tarik dalam suatu daerah sejarak s pada komoponen struktur lentur tinggi.
A_ϕ	= Luas penampang satu batang tulangan.
a	= Tinggi blok tegangan regangan tekan persegi ekuivalen.
a_{leleh}	= Tinggi blok tegangan regangan tekan persegi ekuivalen pada saat leleh.
a_k	= Tinggi blok tegangan regangan persegi kapasitas ekuivalen.
b	= Lebar dari muka tekan komponen struktur.
b_j	= Lebar efektif join.
b_v	= Lebar penampang pada bidang kontak yang ditinjau terhadap geser horizontal.
b_w	= Lebar badan balok atau diameter penampang bulat.
B_x	= lebar abutment arah x
B_y	= lebar <i>abutment</i> arah y
c	= Jarak dari serat tekan terluar ke garis netral.

- C_1 = Koefisien gempa dasar.
- C_c = Gaya tekan dalam beton tanpa tulangan tekan.
- C_s = Gaya tekan tambahan akibat tulangan tekan.
- d = Jarak dari serat tekan terluar ke pusat tulangan tarik (tinggi efektif balok).
- d' = Jarak dari serat terluar ke pusat tulangan tekan.
- d_i = Simpangan horisontal lantai tingkat ke-i.
- D = Beban mati, atau momen dan gaya dalam yang berhubungan dengan beban mati.
- e = Eksentrisitas gaya terhadap sumbu.
- E = Pengaruh beban gempa, atau momen dan gaya dalam yang berhubungan dengan gempa.
- E_c = Modulus elastisitas beton.
- E_s = Modulus elastisitas baja.
- f'_c = Kuat tekan beton yang disyaratkan.
- f_i = Faktor kuat lebih beban dan bahan yang terkandung di dalam struktur gedung dan nilainya ditetapkan sebesar 1,6.
- f_s = Kuat tekan leleh tulangan pada saat beban bekerja.
- f_y = Kuat leleh baja tulangan yang diisyaratkan.
- Fi = Distribusi beban geser dasar pada tingkat ke-i.
- g = Percepatan gravitasi.
- h = Tinggi kolom portal.
- h' = Tinggi bersih kolom portal.
- H = Tinggi kolom, tinggi total portal struktur.

- I = Faktor keutamaan, momen inersia.
- K = Faktor jenis keutamaan.
- k = Kekakuan lentur kolom.
- Kp = Kekakuan gabungan yang merupakan gaya horizontal yang diperlukan untuk menimbulkan satu-satuan lendutan horisontal jembatan.
- L = Beban hidup, atau momen dan gaya dalam yang berhubungan dengan beban hidup.
- l_n = Panjang dari bentang bersih dalam arah memanjang dari konstruksi dua arah, diukur dari muka-ke-muka balok atau tumpuan lain pada kasus lainnya, mm.
- l_n = Bentang bersih.
- l = Panjang bentang.
- m = Perbandingan tegangan
- M_D = Momen akibat beban mati.
- M_E = Momen akibat beban gempa.
- M_{EK} = Momen akibat gaya geser gempa.
- M_{kap} = Momen kapasitas penampang.
- M_L = Momen akibat beban hidup.
- M_n = Kuat momen nominal pada suatu penampang.
- M_u = Momen ultimit/terfaktor penampang.
- n = Jumlah tulangan, jumlah lantai bangunan.
- nb = Jumlah baris tiang

nt = Jumlah tiang bor perbaris

P_b = Kuat beban aksial nominal pada kondisi regangan seimbang.

P_D = Gaya aksial akibat beban mati.

P_E = Gaya aksial akibat beban gempa.

P_g = Gaya aksial akibat beban gravitasi terfaktor pada pusat joint.

P_L = Gaya aksial akibat beban hidup.

P_n = Kekuatan beban aksial nominal.

P_u = Gaya aksial terfaktor pada eksentrisitas yang diberikan.

R = Faktor reduksi gempa.

R_n = Koefisien lawan untuk perencanaan kekuatan.

s = Spasi tulangan geser atau torsi dalam arah paralel dengan tulangan longitudinal, mm.

T = Waktu getar struktur, detik.

T_{EQ} = Gaya gempa/gaya geser total.

T_I = Waktu getar alami fundamental.

T_s = Gaya tarik tulangan baja.

U = Kuat perlu untuk menahan beban yang telah dengan faktor beban atau momen dan gaya dalam yang berhubungan dengannya

V = Gaya gempa/gaya geser total.

V_c = Kuat geser nominal yang disumbangkan oleh beton.

V_D = Gaya geser akibat beban mati.

V_E = Gaya geser akibat beban gempa.

V_g = Gaya geser akibat beban mati ditambah beban hidup.

- V_L = Gaya geser akibat beban hidup.
- V_s = Kuat geser nominal yang disumbangkan oleh tulangna geser.
- V_u = Gaya geser berfaktor pada penampang.
- qc = Nilai konus rata-rata
- qf = Nilai hambatan lekat rata-rata
- w_u = Beban terfaktor per unit luas.
- W_t = Berat total struktur.
- Z = Besaran pembatas distribusi tegangan lentur.
- ΣH = jumlah gaya arah horizontal
- ΣV = jumlah gaya arah vertikal
- ΣM_v = jumlah momen dari beban vertikal
- ΣM_h = jumlah momen dari beban horizontal
- α = Faktor distribusi momen kolom portal yang ditinjau, yang nilainya dihitung sebanding dengan kekakuan relatif unsur-unsur yang bertemu pada titik pertemuan tersebut.
- β = Rasio dari bentang bersih dalam arah memanjang terhadap arah memendek dari plat.
- β_x = Perbandingan w/x ; tinggi dari distribusi tegangan persegi terhadap kedalaman dari garis netral.
- ρ = Perbandingan tulangan tarik dan geser pada tumpuan.
- ρ_m = Perbandingan tulangan pada keadaan regangan berimbang
- ρ_{mak} = Perbandingan tulangan pada keadaan regangan maksimum
- ρ_{min} = Perbandingan tulangan pada keadaan regangan minimum

ε_c = Regangan tekan beton.

ε_{cu} = Regangan tekan beton maksimum pada saat hancur.

ε_s = Regangan pada baja tulangan.

ε_y = Regangan pada saat baja mencapai tegangan leleh.

ϕ = Faktor reduksi kekuatan.

γ_m = Faktor penambahan kekuatan (*overstrength factor*), yang ditetapkan sebesar 1.25 untuk baja tulangan dengan $f_y < 400$ MPa dan 1.4 untuk $f_y \geq 400$ MPa.



ABSTRAKSI

Pesatnya pertumbuhan masyarakat membutuhkan tersedianya sarana jalan dan jembatan yang memadai guna mempermudah arus transportasi barang dan manusia. Selama ini kita mengenal jalur Pantura, yaitu jalur jalan yang menghubungkan kota-kota di sepanjang pesisir utara pulau Jawa. Sebagai alternatif transportasi, maka dipandang perlu untuk membangun jalan di sepanjang pesisir selatan pulau Jawa, yang disebut jalur pantai selatan. Jalur ini banyak melewati sungai-sungai, baik besar maupun kecil. Salah satu sungai yang dilewati adalah Kali Opak di daerah Kretek, Bantul. Oleh karena itu pembangunan Jembatan Kretek II (yang berada di hilir Jembatan Kretek sekarang) menjadi mutlak diperlukan sebagai sarana penghubung pada ruas jalur yang baru tersebut

Adapun tujuan pembangunan Jembatan Kretek II antara lain adalah :

1. memperlancar arus lalu lintas sepanjang jalur pantai selatan,
2. meningkatkan prasarana jalan,
3. memperlancar perekonomian dan industri serta mendukung pertumbuhan sosial budaya dan pariwisata penduduk sekitar kecamatan Kretek kabupaten Bantul, dan
4. mengantisipasi pertumbuhan arus lalu lintas serta pengembangan wilayah pada masa sekarang.

Jembatan Kretek II termasuk jembatan dengan bentang panjang yaitu mencapai 240 m. Jembatan bentang panjang memerlukan perencanaan yang baik sehingga diperoleh hasil yang ekonomis dan aman, salah satu solusinya adalah merencanakan dengan model lengkung (arch) beton bertulang. Tujuan dari tugas akhir ini adalah merencanakan struktur atas jembatan meliputi gelagar, trotoar, sandaran, kolom dan gelagar lengkung yang juga merupakan struktur utama dari jembatan dan struktur bawah meliputi abutment dan pondasi.

Perencanaan jembatan kretek II diawali dengan menentukan spesifikasi struktur yang digunakan meliputi mutu beton dan kuat tarik baja yang digunakan. Kemudian dilakukan perhitungan struktur dengan menentukan beba-beban yang bekerja sesuai dengan PPTJ – 1992 dan BDM-1992, meliputi beban mati, hidup, angin, gempa, rem dan traksi, tekanan tanah, susut rangkai dan aliran air dan hanyutan. Tahap selanjutnya adalah dilakukan analisis struktur dengan program SAP 2000. Dari hasil analisis struktur dilakukan perhitungan struktur beton bertulang dengan metode kuat batas yaitu beban kerja dinaikkan dengan memberikan faktor beban, sehingga diperoleh suatu beban yang dipakai untuk perencanaan.

Hasil perhitungan diperoleh tulangan yang digunakan dalam perencanaan Jembatan Kretek II adalah balok dan kolom digunakan tulangan $\varnothing 25$, $\varnothing 22$, $\varnothing 19$ dengan $f_y = 390$ Mpa. Tulangan geser menggunakan tulangan $\varnothing 10$, $\varnothing 13$, $f_y = 390$ Mpa. Untuk pelat dan sandaran digunakan tulangan $\varnothing 8$, $\varnothing 16$ dan $\varnothing 12$. dan untuk struktur bawah digunakan tulangan $\varnothing 32$, $\varnothing 25$, $\varnothing 16$, $\varnothing 13$, $f_y = 390$ Mpa. Tulangan geser menggunakan tulangan $\varnothing 13$, $\varnothing 16$, dan $f_y = 390$

BAB I

PENDAHULUAN

1.1 Umum

Jembatan merupakan salah satu sarana yang sangat vital bagi kelancaran sistem lalu lintas pada umumnya. Jembatan biasanya menghubungkan antara dua daerah yang dipisahkan oleh kondisi alam, misalnya sungai, jurang dan lain-lain.

Pesatnya pertumbuhan masyarakat membutuhkan tersedianya sarana jalan dan jembatan yang memadai guna mempermudah arus transportasi barang dan manusia. Selama ini kita mengenal jalur Pantura, yaitu jalur jalan yang menghubungkan kota-kota di sepanjang pesisir utara pulau jawa. Sebagai alternatif transportasi, maka dipandang perlu untuk membangun jalan di sepanjang pesisir selatan pulau jawa, yang disebut jalur pantai selatan. Jalur ini banyak melewati sungai-sungai, baik besar maupun kecil. Salah satu sungai yang dilewati adalah Kali Opak di daerah Kretek, Bantul. Oleh karena itu pembangunan Jembatan Kretek II (yang berada di hilir Jembatan Kretek sekarang) menjadi mutlak diperlukan sebagai sarana penghubung pada ruas jalur yang baru tersebut dan selain itu juga membawa perubahan kondisi angkutan barang dan jasa yang meningkat baik volume maupun bebannya sehingga mempermudah dan mempercepat kegiatan ekonomi dan perdagangan bagi masyarakat pengguna ruas jalan tersebut. Adapun tujuan pembangunan Jembatan Kretek II antara lain adalah :

1. memperlancar arus lalu lintas sepanjang jalur pantai selatan,
2. meningkatkan prasarana jalan,

3. memperlancar perekonomian dan industri serta mendukung pertumbuhan sosial budaya dan pariwisata penduduk sekitar kecamatan Kretek kabupaten Bantul, dan
4. mengantisipasi penambahan arus lalu lintas serta pengembangan wilayah pada masa sekarang.

1.2 Tujuan Perencanaan/Disain

Dalam rangka menyelesaikan tugas akhir di Jurusan Teknik Sipil Fakultas Teknik Sipil dan Perencanaan, maka diambil perencanaan jembatan secara lengkap. Adapun jembatan yang direncanakan adalah Jembatan Kretek II, dengan mencakup pekerjaan perencanaan meliputi :

1. perencanaan sandaran dan lantai jembatan,
2. perencanaan gelagar (balok) jembatan,
3. perencanaan pilar (kolom) jembatan (*pier*),
4. perencanaan *abutment*, dan
5. perencanaan pondasi.

1.3 Batasan Masalah

Batasan masalah diperlukan agar penulisan dapat terarah dan terfokus pada acuan yang akan dicapai. Hal-hal penting yang perlu dibatasi adalah :

1. jembatan yang direncanakan adalah tipe kelas I A
2. pondasi yang digunakan adalah pondasi tiang *bore pile*,

3. analisis struktur menggunakan program *SAP 2000*,
4. spesifikasi jembatan ditentukan sebagai berikut (lihat gambar 1.5 dan 1.6) :
 - a. tipe jembatan : beton bertulang gelagar lengkung
(*arch bridge*) dengan 5 perletakan,
 - b. panjang jembatan total : 240 m,
 - c. jumlah bentang : 4 buah (40 m, 80 m, 80 m, 40 m),
 - d. lebar jembatan : 20 m,
 - e. lebar perkerasan : 7 m untuk 1 jalur kendaraan,
 - f. lebar median jalan : 2,5 m,
 - g. lebar trotoar : 1,75 m,
 - h. tebal pelat lantai jembatan : 0,25 m,
 - i. jumlah balok induk memanjang : 3 buah,
 - j. jumlah balok anak memanjang : 6 buah,
 - k. jumlah balok lengkung : 3 buah,
 - l. jumlah balok lintang : 96 buah, dan
 - m. jumlah kolom : 135 buah,
5. pembebanan menggunakan metode Peraturan Perencanaan Teknik Jembatan, 1992 (*PPTJ – 1992*), Departemen Pekerjaan Umum, Direktorat Jendral Bina Marga. dan *Bridge Design Manual*, 1992 (*BDM-1992*), *Directorate General of Highway, Ministry of Public Works, Republic of Indonesia*.

Pedoman Pembebanan untuk perencanaan jembatan jalan raya meliputi data-data beban primer, beban sekunder dan beban khusus serta persyaratan perencanaan untuk penyebaran beban, kombinasi pembebanan, syarat ruang bebas dan penggunaan beban hidup tidak penuh. Pedoman ini dapat digunakan untuk perencanaan jembatan bentang panjang > 200 m dengan mengadakan modifikasi sesuai jenis konstruksi dan kondisi lapangan.

A. Beban Primer

Beban primer adalah beban yang merupakan beban utama dalam perhitungan tegangan pada setiap perencanaan jembatan.

a. Beban Mati

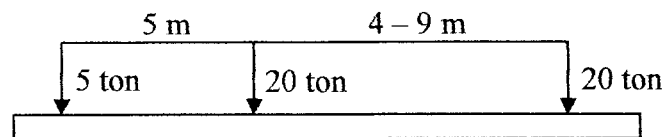
Beban mati adalah beban yang merupakan berat sendiri jembatan atau bagian jembatan yang ditinjau, termasuk segala unsur tambahan yang dianggap merupakan satu kesatuan tetap dengannya.

b. Beban Hidup

Beban hidup adalah semua beban yang berasal dari berat kendaraan-kendaraan bergerak dan atau pejalan kaki yang dianggap pekerja pada jembatan. Beban hidup jembatan terdiri dari :

- Beban Hidup Terpusat (T)

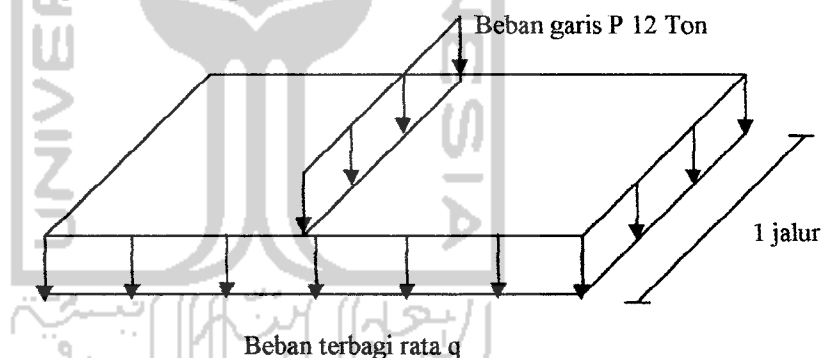
Beban hidup T merupakan beban terpusat untuk lantai kendaraan, beban T ini merupakan beban kendaraan truck yang mempunyai beban roda ganda (*dual wheel load*) sebesar 10 ton dengan ukuran-ukuran serta kedudukan seperti Gambar 1.1.



Gambar 1.1 Beban hidup terpusat T untuk lantai kendaraan

- **Beban Jalur (D)**

Beban hidup D merupakan beban jalur untuk gelagar, beban D ini adalah susunan beban pada setiap jalur lalu lintas yang terdiri dari beban terbagi rata sebesar q (ton per meter panjang per jalur) dan beban garis P (ton per jalur lalu lintas tersebut), seperti terlihat pada Gambar 1.2.



Gambar 1.2 Beban jalur D untuk balok

Besar q ditentukan sebagai berikut :

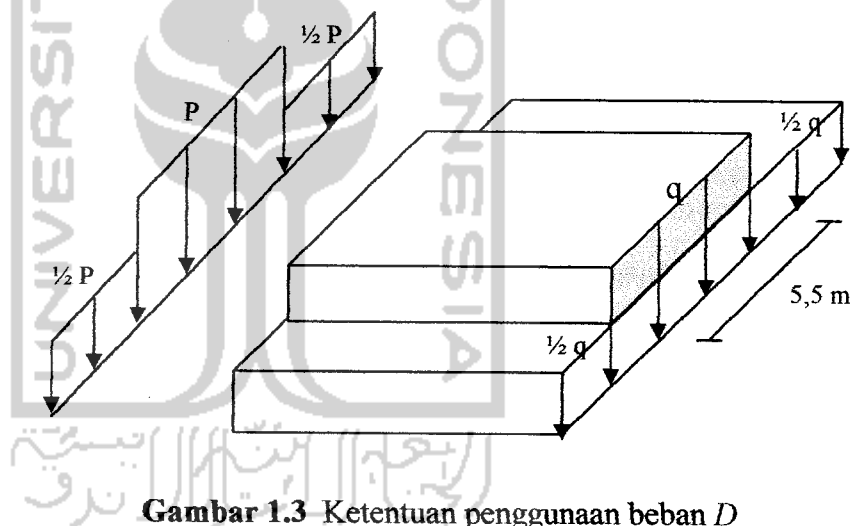
$$q = 2,2 \text{ t/m'} \quad \text{untuk } L < 30 \text{ m} \quad (1.1)$$

$$q = 2,2 - 1,1/60 \cdot (L - 30) \text{ t/m'} \quad \text{untuk } 30 \text{ m} < L < 60 \text{ m} \quad (1.2)$$

$$q = 1,1 (1 + 30/L) \text{ t/m'} \quad \text{untuk } L > 60 \text{ m} \quad (1.3)$$

Ketentuan penggunaan beban D dalam arah melintang jembatan adalah sebagai berikut :

- Untuk jembatan dengan lebar lantai kendaraan sama atau lebih kecil dari 5,5 meter, beban D sepenuhnya 100 % harus dibebankan pada seluruh lebar jembatan.
- Untuk jembatan dengan lebar lantai kendaraan lebih besar dari 5,5 meter, beban D sepenuhnya 100% dibebankan pada lebar jalur 5,5 meter sedang lebar selebihnya dibebani hanya separuh beban D 50 %, seperti terlihat pada gambar 1.3.



Gambar 1.3 Ketentuan penggunaan beban D

Untuk menentukan beban hidup (beban terbagi rata dan beban garis) perlu diperhatikan ketentuan bahwa:

$$\text{Beban terbagi rata} = \frac{q}{2,75} \frac{\text{ton/meter}}{\text{meter}} \quad (1.4)$$

$$\text{Beban garis} = \frac{P}{2,75} \frac{\text{ton}}{\text{meter}} \quad (1.5)$$

- **Beban Kejut**

Untuk memperhitungkan pengaruh-pengaruh getaran dan pengaruh-pengaruh dinamis lainnya, tegangan-tegangan akibat beban garis P harus dikalikan dengan koefisien kejut yang akan memberikan hasil maksimum, sedangkan beban merata q dan beban T tidak dikalikan dengan koefisien kejut.

Koefisien kejut ditentukan dengan rumus :

$$K = 1 + \frac{20}{50 + L} \quad (1.6)$$

K = Koefisien kejut, dan L = panjang bentang dalam meter.

B. Beban Sekunder

a. Beban Gempa

Pengaruh-pengaruh gempa bumi pada jembatan dihitung senilai dengan pengaruh suatu gaya horisontal pada konstruksi akibat beban mati konstruksi yang ditinjau.

Besarnya beban gempa dapat dinyatakan dalam :

$$V = C. I. K. W_t \quad (1.7)$$

dengan

V = gaya geser dasar horisontal total akibat gempa,

C = koefisien gempa dasar,

I = faktor keutamaan,

K = faktor jenis strukutr, dan

Wt = berat total bangunan.

b. Beban Angin

Pengaruh beban angin sebesar $0,15 \text{ ton/m}^2$ pada jembatan ditinjau berdasarakan bekerjanya beban angin horisontal terbagi rata pada bidang vertikal jembatan, dalam arah tegak lurus sumbu memanjang jembatan. Jumlah luas bidang vertikal bangunan atas jembatan yang dianggap terkena oleh angin ditetapkan sebesar suatu prosentase tertentu terhadap luas bagian-bagian sisi jembatan dan luas bidang vertikal beban hidup. Bidang vertikal beban hidup ditetapkan sebagai suatu permukaan bidang vertikal yang mempunyai tinggi menerus sebesar 2 meter di atas lantai kendaraan.

c. Gaya Rem

Pengaruh gaya-gaya dalam arah memanjang jembatan akibat gaya rem, harus ditinjau. Pengaruh ini diperhitungkan senilai dengan pengaruh gaya rem sebesar 5 % dari beban D tanpa koefisien kejut yang memenuhi semua jalur lalu lintas yang ada, dan dalam satu jurusan. Gaya rem tersebut dianggap bekerja horisontal dalam arah sumbu jembatan dengan titik tangkap setinggi 1,8 meter di atas permukaan lantai kendaraan.

d. Beban Tekanan tanah

Bagian bangunan jembatan yang menahan tanah harus direncanakan dapat menahan tekanan tanah sesuai rumus-rumus yang ada.

e. Beban Akibat Perbedaan Temperatur

Peninjauan diadakan terhadap timbulnya tegangan-tegangan struktural karena adanya perubahan bentuk akibat perbedaan suhu antara bagian-bagian jembatan baik yang menggunakan bahan yang sama maupun dengan bahan yang berbeda. Perbedaan suhu ditetapkan sesuai dengan data perkembangan suhu setempat. Pada umumnya pengaruh perbedaan suhu tersebut dapat dihitung dengan mengambil perbedaan suhu, untuk bangunan beton diambil perbedaan suhu maksimum-minimum sebesar 15°C .

f. Beban Susut dan Rangkak

Pengaruh rangkak dan susut bahan beton terhadap konstruksi, harus ditinjau. Besarnya pengaruh tersebut apabila tidak ada ketentuan lain, dapat dianggap senilai dengan gaya yang timbul akibat turunnya suhu sebesar 15°C .

g. Beban Aliran Air dan Hanyutan

Semua pilar dan bagian-bagian dari bangunan jembatan yang mengalami gaya-gaya aliran air, harus diperhitungkan dapat menahan tegangan-tegangan maksimum akibat gaya-gaya tersebut.

Gaya tekanan aliran air adalah hasil perkalian tekanan air dengan luas bidang pengaruh pada suatu pilar, yang dihitung dengan rumus:

$$Ah = k. Va^2 \quad (1.8)$$

dimana

Ah = tekanan aliran air (ton/m^2),

Va = kecepatan aliran air yang dihitung berdasarkan analisa hidrologi (m/det), bila bila tidak ditentukan lain maka :

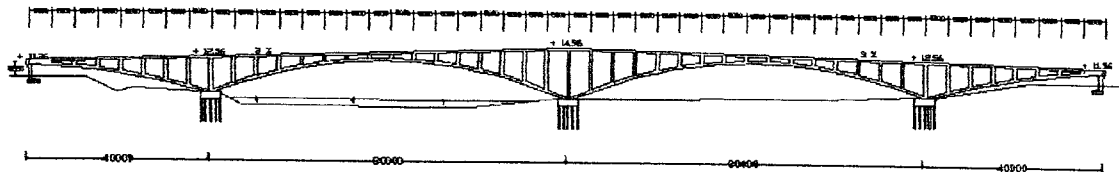
$Va = 3 \text{ m/det}$, dan

K = koefisien aliran yang tergantung bentuk pilar.

1.4 Peta Lokasi Jembatan Kretek II

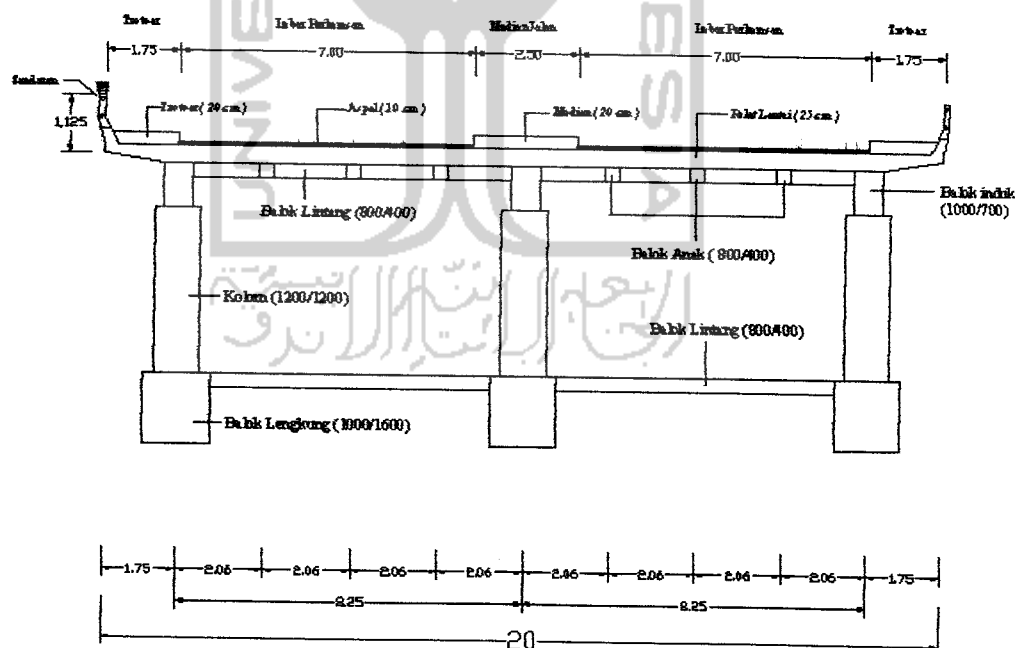
Jembatan Kretek II terletak di Kecamatan Kretek, Kabupaten Bantul, DIY, kurang lebih 20 kilometer sebelah selatan kota Yogyakarta (ke arah pantai Parangtritis). Untuk mencapainya dapat menggunakan kendaraan roda dua atau roda empat sampai ke areal penambangan pasir rakyat, di dataran banjir kali opak yang cukup lebar. Peta lokasi Jembatan kretek II dapat dilihat pada lampiran.

Jembatan Kretek II direncanakan mempunyai panjang bentang 240 m, seperti terlihat pada gambar 1.4.



Gambar 1.4 Potongan memanjang jembatan kretek II

Lebar jembatan Kretek II direncanakan 20 m, dengan lebar perkerasan 7 m dan lebar trotoar 1,75 m, seperti terlihat pada gambar 1.5.



Gambar 1.5 Potongan melintang jembatan kretek II

BAB II

TINJAUAN PUSTAKA

2.1 Umum

Jembatan adalah suatu fasilitas bangunan jalan yang berfungsi mendukung lalu lintas jalan raya atau beban-beban yang bergerak di atas suatu rintangan atau tempat rendah seperti danau, sungai, terusan, jalan raya, jalan kecil, atau kombinasi semuanya (Bindra 1970).

Secara umum komponen jembatan dibagi dalam 2 bagian besar, yaitu *superstructure* dan *substructure*. Bagian atas jembatan seperti sandaran, batu pengaman dan pendukung lantai dengan sistem struktur seperti balok girder/gelagar, lengkungan dan kabel di atas tingkatan pendukung yang terdapat pada *superstructure*. Sedangkan *substructure* adalah suatu sistem yang mendukung *superstructure*, terdiri dari bagian-bagian struktur pendukung jalan yang terdiri dari *abutment*, dinding sayap (*wing wall*), pilar/kolom, pondasi pilar dan pondasi *abutment* (Bindra, 1970).

Struktur jembatan beton bertulang adalah jembatan yang menggunakan beton bertulang pada strukturnya. Jembatan *arch* itu pada dasarnya terdiri dari pondasi utama, gelagar *arch*, pilar, lantai dan *abutment*. Gelagar *arch* dan kolom-kolom pilar merupakan bagian dari bangunan yang meneruskan gaya-gaya dari lantai jembatan ke pondasi yang berarti ke bawah tanah. Pada bentang yang panjang untuk struktur beton bertulang, jembatan gelagar lengkung (*arch bridge*) cukup ekonomis digunakan hingga panjang bentang mencapai 200 m (Bambang Supriyadi, 2000).

2.2 *Abutment* dan pilar

Abutment mempunyai dua fungsi pokok, yaitu mendukung ujung-ujung jembatan dan menyediakan dukungan lateral paling tidak bagi tanah atau batu sekitar jembatan. Oleh karena itu *abutment* merupakan kombinasi dari fungsi pilar dan dinding penahan tanah (Peek, Hanson, Toohrnburn, 1973).

Bentuk pilar jembatan meliputi ; masif (*solid*), kotak (*cellular*), bundar (*circular*), oval dan juga bisa terdiri dari beberapa kolom (*treotic*) atau terdiri dari satu kolom (*hammer head*). Berdasarkan data yang ada serta memperhatikan segi arsitektural, maka perencanaan Jembatan Kretek II menggunakan pilar yang terdiri dari beberapa kolom dengan variasi gelagar lengkung (*arch bridge*) dari beton bertulang.

2.3 Pondasi Tiang *Bore Pile*

Pondasi tiang *bore pile* adalah bagian dari struktur bangunan yang berfungsi untuk meneruskan beban yang bekerja di atasnya sehingga didukung oleh tanah. Kegagalan perencanaan pondasi akan mengakibatkan bangunan secara keseluruhan tidak stabil dan mudah runtuh, meskipun struktur atas kuat dan aman.

Oleh karena itu data yang diperlukan untuk menentukan jenis pondasi suatu bangunan antara lain :

1. susunan, tebal, dan sifat lapisan tanah,
2. besar, macam, dan sifat khusus bangunan,
3. peralatan yang tersedia,

4. beban yang harus didukung,
5. biaya dan tenaga kerja, dan
6. lingkungan sekitar bangunan.

Selain data di atas, ada persyaratan teknis lain yang harus diperhatikan dalam merencanakan pondasi antara lain :

1. tanah dasar harus mampu mendukung beban yang bekerja,
2. penurunan yang terjadi tidak begitu besar (dihindari penurunan lokal),
3. pondasi aman terhadap bahaya guling dan geser yang terjadi,
4. dapat menahan tekanan air yang mungkin terjadi, dan
5. dapat menyesuaikan terhadap kemungkinan terjadi gerakan-gerakan tanah, antara lain penyusutan tanah, tanah yang labil, atau pun gaya horizontal akibat beban gempa bumi (Suyono Sosrodarsono, 1990).

Berdasarkan data-data yang tersedia dan dengan berbagai pertimbangan teknis, kondisi di lapangan maupun biaya, maka Jembatan kretek II direncanakan menggunakan pondasi tiang bor (*bore pile*).

2.4 Dasar-Dasar Perencanaan

Dasar-dasar perencanaan dan analisa hitungan dalam pembangunan Jembatan Kretek II menggunakan peraturan-peraturan yang berlaku di Indonesia, antara lain :

1. Peraturan Umum Bahan Bangunan Indonesia, 1982.
2. Tata cara Perencanaan Ketahanan Gempa Untuk Bangunan, 2002

3. Tata cara Perencanaan Struktur Beton Untuk Bangunan, 2002
4. Peraturan Perencanaan Teknik Jembatan, 1992 (PPTJ-1992), (Departemen Pekerjaan Umum, Direktorat Jendral Bina Marga).
5. *Bridge Design Manual*, 1992 (BDM-1992), (*Directorate General of Highway, Ministry of Public Works, Republic of Indonesia*).
6. Peraturan Pembebanan Jembatan Jalan raya, 1987. (PPJIR-1987).

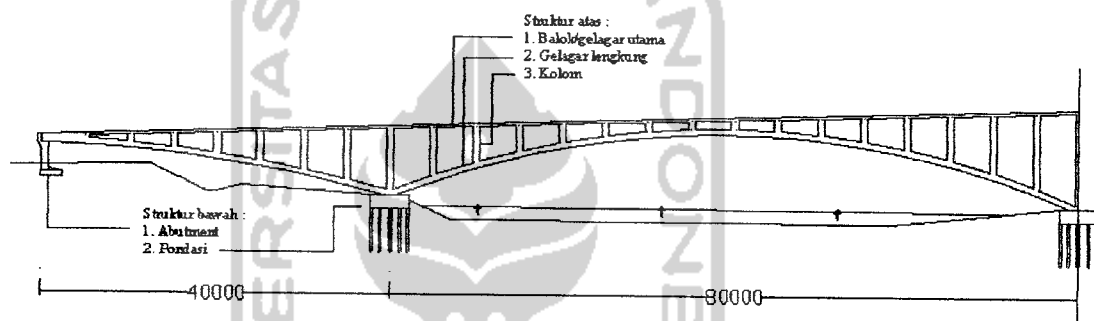


BAB III

LANDASAN TEORI

3.1 Umum

Pada bab ini menjelaskan teori yang mendukung penulisan tugas akhir perencanaan Jembatan Kretak II, meliputi beberapa tentang perencanaan struktur jembatan dengan beton bertulang. Perencanaan struktur jembatan Kretak II meliputi struktur atas dan struktur bawah jembatan seperti terlihat pada gambar 3.1.



Gambar 3.1. Struktur jembatan

3.2 Pembebanan Struktur

3.2.1 Kombinasi Pembebanan

Suatu struktur dapat dijamin keamanannya dengan cara memberikan kapasitas kekuatan atau kuat rencana (*design strength*) dapat diperoleh dengan mengalikan kekuatan nominal dengan nilai reduksi kekuatan ϕ yang lebih kecil dari satu. Kekuatan nominal diperoleh dengan meninjau kekuatan teoritis bahan sepenuhnya. Kekuatan suatu komponen suatu struktur yang diperlukan untuk menahan beban terfaktor dengan berbagai kombinasi efek beban disebut kuat

perlu. Dengan kata lain struktur dapat dijamin kemanannya bila kuat rencana lebih besar daripada kuat perlu (Wahyudi dan Rahim, 1997).

Faktor keamanan yang disyaratkan dapat dibagi dalam dua bagian, yaitu faktor beban dan faktor reduksi kekuatan. Faktor beban yang disyaratkan dalam PPTJ tahun 1992 adalah:

$$U = 1,3D + 2L \quad (3.1)$$

$$U = (1,3D + 2L_R + E) \quad (3.2)$$

Dengan :

U = Kuat perlu untuk menahan beban yang telah dengan faktor beban atau momen dan gaya dalam yang berhubungan dengannya.

D = Beban mati.

L = Beban hidup.

E = Beban gempa..

3.2.2 Kuat Rencana

Dalam menentukan kuat rencana suatu komponen struktur, maka kuat minimalnya harus direduksi dengan faktor reduksi kekuatan yang sesuai dengan sifat beban. Faktor reduksi kekuatan yang disyaratkan adalah:

1. $\phi = 0,80$ untuk lentur tanpa beban aksial.

2. $\phi = 0,70$ untuk aksial tekan dan aksial tekan lentur dengan tulangan spiral maupun sengkang ikat.
3. $\phi = 0,65$ untuk aksial tekan dan aksial tekan lentur dengan tulangan sengkang biasa.
4. $\phi = 0,60$ untuk geser dan torsi.
5. $\phi = 0,70$ untuk tumpuan pada beton.

3.3 Struktur Beton Bertulang dan Beban Gempa

Beban gempa merupakan beban yang harus diperhitungkan dalam perencanaan suatu struktur. Hal ini didasarkan pada karakteristik beban gempa yang sulit untuk dipastikan kapan terjadinya ataupun besarnya, sedangkan akibat yang ditimbulkannya bila struktur tidak mampu menahannya sangat fatal karena dapat mengakibatkan kegagalan struktur.

3.3.1 Faktor-Faktor Penentu Beban Gempa Rencana

a. Waktu getar alami struktur (T)

Waktu getar alami :

$$T = 2. \pi. \sqrt{\frac{Wt}{g.Kp}} \quad (3.3)$$

Dengan :

Kp = Kekakuan gabungan yang merupakan gaya horizontal yang diperlukan untuk menimbulkan satu-satuan lendutan horisontal jembatan.

Wt = Berat total jembatan.

g = Percepatan gravitasi bumi.

Diperkirakan waktu getar alami struktur jembatan rangka beton lengkung, $T = 0,1 - 1$ detik

b. Koefisien gempa dasar (C)

Koefisien gempa dasar berfungsi untuk menjamin agar suatu struktur mampu memikul beban gempa yang dapat menyebabkan kerusakan besar pada struktur. Koefisien C bergantung pada frekuensi terjadinya gerakan tanah yang bersifat sangat merusak, yang berbeda-beda pada daerah setiap wilayah gempa, waktu getar alami struktur, dan kondisi tanah setempat. Besarnya koefisien gempa dasar (C) merupakan plot antara C terhadap T (waktu getar gedung).

c. Faktor keutamaan (I)

Faktor keutamaan digunakan untuk memperbesar beban gempa rencana agar struktur tersebut tetap berfungsi setelah terjadi gempa besar. Nilai faktor keutamaan didasarkan pada tingkat kepentingan fungsi suatu struktur terhadap bahaya gempa.

d. Faktor jenis struktur (K)

Faktor jenis struktur dimaksudkan agar struktur mempunyai kekuatan lateral yang cukup untuk menjamin bahwa daktilitas yang dituntut tidak lebih

besar dari daktilitas yang tersedia, pada saat terjadi gempa kuat. Faktor ini tergantung pada jenis struktur dan bahan konstruksi yang digunakan.

3.3.2 Analisis Beban Statik Ekvivalen

Setiap struktur harus direncanakan untuk menahan suatu beban geser dasar akibat gempa (T_{EQ}). Besarnya T_{EQ} ditentukan menurut persamaan:

$$T_{EQ} = K_h . I . W_t \quad (3.4)$$

Dimana :

$$K_h = C . S \quad (3.5)$$

Dengan :

T_{EQ} = Gaya gempa/gaya geser total.

C = Koefisien gempa dasar yang berlaku untuk wilayah gempa tertentu dan untuk jenis tanah tertentu pula.

I = Faktor keutamaan.

S = Faktor jenis struktur

W_t = Berat total struktur kombinasi beban mati ditambah beban hidup yang direduksi.

3.4. Perencanaan Struktur Atas Jembatan

Perencanaan struktur atas jembatan Kretek II meliputi perencanaan balok/gelagar dan perencanaan kolom.

3.4.1 Perencanaan Plat

Plat merupakan struktur bidang datar (tidak melengkung) yang jika ditinjau secara 3 dimensi mempunyai tebal yang jauh lebih kecil daripada ukuran bidang plat. Untuk merencanakan plat beton bertulang perlu dipertimbangkan tidak hanya pembebanan, tetapi juga ukuran dan syarat-syarat tumpuan pada tepi yang menentukan jenis perletakan dan jenis penghubung ditempat tumpuan.

a. Perencanaan plat satu arah

Sistem plat satu arah adalah plat yang panjang dari permukaannya dua kali atau lebih besar daripada lebarnya, sehingga hampir semua beban lantai menuju balok-balok dan hanya sebagian kecil yang akan menyalur secara langsung ke gelagar (balok induk). Pada plat satu arah tulangan utama sejajar dengan gelagar atau sisi pendek plat, dan tulangan susut sejajar dengan balok-balok atau sisi panjang plat. Permukaan yang melendut dari sistem plat satu arah mempunyai kelengkungan tunggal (Wang, 1985).

Perencanaan plat satu arah dapat direncanakan dengan ketentuan yang sudah ada dalam peraturan maupun dengan metode lain yang lebih akurat tetapi dapat dipertanggungjawabkan. Yang dimaksud plat satu arah adalah plat yang menahan lentur untuk satu arah dan harus memenuhi ketentuan sebagai berikut:

1. Minimum harus ada dua bentang.
2. Panjang bentang lebih kurang sama, dengan ketentuan bahwa bentang yang lebih besar dari dua bentang yang bersebelahan perbedaannya tidak lebih 20 % dari bentang yang pendek.

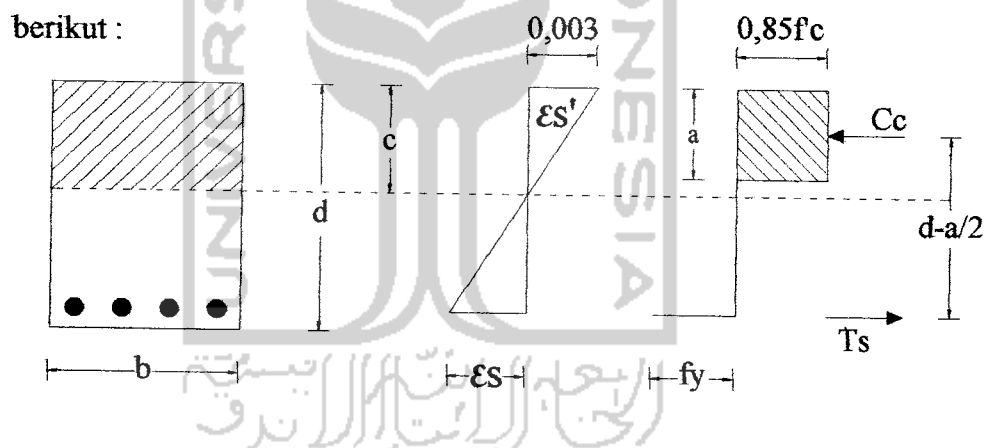
3. Beban yang bekerja merupakan beban terbagi rata.
4. Beban hidup per unit tidak melebihi tiga kali beban per unit.
5. Komponen strukturnya prismatis.
6. Plat yang terkekang dalam satu sumbu atau satu sisinya.

Tebal plat lantai tergantung dari persyaratan lendutan, lentur dan geser.

Persyaratan lendutan untuk mencegah deformasi berlebihan yang menurunkan kelayakan dari struktur.

b. Perhitungan perencanaan plat

Perhitungan perencanaan plat dihitung dengan persamaan sebagai berikut :



Gambar 3.2 Distribusi Tegangan Regangan Beton Bertulang Plat

Dengan:

- b = lebar pelat,
- c = jarak serat tekan terluar ke garis netral,
- d = jarak dari sisi tekan terluar ke pusat tulangan tarik,
- d' = jarak dari sisi tarik terluar beton ke pusat tulangan tarik,

- A_s = luas tulangan tarik,
 ϵ_s = regangan tarik beton,
 ϵ_c = regangan desak beton,
 C_c = gaya tekan yang diberikan beton tekan,
 T = gaya tarik baja tulangan,
 f_c' = mutu beton,

$$\frac{Mu}{\phi} = 0,85 \cdot f'_c \cdot a \cdot b \cdot \left(d - \frac{a}{2} \right) \quad (3.5)$$

$$A_s = \frac{0,85 \cdot f'_c \cdot a \cdot b}{f_y} \quad (3.6)$$

$$A_{s \min} = \frac{1,4}{f_y} \cdot b \cdot d \quad (3.7)$$

Apabila $A_s < A_{s \min}$, maka :

$1,33 A_s < A_{s \min}$ dipakai $A_{s \min}$, jika

$1,33 A_s > A_{s \min}$ dipakai $1,33 A_{s \min}$.

Perhitungan jarak antar tulangan pokok dengan persamaan sebagai berikut :

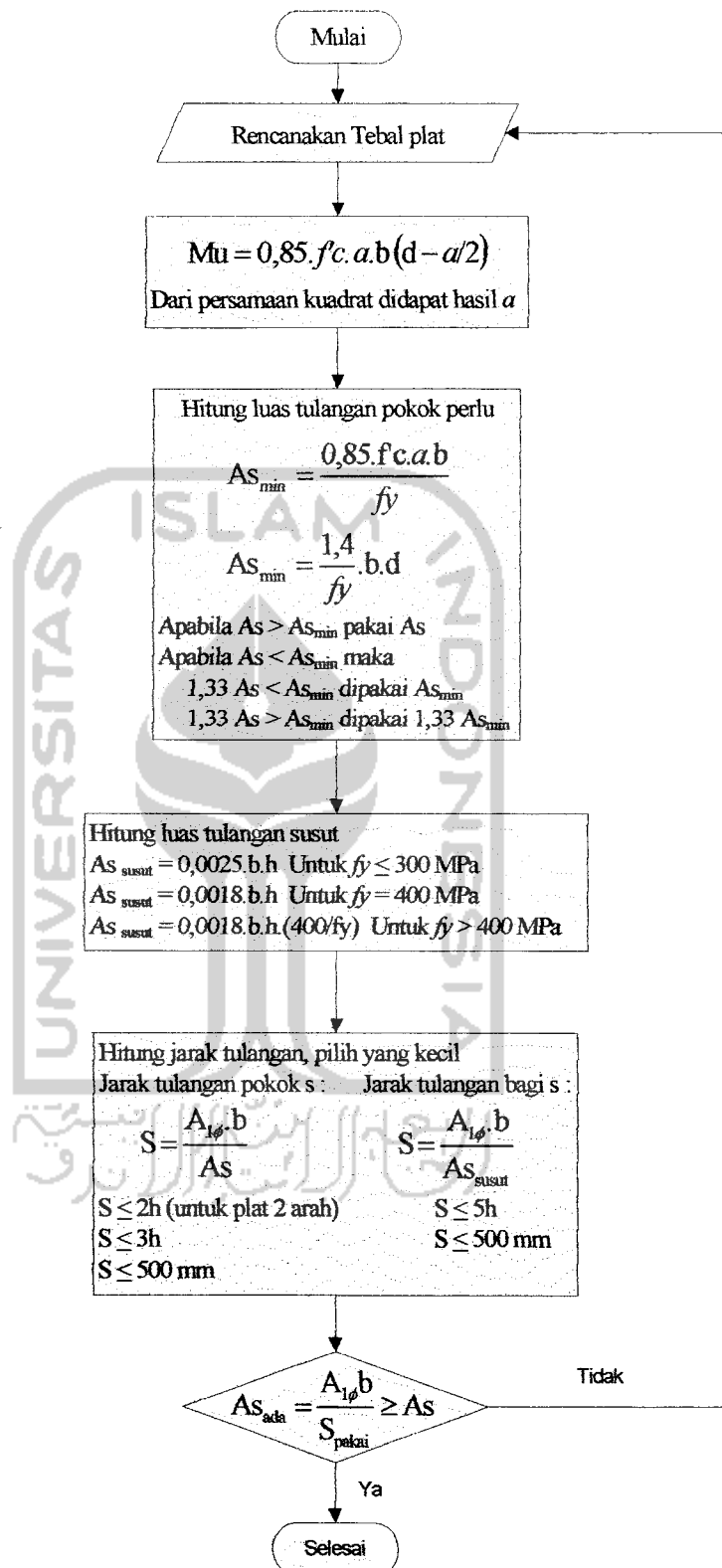
$$S = \frac{A_{1\phi} \cdot b}{A_s} \quad (3.8)$$

Dan jarak antar tulangan susut dengan persamaan sebagai berikut :

$$S = \frac{A_{1\phi} \cdot b}{A_{s \cdot \text{susut}}} \quad (3.9)$$

dengan

$$A_{s \text{ susut}} = 0,002 \cdot b \cdot h \quad (3.10)$$



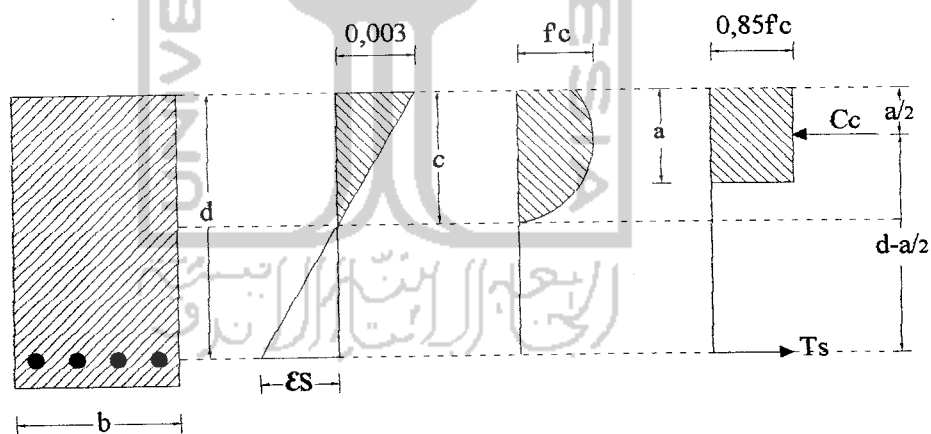
Gambar 3.3 Flow Chart Perhitungan Plat

3.4.2 Desain Balok

a. Balok bertulangan sebelah (tarik)

Beban luar akan menyebabkan balok melentur. Tegangan internal suatu serat penampang akan tetap sebesar tegangan karakteristiknya, dan retak pada serat atas tidak terjadi karena adanya distribusi tegangan ke serat sebelah dalamnya. Distribusi tegangan dan regangan beton bias diasumsikan berbentuk persegi, trapesium, parabola, atau bentuk lainnya, asal menghasilkan perkiraan yang cukup baik bila dibandingkan dengan hasil pengujian.

Secara teoritis balok bertulangan sebelah ini digunakan bila hanya dengan tulangan tarik saja mampu menghasilkan gaya dalam yang dapat menahan momen yang terjadi.



Gambar 3.4 Distribusi Tegangan Regangan Balok Bertulangan Sebelah

Dengan: b = lebar balok,

d = jarak dari sisi tekan terluar ke pusat tulangan tarik,

c = jarak serat tekan terluar ke garis netral,

d' = jarak dari sisi tarik terluar beton ke pusat tulangan tarik,

A_s = luas tulangan tarik,

ϵ_s = regangan tarik beton,

ϵ_c = regangan desak beton,

C_c = gaya tekan yang diberikan beton tekan,

T = gaya tarik baja tulangan,

f_c' = mutu beton,

$$\rho_b = \frac{0,85 \cdot f_c' \cdot \beta}{f_y} \cdot \frac{\epsilon_c \cdot E_s}{\epsilon_c \cdot E_s + f_y} \quad (3.11)$$

$$m = \frac{f_y}{0,85 \cdot f_c'} \quad (3.12)$$

$$\rho_{\text{mak}} = 0,75 \cdot \rho_b \quad (3.13)$$

$$\rho_{\text{min}} = \frac{1,4}{f_y} \quad (3.14)$$

$$R_n = \rho \cdot f_y \cdot \left(1 - \frac{1}{2} \rho \cdot m\right) \quad (3.15)$$

$$M_n = R_n \cdot b \cdot d^2 \quad (3.16)$$

Berdasarkan keseimbangan gaya $C_c = T_s$

$$C_c = 0,85 \cdot f_c' \cdot b \cdot a \quad (3.17)$$

$$T_s = A_s \cdot F_y \quad (3.18)$$

$$a = \frac{T_s}{C_c} = \frac{A_s F_y}{0,85 \cdot f_c'} \quad (3.19)$$

$$M_n = A_s f_y \left(d - \frac{1}{2} \cdot a\right) = 0,85 \cdot f_c' \cdot a \cdot b \cdot \left(d - \frac{1}{2} \cdot a\right) \quad (3.20)$$

b. Balok bertulangan rangkap

Dalam praktek, sistem tulangan tunggal hampir tidak pernah dimanfaatkan untuk balok, karena pemasangan tulangan tambahan didaerah tekan misalnya ditepi atas penampang tengah lapangan akan mempermudah pengaitan sengkang. Secara struktural, tulangan tekan ini diperlukan antara lain:

1. Meningkatkan momen tahanan penampang karena dimensi penampang yang terbatas secara arsitektural.
2. Meningkatkan kapasitas rotasi penampang yang berkaitan dengan peningkatan daktilitas penampang.
3. Meningkatkan kekakuan penampang, sehingga mengurangi defleksi struktur.
4. Dapat mencakup kemungkinan momen yang berubah tanda. Gaya luar yang bekerja pada struktur tidaklah selalu tetap, misalnya gaya horizontal akibat gempa yang mengakibatkan momen-momen internal berubah tanda (Wahyudi dan Rahim, 1997).

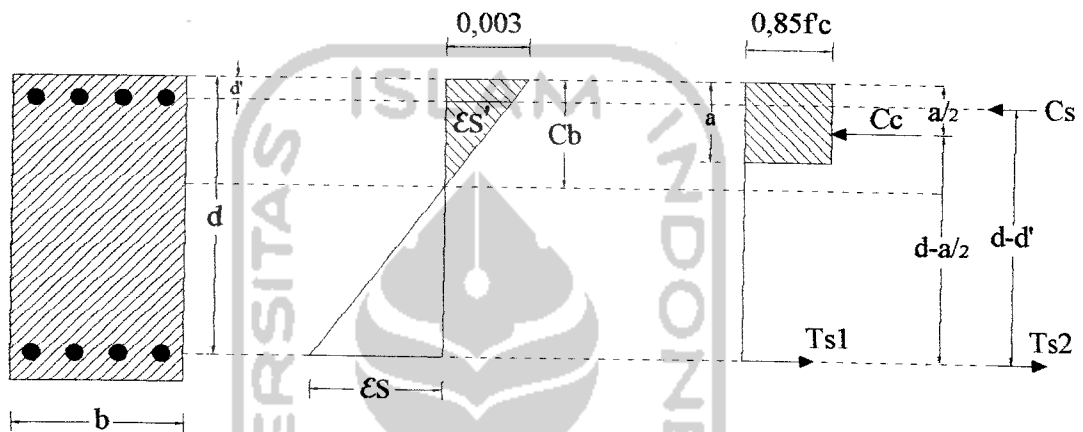
Dalam perencanaan balok tulangan sebelah digunakan

$$Rn1 = (0,3 \text{ s/d } 0,8).Rn \quad (3.21)$$

$$Mn1 = Rn1.b.d^2 \quad (3.22)$$

$$Mn2 = \frac{Mu}{\phi} - Mn1 \quad (3.23)$$

$$Mn = Mn1 + Mn2 \quad (3.24)$$



Gambar 3.5 Distribusi Tegangan Regangan Balok Bertulangan Rangkap

- Dengan: b = lebar balok,
 d = jarak dari sisi tekan terluar ke pusat tulangan tarik,
 cb = jarak serat tekan terluar ke garis netral,
 d' = jarak dari sisi tarik terluar beton ke pusat tulangan tarik,
 As = luas tulangan tarik,
 ϵ_s = regangan tarik beton,
 ϵ_c = regangan desak beton,
 Cc = gaya tekan yang ditahan,

C_s = gaya tekan yang ditahan oleh tulangan baja tekan, dan

T = gaya tarik baja tulangan,

f_c' = mutu beton,

c. Balok bertulangan rangkap dengan tulangan tekan telah luluh

Pada kondisi ini diasumsikan tulangan tarik dan desak telah luluh paling tidak pada saat regangan beton mencapai 0,003, dengan menganggap $f_s = f_s' = f_y$. Untuk kondisi ini $A_s = A_{s1} + A_{s2}$, sedangkan $A_{s2} = A_s'$, sehingga tinggi balok tegangan tekan:

$$a = \frac{(A_s - A_s') \cdot f_y}{0,85 \cdot f_c' \cdot b} \quad (3.25)$$

atau,

$$a = \frac{A_{s1} \cdot f_y}{0,85 \cdot f_c' \cdot b} \quad (3.26)$$

Sebagai kontrol asumsi yang dipakai benar, maka dilakukan pemeriksaan regangan sebagai berikut:

$$a_{leleh} = \frac{E_s \cdot \epsilon_c \cdot d' \cdot \beta_1}{E_s \cdot \epsilon_c - f_y} \quad (3.27)$$

bila a lebih besar sama dengan dari a_{leleh} maka asumsi benar bahwa tulangan tarik dan tulangan desak telah luluh, selanjutnya menghitung momen tahanan nominalnya dengan persamaan:

$$M_n = M_{n1} + M_{n2} \quad (3.28)$$

$$M_{n1} = 0,85.f_c'.a.b.(d - \frac{1}{2}.a) \quad (3.29)$$

atau,

$$M_{n1} = A_s1.f_y.(d - \frac{1}{2}.a) \quad (3.30)$$

$$M_{n2} = A_s.f_y.(d - d') \quad (3.31)$$

d. Balok bertulangan dengan tulangan tekan belum luluh

Kondisi ini merupakan kondisi dimana anggapan tulangan baja tarik telah luluh sedangkan tulangan baja desak belum luluh pada saat regangan beton mencapai 0,003. Jika a kurang dari a_{leleh} ($a < a_{leleh}$), untuk mendapatkan nilai C digunakan persamaan:

$$A_s.f_y = A_s'.\left(\frac{a - \beta_1 d'}{a}\right)\epsilon_{cu}.E_s + 0,85.f_c'.a.b \quad (3.32)$$

Dari persamaan kuadrat diatas, maka didapat nilai a dengan

$$C = \frac{a}{0,85} \quad (3.33)$$

$$f_s' = \left(\frac{a - \beta_1 d'}{a}\right) E_s. \epsilon_c = \frac{C - d'}{C} E_s. \epsilon_c \quad (3.34)$$

Kuat momen tahanan ideal dari pasangan kopel tulangan baja tekan dengan baja tarik tambahan serta kopel gaya beton tekan dengan tulangan baja tarik dihitung dengan persamaan:

$$Mn1 = 0,85.f'c'.a.b.(d-\frac{1}{2}.a) \quad (3.35)$$

$$Mn2 = As.fs'.(d-d') \quad (3.36)$$

$$Mn = Mn1 + Mn2 \quad (3.37)$$

Untuk beton bertulangan tahan gempa, kuat momen positif pada sisi muka join tidak boleh kurang dari 50% kuat momen negatif yang disediakan pada sisi muka join tersebut.

e. Momen kapasitas balok

▪ Momen kapasitas negatif

Dianggap tulangan desak sudah leleh. Pada umumnya saat tulangan tarik mencapai kekuatan maksimum (*oferstrength*) regangan baja desak masih didaerah *yield plateau*. Oleh karena itu tegangan baja desak belum mencapai kekuatan maksimum.

$$\phi_o = 1,2 \text{ untuk } f_y < 400 \text{ MPa, dan}$$

$$\phi_o = 1,4 \text{ untuk } f_y \geq 400 \text{ MPa}$$

$$Ts = Tc + Cc \quad (3.38)$$

$$a = \frac{(As_{ada}.\phi_o - As'_{ada})f_y}{0,85.f'c.b} \quad (3.39)$$

Kriteria leleh :

$$a_{leleh} = \frac{Es.ec.\beta1.d'}{Es.ec - f_y} \quad (3.40)$$

Jika $a \geq a_{leleh}$, Tulangan baja desak leleh tetapi belum mencapai kekuatan maksimum.

$$M_{kap}^- = 0,85 \cdot f'c \cdot a \cdot b \cdot (d - \frac{1}{2} a) + A_{s_{ada}} f_y \cdot \phi_o \cdot (d - d') \quad (3.41)$$

Jika $a < a_{leleh}$, Tulangan baja desak leleh tetapi belum mencapai kekuatan maksimum.

$$A_{s_{ada}} f_y \cdot \phi_o = A_{s'_{ada}} \left(\frac{a - \beta_1 d'}{a} \right) \cdot E_s \cdot \epsilon_c + 0,85 \cdot f'c \cdot a \cdot b \quad (3.42)$$

Dari persamaan (3.55) didapatkan persamaan kuadrat, nilai a dapat dihitung dan f_s' dihitung dengan persamaan (3.48)

$$M_{kap}^- = 0,85 \cdot f'c \cdot a \cdot b \cdot (d - \frac{1}{2} a) + A_{s_{ada}} f_s' \cdot \phi_o \cdot (d - d') \quad (3.43)$$

▪ Momen kapasitas positif

Anggap tulangan desak tidak akan luluh

$$A_{s_{ada}} = A_{s'_{ada}}$$

$$A_{s'_{ada}} f_y \cdot \phi_o = A_{s'_{ada}} \left(\frac{a - \beta_1 d'}{a} \right) \cdot E_s \cdot \epsilon_c + 0,85 \cdot f'c \cdot a \cdot b \quad (3.44)$$

Didapat persamaan kuadrat dalam a

$$M_{kap}^+ = 0,85 \cdot f'c \cdot a \cdot b \cdot (d - \frac{1}{2} a) + A_{s_{ada}} f_s' \cdot \phi_o \cdot (d - d') \quad (3.45)$$

f. Penulangan Geser Balok Terlentur

Selain menahan beban lentur, balok pada saat yang sama juga menahan beban geser akibat lentur. Untuk komponen struktur beton bertulang, apabila

gaya geser yang bekerja sedemikian besar diluar kemampuan beton untuk menahannya maka perlu dipasang tulangan tambahan untuk menahan geser tersebut.

Dalam perencanaan struktur tahan gempa, mensyaratkan bahwa untuk daerah yang berpotensi terjadi sendi plastis, gaya geser yang disumbangkan beton dianggap sama dengan nol. Sedangkan besar gaya geser rencana yang harus ditahan struktur tahan gempa adalah:

$$V_u = V_e + V_g \quad (3.46)$$

$$V_u = \frac{(M_{pr}^-) + (M_{pr}^+)}{L_{netto}} + 1,5 (V_D + V_L) \quad (3.47)$$

dengan:

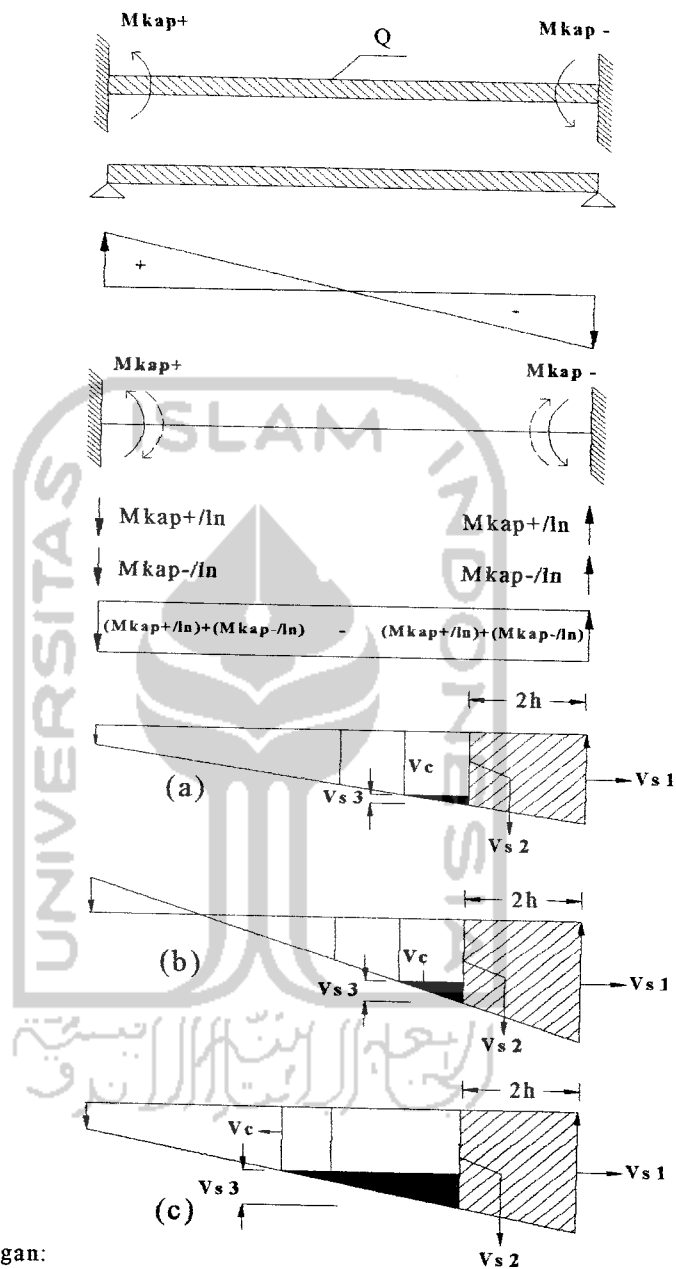
M_{kap} = Momen kapasitas pada ujung komponen dengan memperhitungkan kombinasi momen positif dan negatif.

M_{kap}' = Momen kapasitas pada bidang muka kolom disebelahnya.

L_n = Bentang bersih balok.

V_D = Gaya geser balok akibat beban mati.

V_L = Gaya geser balok akibat beban hidup.



Keterangan:

a,b = jika V_c didalam $\frac{1}{2}$ bentang

c = jika V_c diluar $\frac{1}{2}$ bentang

Gambar 3.6 Balok Portal Dengan Sendi Plastis Pada Kedua Ujungnya

Dasar pemikiran perencanaan penulangan geser adalah usaha menyediakan sejumlah tulangan baja untuk menahan tarik arah tegak lurus terhadap retak tarik diagonal sehingga mampu mencegah bukaan retak yang lebih besar. Perencanaan geser untuk komponen-komponen struktur lentur dilaksanakan berdasarkan anggapan bahwa beton menahan sebagian gaya geser, sedangkan selebihnya dilimpahkan ke tulangan baja. Kuat geser yang disumbangkan beton ditentukan dengan persamaan:

$$V_c = \frac{1}{6} \cdot \sqrt{f_c'} \cdot b_w \cdot d \quad (3.48)$$

Untuk daerah 2h dari muka kolom (sendi plastis) digunakan persamaan :

$$V_{s1} = \frac{V_u}{\phi} \quad (3.49)$$

sedangkan untuk daerah diluar 2h (luar sendi plastis) digunakan persamaan :

$$V_{s2} = \frac{V_{u2}}{\phi} - V_c \quad (3.50)$$

Jarak antar tulangan sengkang dapat dicari dengan persamaan :

$$S = \frac{n \cdot A_{s1} \cdot f_y \cdot d}{V_s} \quad (3.51)$$

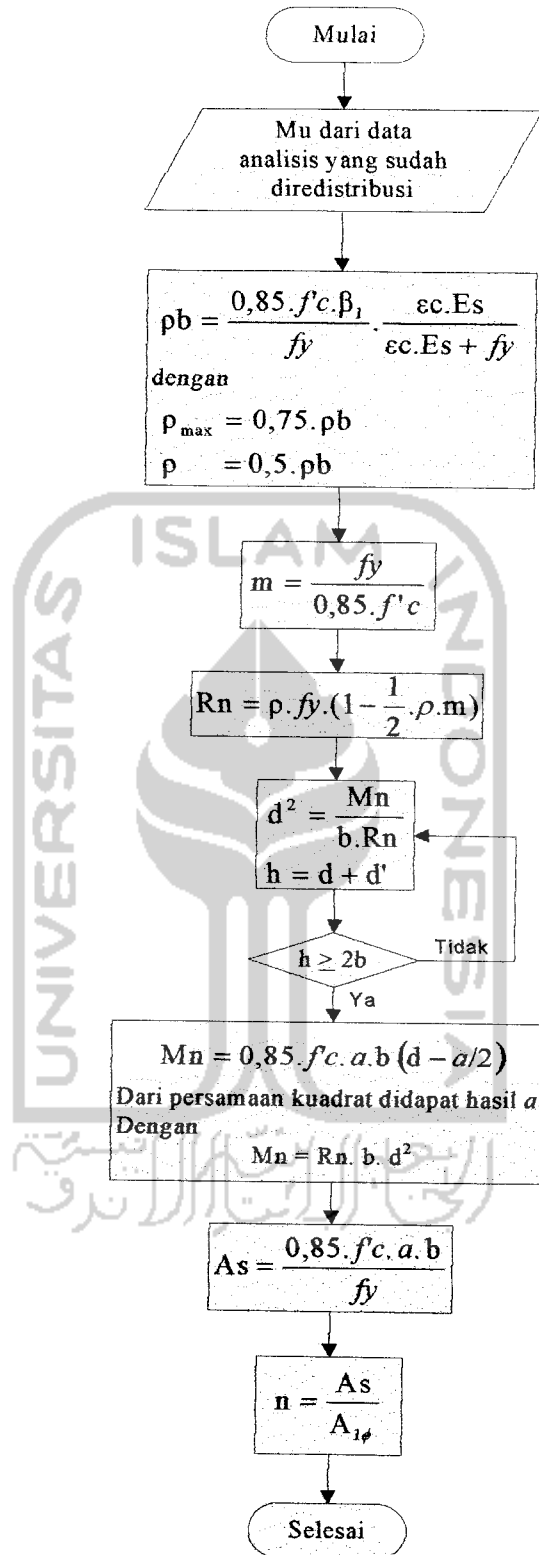
dimana n = jumlah kaki sengkang (minimal 2)

Untuk komponen struktur tahan gempa sengkang tertutup harus dipasang dalam daerah sejauh dua kali tinggi komponen struktur pendukung kearah tengah bentang. Sengkang pertama harus dipasang tidak lebih dari 50 mm

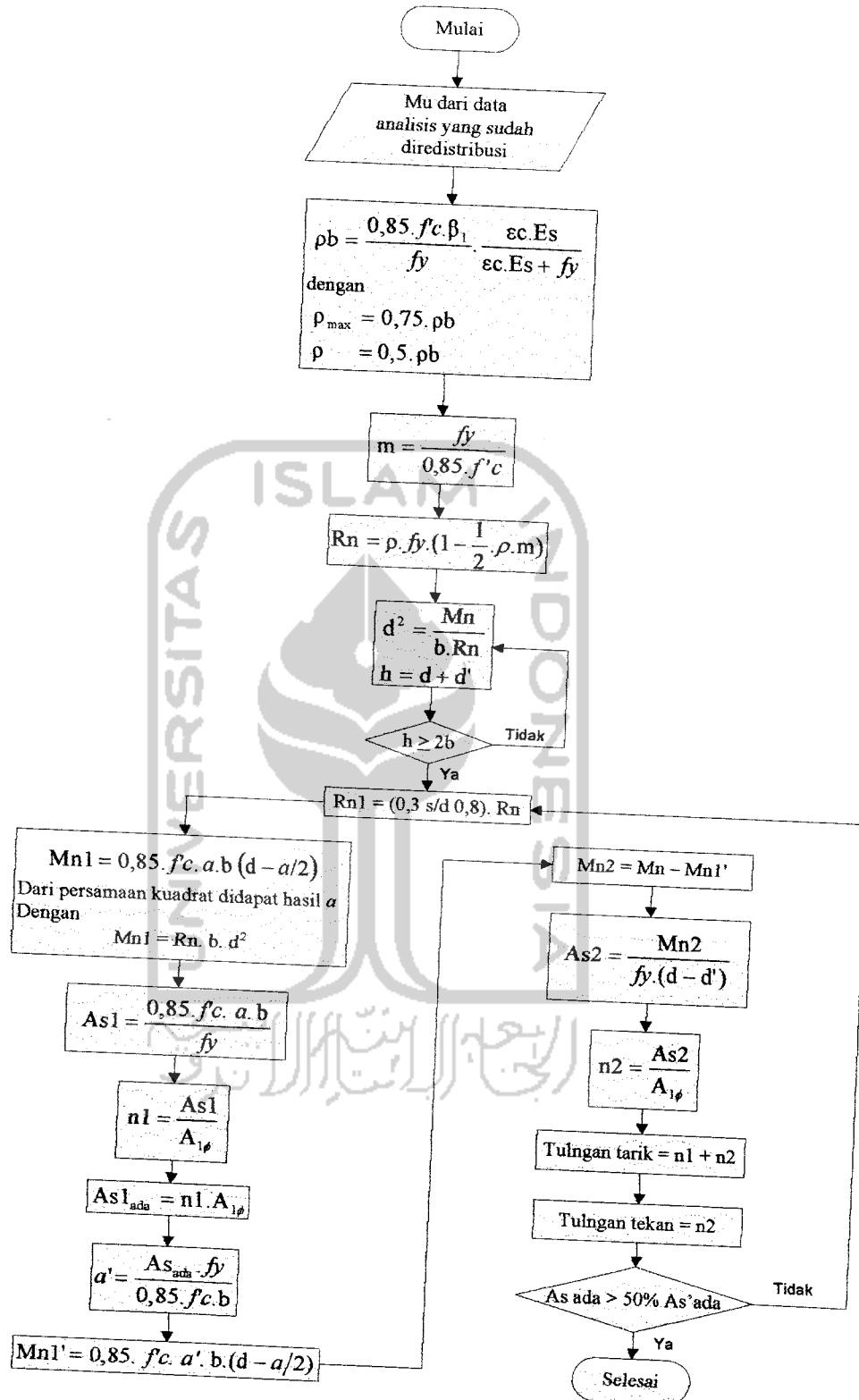
diukur dari sisi muka suatu komponen struktur pendukung. Spasi maksimum tulangan sengkang tidak boleh melebihi:

1. $\frac{1}{4}$ tinggi efektif balok.
2. Delapan kali diameter tulangan longitudinal terkecil.
3. 24 kali diameter tulangan sengkang.
4. 200 mm.

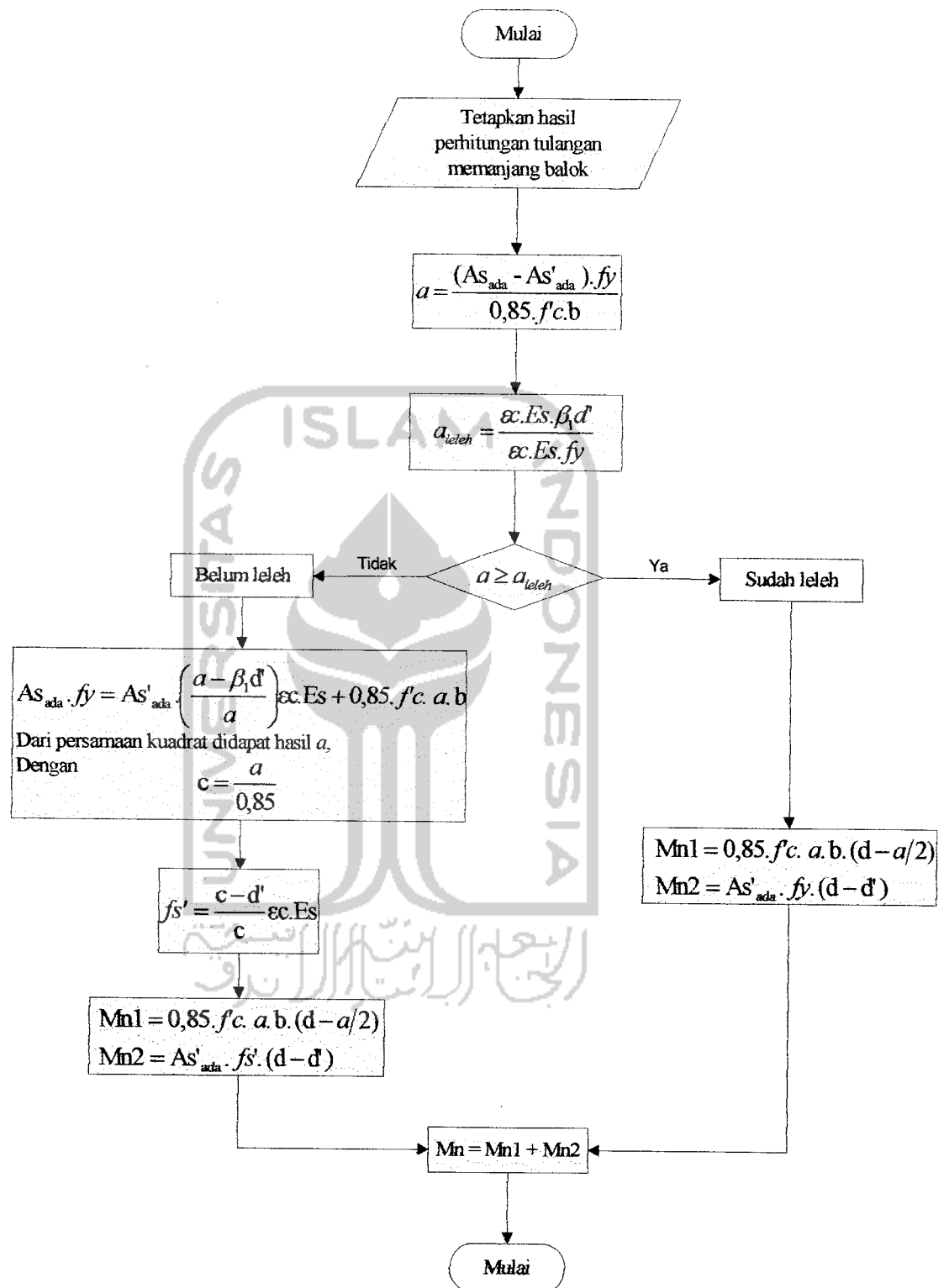




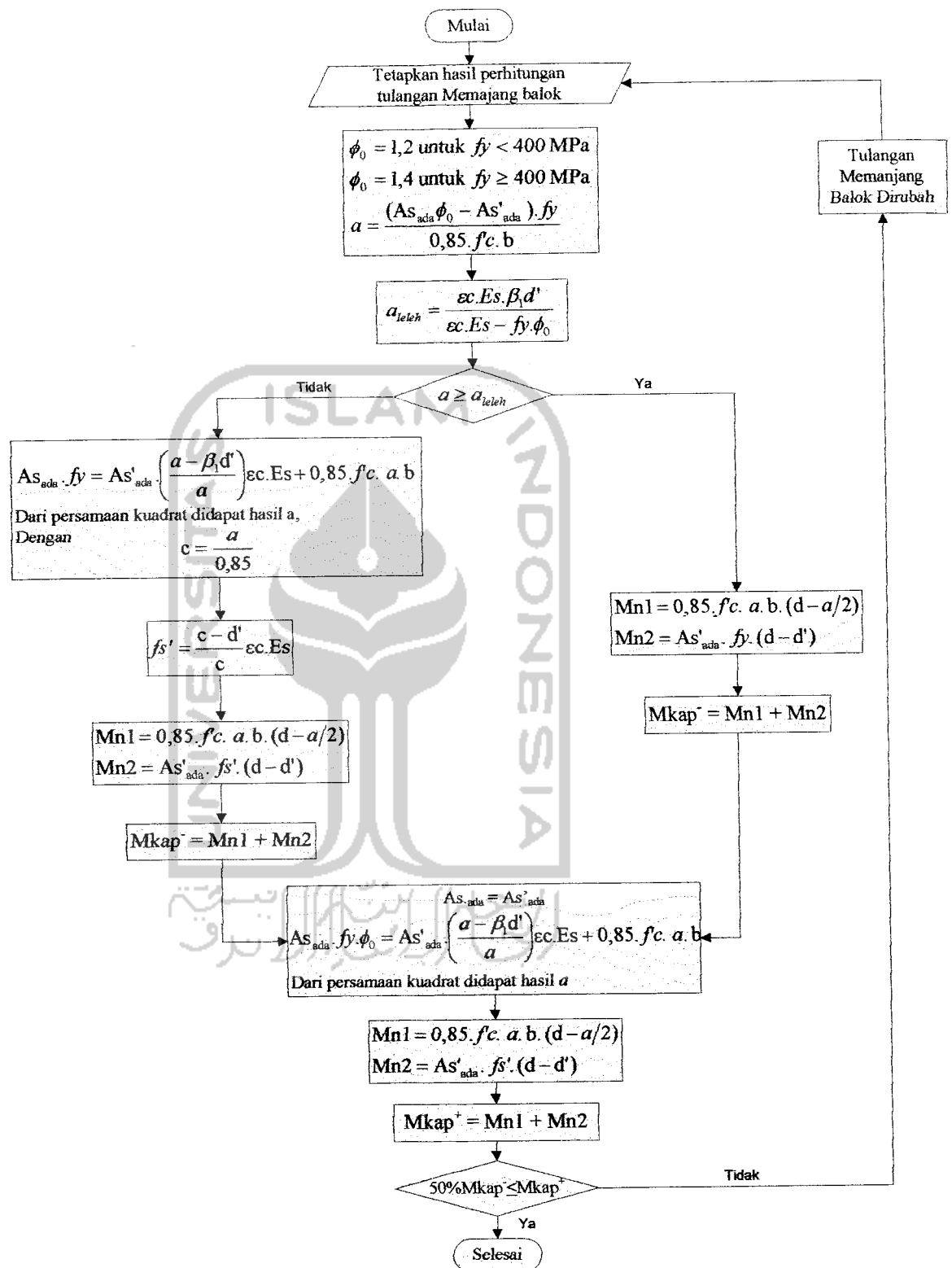
Gambar 3.7 Flow Chart Perhitungan Balok Bertulangan Sebelah



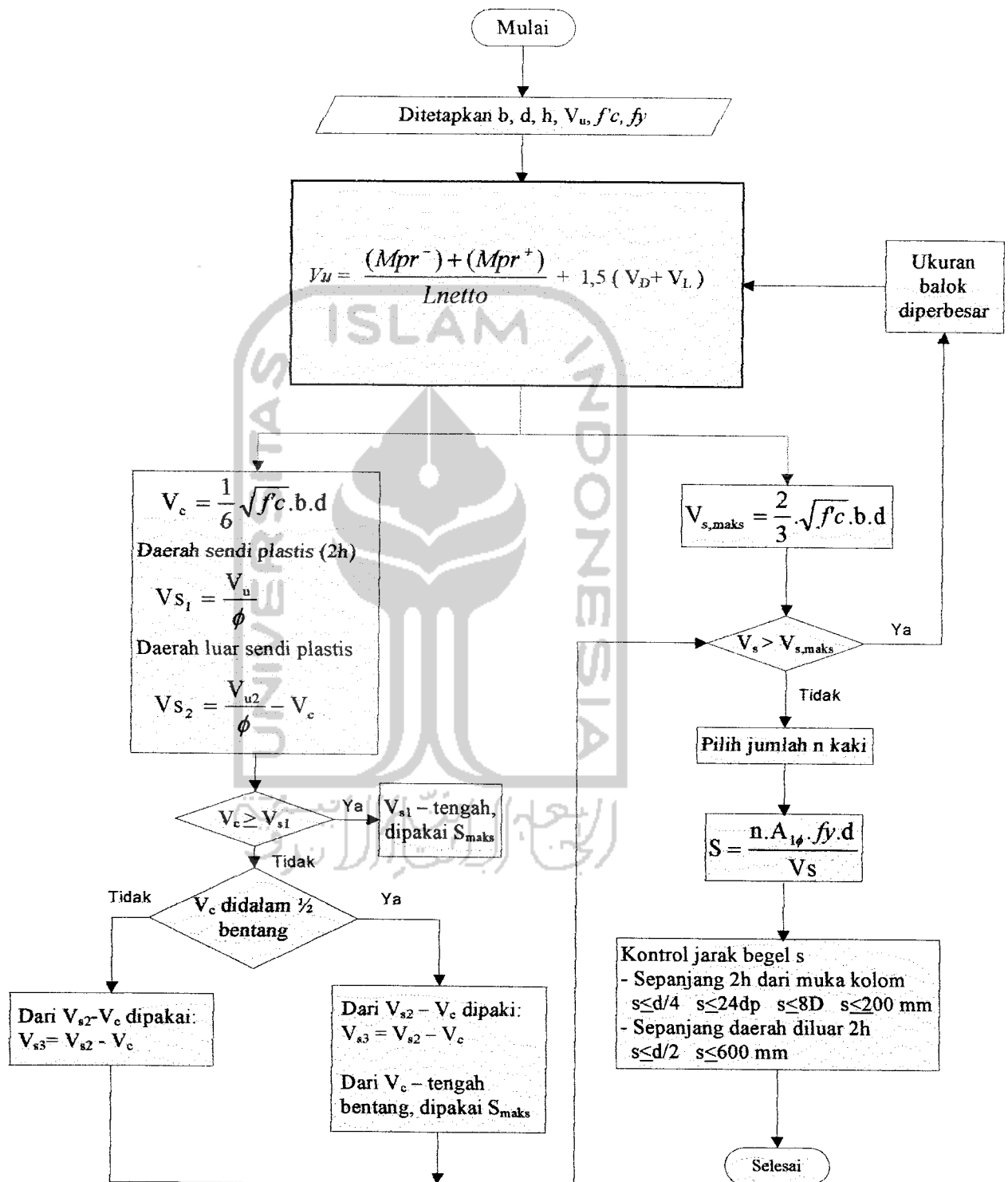
Gambar 3.8 Flow Chart Perhitungan Balok Bertulangan Rangkap



Gambar 3.9 Flow Chart Momen Tersedia Pada Balok



Gambar 3.10 Flow Chart Momen Kapasitas Balok



Gambar 3.11 Flow Chart Penulangan Geser Balok

3.4.3 Perencanaan Kolom

Kolom adalah komponen struktur dengan rasio tinggi terhadap dimensi lateral terkecil sama dengan 3 atau lebih digunakan terutama untuk mendukung beban aksial tekan. Sebagai bagian struktur dengan peran dan fungsi seperti tersebut di atas, kolom menempati posisi penting dalam suatu sistem struktur. Kegagalan kolom dapat berarti keruntuhan total struktur. Oleh karena itu perencanaan kolom terutama pada sistem struktur tahan gempa, harus diperhitungkan secara cermat dengan memberikan cadangan kekuatan yang lebih daripada komponen struktur lainnya, sehingga saat struktur menerima beban gempa besar, kolom-kolom dalam struktur tersebut masih dalam kondisi elastis, kecuali kolom pada lantai dasar dan pada ujung-ujung baloknya telah terbentuk sendi-sendi plastis.

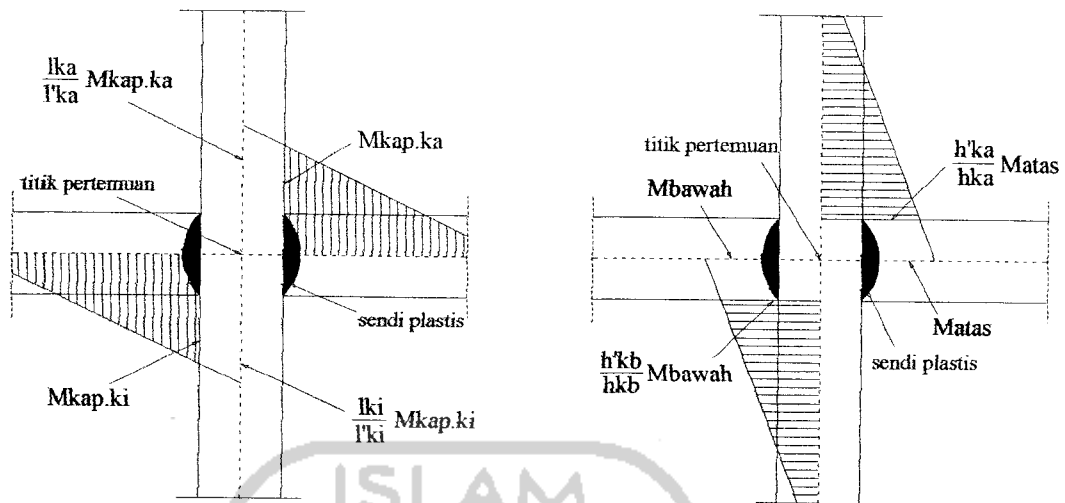
a. Momen rencana kolom

Untuk struktur rangka daktilitas penuh, kuat lentur bidang muka balok Mu.k harus dihitung berdasarkan terjadinya kapasitas lentur sendi plastis kedua ujung balok sebagai berikut:

dimana

$$M_{UK} = 1,3 M_D + 2 M_L \quad (3.52)$$

$$M_{UK} = 1,3 M_D + 2 M_X + 1 M_E \quad (3.53)$$



Gambar 3.12 Momen Lentur Sendi Plastis Pada Kedua Ujung Balok

b. Gaya aksial rencana kolom

Setelah momen ultimit kolom ($M_{u.k}$) maka untuk keperluan desain kolom besaran yang harus diketahui berikutnya adalah gaya aksial yang bekerja pada kolom.

$$P_{Uk} = 1,3 P_D + 2 P_L + 1 P_E \quad (3.54)$$

c. Desain kolom

Dari nilai M_n dan P_n , plotkan ke grafik M_n - P_n didapatkan r

$$A_s \text{ total} = r \cdot b \cdot h \quad (3.55)$$

$$A_{1\emptyset} = \frac{1}{4} \cdot \pi \cdot D^2 \quad (3.56)$$

$$n = \frac{A_{s \text{ total}}}{A_{1\emptyset}} \quad (3.57)$$

dengan :

r = rasio tulangan,

n = jumlah tulangan kolom,

b, h = ukuran kolom.

d. Gaya geser rencana kolom

Pada kuat geser kolom portal dengan daktilitas penuh berdasarkan terjadinya sendi-sendi plastis pada ujung-ujung balok yang bertemu pada kolom tersebut, harus dihitung dengan persamaan:

$$V_{u.k} = \frac{M_{u.k.atas} + M_{u.k.bawah}}{h'} \quad (3.58)$$

dan tidak boleh lebih dari persamaan:

$$V_{u.k} = 1,5 \left(V_{D.k} + V_{L.k} + \frac{4}{K} \cdot V_{E.k} \right) \quad (3.59)$$

dengan:

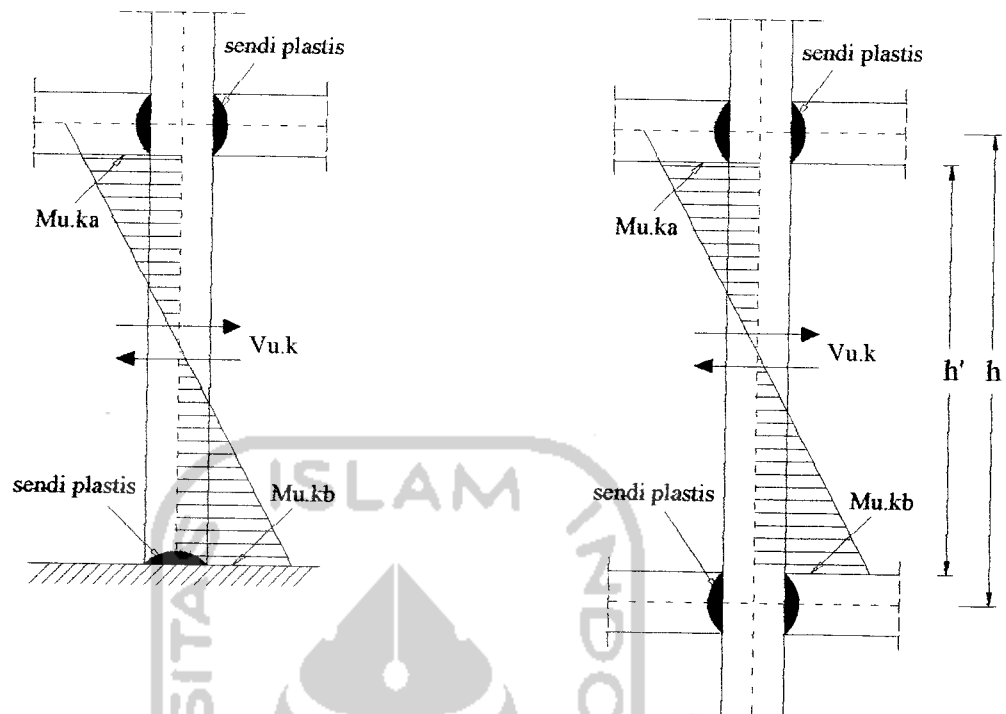
$M_{u.k.atas}$ = Momen rencana kolom pada ujung atas dihitung pada muka balok.

$M_{u.k.bawah}$ = Momen rencana kolom pada ujung bawah.

$V_{D.k}$ = Gaya geser kolom akibat beban mati.

$V_{L.k}$ = Gaya geser kolom akibat beban hidup.

$V_{E.k}$ = Gaya geser kolom akibat beban gempa.



Gambar 3.13 Kuat Geser Pada Kolom Portal

e. Desain geser kolom

Ditetapkan berdasarkan kapasitas sendi plastis balok penulangan geser pada sendi plastis, untuk gaya geser yang diterima tulangan dihitung dengan persamaan berikut:

$$V_{sl} = \frac{V_u}{\phi} \quad (3.60)$$

Jarak sengkang dapat dihitung dengan persamaan berikut ini:

$$S = \frac{n \cdot A_1 \phi \cdot f_y \cdot d}{V_s} \quad (3.61)$$



tetapi s tidak perlu lebih besar dari :

1. $\frac{1}{4}$ dimensi komponen struktur terkecil,
2. 8 kali diameter tulangan longitudinal,
3. 100 mm.

dengan :

S = Jarak antar tulangan geser

$A_1 \phi$ = Luas tulangan geser

V_s = Gaya geser tulangan

V_u = Gaya geser rencana

ϕ = Faktor reduksi kekuatan geser, $\phi = 0,65$

Sedangkan untuk penulangan geser diluar sendi plastis gaya geser beton V_c ikut diperhitungkan. Besar gaya geser yang disumbangkan beton dapat dihitung dengan persamaan:

$$V_c = \left[1 + \frac{P_{u,k}}{14.A_g} \left(\frac{1}{6} \sqrt{f'_c} \right) b.d \right] \quad (3.62)$$

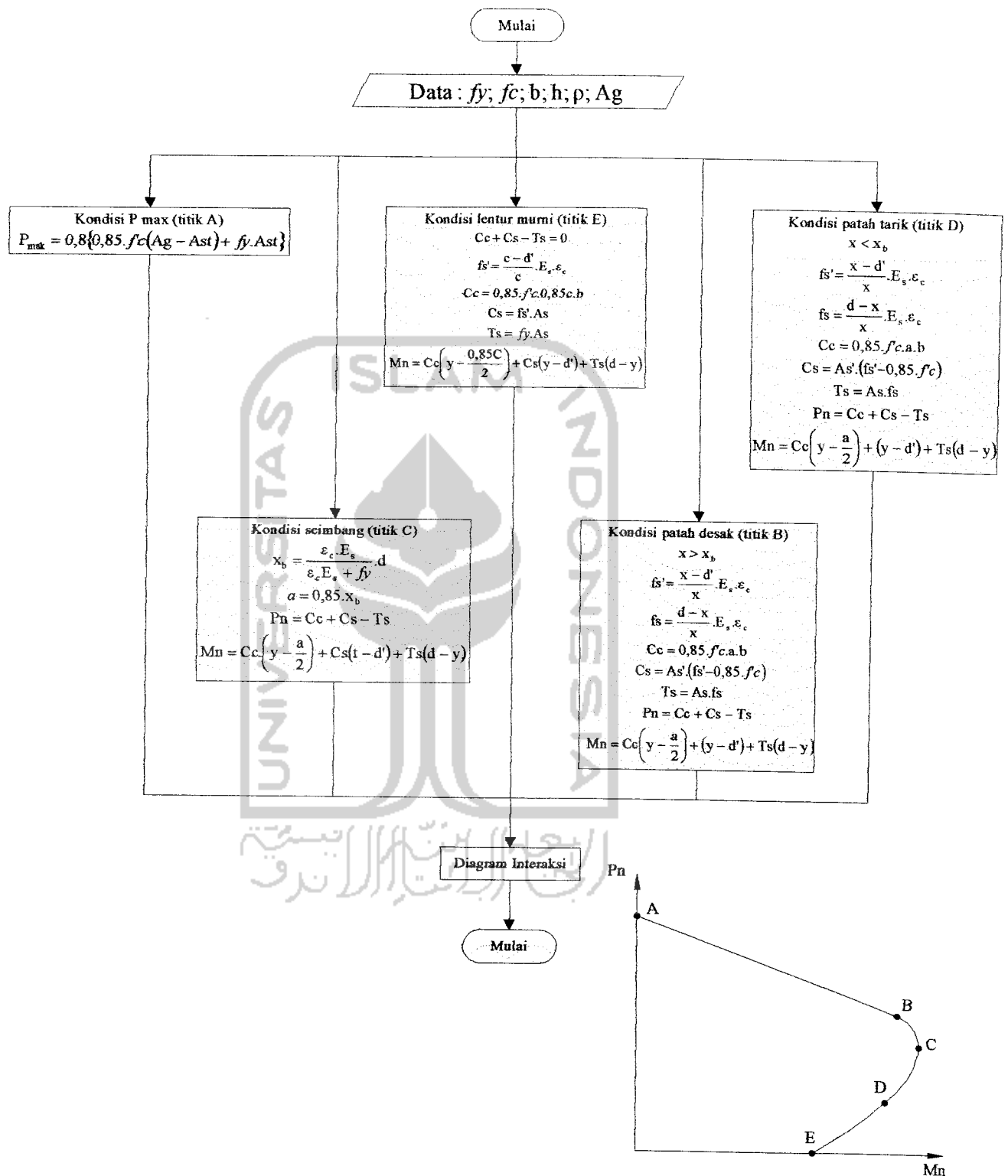
Sehingga gaya geser tulangan V_s dapat dihitung dengan

$$V_{s2} = \frac{V_u}{\phi} - V_c \quad (3.63)$$

dengan :

$P_{u,k}$ = Gaya aksial kolom

A_g = Luas kotor dimensi kolom



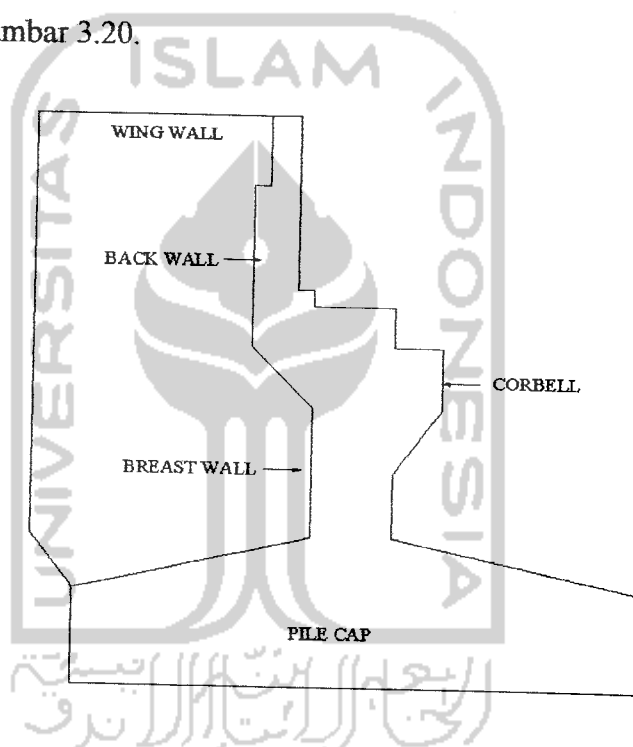
Gambar 3.14 Flow Chart Diagram Interaksi $M_n - P_n$

3.5 Struktur Bawah Jembatan

Perencanaan pada struktur bawah Jembatan Kretek II meliputi perencanaan kepala jembatan (*Abutment*) dan pondasi.

3.5.1 Perencanaan Kepala Jembatan (*Abutment*)

Bentuk struktur kepala jembatan pada perencanaan Jembatan Kretek II menggunakan tipe *T* terbalik sesuai dengan tinggi jembatan antara 5-12 m, seperti terlihat pada gambar 3.20.



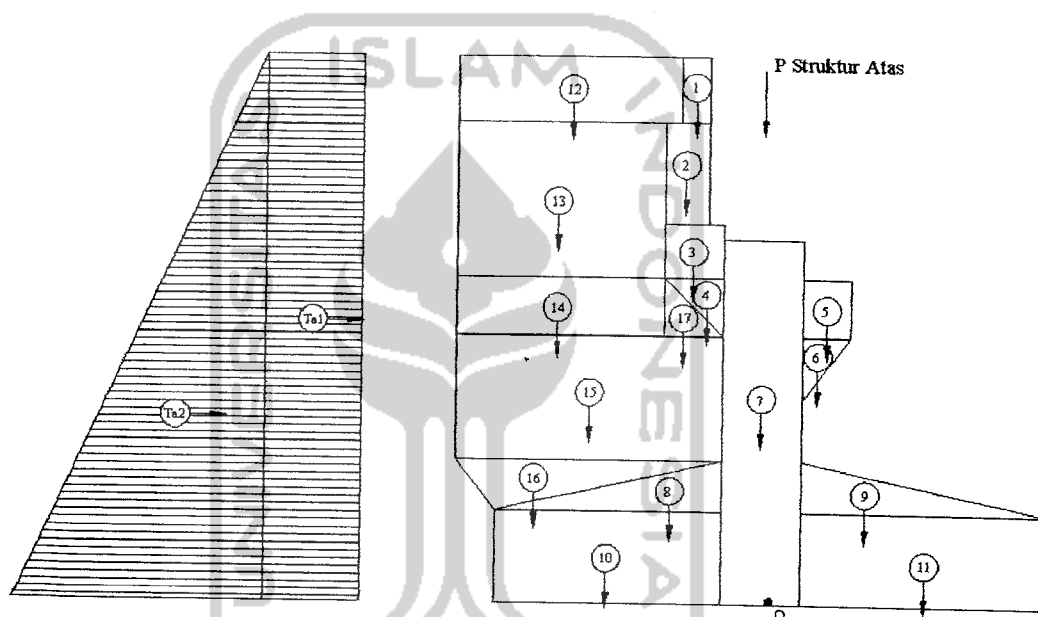
Gambar 3.16 Skets Kepala Jembatan

Gaya-gaya yang bekerja digolongkan dalam :

1. Beban struktur atas
 - a. Beban Mati struktur atas.
 - b. Beban hidup + kejut.

2. Beban struktur bawah
 - a. Beban mati akibat berat sendiri *abutment*.
 - b. Beban mati akibat berat di atas pondasi.
 - c. Beban tekanan tanah.

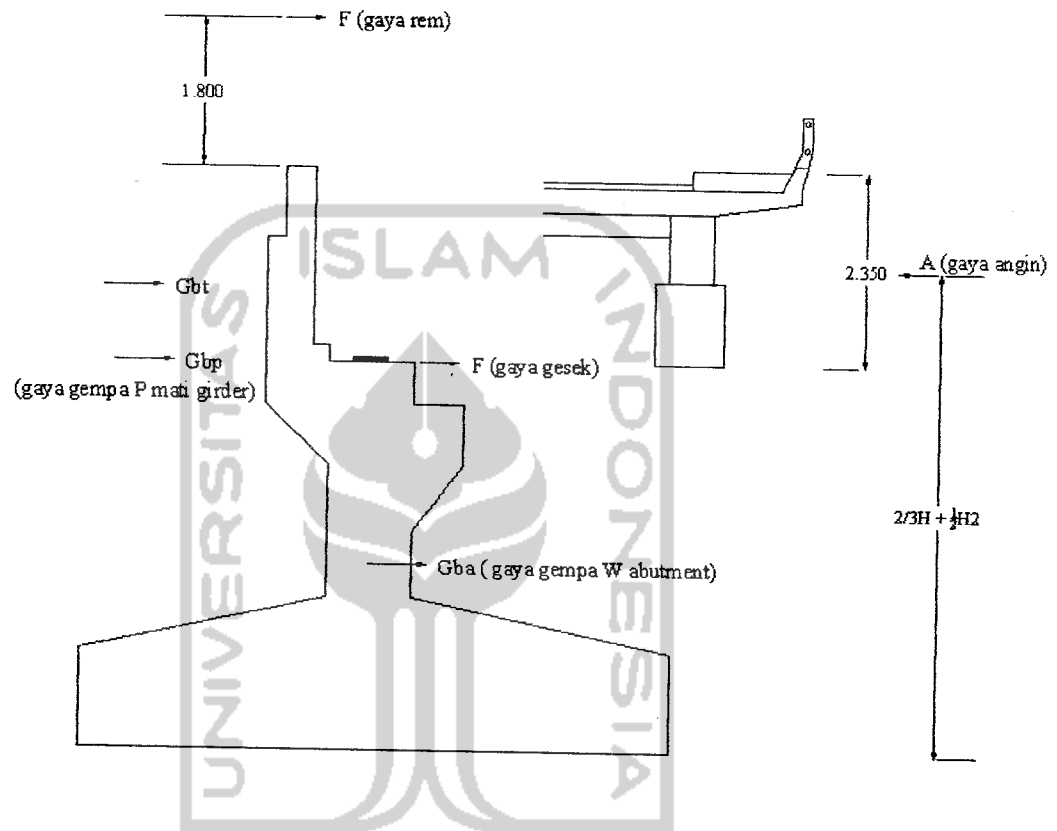
Beban-bekan struktur atas dan beban struktur bawah yang bekerja pada abutment dapat dilihat pada gambar berikut.



Gambar 3.17 Beban struktur atas dan struktur bawah yang bekerja pada *abutment*

3. beban-beban sekunder
 - a. Beban gempa.
 - b. Beban angin.
 - c. Beban rem dan traksi
 - d. Beban gesekan pada tumpuan

Beban-beban sekunder yang bekerja pada abutment dapat dilihat pada gambar berikut.



Gambar 3.18 Beban sekunder yang bekerja pada *abutment*

1. Stabilitas Pondasi

Menghitung keamanan terhadap penggulingan :

$$\text{Momen penahan guling} = \Sigma M_{VA} = -\frac{Bx}{2} \cdot \Sigma v + \Sigma Mv \quad (3.64)$$

$$\text{Angka aman guling fondasi, } SF = \left(\frac{\Sigma MVA}{\Sigma Mh} \right) > 1,5 \quad (3.64)$$

dengan :

Bx = lebar abutment arah x

ΣMv = jumlah momen dari beban vertikal

ΣMh = jumlah momen dari beban horizontal

Menghitung keamanan terhadap penggeseran adalah sebagai berikut :

$$\text{Gaya penahan geser, } \Sigma H_p = C \cdot Bx \cdot By + \Sigma V \cdot \tan \Phi \quad (3.65)$$

$$\text{Angka aman terhadap geser, } SF = \left(\frac{\Sigma H_p}{\Sigma H} \right) > 1,2 \quad (3.66)$$

dengan :

Bx = lebar *abutment* arah x

By = lebar *abutment* arah y

ΣH = jumlah gaya arah horizontal

ΣV = jumlah gaya arah vertikal

c = kohesi tanah

2. Pembesian *Abutment*

- a. Pembesian tulangan lentur *pile cap, breast wall, back wall, corbell* dan *wing wall*

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) \quad (3.67)$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) \quad (3.68)$$

$$M_n = \frac{M_u}{\phi} \quad (3.69)$$

$$R_n = \frac{M_n}{b \cdot d^2} \quad (3.70)$$

$$\rho_{perlu} = \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0,85 \cdot f_c'}} \right) \quad (3.71)$$

$$\rho_{max} = 0,75 \cdot \rho_b \quad (3.87)$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} \quad (3.88)$$

$$\rho_{min} < \rho < \rho_{max}$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d \quad (3.89)$$

$$A_1 \phi = \frac{1}{4} \pi \cdot D^2 \quad (3.90)$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_1 \phi \cdot 1000}{A_s} \quad (3.91)$$

b. Pembesian tulangan geser *pile cap, breast wall, back wall, corbell dan wing wall*

Gaya geser ultimit rencana, V_u = Faktor beban ultimit. V_r

$$V_c = \frac{1}{6} \cdot (\sqrt{f'c}) \cdot b \cdot d \quad (3.92)$$

Jika $\Phi \cdot V_c < V_u$ maka perlu tulangan geser

Jika $\Phi \cdot V_c > V_u$ maka tidak perlu tulangan geser

$$\Phi \cdot V_s = V_u - \Phi \cdot V_c \quad (3.93)$$

$$V_s = \frac{\Phi \cdot V_s}{0,6} \quad (3.94)$$

$$A_1 \phi = \frac{1}{4} \pi \cdot D^2 \quad (3.95)$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_1 \phi \cdot f_y \cdot d}{V_s} \quad (3.96)$$

3.5.2 Perencanaan Pondasi Tiang

3.5.2.1 Kontrol gaya pada pondasi tiang bor

Gaya aksial yang diderita satu tiang bor :

$$P_{max} = \frac{\sum v}{n} + \frac{Mx \cdot X}{\sum X^2} + \frac{My \cdot Y}{\sum Y^2} < P_{ijin} \quad (3.100)$$

Gaya lateral yang diderita satu tiang bor:

$$H_{max} = \frac{\sum H}{n} < H_{ijin} \quad (3.101)$$

dengan :

n = jumlah banyak tiang

ΣH = jumlah gaya arah horizontal

ΣV = jumlah gaya arah vertikal

M_x = momen arah x

M_y = momen arah y

Pada prencananaan pondasi tiang bor, perhitungan tegangan ultimit tiang pancang dihitung berdasarkan kekuatan bahan dan kekuatan tanah (metode *Terzaghi*, metode *Meyerhoff*, dan metode *Bagement*).

Dalam perhitungan daya dukung ijin tiang bor, hanya memperhitungkan daya dukung ujung tiang bor, untuk gesekan selimut tiang tidak diperhitungkan dikarenakan dari hasil penyelidikan tanah, tanahnya berupa pasir.

1. Daya dukung ijin tiang bor berdasarkan kekuatan bahan

$$\text{Daya dukung ijin, } P_{ijin} = A \cdot f - W \quad (3.102)$$

$$\text{Tegangan ijin, } f = 0,33 \cdot f'c \quad (3.103)$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi D^2 \quad (3.104)$$

$$Le = \text{Panjang efektif tiang bor}$$

$$\text{Berat Tiang, } W = A \cdot Le \cdot BJ \quad (3.105)$$

2. Daya dukung ijin tiang bor berdasarkan kekuatan tanah

a. Daya dukung tiang menurut *Terzaghi* (data pengujian lab)

$$Q_{ult} = 1,3. C. N_c + y. D_f. N_q + 0,6. y. R. N_g \quad (3.106)$$

D_f = Kedalaman tiang bor

R = Jari – jari penampang tiang

A = Luas tampang tiang bor

$y, \Phi, C,$ = Parameter kekuatan tanah di ujung tiang bor (*end bearing*) :

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF} \quad (3.107)$$

b. Daya dukung tiang bor menurut *Meyerhoff* (data pengujian *SPT*)

$$Q_{ult} = 40. N \quad (3.108)$$

N = Nilai *SPT*

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF} \quad (3.109)$$

c. Daya dukung tiang bor menurut *Bagement* (data pengujian *CPT*)

$$P_{ijin} = A. \frac{qc}{3} + K. L. \frac{qf}{4} \quad (3.110)$$

qc = Nilai konus rata-rata

qf = Nilai hambatan lekat rata-rata

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 \quad (3.111)$$

K = Keliling penampang tiang bor = $\pi. ds$

L = Panjang tiang bor

Efisiensi kelompok tiang bor menurut *BMS* :

$$E_f = \frac{(2.(nb + nt - 2).xt + 4.ds)}{(\lambda.ds.nb.nt)} \quad (3.112)$$

$$P_{ijin} \text{ yang dipakai} = P_{ijin} \cdot E_{ff} \quad (3.113)$$

Sedangkan untuk daya dukung ijin lateral satu tiang bor adalah :

$$H_{ijin} = \frac{H/(nb.nt)}{SF} \quad (3.114)$$

dengan :

$$H = \frac{F(2.L_2)}{L_2 + L_d + L_a} \quad (3.115)$$

$$L_2 = \frac{M}{F} \quad (3.116)$$

nb = Jumlah baris tiang

nt = Jumlah tiang bor perbaris

3.5.2.2 Pembesian *bore pile*

1. Tulangan Aksial tekan lentur

$$P_{\max} = P_{ijin}$$

Beban Ultimit : P_n = faktor beban ultimit. $P_{\max}$

M_n = faktor beban ultimit. $M_{\max}$

$$A_g = \frac{1}{4} \pi \cdot D^2 \quad (3.117)$$

Plot nilai $\frac{\Phi.Pn}{(f'c.Ag)}$ dan $\frac{\Phi.Mn}{(f'c.Ag)}$ ke dalam diagram interaksi kolom lingkaran diperoleh rasio tulangan, ρ

$$\text{Luas tulangan yang diperlukan, } A_s = \rho . A_g \quad (3.118)$$

$$\text{Jumlah tulangan} = \frac{A_s}{A_{1\phi}} \quad (3.119)$$

2. Tulangan Geser *Bore pile*

$$V_u = \frac{Mu}{L} \quad (3.120)$$

d = tebal efektif

L = panjang efektif tiang bor

$$V_{c \max} = 0,2 . f'c . D . d \quad (3.121)$$

$$\Phi . V_{c \max} > V_u \text{ (Ok)}$$

$$\beta_1 = 1,4 - \frac{d}{2000} \quad (3.122)$$

$$\beta_2 = 1 + \frac{Pu}{14 . f'c . A_g} \quad (3.123)$$

$$\beta_3 = 1$$

$$V_{uc} = \beta_1 . \beta_2 . \beta_3 . D . d . \sqrt{\frac{A_s . F'c}{b . d}} \quad (3.124)$$

$$V_c = V_{uc} + 0,6 . D . d \quad (3.125)$$

Jika $\Phi . V_c > V_u$ (hanya perlu tul geser min)

$$\text{Jarak tulangan yang diperlukan, } S = \frac{A_{1\phi} . f_y . d}{V_s} \quad (3.126)$$

BAB IV

ANALISA DAN DISAIN

4.1 Pendahuluan

Dalam suatu perencanaan/disain diperlukan analisis struktur agar diperoleh tegangan yang diperhitungkan agar tidak mengalami keruntuhan, setelah dilakukan analisis maka untuk mewujudkan perencanaan yang dapat dilaksanakan, maka dilakukan analisis menggunakan data yang berhubungan dengan struktur yang direncanakan. Pada bab ini akan dijelaskan tentang tahapan perencanaan sampai dengan gambar siap dilaksanakan.

4.2 Data Struktur

Struktur Jembatan Kretek II adalah berupa beton bertulang yang memiliki spesifikasi sebagai berikut :

1. struktur jembatan berupa pelengkung yang terdiri dari 4 bentang,
2. struktur atas berupa beton bertulang yang terdiri dari :
 - a. balok induk memanjang,
 - b. balok anak memanjang,
 - c. balok lintang
 - d. kolom, dan
 - e. gelagar lengkung.
3. struktur bawah berupa beton bertulang yang terdiri dari :
 - a. *abutment*, dan

b. pondasi.

untuk keperluan perhitungan maka diperlukan data bahan beton bertulang sebagai berikut :

1. *BJTP* (Baja Tulangan Polos) $U = 24$ atau $f_y = 2400 \text{ kg/cm}^2 = 240 \text{ Mpa}$
2. *BJTD* (Baja Tulangan *Deform*) $U = 39$ atau $f_y = 3900 \text{ kg/cm}^2 = 390 \text{ Mpa}$
3. Mutu beton *K-300* $= f'_c = 0,83. k = 0,83. 300 = 249 \text{ kg/cm}^2 = 24,9 \text{ Mpa}$

4.3 Waktu Penelitian

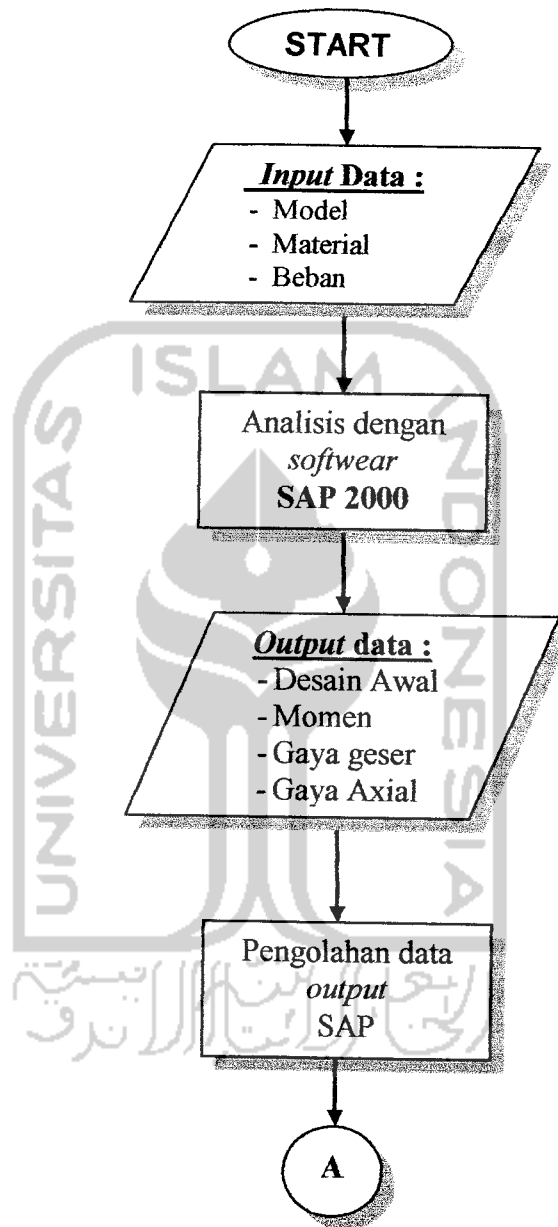
Waktu studi penelitian direncanakan dimulai pada akhir bulan September 2006 dan selesai pada bulan April 2007.

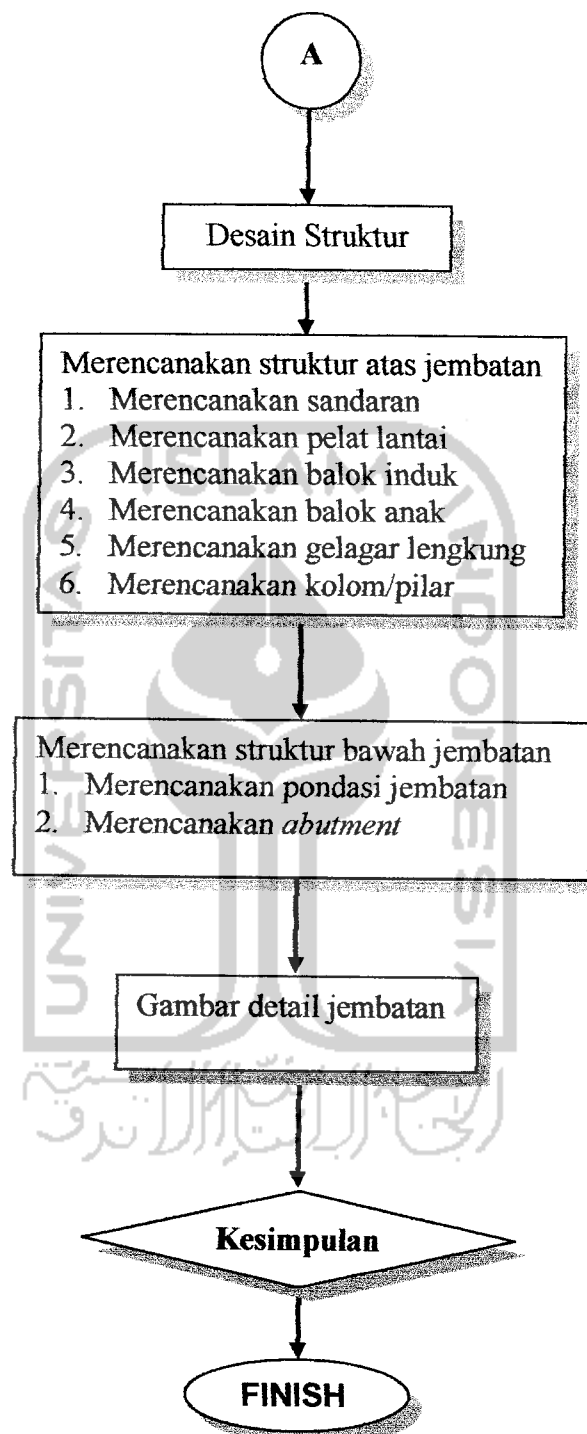
4.4 Tahap Perencanaan

Tahap perencanaan dari tugas akhir perencanaan Jembatan Kretek II ini adalah meliputi :

1. menentukan spesifikasi dan konfigurasi struktur jembatan,
2. menghitung beban-beban yang bekerja dengan Peraturan Perencanaan Teknik Jembatan, 1992 (PPTJ-1992),
3. menganalisa struktur dengan program SAP 2000 dan *excel*,
4. merencanakan elemen-elemen struktur dengan beton bertulang,
5. pembahasan, dan
6. menyimpulkan hasil.

langkah-langkah penyelesaian tugas akhir ini dapat dilihat pada gambar 4.1.

FLOW CHART PERHITUNGAN JEMBATAN KRETEK II**Gambar 4.1.a** *Flow Chart* penulisan tugas akhir



Gambar 4.1.b Flow Chart penulisan tugas akhir

4.5 Pelaksanaan Penelitian dan Jadwal Penelitian

Pelaksanaan penelitian tugas akhir ini adalah mahasiswa Jurusan Teknik Sipil Fakultas Teknik Sipil Dan Perencanaan Universitas Islam Indonesia, sebagai berikut:

Nama : Aries Taven No. Mhs : 02511075

Jadwal penelitian ini meliputi 8 bulan efektif , yang apabila disusun adalah seperti berikut ini :

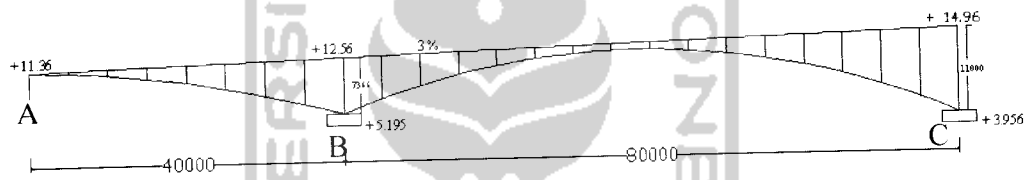
No	Kegiatan	Bulan					
		Sep.	Okt.	Nov.	Des.	Jan.	Feb.
1	Pendaftaran						
2	Penentuan Dosen Pembimbing						
3	Pembuatan Proposal						
4	Seminar Proposal						
5	Konsultasi Penyusunan TA						
6	Sidang – Sidang						
7	Pendadaran						

BAB V

PERHITUNGAN KONSTRUKSI

5.1. Perencanaan Koordinat Lengkung Jembatan

Perencanaan koordinat gelagar lengkung Jembatan Kretek II direncanakan dengan rumus $h_n = \frac{4 \cdot f \cdot x(L-x)}{L^2}$. Gelagar lengkung Jembatan Kretek II dapat dilihat pada gambar 5.1.



Gambar 5.1. Lengkung Parabola

Tinggi kolom dapat dilihat pada tabel 5.1.

Tabel 5.1 Tinggi Kolom

Titik	Tinggi Kolom (mm)
0	0
5	359
10	875
15	1549
20	2383
25	3378
30	4538
35	5866

Titik	Tinggi Kolom (mm)
120	11000
125	8781
130	6864
135	5245
140	3773
145	2777
150	1935
155	1344

40	7365	160	1000
45	5624	165	902
50	4172	170	1049
55	2999	175	1445
60	2093	180	2093
65	1445	185	2999
70	1049	190	4172
75	902	200	5624
80	1000	205	7365
85	1344	210	5866
90	1935	215	4538
95	2777	220	3378
100	3873	225	2383
105	5245	230	1549
110	6864	235	875
115	8781	240	359

5.1. Perencanaan *kantilever*

Perencanaan *kantilever* jembatan meliputi perencanaan tulangan sandaran jembatan, perencanaan tulangan geser dan perencanaan pelat trotoar.

5.2.1 Perencanaan Tulangan Tiang Sandaran

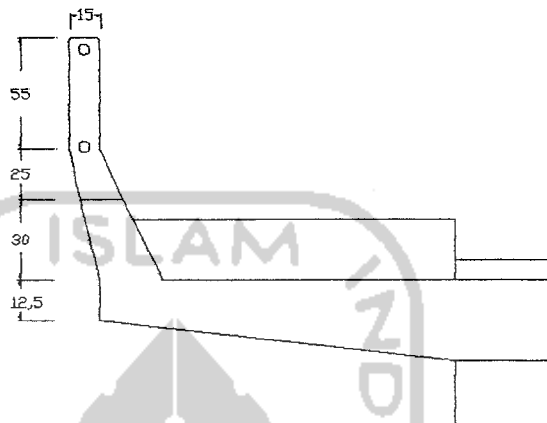
Sandaran merupakan suatu konstruksi pengaman bagi pemakai jembatan, sandaran ini direncanakan dari pipa besi bulat, sedangkan tiang sandaran (*railing*) berupa beton bertulang. Adapun data tiang sandaran adalah sebagai berikut.

Jarak antar tiang <i>railing</i>	= 2 m
Beban <i>railing</i>	= 0,1 Ton/m
Gaya pada tiang <i>railing</i>	= 0,2 Ton
Lengan	= 0,8 m
Mutu beton	= K - 300

Kuat tekan beton, f_c' = 24,9 Mpa

Tegangan leleh baja, f_y = 390 Mpa

Bentuk tiang sandaran dapat dilihat pada gambar 5.2



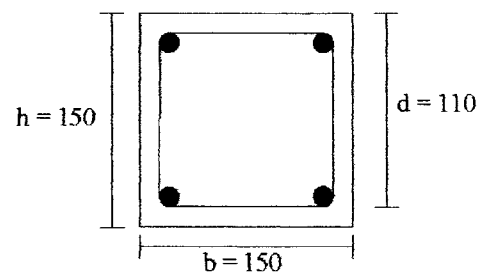
Gambar 5.2 Tiang Sandaran

Momen (M_u) = 0,16 Ton - m

Faktor beban *ultimit* = 2

Momen ultimit rencana (M_u) = $2 \times 0,16 = 0,32$ Ton - m

Diambil ukuran tiang sandaran 15 x 15 cm



Gambar 5.3 Penampang Tiang Sandaran

$$\text{Modulus elastis baja (} E_s \text{)} = 200000 \text{ Mpa}$$

$$\text{Faktor bentuk distribusi tegangan beton (}\beta I\text{)} = 0,85$$

$$\text{Faktor reduksi kekuatan lentur } \phi = 0,8$$

$$\text{Faktor reduksi kekuatan geser } \phi = 0,6$$

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) =$$

$$= 0,85 \cdot \frac{0,85 \cdot 24,9}{390} \left(\frac{600}{600 + 390} \right) = 0,027957$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) =$$

$$= 0,75 \cdot 0,027957 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,027957 \cdot 390}{0,85 \cdot 24,9} \right) = 6,597664 \text{ Mpa}$$

$$M_u = 3200000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = h - p_b - \frac{1}{2} D = 150 - 30 - \frac{1}{2} 6,5 = 113,5 \text{ mm} = 110 \text{ mm}$$

$$\text{Lebar tiang railing, } b = 150 \text{ mm}$$

$$M_n = \frac{M}{\phi} = \frac{3200000}{0,8} = 4000000 \text{ Nmm}$$

$$R_n = \frac{M_n}{b \cdot d^2} = \frac{4000000}{150 \cdot 110^2} = 2,2038567 \text{ Mpa} < R_{max} \text{ (Ok)}$$

$$\rho_{perlu} = \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0,85 \cdot f_c'}} \right) =$$

$$= \frac{0,85 \cdot 24,9}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 2,2038567}{0,85 \cdot 24,9}} \right) = 0,00598$$

$$\rho_{max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,027957 = 0,02096775$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{min} = 0,00090 < \rho = 0,00598 < \rho_{max} = 0,02096775$$

Rasio tulangan yang digunakan $\rho = 0,00598$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,00598 \times 150 \times 110 = 98,67 \text{ mm}^2$$

Dipakai tulangan Ø 10

$$A_{l\phi} = 0,25 \times \pi \times 10^2 = 78,54 \text{ mm}^2$$

$$\text{Jumlah Tulangan} = \frac{A_s}{A_{l\phi}} = \frac{98,67}{78,54} = 1,26 = 2 \text{ buah}$$

Digunakan tulangan **2 D 10**

Untuk tulangan tarik digunakan $A_s = 2 \text{ D } 10$

Untuk tulangan desak digunakan $A_s' = 2 \text{ D } 10$

5.2.2. Perencanaan Tulangan Geser Tiang Sandaran

Gaya geser rencana $= 0,2 \text{ Ton}$

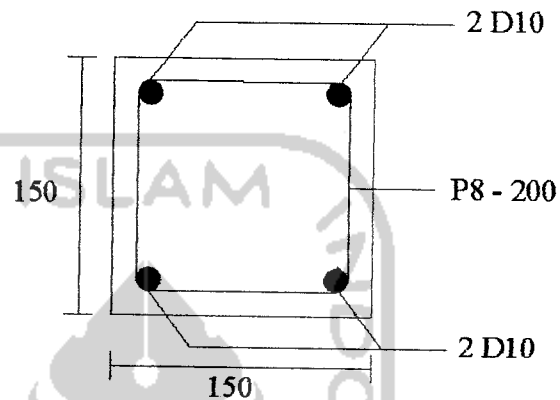
Gaya geser ultimit rencana (V_u) = 4000 N

$$\begin{aligned} V_c &= \left(\frac{1}{6} \times \sqrt{f'c} \times b \times d \right) \\ &= \left(\frac{1}{6} \times \sqrt{24,9} \times 150 \times 110 \right) = 13722,47 \text{ N} \end{aligned}$$

$$\frac{1}{2} \phi V_c = \frac{1}{2} \times 0,6 \times 13722,47 = 4116,6 \text{ N} > V_u = 4000 \text{ N (teoritis tidak$$

perlu sengkang)

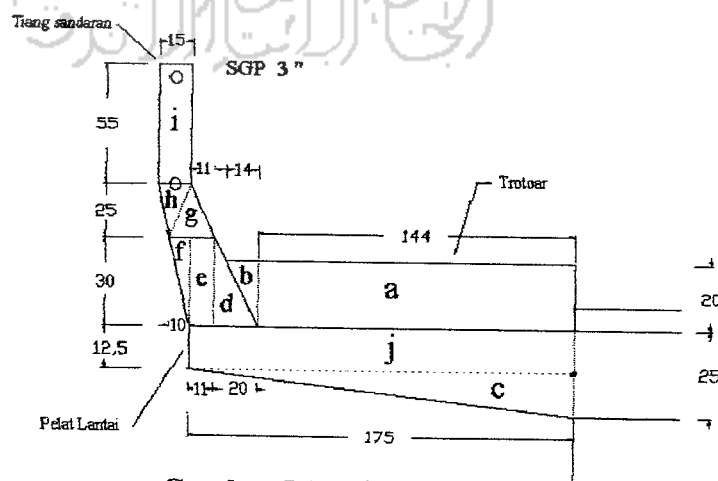
Secara teoritis tidak memerlukan tulangan geser tapi untuk mempermudah pemasangan tulangan, diperlukan tulangan sengkang dengan jarak 20 cm. Jadi sandaran memakai tulangan tarik $A_s = 2 \text{ D10}$ dan desak $A_s' = 2 \text{ D10}$, untuk tulangan geser digunakan P8 – 200 mm. Gambar tulangan dapat dilihat pada gambar 5.4



Gambar 5.4 Tulangan Sandaran

5.2.3. Perencanaan Pelat Trotoar

Beban yang diterima pelat trotoar adalah beban akibat berat sendiri, beban akibat tiang sandaran dan beban hidup, pelat trotoar dapat dilihat pada gambar 5.5.



Gambar 5.5. Pelat Trotoar

Beban yang diterima pelat trotoar per meter panjang

Beban mati pada pelat trotoar :

Jarak antar tiang railing, $L = 2 \text{ m}$

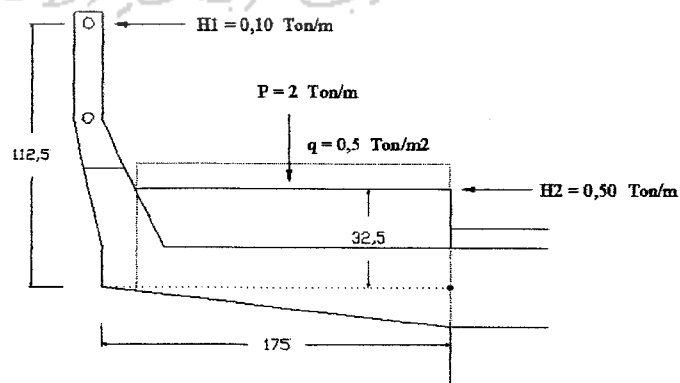
BJ Beton $= 2,5 \text{ Ton/m}^3$

Beban mati trotoar dan railing untuk panjang $L = 2 \text{ m}$

Tabel 5.2 Perhitungan Beban mati trotoar dan railing

No	b (m)	h (m)	Shape	L (m)	BJ Beton (Ton/m ³)	Berat (Ton)	Lengan (m)	Momen (Ton-m)
a	1,44	0,2	1	2	2,5	1,44	0,72	1,037
b	0,14	0,2	0,5	2	2,5	0,07	1,497	0,105
c	1,75	0,125	0,5	2	2,5	0,54688	0,583	0,319
d	0,2	0,3	0,5	2	2,5	0,15	1,583	0,237
e	0,11	0,3	1	2	2,5	0,165	1,705	0,281
f	0,1	0,3	0,5	2	2,5	0,075	1,793	0,134
g	0,21	0,25	0,5	0,15	2,5	0,010	1,755	0,017
h	0,15	0,25	0,5	0,15	2,5	0,007	1,825	0,013
i	0,55	0,15	1	0,15	2,5	0,031	1,825	0,056
j	1,75	0,125	1	2	2,5	1,09375	0,875	0,957
k	SGP 3"		0,063	4		0,252	1,33	0,335
					Qm	3,840	Mm	3,492
Beban Mati Trotoar dan Railing (Per m)					Qm	1,920	Mm	1,746

Beban hidup pada pelat trotoar :



Gambar 5.6 Beban hidup pada trotoar

Tabel 5.3 Perhitungan Beban hidup trotoar

Beban Hidup pada Trotoar				
No	Jenis Beban	Gaya (Ton)	Lengan (m)	Momen (Ton-m)
1	Beban horisontal pada railing (H1)	0,1	1,125	0,1125
2	Beban horisontal pada kerb (H2)	0,5	0,325	0,1625
3	Beban vertikal terpusat (P)	2	0,875	1,75
4	Beban vertikal merta = $q \times b_2$	0,5	0,875	0,438
Momen akibat beban hidup pada pelat trotoar :				Mh = 2,463

Faktor beban ultimit untuk beban mati = 1,3

Faktor beban ultimit untuk beban hidup = 2

Momen ultimit rencana pelat trotoar =

$$Mu = 1,3. Mm + 2. Mh$$

$$Mu = 1,3. 1,746 + 2. 2,463 = 7,196 \text{ Ton-m}$$

Pembesian Pelat trotoar :

Mutu beton = K - 300

Kuat tekan beton, f_c' = 24,9 Mpa

Tegangan leleh baja, f_y = 390 Mpa

Tebal Pelat, h = 250 mm

Jarak tulangan terhadap sisi luar beton = 30 mm

Modulus elastis baja (E_s) = 200000 Mpa

Faktor bentuk distribusi tegangan beton (β_1) = 0,85

Faktor reduksi kekuatan lentur ϕ = 0,8

Faktor reduksi kekuatan geser ϕ = 0,6

$$\begin{aligned}\rho_b &= \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) = \\ &= 0,85 \cdot \frac{0,85 \cdot 24,9}{390} \left(\frac{600}{600 + 390} \right) = 0,027957\end{aligned}$$

$$\begin{aligned}R_{max} &= 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) = \\ &= 0,75 \cdot 0,027957 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,027957 \cdot 390}{0,85 \cdot 24,9} \right) = 6,597664 \text{ Mpa}\end{aligned}$$

$$Mu = 71960000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = h - pb - \frac{1}{2} D = 250 - 30 = 220 \text{ mm}$$

$$\text{Ditinjau selebar 1 m, } b = 1000 \text{ mm}$$

$$Mn = \frac{M}{\phi} = \frac{71960000}{0,8} = 89950000 \text{ Nmm}$$

$$Rn = \frac{Mn}{b \cdot d^2} = \frac{89950000}{1000 \cdot 220^2} = 1,858 \text{ Mpa} < R_{max} \text{ (Ok)}$$

$$\begin{aligned}\rho_{perlu} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot Rn}{0,85 \cdot f_c'}} \right) = \\ &= \frac{0,85 \cdot 24,9}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 1,858}{0,85 \cdot 24,9}} \right) = 0,00499\end{aligned}$$

$$\rho_{max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,027957 = 0,02096775$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{min} = 0,00090 < \rho = 0,00499 < \rho_{max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = 0,00499$$

Luas tulangan pokok :

$$A_s = p \cdot b \cdot d = 0,00499 \times 1000 \times 220 = 1098,65 \text{ mm}^2$$

Dipakai tulangan Ø 16

$$A_{I\phi} = \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (S)} &= \frac{A_{I\phi} \cdot 1000}{A_s} = \frac{201,06 \cdot 1000}{1098,65} = \\ &= 183 \text{ mm} \end{aligned}$$

Digunakan tulangan **D16 – 180**

$$A_s = \frac{201,06 \cdot 1000}{180} = 1117 \text{ mm}^2$$

Tulangan Susut

$$\begin{aligned} A_s &= 0,002 \cdot b \cdot h_{plat} \\ &= 0,002 \cdot 1000 \cdot 250 = 500 \text{ mm}^2 \end{aligned}$$

Diameter tulangan yang digunakan D 13

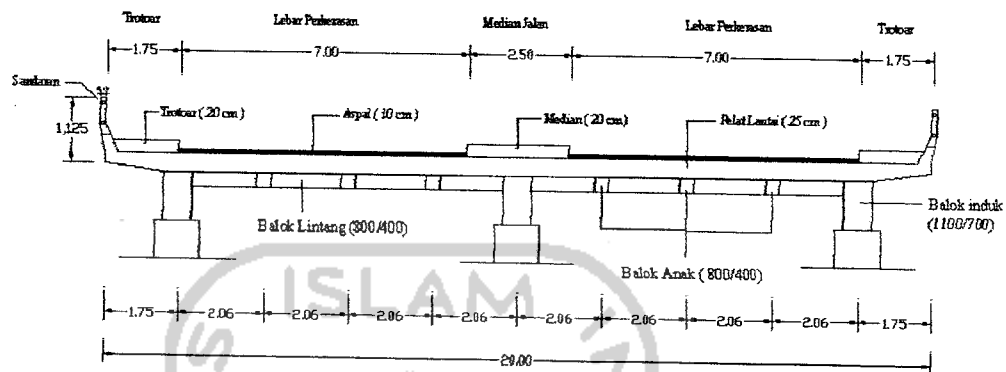
$$A_{I\phi} = \frac{1}{4} \pi \cdot 13^2 = 132,73 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (S)} = \frac{A_{I\phi} \cdot 1000}{A_s} = \frac{132,73 \cdot 1000}{500} = 265 \text{ mm}$$

Jadi dipakai tulangan susut **D13 – 200**

5.3. Perencanaan Pelat Lantai Jembatan

Tampang pelat lantai dapat dilihat pada gambar 5.7.



Gambar 5.7 Tampang pelat lantai jembatan

Tebal pelat (h)	= 0,25 m
Tebal lapisan aspal + overlay (ta)	= 0,1 m
Tebal genangan air hujan	= 0,1 m
Jarak antara penyangga (Lx)	= 2,06 m
Lebar jalur lalu-lintas	= 7 m
Lebar trotoar	= 1,75 m
Lebar median	= 2,5 m
Mutu beton	= K - 300
Mutu baja	= U - 390
BJ beton	= 2,5 Ton/m ³
BJ aspal	= 2,20 Ton/m ³
BJ air	= 1,00 Ton/m ³

5.3.1 Menghitung beban-beban yang bekerja :

1. Beban Mati

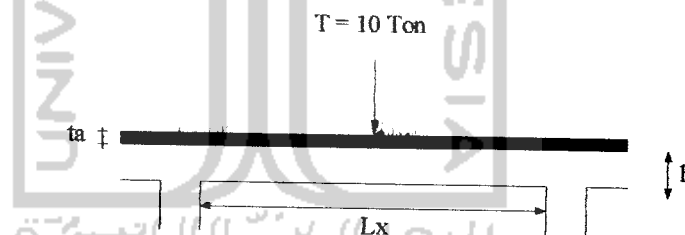
Tabel 5.4 Perhitungan beban mati pelat lantai jembatan

No	Jenis	Tebal (m)	Berat (Ton/m ³)	Beban (Ton/m ²)
1	Pelat	0,25	2,5	0,625
2	Lapisan aspal	0,1	2,2	0,22
3	Air hujan	0,1	1	0,1
Beban Mati :				0,945

2. Beban Hidup

Beban hidup pada lantai jembatan berupa beban roda ganda oleh *Truck* (beban T) yang besarnya beban hidup : $P = 10$ Ton

Bentang plat, $L_x = 2,06$ m



Gambar 5.8 Beban T pada lantai jembatan

5.3.2 Momen Pada Pelat Lantai Jembatan

Pelat lantai jembatan yang digunakan adalah plat (*one way slab*).

$$P = 10 \text{ Ton}$$

$$Q = 0,945 \text{ Ton/m}^2$$

$$L_x = 2,06 \text{ m}$$

Momen akibat beban mati :

Momen tumpuan = Momen lapangan

$$M_m = \frac{1}{10} \cdot Q \cdot Lx^2 = \frac{1}{10} \cdot 0,945 \cdot 2,06^2 = 0,401 \text{ Ton-m}$$

Momen akibat beban hidup :

$$M_0 = \frac{1}{4} \cdot P \cdot Lx = \frac{1}{4} \cdot 10 \cdot 2,06 = 5,15 \text{ Ton-m}$$

$$M_h = \frac{5}{6} \cdot M_0 = \frac{5}{6} \cdot 5,15 = 4,292 \text{ Ton-m}$$

5.3.3 Momen Ultimit Rancangan Slab (*one way slab*)

- Faktor beban ultimit untuk beban mati dengan = 1,3
- Faktor beban ultimit untuk beban hidup = 2,0

Momen Tumpuan = Momen Lapangan

$$= 1,3 \cdot M_m + 2 \cdot M_h = 1,3 (0,401) + 2 (4,292) = 9,105 \text{ Ton-m}$$

5.3.4. Perhitungan Tulangan Pelat Lantai Jembatan

$$\text{Mutu beton} = K - 300$$

$$\text{Kuat tekan beton, } f_c' = 24,9 \text{ Mpa}$$

$$\text{Tegangan leleh baja, } f_y = 390 \text{ Mpa}$$

$$\text{Tebal Pelat, } h = 240 \text{ mm}$$

$$\text{Jarak tulangan terhadap sisi luar beton} = 40 \text{ mm}$$

$$\text{Modulus elastis baja (} E_s \text{)} = 200000 \text{ Mpa}$$

$$\text{Faktor bentuk distribusi tegangan beton (} \beta_1 \text{)} = 0,85$$

$$\text{Faktor reduksi kekuatan lentur } \phi = 0,8$$

$$\text{Faktor reduksi kekuatan geser } \phi = 0,6$$

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) =$$

$$= 0,85 \cdot \frac{0,85 \cdot 24,9}{390} \left(\frac{600}{600 + 390} \right) = 0,027957$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) =$$

$$= 0,75 \cdot 0,027957 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,027957 \cdot 390}{0,85 \cdot 24,9} \right) = 6,597664 \text{ Mpa}$$

$$M_u = 91050000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = h - p_b - \frac{1}{2} D = 250 - 40 = 210 \text{ mm}$$

$$\text{Ditinjau selebar 1 m, } b = 1000 \text{ mm}$$

$$M_n = \frac{M}{\phi} = \frac{91050000}{0,8} = 113812500 \text{ Nmm}$$

$$R_n = \frac{M_n}{b \cdot d^2} = \frac{113812500}{1000 \cdot 210^2} = 2,581 \text{ Mpa} < R_{max} \text{ (Ok)}$$

$$\begin{aligned}\rho_{perlu} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0,85 \cdot f_c'}} \right) = \\ &= \frac{0,85 \cdot 24,9}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 2,581}{0,85 \cdot 24,9}} \right) = 0,00708\end{aligned}$$

$$\rho_{max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,027957 = 0,02096775$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{min} = 0,00090 < \rho = 0,00708 < \rho_{max} = 0,02096775$$

Rasio tulangan yang digunakan $\rho = 0,00708$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,00708 \times 1000 \times 210 = 1487 \text{ mm}^2$$

Dipakai tulangan Ø 16

$$A_1 \phi = \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\begin{aligned}\text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot 1000}{A_s} = \frac{201,06 \cdot 1000}{1487} = \\ &= 135,21 \text{ mm}\end{aligned}$$

Digunakan tulangan **D16 – 100**

$$A_s = \frac{201,06 \cdot 1000}{100} = 2010 \text{ mm}^2$$

Tulangan Susut

Untuk tulangan susut diambil 50% luas tulangan pokok

$$A_s = 50 \% \times 2010 = 1005 \text{ mm}^2$$

Diameter tulangan yang digunakan D 13

$$A_1 \phi = \frac{1}{4} \pi \cdot 13^2 = 132,73 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_1 \phi \cdot 1000}{A_s} = \frac{132,73 \cdot 1000}{1005} = 132 \text{ mm}$$

Jadi dipakai tulangan susut **D13 – 130**

5.3.5. Kontrol Lendutan Pelat Lantai Jembatan

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 24,9 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Tebal Pelat, h	= 250 mm
Jarak tulangan terhadap sisi luar beton	= 40 mm
Modulus elastis baja (E_s)	= 200000 Mpa
Modulus elastis beton, $E_c = 4700 \times \sqrt{f_c'}$	$= 4700 \times \sqrt{24,9} = 23452,953 \text{ Mpa}$
Tebal efektif pelat, $d = h - p_b$	$= 250 - 40 = 210 \text{ mm}$
Luas Tulangan pelat, A_s	= 2010 mm ²
Panjang bentang pelat, L_x	$= 2,06 \text{ m} = 2060 \text{ mm}$
Ditinjau pelat selebar, b	$= 1 \text{ m} = 1000 \text{ mm}$
Beban terpusat, P	= 13,84 Ton
Beban merata, Q	= 0,945 Ton/m
Lendutan total yang terjadi (δ_{tot}) harus <	$\frac{L_x}{240} = \frac{2060}{240} = 8,58 \text{ mm}$

Inersia brutto penampang pelat yang ditinjau =

$$I_g = \frac{1}{12} \cdot b \cdot h^3 = \frac{1}{12} \cdot 1000 \cdot 250^3 = 1302083333 \text{ mm}^4$$

Modulus keruntuhan lentur beton, $f_r = 0,7 \times 0,7 \times \sqrt{24,9} = 3,492993 \text{ Mpa}$

$$n = \frac{E_s}{E_c} = \frac{200000}{23452,953} = 8,53$$

Jarak garis netral terhadap sisi atas beton, $c = \frac{n.A_s}{b} = \frac{8,53.2010}{1000} = 17,15 \text{ mm}$

Inersia penampang retak yang ditransformasikan ke beton =

$$I_{cr} = \frac{1}{3} \cdot b \cdot c^3 + n \cdot A_s \cdot (d - c)^2 = \frac{1}{3} \cdot 1000 \cdot 17,15^3 + 8,53 \cdot 2010 \cdot (210 - 17,15)^2 =$$

$$I_{cr} = 639334353 \text{ mm}^4$$

$$Y_t = \frac{h}{2} = \frac{250}{2} = 125 \text{ mm}$$

$$\text{Momen retak, } M_{cr} = \frac{f_r \cdot I_g}{Y_t} = \frac{3,492993 \cdot 1302083333}{125} = 36385343,74 \text{ N-mm}$$

Momen maksimum akibat beban (tanpa factor beban) =

$$M_a = \frac{1}{8} \cdot Q \cdot Lx^2 + \frac{1}{4} \cdot P \cdot Lx = \frac{1}{8} \cdot 0,945 \cdot 2,06^2 + \frac{1}{4} \cdot 13,84 \cdot 2,06 =$$

$$M_a = 7,63 \text{ Ton-m} = 76300000 \text{ N-mm}$$

Inersia efektif untuk perhitungan lendutan =

$$I_e = \left(\frac{M_{cr}}{M_a} \right)^3 \times I_g + \left(1 - \left(\frac{M_{cr}}{M_a} \right)^3 \right) \times I_{cr} =$$

$$I_e = \left(\frac{36385343,74}{76300000} \right)^3 \times 1302083333 + \left(1 - \left(\frac{36385343,74}{76300000} \right)^3 \right) \times 639334353 =$$

$$I_e = 711205602 \text{ mm}^4$$

$$\text{Beban terpusat, } P = 13,84 \text{ Ton} = 138400 \text{ N}$$

$$\text{Beban merata, } Q = 0,945 \text{ Ton/m} = 9,45 \text{ N/mm}$$

Lendutan elastis seketika akibat beban mati dan beban hidup =

$$\delta_e = \frac{5}{384} \cdot \frac{Q \cdot Lx^4}{E_c \cdot I_e} + \frac{1}{48} \cdot \frac{P \cdot Lx^3}{E_c \cdot I_e} =$$

$$\delta_e = \frac{\frac{5}{384} \cdot 9,45 \cdot 2060^4}{23452,953.711205602} + \frac{\frac{1}{48} \cdot 138400 \cdot 2060^3}{23452,953.711205602} = 2,6 \text{ mm}$$

Rasio tulangan pelat lantai jembatan =

$$\rho = \frac{As}{(b.d)} = \frac{2010}{(1000.210)} = 0,0096$$

Faktor ketergantungan waktu untuk beban mati (jangka waktu > 5 tahun),

$$\zeta = 2$$

$$\lambda = \frac{\xi}{(1 + 50 \cdot \rho)} = \frac{2}{(1 + 50 \cdot 0,0096)} = 1,353$$

Lendutan jangka panjang akibat rangkai dan susut =

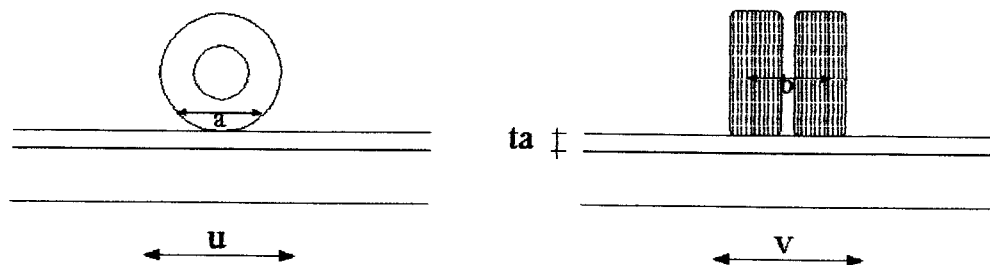
$$\delta_g = \frac{\frac{\lambda \cdot 5}{384} \cdot Q \cdot Lx^4}{Ec \cdot I_e} = \frac{\frac{1,353 \cdot 5}{384} \cdot 9,45 \cdot 2060^4}{23452,953.711205602} = 0,18 \text{ mm}$$

Lendutan total pada pelat lantai jembatan =

$$\delta_{tot} = \delta_e + \delta_g = 2,6 + 0,18 = 2,78 \text{ mm} < \frac{Lx}{240} = \frac{2060}{240} = 8,58 \text{ mm}$$

Aman (Ok)

5.3.6. Kontrol Tegangan Geser Pons



Gambar 5.10 Kontrol tegangan geser pons

$$\text{Mutu beton} = K - 300$$

$$\text{Kuat tekan beton, } f_c' = 24,9 \text{ Mpa}$$

Tegangan geser *pons* yang disyaratkan =

$$f_v = 0,3 \times \sqrt{f_c'} = 0,3 \times \sqrt{24,9} = 1,497 \text{ Mpa}$$

$$\text{Faktor reduksi kekuatan geser } \phi = 0,75$$

$$\phi \cdot f_v = 0,75 \cdot 1,497 = 1,123 \text{ Mpa}$$

$$P = 13,84 \text{ Ton} = 138400 \text{ N}$$

$$h = 0,25 \text{ m}$$

$$t_a = 0,1 \text{ m}$$

$$a = 0,3 \text{ m}$$

$$b = 0,5 \text{ m}$$

$$u = a + 2 \cdot t_a + h = 0,3 + 2 \cdot 0,1 + 0,25 = 0,75 \text{ m} = 750 \text{ mm}$$

$$v = b + 2 \cdot t_a + h = 0,5 + 2 \cdot 0,1 + 0,25 = 0,95 \text{ m} = 950 \text{ mm}$$

$$\text{Tebal efektif pelat, } d = 210 \text{ mm}$$

Luas bidang geser =

$$A_v = 2 \cdot (u + v) \cdot d = 2 \cdot (750 + 950) \cdot 210 = 714000 \text{ mm}^2$$

$$\text{Faktor beban ultimit} = 2$$

$$P_u = 2 \times 138400 = 276800 \text{ N}$$

Tegangan geser *pons ultimit* yang terjadi =

$$f_{vu} = \frac{P_u}{A_v} = \frac{276800}{714000} = 0,388 \text{ Mpa} < \phi \cdot f_v = 0,75 \cdot 1,497 = 1,123 \text{ Mpa}$$

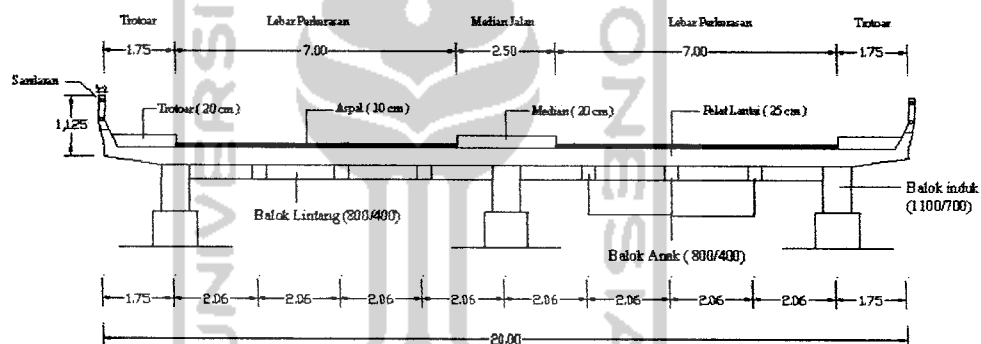
Aman (Ok)

5.4. Perencanaan Pembebanan Struktur Jembatan

Perencanaan pembebanan struktur jembatan meliputi beban mati, beban hidup, beban gempa, beban tekanan tanah, beban angin, beban rem dan traksi, beban akibat perbedaan temperatur, dan beban susut dan rangkai.

5.4.1 Perhitungan Pembebanan Struktur Jembatan

Perhitungan pembebanan struktur pada perencanaan Jembatan Kretek meliputi perencanaan beban mati, beban hidup, beban gempa, beban tekanan tanah, beban angin, beban rem dan traksi, beban akibat perbedaan temperatur, dan beban susut dan rangkai.



Gambar 5.11 Potongan melintang jembatan

Tebal pelat lantai h : 0,25 m

Tebal lapisan aspal + overlay ta : 0,1 m

Tebal genangan air hujan : 0,1 m

Lebar jalur lalu lintas b_1 : 7 m

Lebar trotoar b_2 : 1,75 m

Lebar median b_3 : 2,5 m

Bentang jembatan tengah L_1 : 80 m

Bentang jembatan tepi L_2 : 40 m

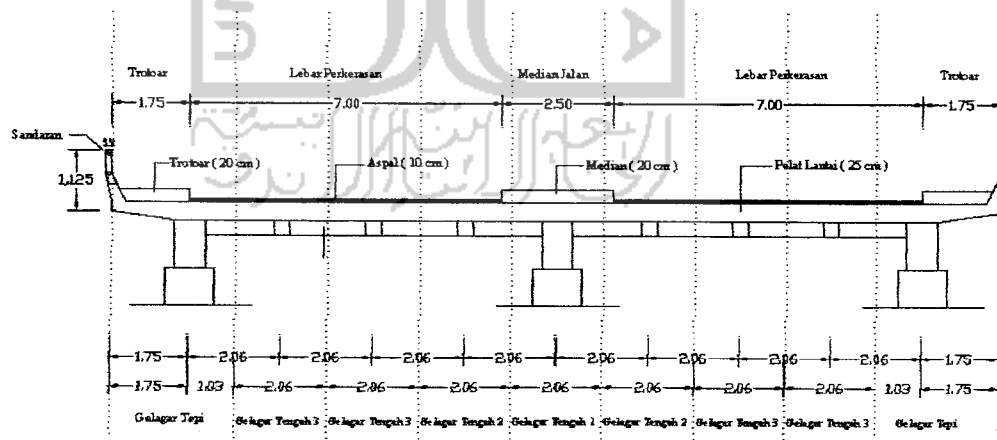
a. Beban Mati

Dalam menentukan besarnya beban mati digunakan nilai berat satuan sebagai berikut :

Tabel 5.5 Berat jenis bahan

Jenis Bahan	Berat	Satuan
Beton Bertulang	2,5	Ton/m ³
Beton Tidak Bertulang	2,4	Ton/m ³
Aspal	2,2	Ton/m ³
Air	1,00	Ton/m ³
Baja	7,85	Ton/m ³
Pasir Kering	1,72	Ton/m ³
Pasir Basah	1,88	Ton/m ³
Timbunan Tanah dipadatkan	1,76	Ton/m ³

Beban mati meliputi beban merata pada gelagar tengah jembatan, gelagar tepi jembatan dan pelat lantai. Pembagian distribusi beban mati gelagar dapat dilihat pada gambar 5.12.



Gambar 5.12. Distribusi beban mati gelagar

1. Beban merata gelagar tengah 1

a. Lapisan aspal	=	$0,1 \text{ m} \times 22 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	4,532	kN/m
b. Genangan air hujan	=	$0,1 \text{ m} \times 10 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	2,06	kN/m
c. Pelat lantai	=	$0,25 \text{ m} \times 25 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	12,875	kN/m
d. Median	=	$0,2 \text{ m} \times 24 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	9,888	kN/m
			Total qd	=	29,355 kN/m

2. Beban merata gelagar tengah 2

a. Lapisan aspal	=	$0,1 \text{ m} \times 22 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	4,532	kN/m
b. Genangan air hujan	=	$0,1 \text{ m} \times 10 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	2,06	kN/m
c. Pelat lantai	=	$0,25 \text{ m} \times 25 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	12,875	kN/m
d. Median	=	$0,2 \text{ m} \times 24 \text{ kN/m}^3 \times 0,22 \text{ m}$	=	1,056	kN/m
			Total qd	=	20,523 kN/m

3. Beban merata gelagar tengah 3

a. Lapisan aspal	=	$0,1 \text{ m} \times 22 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	4,532	kN/m
b. Genangan air hujan	=	$0,1 \text{ m} \times 10 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	2,06	kN/m
c. Pelat lantai	=	$0,25 \text{ m} \times 25 \text{ kN/m}^3 \times 2,06 \text{ m}$	=	12,875	kN/m
			Total qd	=	19,467 kN/m

4. Beban merata gelagar tepi

a. Lapisan aspal	=	$0,1 \text{ m} \times 22 \text{ kN/m}^3 \times 1,03 \text{ m}$	=	2,266	kN/m
b. Genangan air hujan	=	$0,1 \text{ m} \times 10 \text{ kN/m}^3 \times 1,03 \text{ m}$	=	1,03	kN/m
c. Pelat lantai	=	$0,25 \text{ m} \times 25 \text{ kN/m}^3 \times 1,03 \text{ m}$	=	6,438	kN/m
d. Trotoar	=	$0,4 \text{ m} \times 25 \text{ kN/m}^3 \times 1,75 \text{ m}$	=	17,5	kN/m
e. Sandaran	=	$0,15 \text{ m} \times 0,15 \text{ m} \times 25 \text{ kN/m}^3 \times 1,75 \text{ m}$	=	0,98	kN/m
			Total qd	=	28,217 kN/m

b. Beban Hidup

Untuk perhitungan kekuatan gelagar-gelagar pada jembatan harus digunakan muatan *D*. Muatan *D* adalah susunan muatan pada setiap jalur lalu lintas yang terdiri dari muatan terbagi rata sebesar q ton/m panjang jalur dan muatan garis P Ton (belum termasuk kejut) melintang jalur lalu lintas tersebut.

1. Beban hidup perla jalur lalu lintas

a. Beban garis (P) = 12 Ton

b. Beban Merata (q)

$$q = 2,2 \text{ Ton/m} \quad \text{untuk } L < 30 \text{ m}$$

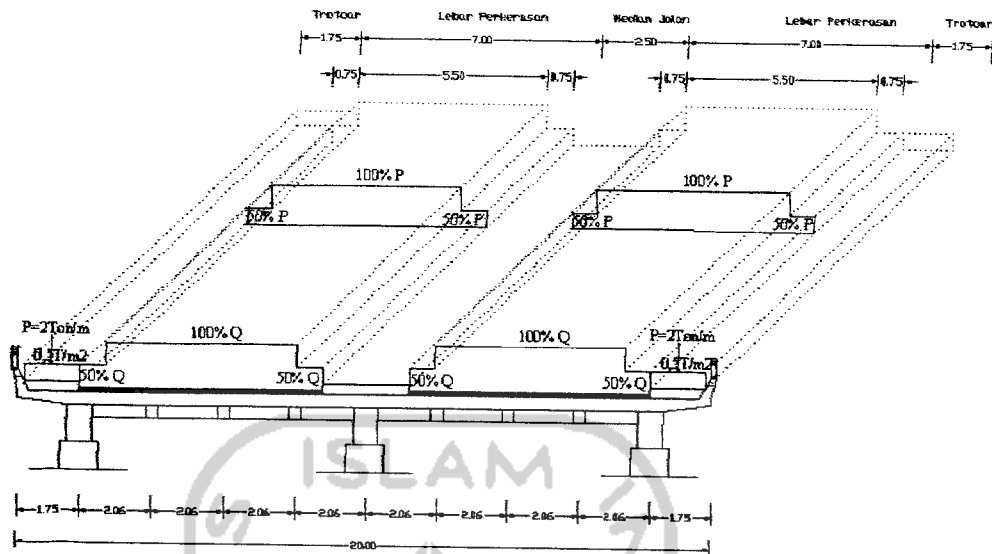
$$q = 2,2 - \frac{1,1}{60} \cdot (L - 30) \text{ Ton/m} \quad \text{untuk } 30 < L < 60 \text{ m}$$

$$q = 1,1 \cdot \left(1,0 + \frac{30}{L}\right) \text{ Ton/m} \quad \text{untuk } L > 60 \text{ m}$$

c. Faktor kejut (K) = $1 + \frac{20}{50 + L}$

2. Distribusi beban

Menurut PPPJIR untuk jembatan dengan lebar lantai kendaraan lebih besar dari 5,5 m, beban *D* sepenuhnya (100 %) dibebankan pada lebar jalur 5,5 m sedang lebar selebihnya dibebani separuh beban *D* (50 %). Beban hidup yang diterima gelagar dapat dilihat pada gambar 5.7.

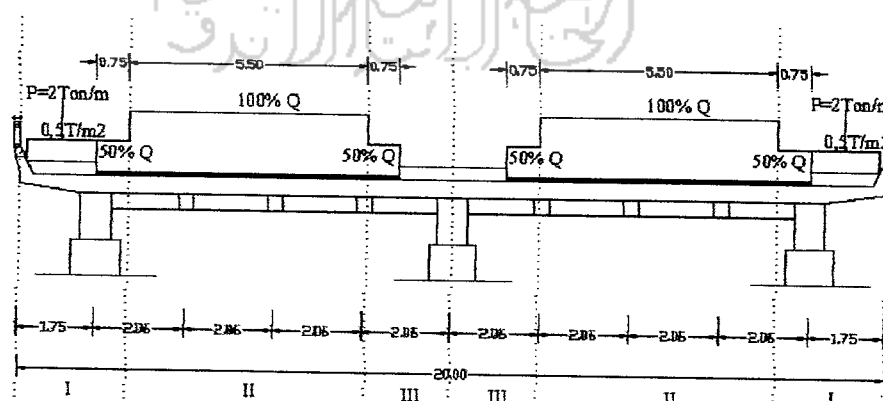


Gambar 5.13 Distribusi beban hidup gelagar

Beban hidup per meter lebar jembatan dapat di hitung sebagai berikut :

$$\text{Beban terbagi rata } Q = \frac{q_{\text{ton / meter}}}{2,75 \text{ meter}}$$

Angka pemabagi 2,75 meter di atas selalu tetap dan tidak tergantung pada lebar jalur lalu lintas (PPPJJR 1987,hal 8). Distribusi beban D dapat dilihat pada gambar 5.8.



Gambar 5.14 Distribusi beban hidup gelagar

Distribusi beban D untuk tiap gelagar dapat dihitung sebagai berikut :

a. Beban jalur D merata untuk $L = 80 \text{ m}$ ($L > 60 \text{ m}$)

$$q = 1,1 \cdot \left(1,0 + \frac{30}{L} \right) = 1,1 \cdot \left(1,0 + \frac{30}{80} \right) = 1,51 \text{ Ton/m}$$

Beban hidup pada trotoar :

$$q' = 0,5 \text{ Ton/m}^2$$

$$P' = 2 \text{ Ton/m}$$

$$\begin{aligned} \text{Beban hidup merata } q \text{ pada trotoar} &= (P' + b_2 \cdot q') \\ &= (2 + 1,75 \cdot 0,5) = 2,875 \text{ Ton/m} \end{aligned}$$

$$\begin{aligned} \text{Bagian I} &= Q \text{ 50 \% } + Q \text{ Trotoar} \\ &= \left(\frac{q}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \right) + Q \text{ Trotoar} \\ &= \left(\frac{1,51}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \right) + 2,875 \\ &= \left(\frac{1,51}{2,75} \times 0,75 \times 50 \% \right) + 2,875 \\ &= 0,206 \text{ Ton/m} + 2,875 \text{ Ton/m} = 3,08 \text{ Ton/m} \end{aligned}$$

$$\begin{aligned} \text{Bagian II} &= Q \text{ 100 \% } \\ &= \frac{q}{2,75} \times 5,5 \times 100 \% \\ &= \frac{1,51}{2,75} \times 5,5 \times 100 \% = 3,02 \text{ Ton/m} \end{aligned}$$

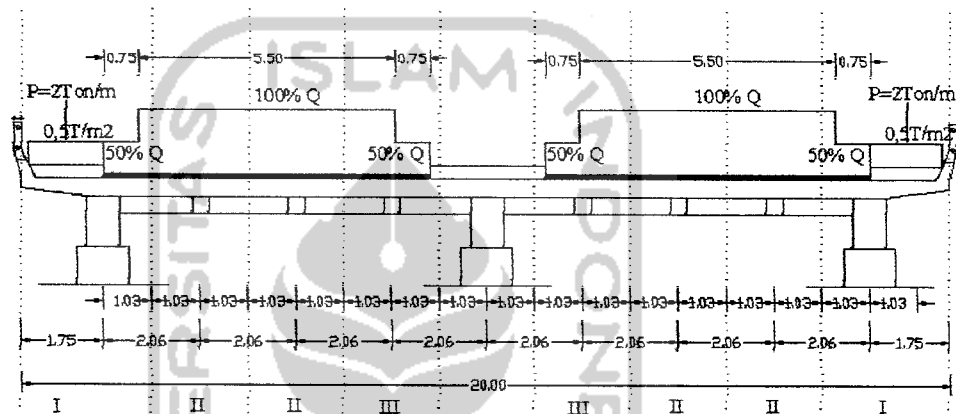
$$\text{Bagian III} = Q \text{ 50 \% }$$

$$= \frac{q}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \%$$

$$= \frac{1,51}{2,75} \times \left(\frac{7-5,5}{2} \right) \times 50 \%$$

$$= \left(\frac{1,51}{2,75} \times 0,75 \times 50 \% \right) = 0,206 \text{ Ton/m}$$

Distribusi beban hidup untuk tiap gelagar dapat dilihat pada gambar 5.9



Gambar 5.15 Distribusi beban hidup tiap gelagar

Distribusi beban D untuk tiap gelagar dapat dihitung sebagai berikut :

$$\text{balok I} = \left(\frac{1,51}{2,75} \times 0,75 \times 50 \% \right) + \left(\frac{1,51}{2,75} \times 0,28 \times 100 \% \right) + 2,875$$

$$= 0,206 \text{ Ton/m} + 0,154 \text{ Ton/m} + 2,875 \text{ Ton/m} = 3,234 \text{ Ton/m}$$

$$\text{balok II} = \left(\frac{1,51}{2,75} \times 2,06 \times 100 \% \right) = 1,13 \text{ Ton/m}$$

$$\text{balok III} = \left(\frac{1,51}{2,75} \times 1,09 \times 100 \% \right) + \left(\frac{1,51}{2,75} \times 0,75 \times 50 \% \right) = 0,805 \text{ Ton/m}$$

Beban garis

$$P = 12 \text{ Ton}$$

$$\text{Faktor kejut} = 1 + \frac{20}{50 + L} = 1 + \frac{20}{50 + 80} = 1,1538$$

$$\text{Bagian I} = P \text{ 50 \%}$$

$$\begin{aligned} &= \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times K \\ &= \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 1,1538 \\ &= \left(\frac{12}{2,75} \times 0,75 \times 50 \% \right) \times 1,1538 = 1,888 \text{ Ton} \end{aligned}$$

$$\text{Bagian II} = P \text{ 100 \%}$$

$$\begin{aligned} &= \frac{P}{2,75} \times 5,5 \times 100 \% \times K \\ &= \frac{12}{2,75} \times 5,5 \times 100 \% \times 1,1538 \\ &= 27,691 \text{ Ton} \end{aligned}$$

$$\text{Bagian III} = P \text{ 50 \%}$$

$$\begin{aligned} &= \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times K \\ &= \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 1,1538 \\ &= \left(\frac{12}{2,75} \times 0,75 \times 50 \% \right) \times 1,1538 = 1,888 \text{ Ton} \end{aligned}$$

b. Beban jalur D merata untuk $L = 40 \text{ m}$ ($L < 60 \text{ m}$)

$$q = 2,2 - \frac{1,1}{60} \cdot (L - 30) = 2,2 - \frac{1,1}{60} \cdot (40 - 30) = 2,02 \text{ Ton/m}$$

Beban hidup pada trotoar :

$$q' = 0,5 \text{ Ton/m}^2$$

$$P' = 2 \text{ Ton/m}$$

$$\text{Beban hidup merata } q \text{ pada trotoar} = (P' + b_2 \cdot q') = (2 + 1,75 \cdot 0,5) = 2,875$$

Ton/m

$$\text{Bagian I} = Q \text{ 50 \%} + Q \text{ Trotoar}$$

$$= \left(\frac{q}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \right) + Q \text{ Trotoar}$$

$$= \left(\frac{2,02}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \right) + 2,875$$

$$= \left(\frac{2,02}{2,75} \times 0,75 \times 50 \% \right) + 2,875$$

$$= 0,3 \text{ Ton/m} + 2,875 \text{ Ton/m} = 3,18 \text{ Ton/m}$$

$$\text{Bagian II} = Q \text{ 100 \%}$$

$$= \frac{q}{2,75} \times 5,5 \times 100 \%$$

$$= \frac{2,02}{2,75} \times 5,5 \times 100 \% = 4,04 \text{ Ton/m}$$

$$\text{Bagian III} = Q \text{ 50 \%}$$

$$= \frac{q}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \%$$

$$= \frac{2,02}{2,75} \times \left(\frac{7-5,5}{2} \right) \times 50 \%$$

$$= \left(\frac{2,02}{2,75} \times 0,75 \times 50 \% \right) = 0,3 \text{ Ton/m}$$

Distribusi beban D untuk tiap gelagar dapat dihitung sebagai berikut :

$$\text{balok I} = \left(\frac{2,02}{2,75} \times 0,75 \times 50 \% \right) + \left(\frac{2,02}{2,75} \times 0,28 \times 100 \% \right) + 2,875$$

$$= 0,275 \text{ Ton/m} + 0,206 \text{ Ton/m} + 2,875 \text{ Ton/m} = 3,356 \text{ Ton/m}$$

$$\text{balok II} = \left(\frac{2,02}{2,75} \times 2,06 \times 100 \% \right) = 1,513 \text{ Ton/m}$$

$$\text{balok III} = \left(\frac{2,02}{2,75} \times 1,09 \times 100 \% \right) + \left(\frac{2,02}{2,75} \times 0,75 \times 50 \% \right) = 1,075 \text{ Ton/m}$$

Beban garis

$$P = 12 \text{ Ton}$$

$$\text{Faktor kejut} = 1 + \frac{20}{50 + L} = 1 + \frac{20}{50 + 40} = 1,222$$

$$\text{Bagian I} = P \ 50 \%$$

$$= \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times K$$

$$= \frac{12}{2,75} \times \left(\frac{7-5,5}{2} \right) \times 50 \% \times 1,222$$

$$= \left(\frac{12}{2,75} \times 0,75 \times 50 \% \right) \times 1,222 = 1,999 \text{ Ton}$$

Bagian II = P 100 %

$$\begin{aligned}
 &= \frac{P}{2,75} \times 5,5 \times 100 \% \times K \\
 &= \frac{12}{2,75} \times 5,5 \times 100 \% \times 1,222 \\
 &= 29,328 \text{ Ton}
 \end{aligned}$$

Bagian III = P 50 %

$$\begin{aligned}
 &= \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times K \\
 &= \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 1,222 \\
 &= \left(\frac{12}{2,75} \times 0,75 \times 50 \% \right) \times 1,222 = 1,999 \text{ Ton}
 \end{aligned}$$

5.4.2. Pembebanan Gempa

Struktur jembatan Kretek direncanakan tahan terhadap gempa, dimana wilayah Yogyakarta termasuk daerah gempa 3 dan dengan kondisi tanah dasar sedang. Besar beban gempa ditentukan oleh koefisien gempa rencana dan berat total struktur jembatan. Berat total struktur terdiri atas berat sendiri struktur jembatan, beban mati dan beban hidup yang bekerja. Diperkirakan waktu getar alami struktur jembatan rangka beton lengkung, $T = 0,1 - 1$ detik.

a. $T_{EQ} = C . S . I . Wt$

Dimana :

T_{EQ} = Gaya geser dasar akibat gempa,

C = koefisien gempa dasar,

I = faktor keutamaan struktur,

S = faktor jenis struktur,

Wt = berat total bangunan.

Berdasarkan Peraturan Perencanaan Tahan Gempa untuk wilayah 3 diperoleh :

Koefisien gempa dasar, $c = 0,18$

Faktor keutamaan struktur, $I = 1,2$

Faktor jenis struktur, $S = 1$

b. Wt (berat bangunan)

1. Beban Mati

Berat pelat lantai dan tiang sandaran :

a. Berat pelat lantai = $0,25 \text{ m} \times 240 \text{ m} \times 16,5 \text{ m} \times 25 \text{ kN/m}^3 = 24750 \text{ kN}$

b. Berat pelat trotoar

$$= ((0,325 \text{ m} \times 240 \text{ m} \times 1,75 \text{ m} \times 25 \text{ kN/m}^3) + (0,5 \times 1,75 \text{ m} \times 0,125 \text{ m} \times 240 \text{ m} \times 25 \text{ kN/m}^3) \times 2) = 8137,5 \text{ kN}$$

c. Berat tiang sandaran

$$= 0,15 \text{ m} \times 0,15 \text{ m} \times 1,125 \text{ m} \times 240 \text{ m} \times 25 \text{ kN/m}^3 = 330,75 \text{ kN}$$

d. Median jalan

$$= (0,2 \text{ m} \times 240 \text{ m} \times 2,5 \text{ m} \times 25 \text{ kN/m}^3) = 300 \text{ kN}$$

Total = 33518,25 kN

Berat Balok

Berat balok = Luas x panjang x b_j x Σ balok

Perhitungan berat balok dapat dilihat pada tabel 5.6.

Tabel 5.6. Tabel berat balok

No	Jenis	B _j (kN/m ³)	H (m)	B (m)	L (m)	Jml	Berat (kN)
1	Balok Induk	25	1	0,7	240	3	12600
2	Balok Anak	25	0,8	0,4	240	6	11520
3	Balok Lintang	25	0,8	0,4	16,5	94	12408
4	Balok Lengkung	25	0,9	1,6	40,5768	6	8764,5888
	Balok Lengkung	25	0,9	1,6	82,2117	6	17757,7272
Total Berat Balok							63050,316

Berat kolom

Berat kolom = Luas x tinggi x b_j x Σ kolom

Perhitungan berat kolom dapat dilihat pada tabel 5.7.

Tabel 5.7. Tabel berat kolom

Kolom	B (m)	H (m)	B _j (kN/m ³)	TINGGI (m)	JML	Berat (kN)
K1	1,4	1,4	25	11	3	1617
K1	1,4	1,4	25	7,365	6	2165,31
K2	1,2	1,2	25	0,359	6	77,544
K2	1,2	1,2	25	0,875	6	189
K2	1,2	1,2	25	1,549	6	334,584
K2	1,2	1,2	25	2,383	6	514,728
K2	1,2	1,2	25	3,378	6	729,648
K2	1,2	1,2	25	4,538	6	980,208
K2	1,2	1,2	25	5,866	6	1267,056
K2	1,2	1,2	25	5,624	6	1214,784
K2	1,2	1,2	25	4,172	6	901,152
K2	1,2	1,2	25	2,999	6	647,784
K2	1,2	1,2	25	2,093	6	452,088

K2	1,2	1,2	25	1,445	6	312,12
K3	0,7	0,7	25	1,049	6	77,1015
K3	0,7	0,7	25	0,902	6	66,297
K3	0,7	0,7	25	1	6	73,5
K2	1,2	1,2	25	1,344	6	290,304
K2	1,2	1,2	25	1,935	6	417,96
K2	1,2	1,2	25	2,777	6	599,832
K2	1,2	1,2	25	3,873	6	836,568
K2	1,2	1,2	25	5,245	6	1132,92
K2	1,2	1,2	25	6,864	6	1482,624
K2	1,2	1,2	25	8,781	6	1896,696
Total berat kolom						18276,81

2. Beban hidup

Beban hidup = koef reduksi x q_l x luas bangunan

$$= 0,3 \times ((0,5 \text{ t/m}^2 \times 1,75 \text{ m} \times 2 \times 240 \text{ m}) + (\frac{2,2 \text{ t/m}}{2,75 \text{ m}} \times 14 \text{ m} \times 240 \text{ m}))$$

$$= 10764 \text{ kN}$$

Berat bangunan Total (W_{tot}) = $W_m + W_l$

$$= 33518,25 \text{ kN} + 63050,316 \text{ kN} + 18276,81 \text{ kN} + 10764 \text{ kN} = 125610 \text{ kN}$$

$$T_{EQ} = C \cdot S \cdot I \cdot W_t$$

$$T_{EQ} = 0,18 \times 1 \times 1,2 \times 125610 \text{ kN} = 27131,76 \text{ kN}$$

Distribusi beban gempa pada pertemuan balok kolom lantai jembatan adalah :

$$\text{untuk joint tengah} = \frac{27131,76}{49} = 554 \text{ kN}$$

$$\text{untuk joint tepi} = \frac{554}{2} = 277 \text{ kN}$$

5.4.3. Beban Angin

Tekanan angin diambil sebesar $= 0,15 \text{ Ton/m}^2$

a. Beban angin arah melintang jembatan

Gaya angin didistribusikan merata pada rangka struktur jembatan lengkung arah melintang jembatan. Lebar bidang kontak vertikal rata-rata untuk setiap elemen rangka jembatan adalah 1 m.

Gaya angin arah melintang jembatan, $A = 0,15 \text{ Ton/m}^2 \times 1 \text{ m} = 0,15 \text{ Ton/m}$

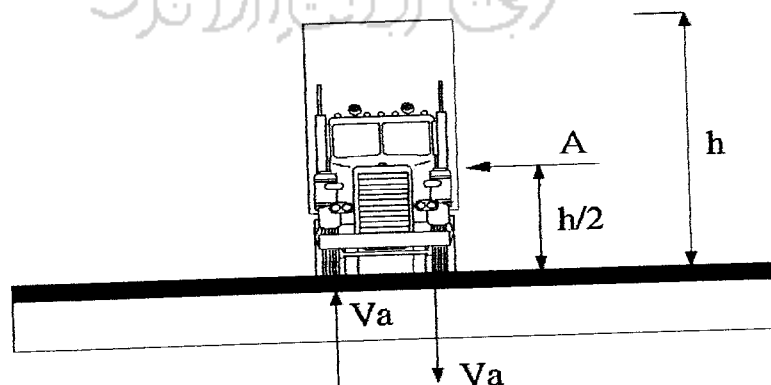
b. Beban angin arah memanjang jembatan

Untuk jembatan menerus yang mempunyai lebih dari 2 peletakan harus diperhitungkan beban angin pada arah memanjang jembatan yang besarnya 40 % beban angin arah melintang jembatan.

Gaya angin arah memanjang, $A = 40 \% \times 0,15 \text{ Ton/m} = 0,06 \text{ Ton/m}$

c. Beban angin pada lantai jembatan

Beban angin pada jembatan pada keadaan dengan beban hidup, maka luas bidang kontak diambil 100 % dari luas bidang sisi yang terkena angin.



Gambar 5.16 Beban angin pada jembatan

Bidang vertikal yang ditiup angin merupakan bidang samping kendaraan yang mempunyai tinggi 2 m di atas lantai jembatan.

$$\text{Jarak antara roda kendaran, } x = 1,75 \text{ m}$$

$$h = 2 \text{ m}$$

$$\text{Gaya angin, } A = p \times h = 0,15 \text{ Ton/m}^2 \times 2 \text{ m} = 0,3 \text{ Ton/m}$$

$$V_a = \frac{1/2 \cdot h}{x \cdot A} \times 2 = \left(\frac{1/2 \cdot 2}{1,75 \cdot 0,3} \right) \times 2 = 0,343 \text{ Ton/m}$$

5.4.4. Beban Rem dan Traksi

Gaya rem pada arah memanjang jembatan diperhitungkan sebesar 5 % beban D (beban hidup tanpa koefisien kejut)

Beban jalur D untuk bentang $L = 80 \text{ m}$

Beban hidup merata dan beban garis tanpa koefisien kejut :

Pada daerah 100 % (selebar 5,5 m)

$$\begin{aligned} = Q \text{ } 100 \% &= \frac{q}{2,75} \times 5,5 \times 100 \% \times L \\ &= \frac{1,51}{2,75} \times 5,5 \times 100 \% \times 80 &= 241,6 \text{ Ton} \end{aligned}$$

$$\begin{aligned} = P \text{ } 100 \% &= \frac{P}{2,75} \times 5,5 \times 100 \% \\ &= \frac{12}{2,75} \times 5,5 \times 100 \% &= 24 \text{ Ton} \end{aligned}$$

$$\text{Total beban hidup D tanpa kejut pada daerah 100 \%} = 265,6 \text{ Ton}$$

$$R_m \text{ pada daerah 100 \%} = 5 \% \times \text{Beban hidup } D \text{ tanpa koefisien kejut}$$

$$= 5 \% \times 265,6 \text{ Ton} = 13,28 \text{ Ton}$$

Pada daerah 50 % (selebar 0,75 m)

$$\begin{aligned} = Q 50 \% &= \frac{q}{2,75} \times 0,75 \times 50 \% \times L \\ &= \frac{1,51}{2,75} \times 0,75 \times 50 \% \times 80 &= 16,47 \text{ Ton} \end{aligned}$$

$$\begin{aligned} = P 100 \% &= \frac{P}{2,75} \times 0,75 \times 50 \% \\ &= \frac{12}{2,75} \times 0,75 \times 50 \% &= 1,636 \text{ Ton} \end{aligned}$$

$$\text{Total beban hidup D tanpa kejut pada daerah 50 \%} = 18,106 \text{ Ton}$$

R_m pada daerah 50 % = 5 % x Beban hidup D tanpa koefisien kejut

$$= 5 \% \times 18,106 \text{ Ton} = 0,91 \text{ Ton}$$

$$\text{Lengan terhadap permukaan lantai jembatan} = 1,8 \text{ m}$$

Lengan terhadap penampang pelat lantai jembatan y

$$y = 1,8 + h/2 + t_a = 1,8 + 0,25/2 + 0,1 = 2,025 \text{ m}$$

Momen akibat gaya rem (M_{rm}) = $R_m \cdot y$

$$= (13,28 + 0,91) \times 2,025 = 28,735 \text{ Ton-m}$$

Beban jalur D untuk bentang $L = 40 \text{ m}$

Beban hidup merata dan beban garis tanpa koefisien kejut :

Pada daerah 100 % (selebar 5,5 m)

$$= Q 100 \% = \frac{q}{2,75} \times 5,5 \times 100 \% \times L$$

$$= \frac{2,02}{2,75} \times 5,5 \times 100 \% \times 40 = 161,6 \text{ Ton}$$

$$= P \ 100 \% = \frac{P}{2,75} \times 5,5 \times 100 \%$$

$$= \frac{12}{2,75} \times 5,5 \times 100 \% = 24 \text{ Ton}$$

$$\text{Total beban hidup D tanpa kejut pada daerah 100 \%} = 185,6 \text{ Ton}$$

$$\text{Rm pada daerah 100 \%} = 5 \% \times \text{Beban hidup D tanpa koefisien kejut}$$

$$= 5 \% \times 185,6 \text{ Ton} = 9,28 \text{ Ton}$$

$$\text{Pada daerah 50 \% (selebar 0,75 m)}$$

$$\begin{aligned} = Q \ 50 \% &= \frac{q}{2,75} \times 0,75 \times 50 \% \times L \\ &= \frac{2,02}{2,75} \times 0,75 \times 50 \% \times 40 = 11,018 \text{ Ton} \end{aligned}$$

$$\begin{aligned} = P \ 100 \% &= \frac{P}{2,75} \times 0,75 \times 50 \% \\ &= \frac{12}{2,75} \times 0,75 \times 50 \% = 1,636 \text{ Ton} \end{aligned}$$

$$\text{Total beban hidup D tanpa kejut pada daerah 50 \%} = 12,65 \text{ Ton}$$

$$\text{Rm pada daerah 50 \%} = 5 \% \times \text{Beban hidup D tanpa koefisien kejut}$$

$$= 5 \% \times 12,65 \text{ Ton} = 0,63 \text{ Ton}$$

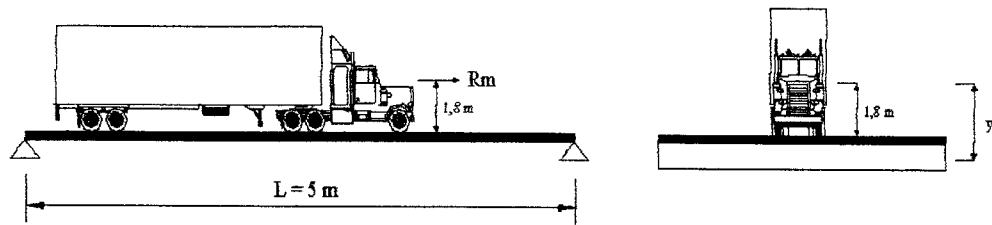
$$\text{Lengan terhadap permukaan lantai jembatan} = 1,8 \text{ m}$$

$$\text{Lengan terhadap penampang pelat lantai jembatan ,y}$$

$$y = 1,8 + h/2 + t_a = 1,8 + 0,25/2 + 0,1 = 2,025 \text{ m}$$

$$\text{Momen akibat gaya rem (M_{rm})} = R_m \cdot y$$

$$= (9,28 + 0,63) \times 2,025 = 20,07 \text{ Ton-m}$$



Gambar 5.17 Gaya rem pada jembatan

5.4.5. Beban Temperatur

Untuk memperhitungkan tegangan maupun deformasi struktur yang timbul akibat perbedaan temperatur antara bagian jembatan, diambil perbedaan temperatur antara bagian jembatan, diambil perbedaan temperatur maksimum 15^0 C .

$$\Delta T = 15^0 \text{ C}$$

$$\text{Mutu beton} = K - 300$$

$$\text{Kuat tekan beton, } f_c' = 24,9 \text{ Mpa}$$

$$\text{Koefisien muai panjang untuk beton, } \epsilon = 100000 / ^0\text{C}$$

$$\text{Modulus elastis beton, } E_c = 4700 \times \sqrt{f_c'} = 4700 \times \sqrt{24,9} = 23452,953 \text{ Mpa}$$

5.4.6. Beban Susut dan Rangkak

Pengaruh rangkak dan susut terhadap konstruksi jembatan diperhitungkan senilai dengan gaya yang timbul akibat turunnya suhu sebesar 15^0 C .

$$\Delta T = 15^0 \text{ C}$$

Mutu beton $= K-300$

Kuat tekan beton, f_c' $= 24,9 \text{ Mpa}$

Modulus elastisitas beton, $E_c = 4700 \times \sqrt{f_c'} = 4700 \times \sqrt{24,9} = 23452,953 \text{ Mpa}$

5.4.7. Beban aliran air dan hanyutan

Return periode banjir $= 100$ tahun

Kecepatan aliran, diambil $V_a = 3 \text{ m/det}$

Koefisien seret untuk bentuk permukaan pier bundar, $C_d = 0,7$

Tekanan air, $p = 0,5 \times C_d \times V_a^2 = 0,5 \times 0,7 \times 3^2 = 3,15 \text{ Ton/m}^2$

Lebar bidang kontak aliran air $= 1,4 \text{ m}$

Gaya akibat aliran air, $A_h = 3,15 \text{ Ton/m}^2 \times 1,4 \text{ m} = 4,41 \text{ Ton/m}$

Perencanaan beban horisontal diambil yang terbesar antara beban gempa, angin, rem dan traksi, beban temperatur dan beban susut dan rangkai, sehingga beban sekunder yang digunakan adalah beban gempa.

Kombinasi Pembebanan :

$COMB 1 = 1,3 MD + 2 (MQL + MPL)$

$COMB 2 = 1,3 MD + 2 (MQL + MPL) + 1 MEX$

$COMB 3 = 1,3 MD + 2 (MQL + MPL) + 1 MEY$

5.5. Perencanaan Tulangan Balok / Gelagar

Pada perencanaan balok perhitungan dilakukan hingga elemen tengah bentang jembatan karena struktur simetris. Diambil sebagai contoh perhitungan adalah tulangan tumpuan pada balok tepi elemen 435.

5.5.1 Perhitungan tulangan tumpuan pada balok tepi elemen 435

Dari hasil Analisis struktur dengan *SAP 2000* didapat momen tumpuan (M_u) pada elemen 435 akibat beban mati, beban hidup dan beban gempa adalah

$$M_D = 728,7521 \text{ kNm}$$

$$M_L = 443,1213 \text{ kNm}$$

$$M_E = -71,6843 \text{ kN}$$

$$\begin{aligned} \text{COMB 1} &= 1,3 M_D + 2 (M_{QL} + M_{PL}) \\ &= 1,3 (728,7521) + 2 (443,1213) = 1833,620 \text{ kNm} \end{aligned}$$

$$\begin{aligned} \text{COMB 2} &= 1,3 M_D + 2 (M_{QL} + M_{PL}) + 1 M_{EX} \\ &= 1,3 (728,7521) + 2 (443,1213) + 1 (-71,6843) \\ &= 1761,936 \text{ kNm} \end{aligned}$$

$$M_u \text{ pakai} = 1833,620 \text{ kNm}$$

$$f_c' = 20 \text{ Mpa}$$

$$f_y = 400 \text{ Mpa}$$

$$f_c' = 20 \text{ Mpa} < 30 \text{ Mpa} \text{ maka } \beta_1 = 0,85$$

$$\rho_b = \frac{0,85 \times \beta_1 \times f_c'}{f_y} \times \left(\frac{600}{600 + f_y} \right)$$

$$\rho_b = \frac{0,85 \times 0,85 \times 24,5}{390} \times \left(\frac{600}{600 + 390} \right) = 0,028$$

$$\begin{aligned}\rho_{max} &= 0,75 \times \rho_b \\ &= 0,75 \times 0,028 = 0,0210\end{aligned}$$

$$\begin{aligned}\rho &= 0,5 \times \rho_{Max} \\ &= 0,5 \times 0,021 = 0,0105\end{aligned}$$

$$m = \frac{f_y}{0,85 \times f_c} = \frac{390}{0,85 \times 24,9} = 18,4266 \text{ Mpa}$$

$$\begin{aligned}R_1 &= \rho \times f_y \times (1 - (0,5 \times \rho \times m)) \\ &= 0,0105 \times 390 \times (1 - (0,5 \times 0,0105 \times 18,4266)) \\ &= 3,6938 \text{ Mpa}\end{aligned}$$

$$b d^2 = \frac{M_u / \phi}{R_1} = \frac{(1833,620 / 0,8) \times 10^6}{3,6938} = 620,5123 \times 10^6 \text{ mm}^3$$

Ambil $b = 700 \text{ mm}$

$$d = \sqrt{\frac{b \cdot d^2}{b}} = \sqrt{\frac{620,5123 \times 10^6}{700}} = 941,513 \text{ mm}$$

$$d' = 60 \text{ mm}$$

$$z = 75 \text{ mm}$$

$$\begin{aligned}h &= d + z = 941,513 \text{ mm} + 75 \text{ mm} \\ &= 1016,513 \text{ mm} \rightarrow h \text{ ambil} = 1000 \text{ mm}\end{aligned}$$

$$d = h - z = 1000 \text{ mm} - 75 \text{ mm} = 925 \text{ mm}$$

Tulangan Desak

Ambil $\gamma = 0,40$

$$\begin{aligned}R_2 &= \gamma \times R_1 \\ &= 0,4 \times 3,6938 = 1,4775 \text{ Mpa}\end{aligned}$$

$$\begin{aligned}
 M_1 &= R_2 \times b \times d^2 \\
 &= 1,4775 \times 700 \times 925^2 = 884,9332 \text{ kNm}
 \end{aligned}$$

$$\begin{aligned}
 M_2 &= (Mu/\phi) - M_1 \\
 &= (1833,620/0,8) - 884,9332 = 1407,0918 \text{ kNm}
 \end{aligned}$$

$$\begin{aligned}
 A_s' &= \frac{M_2}{f_y \times (d - d')} \\
 &= \frac{332,3497 \times 10^6}{400 \times (625 - 60)} = 4171,0148 \text{ mm}^2
 \end{aligned}$$

Dipakai Tulangan D 25

$$A_1 = 0,25 \times \pi \times 25^2 = 490,87 \text{ mm}^2$$

$$\text{Jumlah tulangan} = \frac{A_s'}{A_1} = \frac{4171,0148}{490,87} = 8,497 \text{ batang} \rightarrow \text{Dipakai 9 D25}$$

Tulangan Tarik

$$\begin{aligned}
 \rho \text{ baru} &= \gamma \times \rho = 0,40 \times 0,0105 \\
 &= 0,0042
 \end{aligned}$$

$$\begin{aligned}
 A_s &= (\rho \text{ baru} \times b \times d) + A_s' \\
 &= (0,0042 \times 700 \times 925) + 4171,0148 = 6890,515 \text{ mm}^2
 \end{aligned}$$

Dipakai Tulangan D 22

$$A_1 = 0,25 \times \pi \times 22^2 = 490,87 \text{ mm}^2$$

$$\text{Jumlah tulangan} = \frac{A_s}{A_1} = \frac{6890,515}{490,87} = 14,037 \text{ batang} \rightarrow \text{Dipakai 15 D25}$$

Kontrol Momen Tersedia M_g

$$A_s \text{ ada} = 15 \times A_l$$

$$= 15 \times 0,25 \times \pi \times 25^2 = 7359 \text{ mm}^2$$

$$A_s' \text{ ada} = 9 \times A_l$$

$$= 9 \times 0,25 \times \pi \times 25^2 = 4416 \text{ mm}^2$$

$$C_c = 0,85 \times f'_c \times a \times b$$

$$= 0,85 \times 24,9 \times (0,85 c) \times 700 = 12593,18 c$$

$$C_s = A_s' \times \frac{c-d'}{c} \times 600$$

$$= 4416 \times \frac{c-60}{c} \times 600 = 2649600 \frac{c-60}{c}$$

$$T_s = A_s \times f_y$$

$$= 7359 \times 390 = 2870010$$

$$C_c + C_s - T_s = 0$$

$$12593,18 c + 2649600 \frac{c-60}{c} - 2870010 = 0$$

$$c = 121,4591 \text{ mm}$$

$$a = 0,85 \times c = 0,85 \times 121,4591 = 103,2402 \text{ mm}$$

$$f_s' = \frac{c-60}{c} \times 600$$

$$= \frac{121,4591-60}{121,4591} \times 600 = 303,6039 \text{ Mpa} < F_y$$

$$\rightarrow f_s' \text{ pakai} = f_s' = 303,6039 \text{ Mpa}$$

$$M_n = (0,8 \times f'_c \times a \times b \times (d - \frac{a}{2})) + (A_s' \times f_s' \times (d - d'))$$

$$= (0,8 \times 24,9 \times 103,2402 \times 700 \times (925 - \frac{103,2402}{2})) +$$

$$(4416 \times 330,6039 \times (925 - 60))$$

$$= 2495,5027 \text{ kNm}$$

$$0,8 Mn = 0,8 \times 2495,5027 \text{ kNm}$$

$$= 1996,4021 \text{ kNm} > Mu = 1833,620 \text{ kNm} \quad (\text{Aman!!!!})$$

$$\rho_{\text{ada}} = \frac{As_{\text{ada}}}{b \times d} = \frac{7359}{700 \times 925} = 0,01114$$

$$\rho'_{\text{ada}} = \frac{As'_{\text{ada}}}{b \times d} = \frac{4416}{700 \times 925} = 0,0068$$

$$\rho_{\text{ada}} - \rho'_{\text{ada}} = 0,01114 - 0,0068 = 0,00434 < \rho_{\text{max}} = 0,0210 \Rightarrow \text{Aman !!!}$$

Kontrol Momen Tersedia Mg^+

$$\begin{aligned} As_{\text{ada}} &= 9 \times A_I \\ &= 9 \times 0,25 \times \pi \times 25^2 = 4416 \text{ mm}^2 \end{aligned}$$

$$\begin{aligned} As'_{\text{ada}} &= 15 \times A_I \\ &= 15 \times 0,25 \times \pi \times 25^2 = 7359 \text{ mm}^2 \end{aligned}$$

$$\begin{aligned} Cc &= 0,85 \times f'_c \times a \times b \\ &= 0,85 \times 24,9 \times (0,85 c) \times 700 = 12593,18 c \end{aligned}$$

$$\begin{aligned} Cs &= As' \times \frac{c - d'}{c} \times 600 \\ &= 7359 \times \frac{c - 75}{c} \times 600 = 4415400 \frac{c - 75}{c} \end{aligned}$$

$$\begin{aligned} Ts &= As \times fy \\ &= 4416 \times 390 = 1722240 \end{aligned}$$

$$Cc + Cs - Ts = 0$$

$$12593,18 c + 4415400 \frac{c-75}{c} - 1722240 = 0$$

$$12593,18 c^2 + 4415400 (c-75) - 1722240 c = 0$$

$$12593,18 c^2 + 4415400 c - 331155000 - 1722240 c = 0$$

$$12593,18 c^2 + 2693160c - 331155000 = 0$$

$$c = 87,3103 \text{ mm}$$

$$a = 0,85 \times c = 0,85 \times 87,3103 = 74,2137 \text{ mm}$$

$$\begin{aligned} f_s' &= \frac{c-75}{c} \times 600 \\ &= \frac{87,3103-75}{87,3103} \times 600 = 84,5969 \text{ Mpa} < F_y \end{aligned}$$

$$\rightarrow f_s' \text{ pakai} = f_s' = 84,5969 \text{ Mpa}$$

$$\begin{aligned} Mn &= (0,85 \times f_c \times a \times b \times (d - \frac{a}{2})) + (A_s' \times f_s' \times (d - d')) \\ &= (0,85 \times 24,9 \times 74,2137 \times 700 \times (925 - \frac{74,2137}{2})) + \\ &\quad (7359 \times 84,5969 \times (925 - 75)) \\ &= 1505,4437 \text{ kNm} \end{aligned}$$

$$0,8 Mn = 0,8 \times 1505,4437 = 1204,355 \text{ kNm}$$

5.5.2 Perhitungan Momen Kapasitas Balok

Contoh perhitungan momen kapasitas balok pada elemen 435.

Momen Kapasitas Negatif (Mpr')

$$\text{Tarik} : A_l = 0,25 \times \pi \times 25^2 = 490,87 \text{ mm}^2$$

$$As \text{ ada} = 15 \times 490,87 = 7359 \text{ mm}^2$$

$$\text{Desak} : A_l = 0,25 \times \pi \times 25^2 = 490,87 \text{ mm}^2$$

$$As' \text{ ada} = 9 \times 490,87 = 4416 \text{ mm}^2$$

$$Cc = 0,85 \times f'_c \times a \times b$$

$$= 0,85 \times 24,9 \times (0,85 \times c) \times 700$$

$$= 12593,175 \cdot c$$

$$Cs = As' \text{ ada} \times \frac{c - d'}{c} \times 600$$

$$= 4416 \times \frac{c - 60}{c} \times 600$$

$$= 2649375 \times \frac{c - 60}{c}$$

$$Ts = 1,25 \times As \text{ ada} \times f_y$$

$$= 1,25 \times 7359 \times 390 = 3587512,5$$

$$Cc + Cs - Ts = 0$$

$$12593,175c + 2649375 \cdot \frac{c - 60}{c} - 3587512,5 = 0$$

$$12593,175 c^2 - 938137,5 c - 158962500 = 0$$

$$c = 155,6226 \text{ mm}$$

$$a = 0,85 \times c = 0,85 \times 155,6226 = 132,2792 \text{ mm}$$

$$f_s' = \frac{c-60}{c} \times 600$$

$$= \frac{155,6226-60}{155,6226} \times 600 = 368,6711 \text{ Mpa} < f_y = 400 \text{ Mpa}$$

$$f_s' \text{ pakai} = f_s' = 368,6711 \text{ Mpa}$$

$$M_{pr} = \left\{ 0,85 \times f'c \times a \times b \times \left(d - \frac{a}{2} \right) \right\} + \{ As'_{ada} \times f_s' \times (d - d') \}$$

$$= \left\{ 0,85 \times 24,9 \times 132,2792 \times 700 \times \left(925 - \frac{132,2792}{2} \right) \right\} +$$

$$\{ 4416 \times 368,6711 \times (925 - 60) \}$$

$$= 3091,3242 \text{ KNm}$$

$$0,8 Mn = 0,8 \times 3091,3242 = 2473,0594 \text{ Mpa}$$

Momen Kapasitas Positif (M_{pr}^+)

$$\text{Tarik} : A_l = 0,25 \times \pi \times 25^2 = 490,87 \text{ mm}^2$$

$$As_{ada} = 5 \times 490,87 = 2453 \text{ mm}^2$$

$$\text{Desak} : A_l = 0,25 \times \pi \times 25^2 = 490,87 \text{ mm}^2$$

$$As'_{ada} = 9 \times 490,87 = 4416 \text{ mm}^2$$

$$Cc = 0,85 \times f'c \times a \times b$$

$$= 0,85 \times 24,9 \times (0,85 \times c) \times 700$$

$$= 12593,175 \cdot c$$

$$Cs = As'_{ada} \times \frac{c-d'}{c} \times 600$$

$$= 4416 \times \frac{c-75}{c} \times 600$$

$$= 2649375 \times \frac{c-75}{c}$$

$$Ts = 1,25 \times Asada \times fy$$

$$= 1,25 \times 2453 \times 390 = 1195898,438$$

$$Cc + Cs - Ts = 0$$

$$12593,175c + 2649375 \cdot \frac{c-75}{c} - 1195898,438 = 0$$

$$12593,175 c^2 + 1453476,56 c - 198703125 = 0$$

$$c = 80,5262 \text{ mm}$$

$$a = 0,85 \times c = 0,85 \times 80,5262 = 68,4473 \text{ mm}$$

$$fs' = \frac{c-75}{c} \times 600$$

$$= \frac{80,5262 - 75}{80,5262} \times 600 = 41,1759 \text{ Mpa} < fy = 400 \text{ Mpa}$$

$$fs' \text{ pakai} = fs' = 41,1759 \text{ Mpa}$$

$$Mpr^{+-} = \left\{ 0,85 \times f'c \times a \times b \times \left(d - \frac{a}{2} \right) \right\} + \{ As' \text{ ada} \times fs' \times (d - d'') \}$$

$$= \left\{ 0,85 \times 24,9 \times 68,4473 \times 700 \left(940 - \frac{68,4473}{2} \right) \right\} +$$

$$\{ 4416 \times 41,1759 \times (940 - 75) \}$$

$$= 1078,5299 \text{ KNm}$$

$$0,8 Mn = 0,8 \times 1078,5299 = 862,8239 \text{ kNm}$$

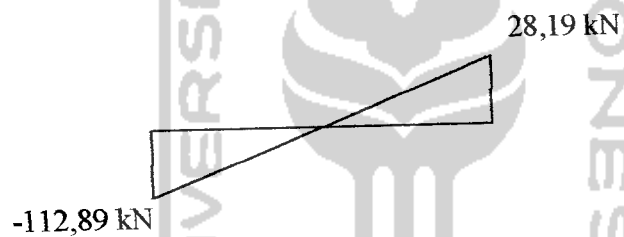
5.5.3. Perencanaan Tulangan Geser Balok

Sebagai contoh perhitungan perencanaan tulangan geser balok adalah pada balok elemen 148, meliputi perhitungan gaya geser balok, perhitungan tulangan geser di dalam sendi plastis, dan perhitungan tulangan geser di luar sendi plastis.

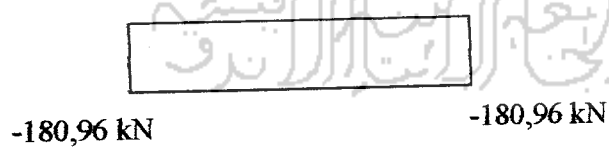
a. Perhitungan gaya geser rencana balok

Dari hasil analisis struktur dengan SAP 2000 didapat gaya geser akibat beban mati dan beban hidup sebagai berikut:

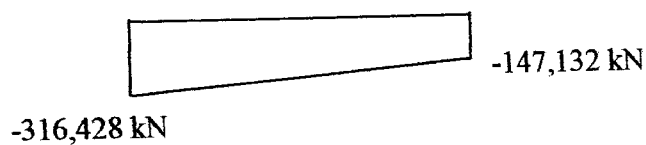
Beban Mati :



Beban Hidup :



Beban Kombinasi ($1,2 VD + VL$) :



Gamabr 5.18 Outpur SAP gaya geser balok

Dari hasil perhitungan momen kapasitas balok, didapat momen kapasitas negatif dan positif balok elemen 148 sebagai berikut :

$$M_{pr}^{-} = 2282,09 \text{ kNm}$$

$$M_{pr}^{+} = 1078,52 \text{ kNm}$$

Gaya geser yang diperlukan :

$$V_u = V_e + V_g$$

$$V_u = \frac{(M_{pr}^{-}) + (M_{pr}^{+})}{L_{netto}} + (1,2 V_D + V_L)$$

L_{netto} = Bentang bersih balok, diukur dari muka kolom

$$L_{netto} = L \text{ Balok} - (0,5 \text{ lebar kolom} + 0,5 \text{ lebar kolom})$$

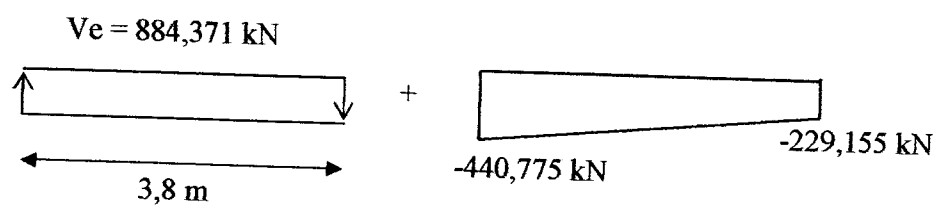
$$L_{netto} = 5 \text{ m} - (0,5 \cdot 1,2 \text{ m} + 0,5 \cdot 1,2 \text{ m}) = 3,8 \text{ m}$$

$$V_e = \frac{(M_{pr}^{-}) + (M_{pr}^{+})}{L_{netto}}$$

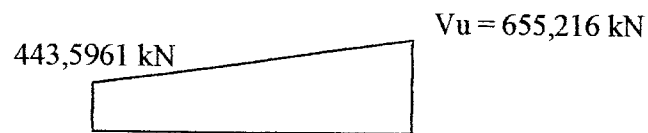
$$V_e = \frac{(2282,09 + 1078,52)}{3,8} = 884,3711 \text{ kN}$$

Menghitung V_u

$$V_u = V_e + V_g$$



V_u :



$$V_u \text{ rencana} = 655,216 \text{ kN}$$

$$b \text{ balok} = 700 \text{ mm}$$

$$h \text{ balok} = 1000 \text{ mm}$$

$$f'_c = 24,9 \text{ Mpa}$$

$$f_y \text{ sengkang} = 390 \text{ Mpa}$$

$$d = 925 \text{ mm}$$

b. Perhitungan tulangan geser balok dalam sendi plastis

$$\text{Bila } V_e \geq 50 \% V_u \quad \text{maka} \quad V_c = 0$$

$$844,371 \text{ kN} > 50 \% \cdot 655,216 \text{ kN}$$

$$844,371 \text{ kN} > 327,608 \text{ kN} \quad \text{maka} \quad V_c = 0$$

$$V_{sI} = \frac{V_u}{\phi} - V_c = \frac{V_u}{0,75}$$

$$= 1092,027 \text{ kN}$$

$$\text{Pakai D13} \longrightarrow A_I \emptyset = \frac{1}{4} \times \pi \times 13^2 = 132,665 \text{ mm}^2$$

dipakai sengkang 4 kaki

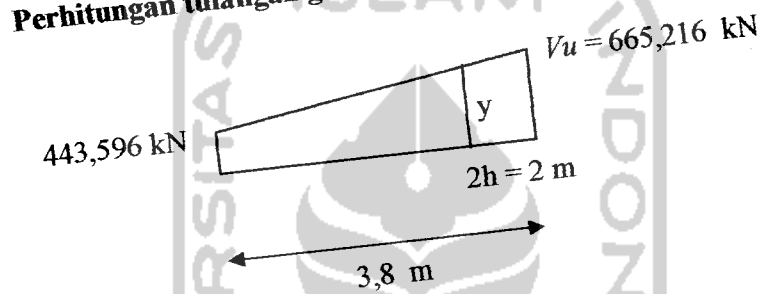
$$S = \frac{kaki \times A_1 \phi \times f_y \times d}{V_{s_1}} = \frac{4 \times 132,665 \times 390 \times 925}{1092,027 \times 1000}$$

$$= 175,303 \text{ mm}$$

$$S_{pakai} = 170 \text{ mm}$$

Dipakai 2D13 -170

b. Perhitungan tulangan geser balok luar sendi plastis



$$y = 443,596 + \frac{(3,8 - 2)}{3,8} \times (665,216 - 443,596)$$

$$y = 543,837 \text{ kN}$$

$$V_{s2} = \frac{y}{0,75} - V_c$$

$$V_{s2} = \frac{y}{0,6} - \left(\frac{1}{6} \times \sqrt{f'_c} \times 350 \times 625 \times \frac{1}{1000} \right)$$

$$= \frac{543,837}{0,6} - \left(\frac{1}{6} \times \sqrt{24,9} \times 700 \times 925 \times \frac{1}{1000} \right)$$

$$= 367,891 \text{ kN}$$

$$\text{Pakai D10} \rightarrow A_l \emptyset = \frac{1}{4} \times \pi \times 13^2 = 132,665 \text{ mm}^2$$

dipakai sengkang 2 kaki

$$S = \frac{kaki \times A_1 \phi \times f_y \times d}{Vs_2} = \frac{2 \times 132,665 \times 390 \times 925}{367,891 \times 1000}$$

$$= 260,1798 \text{ mm}$$

$$S_{pakai} = 200 \text{ mm}$$

Dipakai D13 -200



5.5.4 Perhitungan Grafik Interaksi Kolom

Contoh hitungan untuk membuat diagram M_n Vs P_n Untuk Ast 1%

Data bahan struktur yang digunakan adalah sebagai berikut :

$$f'_c = 24,9 \text{ Mpa}$$

$$f_y = 390 \text{ Mpa}$$

$$h = 1200 \text{ mm}$$

$$d' = 80 \text{ mm}$$

$$d = 1120 \text{ mm}$$

$$b = 1200 \text{ mm}$$

$$Y = h/2 = 1200/2 = 600 \text{ mm}$$

$$A_g = (1200 \cdot 1200) = 1440000 \text{ mm}^2$$

$$A_{sst} = 1\% \cdot A_g = 1\% \cdot 1440000 = 14400 \text{ mm}^2$$

$$A_s = A_s' = 0,5 \cdot A_{sst} = 0,5 \cdot 14400 = 7200 \text{ mm}^2$$

a. Kondisi beban sentris

$$P_n = (0,85 \cdot f'_c \cdot (A_g - A_{sst}) + f_y \cdot A_{sst})$$

$$P_n = (0,85 \cdot 24,9 \cdot (1440000 - 14400) + 390 \cdot 14400) \times 10^{-3}$$

$$P_n = 35788,824 \text{ kN}$$

$$M_n = 0$$

b. Dalam keadaan seimbang ($f_s = f_y$)

$$d = h - d' = 1200 - 80 = 1120 \text{ mm}$$

$$cb = \frac{600}{600 + f_y} x d = \frac{600}{600 + 390} x 1120 = 678,7879 \text{ mm}$$

$$a = 0,85 \cdot cb = 0,85 \cdot 678,7879 = 576,9697 \text{ mm}$$

$$f'_s = \frac{xb - d'}{xb} x 600 = \frac{678,7879 - 80}{678,7879} x 600 = 529,2857 \text{ Mpa} > f_y = 390$$

Mpa

f_s pakai = 390 Mpa

$$\begin{aligned} Cc &= 0,85 \cdot f'_c \cdot a \cdot b \cdot 10^{-3} \\ &= 0,85 \times 24,9 \times 576,9697 \times 1200 \cdot 10^{-3} = 14654 \text{ kN} \end{aligned}$$

$$\begin{aligned} Cs &= A_s' (f'_s - 0,85 \cdot f'_c) \cdot 10^{-3} \\ &= 7200 (390 - 0,85 \cdot 24,9) \cdot 10^{-3} = 2655,612 \text{ kN} \end{aligned}$$

$$Ts = A_s \cdot f_y \cdot 10^{-3} = 7200 \cdot 390 \cdot 10^{-3} = 2808 \text{ kN}$$

$$\begin{aligned} Pnb &= Cc + Cs - Ts \\ &= 14654 + 2655,612 - 2808 = 14501 \text{ kN} \end{aligned}$$

$$\begin{aligned} Mnb &= Cc \left(y - \frac{a}{2} \right) + Cs (y - d') + Ts (d - y) \\ &= 14654 \left(600 - \frac{576,9697}{2} \right) + 2655,612 (600 - 80) + 2808 (1120 - 600) \cdot 10^{-3} \end{aligned}$$

3

$$= 7405,982756 \text{ kNm}$$

c. Patah Desak ($c > cb$) atau ($c < cb$)

Ambil $c = 700 \text{ mm}$

$$f'_s = \frac{c - d'}{c} x 600 = \frac{700 - 80}{700} x 600 = 631,4285714 \text{ Mpa} > f_y = 390 \text{ Mpa}$$

$$f's \text{ pakai} = 390 \text{ Mpa}$$

$$f_s = \frac{d-c}{c} x 600 = \frac{1120-700}{700} x 600 = 360 \text{ Mpa} < f_y = 390 \text{ Mpa}$$

$$f_s \text{ pakai} = 360 \text{ Mpa}$$

$$a = 0,85 \cdot c$$

$$= 0,85 \cdot 700 = 595 \text{ mm}$$

$$C_c = 0,85 \cdot f_c \cdot a \cdot b$$

$$= 0,85 \times 24,9 \times 595 \times 1200 \cdot 10^{-3} = 15111,81 \text{ kN}$$

$$C_s = A_s' (f_s' - 0,85 \cdot f_c)$$

$$= 7200 (390 - 0,85 \cdot 24,9) \cdot 10^{-3} = 2655,612 \text{ kN}$$

$$T_s = A_s \cdot f_s = 7200 \cdot 360 \cdot 10^{-3} = 2592 \text{ kN}$$

$$P_{nb} = C_c + C_s - T_s$$

$$= 15111,81 + 2655,612 - 2592 = 15175,422 \text{ kN}$$

$$M_{nb} = C_c \left(y - \frac{a}{2} \right) + C_s (y - d') + T_s (d - y)$$

$$= 15111,81 \left(600 - \frac{595}{2} \right) + 2655,612 (600 - 80) + 2592 (1120 - 600) \cdot 10^{-3}$$

$$= 7300,080765 \text{ kN}$$

d. Patah Tarik ($c > c_b$) atau ($c < c_b$)

$$\text{Ambil } c = 250 \text{ mm}$$

$$f's = \frac{c-d'}{c} x 600 = \frac{250-80}{250} x 600 = 408 \text{ Mpa} > f_y = 390 \text{ Mpa}$$

$$f's \text{ pakai} = 390 \text{ Mpa}$$

$$f_s = f_y = 390 \text{ Mpa}$$

$$f_s \text{ pakai} = 390 \text{ Mpa}$$

$$\begin{aligned} a &= 0,85 \cdot c \\ &= 0,85 \cdot 250 = 212,5 \text{ mm} \end{aligned}$$

$$\begin{aligned} C_c &= 0,85 \cdot f'_c \cdot a \cdot b \\ &= 0,85 \times 24,9 \times 212,5 \times 1200 \cdot 10^{-3} = 5397,075 \text{ kN} \end{aligned}$$

$$\begin{aligned} C_s &= A_s' (f_s' - 0,85 \cdot f'_c) \\ &= 7200 (390 - 0,85 \cdot 24,9) \cdot 10^{-3} = 2655,612 \text{ kN} \end{aligned}$$

$$T_s = A_s \cdot f_s = 7200 \cdot 390 \cdot 10^{-3} = 2808 \text{ kN}$$

$$\begin{aligned} P_{nb} &= C_c + C_s - T_s \\ &= 15397,075 + 2655,612 - 2808 = 5244,687 \text{ kN} \end{aligned}$$

$$\begin{aligned} M_{nb} &= C_c \left(y - \frac{a}{2} \right) + C_s (y - d') + T_s (d - y) \\ &= 15397,075 \left(600 - \frac{212,5}{2} \right) + 2655,612 (600 - 80) + 2808 (1120 - 600) \cdot 10^{-3} \\ &= 5505,884021 \text{ kN} \end{aligned}$$

e. Kondisi momen murni

$$a = \frac{A_s \cdot f_y}{0,85 \cdot f'_c \cdot b} = \frac{7200 \cdot 390}{0,85 \cdot 24,9 \cdot 1200} = 110,559 \text{ mm}$$

$$\begin{aligned} M_n &= A_s \cdot f_y \cdot (d - a/2) \cdot 10^{-6} \\ &= 7200 \cdot 390 \cdot (1120 - 110,559 / 2) = 2989,733919 \text{ kNm} \end{aligned}$$

$$P_n = 0$$

5.5.5 Perhitungan Tulangan Balok Lengkung

Perhitungan tulangan pada balok lengkung dihitung sebagai perhitungan kolom dikarenakan adanya gaya aksial yang besar. Sebagai contoh perhitungan adalah balok lengkung elemen 14 dan 371. Dari analisis struktur dengan *SAP* 2000 didapat gaya aksial dan momen pada balok lengkung elemen 14 dan 371 adalah :

a. Gaya aksial

$$\begin{aligned}
 P_D &= 2810,25 \text{ kN} \\
 P_L &= 2331,15 \text{ kN} \\
 P_E &= 0,5985 \text{ kN} \\
 P_U &= 1,3 P_D + 2 P_L + 1 P_E \\
 &= 1,3 \cdot 2810,25 + 2 \cdot 2331,15 + 1 \cdot 0,5985 = 8316,22 \text{ kN}
 \end{aligned}$$

dari hasil analisis struktur didapat momen akibat beban hidup, mati dan gempa adalah :

b. Momen arah x

$$\begin{aligned}
 M_{DX} &= 429,453 \text{ kNm} \\
 M_{LX} &= 640,2796 \text{ kNm} \\
 M_{EX} &= 0,22080829 \text{ kNm} \\
 M_{UK} &= 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX} \\
 &= 1,3 \cdot 429,43 + 2 \cdot 640,2796 + 1 \cdot 0,2208 = 1839,06 \text{ kNm}
 \end{aligned}$$

c. Momen arah y

$$M_{DY} = 636,411 \text{ kNm}$$

$$M_{LY} = 2,94883 \text{ kNm}$$

$$M_{EY} = -2,43189 \text{ kNm}$$

$$\begin{aligned} M_{UK} &= 1,3 M_{DY} + 2 M_{LY} + 1 M_{EY} \\ &= 1,3 \cdot 636,411 + 2 \cdot 2,94883 + 1 \cdot -2,43189 = 830,8 \text{ kNm} \end{aligned}$$

d. Perhitungan tulangan

Data bahan struktur yang digunakan adalah sebagai berikut :

$$f'_c = 24,9 \text{ Mpa}$$

$$f_y = 390 \text{ Mpa}$$

$$h = 1000 \text{ mm}$$

$$b = 1600 \text{ mm}$$

$$A_g = 1600 \times 1000 = 1600000 \text{ mm}^2$$

1. Arah X

$$M_{UK\ x} = 1839,06 \text{ kNm}$$

$$P_{UK\ x} = 8316,22 \text{ kN}$$

$$M_{nx} = \frac{M_{ukx}}{\phi} = \frac{1839,06}{0,65} = 2829,32308 \text{ kNm}$$

$$P_{nx} = \frac{P_{ukx}}{\phi} = \frac{8316,22}{0,65} = 12794,1846 \text{ kN}$$

Dari nilai M_n dan P_n , plotkan ke grafik M_n - P_n didapatkan $r = 1 \%$

$$A_s \text{ total} = r \cdot b \cdot h = 1 \% \cdot 1600 \cdot 1000 = 16000 \text{ mm}^2$$

Pakai tulangan $D = 25 \text{ mm}$

$$A_{1\emptyset} = \frac{1}{4} \cdot \pi \cdot D^2 = \frac{1}{4} \cdot \pi \cdot 25^2 = 490,625 \text{ mm}^2$$

$$n = \frac{A_{stotal}}{A_{1\emptyset}} = \frac{16000}{490,625} = 32,611465$$

$n \text{ pakai} = 34 \text{ buah}$

Pakai **34D25**

2. Arah Y

$$M_{UK \ y} = 830,8 \text{ kNm}$$

$$P_{UK \ y} = 8316,22 \text{ kN}$$

$$M_{ny} = \frac{M_{uky}}{\emptyset} = \frac{830,8}{0,65} = 1278,153846 \text{ kNm}$$

$$P_{ny} = \frac{P_{uky}}{\emptyset} = \frac{8316,22}{0,65} = 12794,1846 \text{ kN}$$

Dari nilai M_n dan P_n , plotkan ke grafik M_n - P_n didapatkan $r = 1 \%$

$$A_{s \text{ total}} = r \cdot b \cdot h = 1 \% \cdot 1600 \cdot 1000 = 16000 \text{ mm}^2$$

Pakai tulangan $D = 25 \text{ mm}$

$$A_{1\emptyset} = \frac{1}{4} \cdot \pi \cdot D^2 = \frac{1}{4} \cdot \pi \cdot 25^2 = 490,625 \text{ mm}^2$$

$$n = \frac{A_{stotal}}{A_{1\emptyset}} = \frac{16000}{490,625} = 32,611465$$

$n \text{ pakai} = 34 \text{ buah}$

Pakai **34 D25**

5.5.6 Perhitungan Tulangan Geser Balok Lengkung

Contoh dari perhitungan tulangan geser diambil pada balok lengkung elemen 13 dan 372. Dari hasil analisis struktur didapat gaya geser maksimum akibat beban mati, beban hidup dan beban gempa balok lengkung elemen 13 dan 372 adalah :

$$V_D = 294,3155 \text{ kN}$$

$$V_L = 339,1927 \text{ kN}$$

$$V_E = -44,2622 \text{ kN}$$

$$\begin{aligned} V_{UK} &= 1,5 (V_D + V_L + V_E) = 1,5 \cdot (294,3155 + 339,1927 + (-44,2622)) = \\ &= 883,868 \text{ Kn} \end{aligned}$$

Data bahan struktur yang digunakan :

$$f_c = 24,9 \text{ Mpa}$$

$$f_y = 390 \text{ Mpa}$$

$$b = 1600 \text{ mm}$$

$$h = 1000 \text{ mm}$$

$$d' = 80 \text{ mm}$$

$$d = h - d' = 1000 - 80 = 920 \text{ mm}$$

b. Perhitungan tulangan geser balok lengkung dalam sendi plastis

$$V_{Sl} = \frac{V_u}{\phi} = \frac{V_u}{0,6}$$

$$= \frac{883,868}{0,6}$$

$$= 1473,113 \text{ kN}$$

Pakai tulangan sengkang D13

$$A_1\phi = \frac{1}{4} \times \pi \times 13^2 = 132,732 \text{ mm}^2$$

dipakai sengkang 4 kaki

$$S = \frac{kaki \times A_1\phi \times f_y \times d}{V_{s_1}} = \frac{4 \times 132,732 \times 390 \times 925}{1473,113 \times 1000}$$

$$= 129,316 \text{ mm}$$

$$S_{pakai} = 100 \text{ mm}$$

Dipakai 2 D13 -100

b. Perhitungan tulangan geser balok lengkung luar sendi plastis

$$Puk = 9362,52 \text{ kN}$$

$$Ag = b \cdot h = 1600 \cdot 1000 = 1600000 \text{ mm}^2$$

$$\begin{aligned} V_c &= \left(1 + \frac{Puk}{14 \cdot Ag}\right) \times \left(\frac{1}{6}\right) \times \sqrt{f'c} \times b \times d \\ &= \left(1 + \frac{9362,52}{14 \cdot 1600000}\right) \times \left(\frac{1}{6}\right) \times \sqrt{24,9} \times 1600 \times 920 \times 10^{-3} \\ &= 1735,894 \text{ kN} \end{aligned}$$

$$V_{s_2} = \frac{Vuk}{\phi} - V_c = \frac{883,868}{0,6} - 1735,894 = -262,781 \text{ kN}$$

Pakai tulangan sengkang D13 dengan sengkang 4 kaki

Dipakai 2 D13 -200

5.6 Perhitungan Tulangan Kolom

5.6.1 Kelangsingan Kolom

Dimensi kolom disesuaikan dengan tinggi kolom, sehingga memenuhi syarat kelangsingan.

a. tinggi kolom 11 m

Syarat tidak langsing $\frac{k.l}{r} < 22$

Ukuran kolom :

$$b = 1400 \text{ mm}$$

$$h = 1400 \text{ mm}$$

$$I_y = \frac{1}{12} \cdot b \cdot h^3 = \frac{1}{12} \cdot b^3 \cdot h = \frac{1}{12} \cdot 1,4^3 \cdot 1,4 = 0,32013 \text{ m}^4$$

$$A = b \cdot h = 1,4 \cdot 1,4 = 1,96 \text{ m}^2$$

$$r = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{0,32013}{1,96}} = 0,404 \text{ m}$$

$$\frac{k.l}{r} = \frac{0,5 \times 11}{0,404} = 13,61 < 22 \quad \text{OK}$$

b. Tinggi kolom 8,781 m

Ukuran kolom :

$$b = 1200 \text{ mm}$$

$$h = 1200 \text{ mm}$$

$$I_y = \frac{1}{12} \cdot b \cdot h^3 = \frac{1}{12} \cdot b^3 \cdot h = \frac{1}{12} \cdot 1,2^3 \cdot 1,2 = 0,1728 \text{ m}^4$$

$$A = b \cdot h = 1,2 \cdot 1,2 = 1,44 \text{ m}^2$$

$$r = \sqrt{\frac{I_y}{A}} = \sqrt{\frac{0,1728}{1,44}} = 0,346 \text{ m}$$

$$\frac{kl}{r} = \frac{0,5 \times 8,781}{0,346} = 12,689 < 22 \quad \text{OK}$$

5.6.2 Menghitung Momen Rencana Kolom

Sebagai contoh perhitungan adalah kolom elemen 41 dan 2. Dari analisis struktur dengan SAP 2000 didapat gaya aksial dan momen pada kolom elemen 41 dan 2 adalah :

a. Gaya aksial

$$P_D = 232,85 \text{ kN}$$

$$P_L = 104,09 \text{ kN}$$

$$P_E = 1,86076 \text{ kN}$$

$$P_u = 1,3 P_D + 2 P_L + 1 P_E$$

$$= 1,3 \cdot 232,85 + 2 \cdot 104,09 + 1 \cdot 1,86076 = 512,74 \text{ kN}$$

dari hasil analisis struktur didapat momen akibat beban hidup, mati dan gempa adalah :

b. Momen arah x

Momen kolom bawah

$$M_{DX} = 484,5538 \text{ kNm}$$

$$M_{LX} = 204,8167 \text{ kNm}$$

$$M_{EX} = -10,585 \text{ kNm}$$

Momen maksimum kolom bawah

$$M_{UK \max 1} = 1,3 M_{DX} + 2 M_{LX}$$

$$= 1,3 \cdot 484,5538 + 2 \cdot 204,8167 = 1039,55 \text{ kNm}$$

$$M_{UK \max 2} = 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX}$$

$$= 1,3 \cdot 484,5538 + 2 \cdot 204,8167 + (1 \cdot -10,585) = 1028,96 \text{ kNm}$$

$$M_{uk \max \text{ pakai}} = 1039,53 \text{ kNm}$$

Momen kolom atas

$$M_{DX} = -423,4 \text{ kNm}$$

$$M_{LX} = -153,965 \text{ kNm}$$

$$M_{EX} = 9,217656 \text{ kNm}$$

Momen maksimum kolom atas

$$M_{UK \max 1} = 1,3 M_{DX} + 2 M_{LX}$$

$$= 1,3 \cdot -423,4 + 2 \cdot -153,965 = -860,94 \text{ kNm}$$

$$M_{UK \max 2} = 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX}$$

$$= 1,3 \cdot -423,4 + 2 \cdot -153,965 + (1 \cdot 9,217656) = -851,73 \text{ kNm}$$

$$M_{uk \max \text{ pakai}} = -860,94 \text{ kNm}$$

Momen yang digunakan adalah $M_{uk \max \text{ pakai}} = 860,94 \text{ kNm}$

c. Momen arah y

Momen kolom bawah

$$M_{DY} = 22,15596 \text{ kNm}$$

$$M_{LY} = -16,6145 \text{ kNm}$$

$$M_{EY} = -1,40446 \text{ kNm}$$

Momen maksimum kolom bawah

$$\begin{aligned} M_{UK \max} &= 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX} \\ &= 1,3 \cdot 484,5538 + 2 \cdot -16,6145 + (1 \cdot -1,40446) = 5,83063 \text{ kNm} \end{aligned}$$

Momen kolom atas

$$M_{DY} = 28,08438 \text{ kNm}$$

$$M_{LY} = 149,4598 \text{ kNm}$$

$$M_{EY} = 1,406366 \text{ kNm}$$

Momen maksimum kolom atas

$$\begin{aligned} M_{UK \max} &= 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX} \\ &= 1,3 \cdot 28,08438 + 2 \cdot 149,4598 + (1 \cdot 1,406366) = 336,83 \text{ kNm} \end{aligned}$$

Momen yang digunakan adalah, M_{UK} pakai = 5,83063 kNm

d. Perhitungan tulangan

Data bahan struktur yang digunakan adalah sebagai berikut :

$$f'_c = 24,9 \text{ Mpa}$$

$$f_y = 390 \text{ Mpa}$$

$$h = 1200 \text{ mm}$$

$$b = 1200 \text{ mm}$$

$$A_g = 1200 \times 1200 = 1440000 \text{ mm}^2$$

1. Arah X

$$M_{UK\ x} = 860,94 \text{ kNm}$$

$$P_{UK\ x} = 512,74 \text{ kN}$$

$$M_{nx} = \frac{M_{ukx}}{\phi} = \frac{860,94}{0,65} = 1324,52308 \text{ kNm}$$

$$P_{nx} = \frac{P_{ukx}}{\phi} = \frac{512,74}{0,65} = 788,83077 \text{ kN}$$

Dari nilai M_n dan P_n , plotkan ke grafik M_n - P_n didapatkan $r = 1 \%$

$$A_s \text{ total} = r \cdot b \cdot h = 1\% \cdot 1200 \cdot 1200 = 14400 \text{ mm}^2$$

Pakai tulangan $D = 25 \text{ mm}$

$$A_{1\phi} = \frac{1}{4} \cdot \pi \cdot D^2 = \frac{1}{4} \cdot \pi \cdot 25^2 = 490,625 \text{ mm}^2$$

$$n = \frac{A_{s \text{ total}}}{A_{1\phi}} = \frac{14400}{490,625} = 29,350318$$

n pakai = 30 buah

Pakai 30 D25

2. Arah Y

$$M_{UK\ y} = 336,83 \text{ kNm}$$

$$P_{UK\ y} = 512,74 \text{ kN}$$

$$M_{ny} = \frac{M_{uky}}{\phi} = \frac{5,83}{0,65} = 8,96923 \text{ kNm}$$

$$P_{ny} = \frac{P_{uky}}{\phi} = \frac{512,74}{0,65} = 788,83077 \text{ kN}$$

Dari nilai M_n dan P_n , plotkan ke grafik M_n - P_n didapatkan $r = 1\%$

$$A_s \text{ total} = r \cdot b \cdot h = 1\% \cdot 1200 \cdot 1200 = 14400 \text{ mm}^2$$

Pakai tulangan $D = 25 \text{ mm}$

$$A_{1\phi} = \frac{1}{4} \cdot \pi \cdot D^2 = \frac{1}{4} \cdot \pi \cdot 25^2 = 490,625 \text{ mm}^2$$

$$n = \frac{A_s \text{ total}}{A_{1\phi}} = \frac{14400}{490,625} = 29,350318$$

n pakai = 30 buah

Pakai 30 D25

5.6.5 Perhitungan Geser Kolom

Dari hasil analisis struktur didapat momen kolom bawah akibat beban mati, beban hidup dan beban gempa pada elemen kolom 151 dan 444 adalah sebagai berikut :

$$M_{DX} = 773,6482 \text{ kNm}$$

$$M_{LX} = 848,7059 \text{ kNm}$$

$$M_{EX} = -0,5107 \text{ kNm}$$

Momen maksimum kolom bawah

$$\begin{aligned} M_{UK \max 1} &= 1,3 M_{DX} + 2 M_{LX} \\ &= 1,3 \cdot 773,648 + 2 \cdot 848,7059 = 2703,15 \text{ kNm} \\ &= 1,3 \cdot 773,648 + 2 \cdot 848,7059 + (1 \cdot -0,5107) = 2702,64 \text{ kNm} \end{aligned}$$

$$M_{uk \max \text{ pakai}} = 2703,15 \text{ kNm}$$

Momen kolom atas

$$M_{DX} = -726,717 \text{ kNm}$$

$$M_{LX} = -790,915 \text{ kNm}$$

$$M_{EX} = 0,574615 \text{ kNm}$$

Momen maksimum kolom atas

$$\begin{aligned} M_{UK \max 1} &= 1,3 M_{DX} + 2 M_{LX} \\ &= 1,3 \cdot -726,717 + 2 \cdot -790,915 = -2526,56 \text{ kNm} \end{aligned}$$

$$\begin{aligned} M_{UK \max 2} &= 1,3 M_{DX} + 2 M_{LX} + 1 M_{EX} \\ &= 1,3 \cdot -726,717 + 2 \cdot -790,915 + (0,574615) = -2525,98 \text{ kNm} \end{aligned}$$

$$M_{uk \max \text{ pakai}} = -2526,56 \text{ kNm}$$

$$Vu_1 = \frac{(Mu_{bawah} + Mu_{atas})}{L} = \frac{(2703,15 + 2526,56)}{3,378} = 1548,16755 \text{ kN}$$

Dari hasil analisis struktur didapat gaya geser maksimum akibat beban mati , beban hidup dan beban gempa pada elemen 151 dan 444 adalah sebagai berikut :

$$V_{DX} = 558,5207 \text{ kNm}$$

$$V_{LX} = 596,042 \text{ kNm}$$

$$V_E = 48,92008 \text{ kN}$$

Gaya geser kolom maksimum

$$Vu_2 = 1,5 (V_D + V_L + V_E)$$

$$Vu_2 = 1,5 \cdot (558,521 + 596,024 + 48,92008) = 1805,224 \text{ kN}$$

$$Vu \text{ Pakai} = 1548,167 \text{ kN}$$

5.6.6 Perhitungan Tulangan Geser Kolom

$$V_{UK} = 1548,167 \text{ kN}$$

Data bahan struktur yang digunakan :

$$f'_c = 24,9 \text{ Mpa}$$

$$f_y = 390 \text{ Mpa}$$

$$b = 1200 \text{ mm}$$

$$h = 1200 \text{ mm}$$

$$d' = 80 \text{ mm}$$

$$d = h - d' = 1200 - 80 = 1120 \text{ mm}$$

b. Perhitungan tulangan geser kolom dalam sendi plastis

$$\begin{aligned}
 V_{s1} &= \frac{V_u}{\phi} = \frac{V_u}{0,6} \\
 &= \frac{1548,167}{0,6} \\
 &= 2580,279 \text{ kN}
 \end{aligned}$$

Pakai tulangan sengkang D13

$$A_1 \phi = \frac{1}{4} \times \pi \times 10^2 = 132,73 \text{ mm}^2$$

dipakai sengkang 4 kaki

$$\begin{aligned}
 S &= \frac{kaki \times A_1 \phi \times f_y \times d}{V_{s1}} = \frac{4 \times 132,73 \times 390 \times 1120}{2580,279 \times 1000} \\
 &= 89,878 \text{ mm}
 \end{aligned}$$

$$S_{pakai} = 80 \text{ mm}$$

Dipakai 2 D13 -80

b. Perhitungan tulangan geser kolom luar sendi plastis

$$P_u k = 210,780 \text{ kN}$$

$$A_g = b \cdot h = 1200 \cdot 1200 = 1440000 \text{ mm}^2$$

$$\begin{aligned}
 V_c &= \left(1 + \frac{P_{uk}}{14 A_g} \right) \times \left(\frac{1}{6} \right) \times \sqrt{f'_c} \times b \times d \\
 &= \left(1 + \frac{210,78}{14 \times 1440000} \right) \times \left(\frac{1}{6} \right) \times \sqrt{24,9} \times 1200 \times 1120 \times 10^{-3}
 \end{aligned}$$

$$= 1129,444 \text{ kN}$$

$$V_{s2} = \frac{V_{uk}}{\phi} - V_c = = \frac{1548,167}{0,6} - 1129,444 = 1450,835 \text{ kN}$$

Pakai tulangan sengkang D13

$$A_1\phi = \frac{1}{4} \times \pi \times 10^2 = 132,73 \text{ mm}^2$$

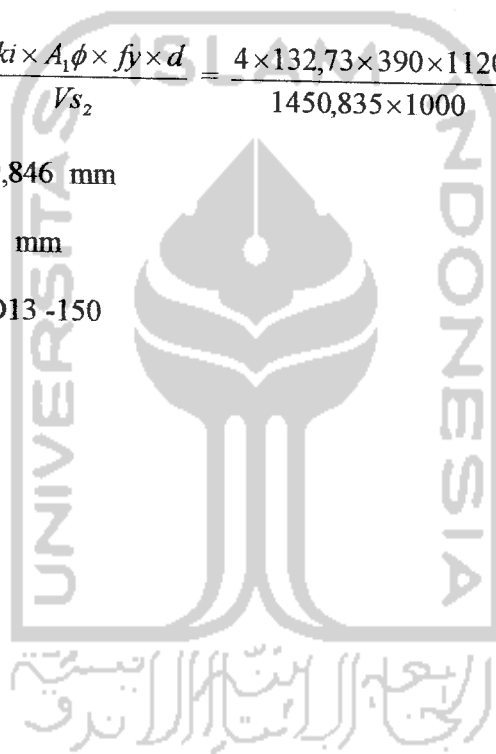
dipakai sengkang 4 kaki

$$S = \frac{kaki \times A_1\phi \times f_y \times d}{V_{s2}} = \frac{4 \times 132,73 \times 390 \times 1120}{1450,835 \times 1000}$$

$$= 159,846 \text{ mm}$$

$$S_{pakai} = 150 \text{ mm}$$

Dipakai 2 D13 -150



5.7 PERHITUNGAN KONSTRUKSI BAGIAN BAWAH

Konstruksi bagian bawah merupakan pendukung konstruksi bagian atas jembatan.

Konstruksi bagian bawah terdiri dari :

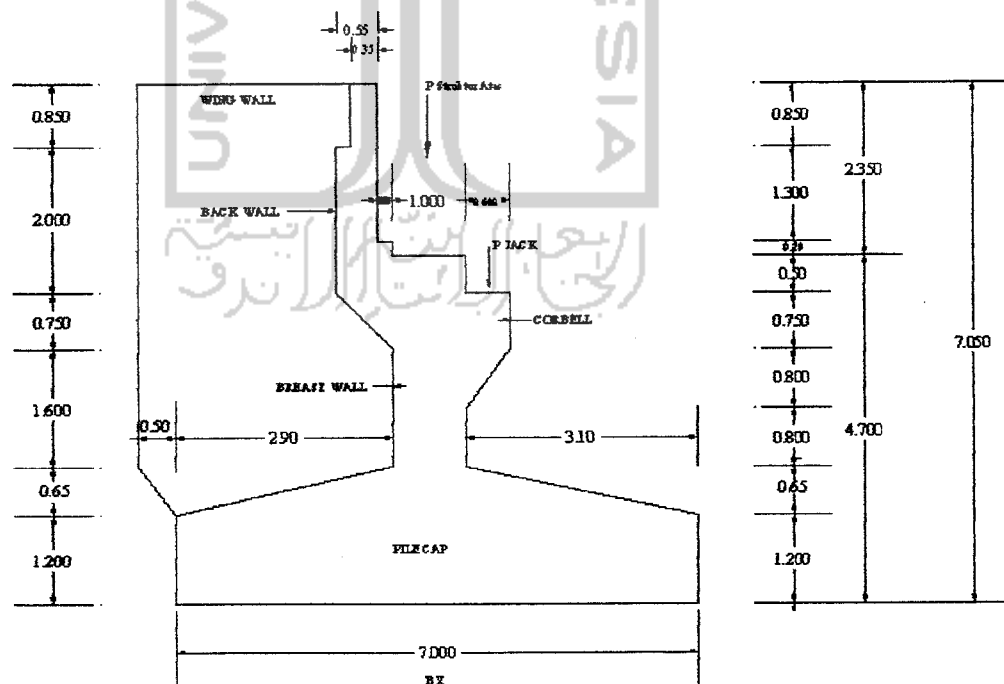
1. Kepala jembatan (*abutment*), dan
2. Pondasi

5.7.1 PERHITUNGAN KEPALA JEMBATAN (*abutment*)

5.7.1.1 Input Data Struktur Bawah :

1. Dimensi *Abutment*

Dimensi *abutment* yang direncanakan pada jembatan Kretak ini dapat dilihat pada gambar berikut ini :



Gambar 5.19 Gambar dimensi penampang *abutment*

$$\text{Tebal Wing wall} = 0,5 \text{ m}$$

$$\text{Lebar abutment arah x, } B_x = 7 \text{ m}$$

$$\text{Lebar abutment arah y, } B_y = 19 \text{ m}$$

2. Data Tanah

$$\text{Berat volume, } \gamma = 1,76 \text{ Ton/m}^3$$

$$\text{Sudut gesek, } \phi = 35 \text{ derajat}$$

5.7.1.2 PERHITUNGAN BEBAN PADA ABUTMENT

1. BEBAN STRUKTUR ATAS

1.1 BEBAN MATI (M)

Tabel 5.8 Perhitungan beban mati struktur atas

No	Beban Mati	Parameter Volume			n	Berat Sat (ton/m ³)	Beban Ton
		b(m)	t(m)	L (m)			
1	Aspal	7	0,1	40	2	2,2	123,2
2	Air hujan	20	0,1	40	1	1	80
3	Slab	20	0,25	40	1	2,5	500
4	Trotoar	1,75	0,2	40	2	2,2	61,6
5	Sandaran	0,15	1,125	40	2	2,5	33,75
6	Balok Induk	0,7	1	40	3	2,5	210
7	Balok Anak	0,4	0,8	40	6	2,5	192
8	Median	2,5	0,2	40	1	2,5	50
9	Balok Lintang	0,4	0,8	15,1	8	2,5	96,64
Total baban mati =							1347,19

$$\text{Beban mati struktur atas pada abutment} = \frac{1}{2} \times \text{Total beban mati} =$$

$$= \frac{1}{2} \times 1347,19 = 673,595 \text{ Ton}$$

$$\text{Eksentrisitas beban terhadap Fondasi} = -\frac{B_x}{2} + 2,9 + \frac{1}{2} = -0,1 \text{ m}$$

$$\text{Momen akibat beban srutur atas} = -0.1 \cdot 673,595 = -67,3595 \text{ Ton} - \text{m}$$

1.2 BEBAN HIDUP + KEJUT (H + K)

1.2.1. Beban Merata q

$$\text{Lebar prkerasan 1 jalur, } b_1 = 7 \text{ m}$$

$$\text{untuk panjang bentang, } L = 40 \text{ m}$$

$$\begin{aligned} \text{Beban merata, } q &= 2,2 - \frac{1,1}{60} \cdot (L - 30) = 2,2 - \frac{1,1}{60} \cdot (40 - 30) \\ &= 2,01667 \text{ Ton/m} \end{aligned}$$

$$\text{Beban hidup merata per meter lebar jembatan} = \frac{q}{2,75} \text{ ton/m}^2$$

Beban hidup pada trotoar :

$$q' = 0,5 \text{ Ton/m}^2$$

$$P' = 2 \text{ Ton/m}$$

$$\begin{aligned} \text{Beban hidup merata } q \text{ pada trotoar} &= (P' + b_2 \cdot q') \times 2 \times L = \\ &= (2 + 1,75 \cdot 0,5) \times 2 \times 40 = 230 \text{ Ton} \end{aligned}$$

$$\begin{aligned} \text{Beban hidup merata } q \text{ pada jalan} &= \\ &= \left(\left(\frac{q}{2,75} \times 5,5 \times 100 \% \times L \right) + \left(\frac{q}{2,75} \times \left(\frac{\text{Lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times L \right) \right) \times 2 = \\ &= \left(\left(\frac{2,01667}{2,75} \times 5,5 \times 100 \% \times 40 \right) + \left(\frac{2,01667}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 40 \right) \right) \times 2 = \\ &= 366,63 \text{ Ton} \end{aligned}$$

$$\begin{aligned} \text{Beban hidup pada } abutment \text{ akibat beban merata } q &= 230 + 366,63 \\ &= 596,67 \text{ Ton} \end{aligned}$$

1.2.2 Beban Garis P + Kejut

Besar muatan garis, $P = 12$ Ton

$$\text{Beban hidup garis per meter lebar jembatan} = \frac{P}{2,75} = \frac{12}{2,75} = 4,364 \text{ Ton/m}$$

Beban hidup pada *abutment* akibat beban garis :

$$\begin{aligned} &= \frac{P}{2,75} \times 5,5 \times 100 \% + \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times 2 = \\ &= \frac{12}{2,75} \times 5,5 \times 100 \% + \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 2 = 54,55 \text{ Ton} \end{aligned}$$

Koefisien kejut :

$$= 1 + \frac{20}{50 + L} = 1 + \frac{20}{50 + 40} = 1,222$$

Beban hidup pada *abutment* akibat beban garis P + Kejut :

$$\begin{aligned} &= \frac{P}{2,75} \times 5,5 \times 100 \% + \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times 2 \times K = \\ &= \frac{12}{2,75} \times 5,5 \times 100 \% + \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 2 \times 1,222 = 66,66 \text{ Ton} \end{aligned}$$

Beban hidup + Kejut (H + K) pada *Abutment* =

$$= 596,67 \text{ Ton} + 66,66 \text{ Ton} = 663,333 \text{ Ton}$$

Eksentrisitas beban terhadap Fondasi :

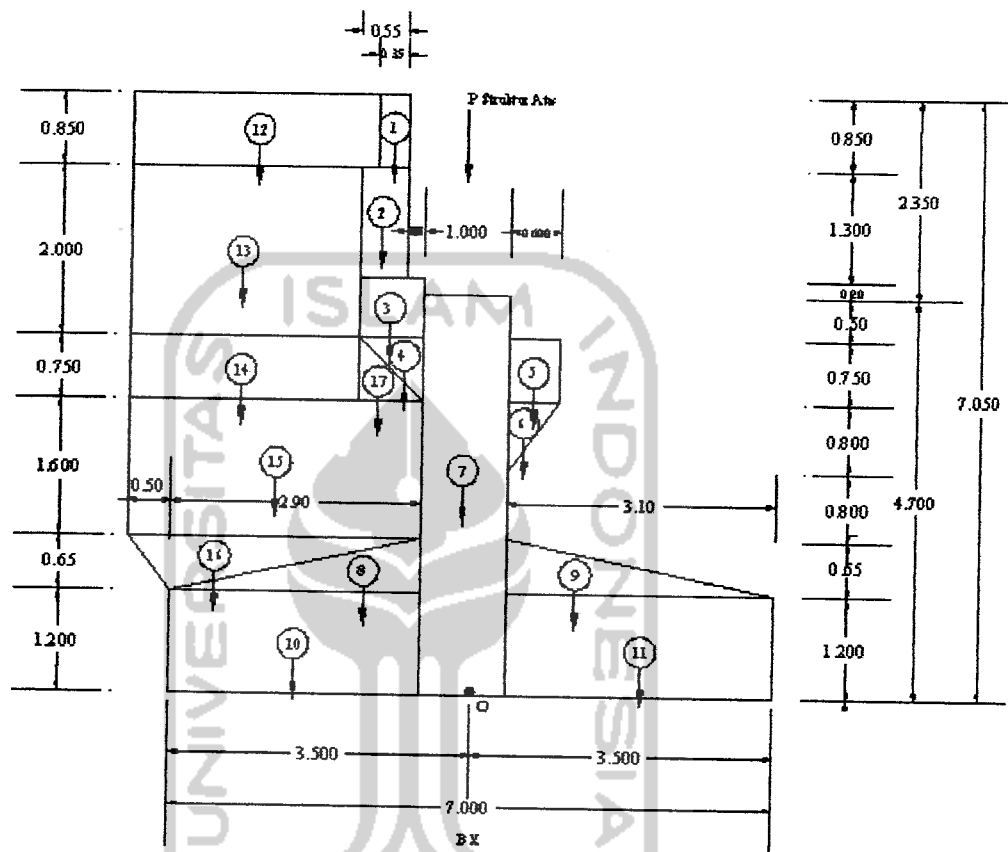
$$= -\frac{Bx}{2} + 2,9 + \frac{1}{2} = -0,1 \text{ m}$$

Momen akibat beban hidup + kejut (H + K) =

$$= -0,1 \cdot 663,333 = -66,333 \text{ Ton - m}$$

2. BEBAN STRUKTUR BAWAH

2.1. BEBAN MATI (M) AKIBAT BERAT SENDIRI *ABUTMENT*



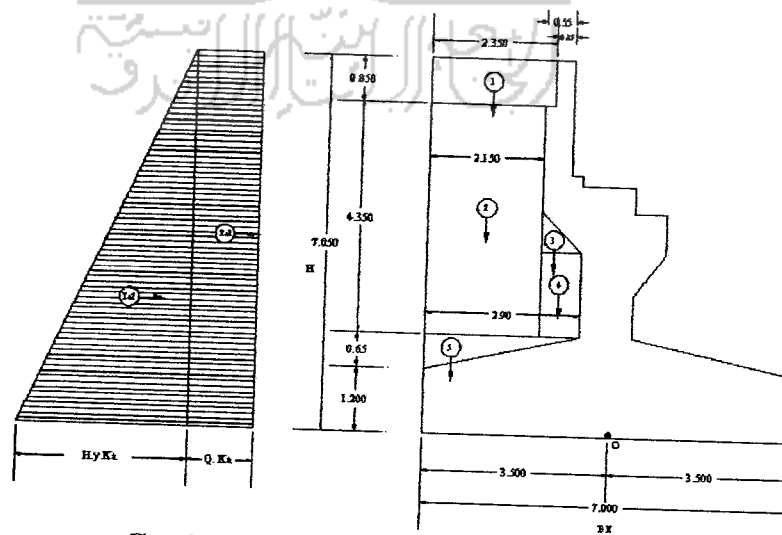
Gambar 5.20 Penampang *abutment* untuk perhitungan berat sendiri

Tabel 5.9 Perhitungan berat sendiri abutment

$2 \times \text{Tebal wing wall} = 0,5 \times 2 = 1 \text{ m}$

No	PARAMETER BERAT BAGIAN BETON				BJ (Ton/m ³)	Lebar By (m)	BERAT (Ton)	LENGAN (m)	MOMEN (Ton-m)
	b	h	shape	direc					
1	0,35	0,85	1	-1	2,5	19	14,1313	0,975	-13,778
2	0,55	1,3	1	-1	2,5	19	33,9625	1,075	-36,5097
3	0,75	0,7	1	-1	2,5	19	24,9375	0,975	-24,3141
4	0,75	0,75	0,5	-1	2,5	19	13,3594	0,85	-11,3555
5	0,6	0,75	1	1	2,5	19	21,375	0,7	14,9625
6	0,6	0,8	0,5	1	2,5	19	11,4	0,6	6,84
7	1	4,7	1	-1	2,5	19	223,25	0,1	-22,325
8	2,9	0,65	0,5	-1	2,5	19	44,7688	1,567	-70,1526
9	3,1	0,65	0,5	1	2,5	19	47,8563	1,433	68,57801
10	2,9	1,2	1	-1	2,5	19	165,3	2,05	-338,865
11	3,1	1,2	1	1	2,5	19	176,7	1,95	344,565
12	2,85	1,35	1	-1	2,5		9,61875	2,575	-24,7683
13	2,65	2	1	-1	2,5		13,25	2,675	-35,4438
14	2,65	0,75	1	-1	2,5		4,96875	2,675	-13,2914
15	3,4	1,6	1	-1	2,5		13,6	2,3	-31,28
16	3,4	0,65	0,5	-1	2,5		2,7625	2,867	-7,92009
17	0,75	0,75	0,5	-1	2,5		0,70313	1,1	-0,77344
	Lateral stop block								
			0,2	1			1	0	0
W ABUTMENT =							822,944	MBS =	-195,831

2.2. BEBAN MATI (M) AKIBAT BERAT TANAH DI ATAS FONDASI



Gambar 5.21 Berat tanah di atas pondasi

Tabel 5.10 Perhitungan berat tanah di atas pondasi

No	PARAMETER BERAT BAGIAN TANAH				BJ (Ton/m ³)	Lebar By (m)	BERAT (Ton)	LENGAN (m)	MOMEN (Ton-m)
	b	h	shape	direc					
1	2,35	0,85	1	-1	1,76	19	66,7964	2,325	-155,30163
2	2,15	4,35	1	-1	1,76	19	312,7476	2,425	-758,41293
3	0,75	0,75	0,5	-1	1,76	19	9,405	1,1	-10,3455
4	0,75	1,6	1	-1	1,76	19	40,128	0,975	-39,1248
5	2,9	0,65	0,5	-1	1,76	19	31,5172	2,533	-79,833068
W tanah =							460,5942	Mwt =	-1043,0179

Beban mati akibat berat sendiri abutment dan berat tanah =

$$= W (\text{abutment}) + W \text{ tanah} = 822,94 + 460,5942 = 1283,538 \text{ Ton}$$

Momen akibat beban mati berat sendiri abutment dan berat tanah =

$$= M_{bs} + M_{wt} = -195,831 + (-1043,0179) = -1238,849 \text{ Ton-m}$$

2.2. BEBAN TEKANAN TANAH (T_a)

Sudut gesek dalam, Φ = 35 derajat

Koefisien tekanan tanah aktif, K_a = $\tan^2 (45 - \Phi/2)$

$$K_a = \tan^2 (45 - 35/2) = 0,27099005$$

Beban merata, Q = 2,2 Ton/m²

Berat tanah, γ = 1,76 Ton/m³

Lebar B_y = 19 m

H = 7,05

3.1. BEBAN GEMPA (Gb)

Diperkirakan waktu getar alami struktur jembatan rangka beton lengkung,

$$T = 0,1 - 1 \text{ detik.}$$

Berdasarkan Peraturan Perencanaan Tahan Gempa untuk wilayah 3 diperoleh :

$$\text{Koefisien gempa dasar, } C_g = 0,18$$

$$\text{Faktor keutamaan struktur, } I = 1,2$$

$$\text{Faktor jenis struktur, } K = 1$$

$$\text{Beban gempa, } G_b = C_g \cdot I \cdot S \cdot W_t = 0,18 \cdot 1,2 \cdot 1 \cdot W_t = 0,216 \cdot W_t$$

Distribusi gaya gempa arah memanjang jembatan :

Tabel 5.12 Perhitungan beban gempa pada abutment

No	Beban Mati Akibat	Wt (Ton)	Beban Gempa	CxIxSxWt (Ton)	Lengan thd O		Momen (Ton-m)
					URAIAN	(m)	
1	P struktur atas	673,595	Gbp	145,49652	h7	4,7	683,8336
2	W abutment	822,9438	Gba	177,75585	1/2.h7	2,35	417,7262
3	W tanah	460,5942	Gbt	99,4883472	2/3.H	4,7	467,5952
			Gb =	422,7407172		Mgb =	1569,155

3.2. BEBAN ANGIN (A)

$$\text{Tekanan angin diambil sebesar } = 0,15 \text{ Ton/m}^2$$

$$\text{Luas bidang kontak vertikal jembatan} = h \cdot \frac{L}{2} = 2,35 \cdot \frac{40}{2} = 47 \text{ m}^2$$

$$\text{Gaya angin, } A = 0,15 \cdot 47 = 7,05 \text{ Ton}$$

$$\text{Lengan terhadap fondasi} = \frac{2}{3} \cdot H + \frac{1}{2} \cdot H \cdot 2 = \frac{2}{3} \cdot 7,05 + \frac{1}{2} \cdot 2,35 = 5,875 \text{ m}$$

$$\text{Momen akibat gaya angin, } M_a = 7,05 \cdot 5,875 = 41,41875 \text{ Ton-m}$$

3.3 BEBAN REM DAN TRAKSI (R_m)

Gaya rem memanjang jembatan diperhitungkan sebesar 5 % beban D (beban hidup tanpa koefisien kejut) :

$$R_m = 5 \% \times \text{Beban hidup } D \text{ tanpa koefisien kejut}$$

$$\text{Beban hidup pada abutment akibat beban merata } q = 596,67 \text{ Ton}$$

$$\text{Beban hidup pada abutment akibat beban garis} = 54,55 \text{ Ton}$$

$$\text{Beban } D \text{ tanpa koefisien kejut} = 366,67 + 54,55 = 651,22 \text{ Ton}$$

$$R_m = 5 \% \times 651,22 = 32,56 \text{ Ton}$$

$$\text{Lengan terhadap Fondasi} = H + 1,8 = 7,05 + 1,8 = 8,85 \text{ m}$$

$$\text{Momen akibat gaya rem, } M_{rm} = 32,56 \cdot 8,85 = 288,156 \text{ Ton-m}$$

3.4. BEBAN GESEKAN PADA TUMPUAN (F)

$$\text{Koefisien gesek pada tumpuan yang berupa elastomer} = 0,18$$

Gaya gesek yang timbul hanya ditinjau terhadap beban mati saja.

$$\text{Beban mati struktur atas} = 673,595 \text{ Ton}$$

$$\text{Beban gesek} = \text{Koefisien gesek} \times \text{Beban mati} =$$

$$F = 0,18 \cdot 673,595 = 121,247 \text{ Ton}$$

$$\text{Lengna terhadap Fondasi, } h_7 = 4,7 \text{ m}$$

$$\text{Momen akibat gaya gesek, } M_f = 569,861 \text{ Ton-m}$$

4. KOMBINASI PEMBEBANAN

Tabel 5.13 Kombinasi pembebanan pada perhitungan *abutment*

NO	KOMBINASI PEMBEBANAN	Kekuatan yang digunakan dalam % kekuatan ijin
I	$M + (H + K) + Ta$	100%
II	$M + F + A + Ta$	125%
III	$M + (H + K) + Ta + Rm + F + A$	140%
IV	$M + Ta + Gb$	150%

Tabel 5.14 Kombinasi pembebanan I ($M + (H + K) + Ta$)

KOMBINASI I : $M + (H + K) + Ta$

KOMBINASI BEBAN		< 100 %			
		ARAH HORIZONTAL		ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas				
	W (abutment) + W (tanah)			673,595	-67,3595
H+K	Beban hidup + kejut pada abutment			1283,53795	-1238,8492
Ta	Gaya horizontal akibat tekanan tanah			663,333	-66,333
		305,0577809	810,719003		
		305,0577809	810,719003	2820,46595	-1372,5417

Tabel 5.15 Kombinasi pembebanan II ($M + F + A + Ta$)

KOMBINASI II : $M + F + A + Ta$

KOMBINASI BEBAN		< 125 %			
		ARAH HORIZONTAL		ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas				
	W (abutment) + W (tanah)			673,595	-67,3595
F	Beban gesekan pada tumpuan	121,247	569,861	1283,53795	-1238,849203
A	Beban angin	7,05	41,41875		
Ta	beban akibat tekanan tanah				
		305,0577809	810,719003		
		433,3547809	1421,998753	1957,13295	-1306,208703

Tabel 5.16 Kombinasi pembebanan III (M + (H + K) + Rm + F + A)

KOMBINASI III : M + (H + K) + Rm + F + A < 140 %

KOMBINASI BEBAN		ARAH HORIZONTAL		ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas			673,595	-67,3595
	W (abutment) + W (tanah)			1283,53795	-1238,8492
H+K	Beban hidup + kejut pada abutment			663,333	-66,333
Ta	Beban akibat tekanan tanah	305,0577809	810,719003		
Rm	Beban Rem	32,56	288,156		
F	Beban gesekan pada tumpuan	121,247	569,861		
A	Beban angin	7,05	41,41875		
		465,9147809	1710,154753	2620,46595	1372,54170

Tabel 5.17 Kombinasi pembebanan IV (M + Gb + Ta)

KOMBINASI IV : M + Gb + Ta < 150 %

KOMBINASI BEBAN		ARAH HORIZONTAL		ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas			673,595	-67,3595
	W (abutment) + W (tanah)			1283,53795	-1238,849203
Gb	Beban Gempa	422,7407172	1569,155123		
Ta	beban akibat tekanan tanah	305,0577809	810,719003		
		727,7984981	2379,874126	1957,13295	-1306,208703

4.5. EKSENTRISITAS FONDASI

$$\text{Eksentrisitas fondasi} = ex = \frac{(\sum Mv + \sum Mh)}{\sum V}$$

Untuk $ex < \frac{Bx}{6} = \frac{7}{6} = 1,1667$ maka tidak terjadi tarik (masuk *kern*)

Tabel 5.18 Perhitungan eksentrisitas pondasi

KOMBINASI	$\sum Mv$	$\sum Mh$	$\sum V$	ex	
KOMBINASI I	-1372,541703	810,7190031	2620,46595	-0,214398016	Masuk kern (OK)
KOMBINASI II	-1306,208703	1421,998753	1957,13295	0,059163099	Masuk kern (OK)
KOMBINASI III	-1372,541703	1710,154753	2620,46595	0,12883703	Masuk kern (OK)
KOMBINASI IV	-1306,208703	2379,874126	1957,13295	0,54859095	Masuk kern (OK)

4.6. STABILITAS FONDASI

Letak titik guling A (ujung fondasi) terhadap pusat fondasi = $\frac{Bx}{2} = \frac{7}{2} = 3,5 \text{ m}$

$$\text{Momen penahan guling} = \Sigma M_{VA} = -\frac{Bx}{2} \cdot \Sigma v + \Sigma Mv$$

$$\text{Angka aman guling fondasi, } SF = \left(\frac{\Sigma M_{VA}}{\Sigma Mh} \right) > 1,5$$

Tabel 5.19 Perhitungan stabilitas pondasi terhadap guling

KOMBINASI	ΣM_{VA}	SF	
KOMBINASI I : 100 %	-10544,17253	13,0059521	AMAN (OK)
KOMBINASI II : 125 %	-8156,174028	7,16963887	AMAN (OK)
KOMBINASI III : 140 %	-10544,17253	8,6318747	AMAN (OK)
KOMBINASI IV : 150 %	-8156,174028	5,1407177	AMAN (OK)

4.7. STABILITAS GESER

$$\text{Berat Volume, } \gamma = 1,76 \text{ T/m}^3$$

$$\text{Sudut gesek, } \Phi = 35 \text{ derajat}$$

$$C = 0,06$$

$$\tan \Phi = 0,70021$$

$$Bx = 7 \text{ m}$$

$$By = 19 \text{ m}$$

$$\text{Gaya penahan geser, } \Sigma H_p = C \cdot Bx \cdot By + \Sigma V \cdot \tan \Phi$$

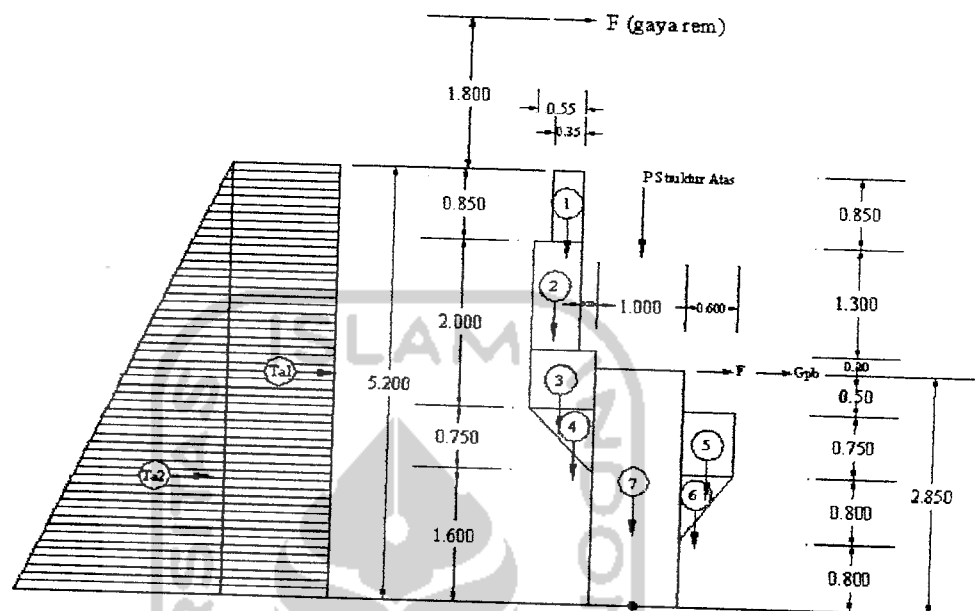
$$\text{Angka aman terhadap geser, } SF = \left(\frac{\Sigma H_p}{\Sigma H} \right) > 1,2$$

Tabel 5.20 Perhitungan stabilitas pondasi terhadap geser

KOMBINASI	ΣH	ΣH_p	SF	
KOMBINASI I : 100 %	305,0577809	1842,85002	6,04098676	AMAN (OK)
KOMBINASI II : 125 %	433,3547809	1378,37925	3,9758972	AMAN (OK)
KOMBINASI III : 140 %	465,9147809	1842,85002	5,53747193	AMAN (OK)
KOMBINASI IV : 150 %	727,7984981	1378,37925	2,84085345	AMAN (OK)

5.7.1.3 PERHITUNGAN *BREAST WALL*

1. TINJAUAN POTONGAN BAGIAN *BREAST WALL*



Gambar 5.23 Potongan bagian *breast wall*

Ditinjau potongan *Breast Wall* selebar 1 m (tegak lurus bidang gambar)

1.1. Gaya dan Momen Akibat Berat Sendiri

Tabel 5.21 Perhitngan momen akibat berat sendiri *breast wall*

					h7 = 2,85 m			
					H = 5,2 m			
No	Parameter Berat Bagian Beton				BJ Beton (Ton/m3)	Berat (Ton)	Lengan (m)	Momen (Ton - m)
	b	h	Shape	Direc				
1	0,35	0,85	1	-1	2,5	0,744	0,875	-0,651
2	0,55	1,3	1	-1	2,5	1,788	0,975	-1,743
3	0,75	0,7	1	-1	2,5	1,313	0,875	-1,148
4	0,75	0,75	0,5	-1	2,5	0,703	0,75	-0,527
5	0,6	0,75	1	1	2,5	1,125	0,8	0,900
6	0,6	0,8	0,5	1	2,5	0,600	0,7	0,420
7	1	2,85	1	1	2,5	7,125	0	0,000
Lateral stop block						0,2	1	
						1	0	0
					V =	14,397	Mv =	-2,749

1.2. Gaya dan Momen Akibat Tekanan Tanah

Sudut gesek dalam, Φ = 35 derajat

Koefisien tekanan tanah aktif, Ka = $\tan^2 (45 - \Phi/2)$

$$Ka = \tan^2 (45 - 35/2) = 0,27099005$$

Beban merata, Q = 2,2 Ton/m²

Berat tanah, y = 1,76 Ton/m³

Ditinjau lebar = 1 m

Tabel 5.22 Perhitungan gaya dan momen akibat tekanan tanah pada *breast wall*

No	Gaya Horizontal Tekanan Tanah	Besar (Ton)	Lengan (m)	Momen (Ton-m)
1	Ta1 = Q. Ka. H	3,1001262	2,6	8,060328
2	Ta2 = $\frac{1}{2}$. H ² . y. Ka	6,4482624	1,73333333	11,17699
		H = 9,5483886	Mh =	19,23732

1.3. Gaya dan Momen Akibat Gempa (Gp)

Beban gempa, Gp = $Cg \cdot I \cdot S \cdot Wt$ = 0,216 . Wt

Lebar *breast wall*, By = 19 m

Ditinjau selebar 1 m (tegak lurus gambar)

Tabel 5.23 Perhitungan gaya dan momen akibat gempa pada *breast wall*

No	BEBAN MATI AKIBAT	Wt (Ton)	Beban gempa	CxIxSxWt (Ton)	Lengan thd O		Momen (Ton-m)
					URAIAN	m	
1	P str Ats	35,4523684	Gbp	7,657712	h7	2,85	21,824478
2	Berat sendiri V	14,397	Gba	3,109725	1/2*h7	1,425	4,4313581
			H =	10,76744		Mh =	26,255836

1.4. Gaya gesek (F) dan Gaya Rem (Rm)

Lebar *breast wall*, B_y = 19 m

Ditinjau selebar 1 m (tegak lurus gambar)

Tabel 5.24 Perhitungan gaya dan momen akibat gaya gesek dan rem

No	GAYA-GAYA SEKUNDER	BESAR (Ton)	LENGAN (m)	MOMEN (Ton-m)
1	Gaya gesek pada tumpuan (F)	6,381421	2,85	18,18705
2	Gaya Rem (Rm)	1,713684	7	11,99579

2. KOMBINASI BEBAN PADA POTONGAN *BREAST WALL*

Tabel 5.25 Kombinasi pembebanan I pada *breast wall*

KOMBINASI I : $M + (H + K) + Ta$

KOMBINASI BEBAN		ARAH HORIZONTAL	ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas			
	Berat sendiri V			35,45236842
				0
H+K	Beban hidup + kejut			14,397
				-2,749
Ta	Gaya horizontal akibat tekanan tanah	10,76743658	19,2373163	
		10,76743658	19,2373163	0
			84,761506	-2,74937

Tabel 5.26.a Kombinasi pembebanan II pada *breast wall*

KOMBINASI II : $M + F + Ta$

KOMBINASI BEBAN		ARAH HORIZONTAL	ARAH VERTIKAL	
		GAYA H (Ton)	MOMEN Mh (Ton-m)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas			
	Berat sendiri V			35,4523684
				0
F	Beban gesekan pada tumpuan	6,381421053	18,18705	
				-2,74937
Ta	Gaya horizontal akibat tekanan tanah	10,76743658	19,23731627	
		17,14885763	37,42436627	49,849243
				-2,74937

Tabel 5.26.b Kombinasi pembebanan III pada *breast wall*KOMBINASI III : $M + (H + K) + Ta + Rm + F$

KOMBINASI BEBAN		ARAH HORIZONTAL	ARAH VERTIKAL		
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas				
	Berat sendiri V			35,45236842	0
H+K	Beban hidup + kejut pada abutment			14,396875	-2,749375
Ta	Gaya horizontal akibat tekanan tanah	10,76743658	19,23731627	34,91226316	0
Rm	Beban Rem	1,713684211	11,99578947		
F	Beban gesekan pada tumpuan	6,381421053	18,18705		
		18,86254184	49,42015575	84,76150658	-2,749375

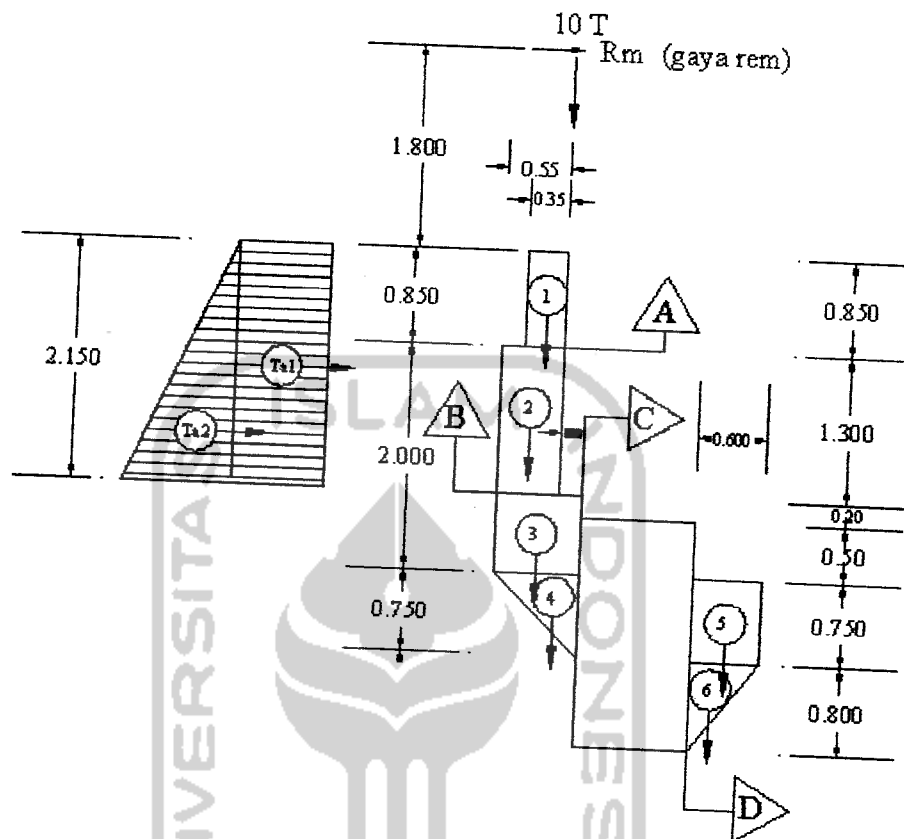
Tabel 5.27 Kombinasi pembebanan IV pada *breast wall*KOMBINASI IV : $M + Gb + Ta$

KOMBINASI BEBAN		ARAH HORIZONTAL	ARAH VERTIKAL		
		GAYA H (Ton)	MOMEN Mh (Ton-m)	GAYA V (Ton)	MOMEN Mv (Ton-m)
M	Beban Mati struktur atas				
	Berat sendiri V			35,45236842	0
Gb	Beban Gempa	10,76743658	26,25583613	14,396875	-2,749375
Ta	beban akibat tekanan tanah	10,76743658	19,23731627		
		21,53487316	45,4931524	49,84924342	-2,749375

GAYA DAN MOMEN PADA POTONGAN BREAST WALL**Tabel 5.28** Gaya dan momen pada potongan *breast wall*

KOMBINASI	Geser	Aksial	Momen
	H (Ton)	V (Ton)	M (Ton-m)
Kombinasi I	10,76743658	84,7615066	16,48794127
Kombinasi II	17,14885763	49,8492434	34,67499127
Kombinasi III	18,86254184	84,7615066	46,67078075
Kombinasi IV	21,53487316	49,8492434	42,7437774

5.7.1.4 PERHITUNGAN BACK WALL DAN CORBELL



Gambar 5.24 Potongan back wall dan corbell

Sudut gesek dalam, $\Phi = 35$ derajat

Koefisien tekanan tanah aktif, $Ka = \tan^2 (45 - \Phi/2)$

$$Ka = \tan^2 (45 - 35/2) = 0,27099005$$

Beban merata, $Q = 2,2 \text{ Ton/m}^2$

Berat tanah, $\gamma = 1,76 \text{ Ton/m}^3$

Ditinjau lebar = 1 m

1. TINJAUAN POTONGAN - A

Ditinjau Back Wall selebar 1 m (tegak lurus bidang gambar)

1.1. Gaya dan Momen akibat Berat Sendiri

Tabel 5.29 Perhitungan gaya dan momen akibat berat sendiri *back wall* pot. A

No	Parameter Berat Bagian Beton				BJ Beton	Berat	Lengan	Momen
	b	h	Shape	Direc	(Ton/m ³)	(Ton)	(m)	(Ton - m)
1	0,35	0,85	1	-1	2,5	0,744	0	0,000
Va =						0,744	Ma =	0,000

1.2. Gaya dan Momen Akibat Tekanan Tanah

Tabel 5.30 Perhitungan gaya dan momen akibat tekanan tanah pada *back wall*

				Ha =		0,85 m	
No	Gaya Horizontal Tekanan Tanah		Besar	Lengan	Momen		
			(Ton)	(m)	(Ton-m)		
1	Ta1 = Q. Ka. Ha		0,506751	0,425	0,2153693		
2	Ta2 = ½. Ha². y. Ka		0,172295	0,283333333	0,0488171		
			Ha =	0,679047	Ma =	0,2641864	

1.3. Gaya dan Momen Akibat Beban Hidup

Akibat beban hidup Truck = 10 Ton

Lengan = 0,175 m

Ma = 1,75 Ton-m

1.4. Gaya dan Momen Akibat Beban gempa

Tabel 5.31 Perhitungan gaya dan momen akibat gempa pada *back wall*

No	W	Koefisien	Gb	Lengan	Momen
	(Ton)	Cgxlxs	(Ton)	(m)	(Ton-m)
1	0,744	0,216	0,16065	0,425	0,06827625
Ha =			0,16065	Ma =	0,06827625

1.5. Gaya dan Momen Akibat Gaya Rem (R_m)

$$\text{Gaya Rem, } R_m = 1,713684 \text{ Ton}$$

$$\text{Lengan} = 2,65 \text{ m}$$

$$\text{Momen Akibat gaya rem, } M_a = 4,541263 \text{ Ton-m}$$

2. TINJAUAN POTONGAN - B

Ditinjau Back Wall selebar 1 m (tegak lurus bidang gambar)

2.1. Gaya dan Momen akibat Berat Sendiri

Tabel 5.32 Perhitungan gaya dan momen akibat berat sendiri *back wall* pot. B

No	Parameter Berat Bagian Beton				BJ Beton (Ton/m ³)	Berat (Ton)	Lengan (m)	Momen (Ton - m)
	b	h	Shape	Direc				
1	0,35	0,85	1	-1	2,5	0,744	0,1	-0,074
2	0,55	1,3	1	-1	2,5	1,7875	0,275	-0,49156
Vb =						2,531	Mb =	-0,566

2.2. Gaya dan Momen Akibat Tekanan Tanah

Tabel 5.33 Perhitungan gaya dan momen akibat tekanan tanah pada *back wall*

No	Gaya Horizontal Tekanan Tanah	Ha = 2,15 m		
		Besar (Ton)	Lengan (m)	Momen (Ton-m)
1	Ta1 = Q. Ka. Ha	1,281783	1,075	1,3779167
2	Ta2 = ½. Ha ² . y. Ka	1,102333	0,716666667	0,7900055
Hb =		2,384116	Mb = 2,1679222	

2.3. Gaya dan Momen Akibat Beban Hidup

Akibat beban hidup Truck, V_a = 10 Ton

Lengan = 0,275 m

M_b = 2,75 Ton-m

2.4. Gaya dan Momen Akibat Gaya Rem (R_m)

Gaya Rem, R_m = 1,713684 Ton

Lengan = 3,95 m

Momen Akibat gaya rem, M_b = 6,769053 Ton-m

2.5. Gaya dan Momen Akibat Beban gempa

Tabel 5.34 Perhitungan gaya dan momen akibat gempa pada *back wall*

No	W (Ton)	Koefisien $C_g \times I_x / S$	G _b (Ton)	Lengan (m)	Momen (Ton-m)
1	0,744	0,216	0,16065	1,725	0,27712125
2	1,788	0,216	0,3861	0,65	0,250965
			H _b = 0,54675	M _b = 0,52808625	

3. TINJAUAN POTONGAN - C

3.1. Gaya dan Momen akibat Berat Sendiri

Tabel 5.35 Perhitungan gaya dan momen akibat berat sendiri *back wall* pot. C

No	Parameter Berat Bagian Beton			BJ Beton	Berat	Lengan	Momen
	b	h	Shape	(Ton/m ³)	(Ton)	(m)	(Ton - m)
1	0,35	0,85	1	2,5	0,744	0,375	0,279
2	0,55	1,3	1	2,5	1,7875	0,475	0,849
3	0,75	0,7	1	2,5	1,3125	0,375	0,492
4	0,75	0,75	0,5	2,5	0,703125	0,25	0,176
					V _c = 4,547	M _c = 1,796	

3.2. Gaya dan Momen Akibat Beban Hidup

$$\begin{aligned}\text{Akibat beban hidup Truck, } V_a &= 10 \text{ Ton} \\ \text{Lengan} &= 0,2 \text{ m} \\ M_c &= 2 \text{ Ton-m}\end{aligned}$$

4. TINJAUAN POTONGAN - D

4.1. Gaya dan Momen akibat Berat Sendiri

Tabel 5.36 Perhitungan gaya dan momen akibat berat sendiri *back wall* pot. D

No	Parameter Berat Bagian Beton			BJ Beton	Berat	Lengan	Momen
	b	h	Shape	(Ton/m ³)	(Ton)	(m)	(Ton - m)
5	0,6	0,75	1	2,5	1,125	0,3	0,338
6	0,6	0,8	0,2	2,5	0,24	0,2	0,048

$$V_a = 1,365 \quad M_a = 0,386$$

4.2. Gaya dan Momen Akibat Beban Mati dan Hidup

$$\text{Jarak antara balok} = 2,06 \text{ m}$$

Saat penggantian elatomerik (ditinjau corbell selebar 1 m tegak lurus bidang gambar)

$$\text{Reaksi/m 1 buah balok akibat beban mati struktur atas, } P_m = 36,332 \text{ Ton}$$

$$\text{Reaksi/m 1 buah balok akibat beban hidup struktur atas, } P_h = 35,778479 \text{ Ton}$$

$$\text{Lengan terhadap potongan } D = 0,3 \text{ m}$$

$$\text{Momen akibat beban mati, } M_{dm} = 10,89959547 \text{ Ton-m}$$

$$\text{Momen akibat beban hidup, } M_{dh} = 10,73354369 \text{ Ton-m}$$

5. KOMBINASI GAYA

Tabel 5.37 Kombinasi gaya dan momen *back wall* pot. A

5.1. Kombinasi Gaya dan momen Potongan A

NO	KOMBINASI	AKSIAL (Ton)	GESER (Ton)	MOMEN (Ton-m)
I	M+(H+K)+Ta	10,744	0,679046867	2,01418639
II	M+F+A+Ta	0,744	2,392731078	4,80544955
III	M+(H+K)+Ta+Rm+F+A	10,744	2,392731078	6,55544955
IV	M+Ta+Gb	0,744	0,839696867	0,33246264

Tabel 5.38 Kombinasi gaya dan momen *back wall* pot. B

5.2. Kombinasi Gaya dan momen Potongan B

NO	KOMBINASI	AKSIAL (Ton)	GESER (Ton)	MOMEN (Ton-m)
I	M+(H+K)+Ta	12,531	2,384116262	4,352
II	M+F+A+Ta	2,531	4,097800472	8,371
III	M+(H+K)+Ta+Rm+F+A	12,531	4,097800472	11,121
IV	M+Ta+Gb	2,531	2,930866262	2,130

Tabel 5.39 Kombinasi gaya dan momen *back wall* pot. C

5.3. Kombinasi Gaya dan momen Potongan C

NO	KOMBINASI	GESER (Ton)	MOMEN (Ton-m)
I	M+(H+K)+Ta	14,547	3,796
II	M+F+A+Ta	4,547	1,796
III	M+(H+K)+Ta+Rm+F+A	14,547	3,796
IV	M+Ta+Gb	4,547	1,796

Tabel 5.40 Kombinasi gaya dan momen *back wall* pot. D

5.4. Kombinasi Gaya dan momen Potongan D

NO	KOMBINASI	GESER (Ton)	MOMEN (Ton-m)
I	M+(H+K)+Ta	73,475	22,019
II	M+F+A+Ta	37,697	36,717
III	M+(H+K)+Ta+Rm+F+A	73,475	22,019
IV	M+Ta+Gb	37,697	36,717

6. GAYA DAN MOMEN RENCANA *BACK WALL* DAN *CORBELL*

Tabel 5.41 Kombinasi gaya dan momen rencana *back wall* pot. A

6.1 Gaya dan Momen Rencana Potongan A

NO	KOMBINASI		AKSIAL	GESER	MOMEN
			(Ton)	(Ton)	(Ton-m)
I	M+(H+K)+Ta	100%	10,744	0,67904687	2,01418639
II	M+F+A+Ta	125%	0,595	1,914	3,844
III	M+(H+K)+Ta+Rm+F+A	140%	7,674	1,709	4,682
IV	M+Ta+Gb	150%	0,496	0,560	0,222

Tabel 5.42 Kombinasi gaya dan momen rencana *back wall* pot. B

6.2 Gaya dan Momen Rencana Potongan B

NO	KOMBINASI		AKSIAL	GESER	MOMEN
			(Ton)	(Ton)	(Ton-m)
I	M+(H+K)+Ta	100%	12,531	2,384	4,352
II	M+F+A+Ta	125%	2,025	3,278	6,697
III	M+(H+K)+Ta+Rm+F+A	140%	8,951	2,927	7,944
IV	M+Ta+Gb	150%	1,688	1,954	1,420

Tabel 5.43 Kombinasi gaya dan momen rencana *back wall* pot. C

6.3. Gaya dan Momen Rencana Potongan C

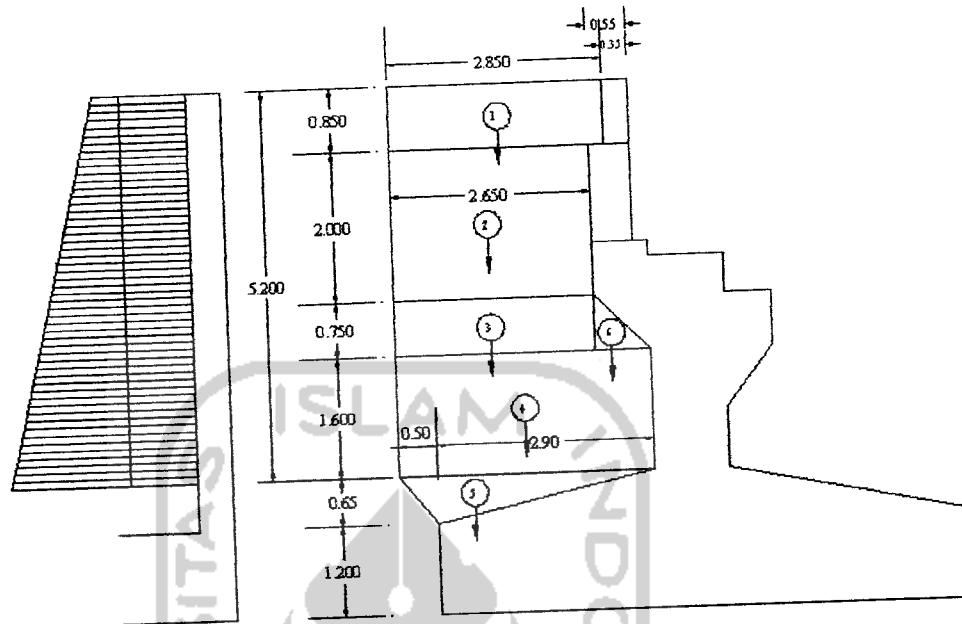
NO	KOMBINASI		GESER	MOMEN
			(Ton)	(Ton-m)
I	M+(H+K)+Ta	100%	14,547	3,796
II	M+F+A+Ta	125%	3,638	1,437
III	M+(H+K)+Ta+Rm+F+A	140%	10,391	2,711
IV	M+Ta+Gb	150%	3,031	1,197

Tabel 5.44 Kombinasi gaya dan momen rencana *back wall* pot. D

6.4. Gaya dan Momen Rencana Potongan D

NO	KOMBINASI		GESER	MOMEN
			(Ton)	(Ton-m)
I	M+(H+K)+Ta	100%	73,475	22,019
II	M+F+A+Ta	125%	30,158	29,374
III	M+(H+K)+Ta+Rm+F+A	140%	52,482	15,728
IV	M+Ta+Gb	150%	25,131	24,478

5.7.1.5 PERHITUNGAN WING WALL



Gambar 5.25 Potongan wing wall

Luas Wing Wall

Tabel 5.45 Perhitungan luas wing wall

No	Parameter berat bagian beton			Luas (m ²)
	b	h	Shape	
1	2,85	0,85	1	2,4225
2	2,65	2	1	5,3
3	2,65	0,75	1	1,9875
4	3,4	1,6	1	5,44
5	3,4	0,65	0,5	1,105
6	0,75	0,75	0,5	0,28125
A =				16,53625
H =				5,2

$$\text{Lebar ekuivalen, } B = \frac{A}{H} = \frac{16,53625}{5,2} = 3,180048 \text{ m}$$

$$\text{Sudut gesek dalam, } \Phi = 35 \text{ derajat}$$

$$\text{Koefisien tekanan tanah aktif, } Ka = \tan^2 (45 - \Phi/2)$$

$$Ka = \tan^2 (45 - 35/2) = 0,27099005$$

$$\text{Beban merata, } Q = 2,2 \text{ Ton/m}^2$$

$$\text{Berat tanah, } \gamma = 1,76 \text{ Ton/m}^3$$

$$\text{Ditinjau lebar} = 1 \text{ m}$$

Beban merata akibat tekanan tanah pada wing wall :

$$q = Q \cdot Ka + \frac{1}{2} \cdot H \cdot \gamma \cdot Ka = 2,2 \cdot 0,27099005 + \frac{1}{2} \cdot 5,2 \cdot 1,76 \cdot 0,27099005 =$$

$$q = 1,836228579 \text{ Ton/m}^2$$

$$Ly = H = 5,2 \text{ m}$$

$$Lx = B = 3,180048 \text{ m}$$

$$\frac{Ly}{Lx} = \frac{5,2}{3,180048} = 1,635195$$

Dari tabel momen plat :

$$Cx = 0,05835$$

$$Cy = 0,036$$

$$\text{Momen Tumpuan, } Mt = Cx \cdot q \cdot Lx^2 = 0,05835 \cdot 1,836228579 \cdot 3,180048^2 =$$

$$Mt = 1,083515116 \text{ Ton-m}$$

$$\text{Momen Lapangan, } Ml = Cy \cdot q \cdot Lx^2 = 0,036 \cdot 1,836228579 \cdot 3,180048^2 =$$

$$Ml = 0,668492616 \text{ Ton-m}$$

5.7.2 PERHITUNGAN FONDASI *ABUTMENT* DAN *ABUTMENT*

1. DATA FONDASI TIANG BOR *ABUTMENT*

Jumlah baris, nb	= 8
Jumlah tiang bor perbaris, nt	= 3
Jarak antara baris, xb	= 2,43 m
Jarak antara bore pile dalam satu baris, xt	= 2,5 m
Diamter tiang bor, ds	= 0,8 m
Panjang efektif tiang tiang bor, Le	= 25 m
Mutu beton, K	= 350 Mpa
Kuat tekan beton, $f'c$	= 25 Mpa
Ukuran Pile Cap :	
Bx	= 7 m
By	= 19 m

2. GAYA YANG DITERIMA TIANG BOR

Jumlah bor - pile, $n = 24$ buah

x max = 2,5 m			
$X1 =$	2,5	$X1^2 =$	100
$X2 =$	0	$X2^2 =$	0
$X3 =$	Tidak ada	$X3^2 =$	Tidak ada
$X4 =$	Tidak ada	$X4^2 =$	Tidak ada
$X5 =$	Tidak ada	$X5^2 =$	Tidak ada
$\Sigma X^2 =$		100 m ²	

2.1. GAYA AKSIAL PADA TIANG BOR

Gaya aksial yang diterima satu tiang bor :

$$P_{1,2} = \frac{\sum v}{n} \pm \sum v \cdot ex \cdot X_{max} / \sum X^2$$

Tabel 5.46 Gaya aksial yang diterima satu tiang bor

KOMBINASI PEMBEBANAN	$\sum V$ (Ton)	ex (m)	P1 (Ton)	P2 (Ton)	Pmax (Ton)
Kombinasi I	2620,466	-0,2144	95,140514	123,2316	123,2316
Kombinasi II	1957,133	0,059163	84,441958	78,65245	84,44196
Kombinasi III	2620,466	0,128837	117,62641	100,7458	117,6264
Kombinasi IV	1957,133	0,548591	108,38884	54,70557	108,3888

2.2. GAYA LATERAL PADA TIANG BOR

Gaya lateral yang diterima satu tiang bor, $P_h = \frac{\sum H}{n}$

Tabel 5.47 Gaya lateral yang diterima satu tiang bor

KOMBINASI PEMBEBANAN	$\sum H$ (Ton)	Hmax (Ton)
Kombinasi I	305,0578	12,71074
Kombinasi II	433,3548	18,05645
Kombinasi III	465,9148	19,41312
Kombinasi IV	727,7985	30,32494

3. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN

BAHAN

$$\text{Kuat Tekan beton, } f'c = 25 \text{ Mpa}$$

$$\text{Tegangan ijin, } f = 0,33 \cdot f'c = 0,33 \cdot 25 = 825 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi \cdot D^2 = \frac{1}{4} \pi \cdot 0,8^2 = 0,5026548 \text{ m}^2$$

$$\text{Panjang efektif, } Le = 25 \text{ m}$$

$$\text{Berat Tiang, } W = A \cdot Le \cdot 2,4 = 0,5026548 \cdot 25 \cdot 2,4 = 30,16 \text{ Ton}$$

$$\text{Daya dukung ijin, } P_{ijin} = A \cdot f - W = 0,5026548 \cdot 825 - 30,16 =$$

$$P_{ijin} = 384,5 \text{ Ton}$$

4. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN

TANAH

4.1. DAYA DUKUNG TIANG MENURUT TERZAGHI (DATA PENGUJIAN LAB)

$$Q_{ult} = 1,3 \cdot C \cdot N_c + y \cdot D_f \cdot N_q + 0,6 \cdot y \cdot R \cdot N_g$$

$$D_f = \text{Kedalaman tiang bor} = 25 \text{ m}$$

$$R = \text{Jari – jari penampang tiang} = 0,4 \text{ m}$$

Parameter kekuatan tanah di ujung tiang bor (*end bearing*) :

$$y = 1,76 \text{ T/m}^3 \quad \Phi = 40^\circ \quad C = 0,06$$

Dari grafik diperoleh nilai faktor daya dukung :

$$N_c = 95,7 \quad N_q = 81,3 \quad N_g = 100,4$$

$$Q_{ult} = 1,3. C. N_c + y. Df. N_q + 0,6. y. R. N_g$$

$$Q_{ult} = 1,3. 0,06. 95,7 + 1,76. 25. 81,3 + 0,6. 1,76. 0,4. 100,4 = 3627,07 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 = \frac{1}{4} \pi. 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF$$

$$= 2$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.3627,07}{2} = 911,58 \text{ Ton}$$

4.2. DAYA DUKUNG TIANG BOR MENURUT MEYERHOFF (DATA PENGUJIAN SPT)

$$Q_{ult} = 40. N$$

$$N = \text{Nilai SPT} = 50$$

$$Q_{ult} = 40. N = 40. 50 = 2000 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 = \frac{1}{4} \pi. 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF$$

$$= 4$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.2000}{4} = 251 \text{ Ton}$$

4.3. DAYA DUKUNG TIANG BOR MENURUT BAGEMENT (DATA PENGUJIAN CPT)

$$P_{ijin} = A. \frac{qc}{3} + K. L. \frac{qf}{4} =$$

$$qc = \text{Nilai konus rata-rata} = 0 \text{ Ton/m}^2$$

$$qf = \text{Nilai hambatan lekat rata-rata} = 0 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi D^2 = \frac{1}{4} \pi 0,8^2 = 0,5026548 \text{ m}^2$$

$$K = \text{Keliling penampang tiang bor} = \pi \cdot ds = \pi \cdot 0,8 = 2,5132741 \text{ m}$$

$$L = \text{Panjang tiang bor} = 25 \text{ m}$$

$$P_{ijin} = 0 \text{ Ton}$$

$$\text{Daya dukung ijin tiang bor terkecil} = 251 \text{ Ton}$$

Efisiensi kelompok tiang bor menurut BMS :

$$Ef = \frac{(2 \cdot (nb + nt - 2) \cdot xt + 4 \cdot ds)}{(\lambda \cdot ds \cdot nb \cdot nt)} = \frac{(2 \cdot (8 + 3 - 2) \cdot 2,5 + 4 \cdot 0,8)}{(\lambda \cdot 0,8 \cdot 8 \cdot 3)} = 0,799$$

$$P_{ijin} \cdot Eff = 251 \cdot 0,799 = 200 \text{ Ton}$$

$$\text{Diambil daya dukung ijin tiang, } P_{ijin} = 160 \text{ Ton}$$

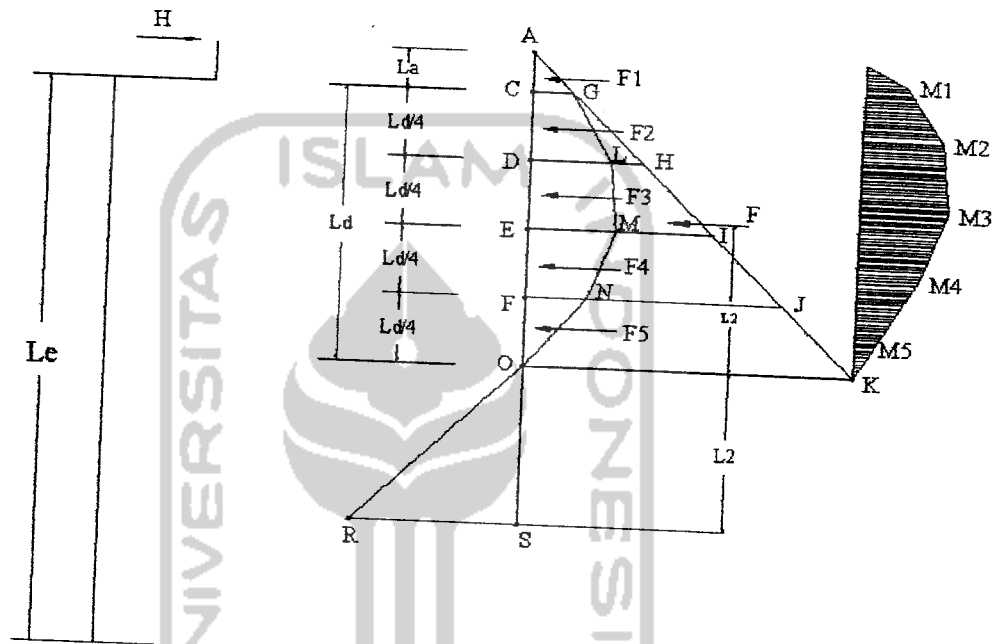
5. DAYA DUKUNG LATERAL IJIN TIANG BOR

$$La = 1,2 \text{ m}$$

$$By = 19 \text{ m}$$

$$y = 1,76 \text{ m}$$

$$\Phi = 40 \text{ derajat}$$



Gambar 5.26 BMD tiang pondasi bor *abutment*

Panjang efektif tiang bor, $l_e = 25 \text{ m}$

Panjang Jepitan tiang, $L_d = 1/3 \cdot L_e = 8,333 \text{ m}$

$$\text{Koefisien tekanan tanah pasih, } K_p = \tan^2(45 + \frac{\Phi}{2})$$

$$Kp = \tan^2 \left(45 + \frac{40}{2} \right) = 4,599$$

Diagram Tekanan Tanah Pasif efektif :

Tabel 5.48 Perhitungan tekanan tanah pasif pada tiang bor *abutment*

Bagian	Kedalaman H (m)	H.y.Kp (Ton/m ²)	Bagian	Tekanan (Ton/m ²)
OK	La + Ld = 9,533	77,16239	O	0
FJ	La + 3/4. Ld = 7,44975	60,30006	FN = 1/4. FJ	15,07502
EI	La + 1/2. Ld = 5,3665	43,43774	EM = 1/2. EI	21,71887
DH	La + 1/4. Ld = 3,28325	26,57541	DL = 3/4. DH	19,93156
CG	La = 1,2	9,713088	CG	9,713088

Tabel 5.49 Perhitungan gaya dan momen akibat tekanan tanah

KODE	Tegangan - 1 (Ton/m ²)	Tegangan - 2 (Ton/m ²)	Lebar (m)	Besar Gaya (Ton)	Lengan Thd. O (m)	Momen (Ton-m)
F1	0	15,07501611	1,2	90,45009666	8,733	789,9007
F2	15,0750161	21,71886948	2,08325	383,2543108	7,291375	2794,451
F3	21,7188695	19,93156011	2,08325	433,8412872	5,208125	2259,5
F4	19,9315601	9,713088	2,08325	308,7860659	3,124875	964,9179
F5	9,713088	0	2,08325	101,1739529	1,3888333	140,5138
			F =	1317,505713	M =	6949,283

$$L_2 = \frac{M}{F} = \frac{6949,283}{1317,506} = 5,27 \text{ m}$$

$$\text{Gaya lateral, } \Sigma Ms = 0$$

$$H = \frac{F(2.L_2)}{L_2 + L_d + L_a} = \frac{1317,506(2.5,27)}{5,27 + 8,333 + 1,2} = 939 \text{ Ton}$$

$$\text{Jumlah baris tiang, } nb = 8 \text{ buah}$$

$$\text{Jumlah tiang bor perbaris, } nt = 3 \text{ buah}$$

$$\text{Angka Aman, } SF = 2$$

$$\text{Daya Dukung ijin lateral satu tiang bor, } H_{ijin} = \frac{H/(nb.nt)}{SF}$$

$$H_{ijin} = \frac{939/(8.3)}{2} = 20 \text{ Ton}$$

6. MOMEN MAKSIMUM AKIBAT GAYA LATERAL

6.1. PERHITUNGAN DENGAN CARA BENDING MOMENT DIAGRAM (BMD)

Tabel 5.50 Perhitungan bending moment diagram pada tiang bor abutment

Lengan yh (m)	Momen Mh = H.yh (Ton-m)	Lengan yf (m)	MOMEN AKIBAT GAYA F (Ton-m)				
			F1	F2	F3	F4	F5
0,8	751,2	0,4	90,4501	383,2543	433,8413	308,7861	101,174
1,841625	1729,286	1,441625	36,18004				
3,924875	3685,458	3,524875	130,3951	153,3017			
6,008125	5641,629	5,608125	318,8253	552,509	173,5365		
8,091375	7597,801	7,691375	507,2554	1350,924	625,4364	123,5144	
10,17463	9553,973	9,774625	695,6856	2149,338	1529,236	445,1537	40,46958
12,25788	11510,14	11,85788	884,1158	2947,753	2433,036	1088,432	145,8549
			1072,546	3746,167	3336,836	1731,711	356,6255

KEDE	BMD H.yh-Σ(Fi.yfi) (Ton-m)
M1	715,0199613
M2	1445,58903
M3	2640,58683
M4	3034,499516
M5	2737,917831
M6	2054,781122
M7	1266,259094

Momen maksimum, $M_{max} = 3034,4995 \text{ Ton-m}$

Jumlah Baris tiang, $nb = 8 \text{ buah}$

Jumlah tiang bor perbaris, $nt = 3 \text{ buah}$

Angka aman, $SF = 2$

Momen maksimum yang diijinkan untuk satu tiang bor akibat gaya lateral :

$$M_{max \text{ ijin}} = \frac{M_{max}/(nb.nt)}{SF} = \frac{3034,4995/(8.3)}{2} = 63,22 \text{ Ton-m}$$

7. KONTROL GAYA PADA TIANG BOR TERHADAP DAYA DUKUNG IJIN

7.1. TERHADAP DAYA DUKUNG IJIN AKSIAL

Tabel 5.51 Kontrol gaya terhadap daya dukung ijin aksial tiang bor *abutment*

KOMBINASI PEMBEBANAN		Pmax (Ton)	P ijin (Ton)	Keterangan
Kombinasi - I :	100%	123,2316	160	AMAN
Kombinasi - II :	125%	84,44196	200	AMAN
Kombinasi - III :	140%	117,6264	224	AMAN
Kombinasi - IV :	150%	108,3888	240	AMAN

7.2. TERHADAP DAYA DUKUNG IJIN LATERAL

Tabel 5.52 Kontrol gaya terhadap daya dukung ijin lateral tiang bor *abutment*

KOMBINASI PEMBEBANAN		Hmax (Ton)	H ijin (Ton)	Keterangan
Kombinasi - I :	100%	12,71074	20	AMAN
Kombinasi - II :	125%	18,05645	25	AMAN
Kombinasi - III :	140%	19,41312	28	AMAN
Kombinasi - IV :	150%	30	30	AMAN

8. PEMBESIAN BORE PILE

Beban maksimum pada bore pile :

$$P_{max} = P_{ijin} = 160 \text{ Ton}$$

$$M_{max} = 63,22 \text{ Ton-m}$$

$$\text{Faktor beban ultimit} = 1,5$$

$$\text{Beban Ultimit : } P_u = 1,5 \cdot 160 = 2400000 \text{ N}$$

$$M_u = 1,5 \cdot 63,22 = 948300000 \text{ Nmm}$$

$$f'_c = 25 \text{ Mpa}$$

$$D = 800 \text{ mm}$$

$$A_g = \frac{1}{4} \pi \cdot 800^2 = 502654,82 \text{ mm}^2$$

$$\frac{\Phi \cdot P_n}{(f'_c \cdot A_g)} = \frac{2400000}{(25 \cdot 502654,82)} = 0,191$$

$$\frac{\Phi \cdot M_n}{(f'_c \cdot A_g \cdot D)} = \frac{948300000}{(25 \cdot 502654,82 \cdot 800)} = 0,094$$

Plot nilai $\frac{\Phi \cdot P_n}{(f'_c \cdot A_g)}$ dan $\frac{\Phi \cdot M_n}{(f'_c \cdot A_g)}$ ke dalam diagram interaksi kolom lingkaran diperoleh :

Rasio tulangan, $\rho = 0,7\%$

Luas tulangan yang diperlukan, $A_s = \rho \cdot A_g = 0,007 \cdot 502654,82 = 3519 \text{ mm}^2$

Dipakai tulangan Ø 19

$$A_{1\phi} = \frac{1}{4} \pi \cdot 19^2 = 283,53 \text{ mm}^2$$

$$\text{Jumlah tulangan} = \frac{A_s}{A_{1\phi}} = \frac{3519}{283,53} = 12 \longrightarrow \text{Digunakan tulangan 12D19}$$

5.7.3 PEMBESIAN ABUTMENT

5.7.3.1 PEMBESIAN PILE CAP

1. MOMEN RENCANA

Tabel 5.53 Momen rencana pile cap

KOMBINASI PEMBEBANAN	FAKTOR KEKUATAN	P max (Ton)	P max Rencana
Kombinasi – I	100 %	123,2316	123,2316
Kombinasi – II	125 %	84,44196	67,5536
Kombinasi – III	140 %	117,6264	84,018857
Kombinasi – IV	150 %	108,3888	72,2586666

Gaya reaksi maksimum (rencana) tiang bor, $P_{max} = 123,2316$ Ton

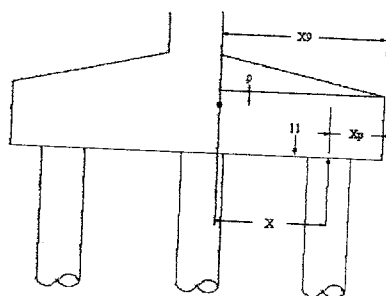
Jumlah baris tiang bor = 8 buah

Jarak pusat tiang bor ke tepi luar pile cap, $X_p = \left(\frac{(Bx - (nt - 1).xt)}{2} \right)$

$$X_p = \left(\frac{(7 - (3 - 1)2,5)}{2} \right) = 1 \text{ m}$$

Lengan terhadap sisi depan breast wall, $X = b_9 - X_p = 3,1 - 1 = 2,1 \text{ m}$

$M_p = 8 \cdot (123,2316 \cdot 2,1) = 2070,291 \text{ Ton -m}$



Gambar 5.27 Lengan terhadap sisi depan

Tabel 5.54 Perhitungan berat dan momen pada pile cap

No	PARAMETER BERAT BAGIAN BETON				Berat (Ton)	Lengan (m)	Momen (Ton-m)
	B	H	Lebar	BJ			
9	3,1	0,36	19	2,5	26,505	1,033	27,37967
11	3,1	1,2	19	2,5	176,7	1,55	273,885
Wbs =					203,205	Mbs =	301,2647

Momen rencana Pile Cap ;

$$Mr = Mp - Mbs = 2070,291 - 301,2647 = 1769,026 \text{ Ton-m}$$

Untuk lebar pile cap = 19 m

$$Mr = 93,107 \text{ Ton - m/m}$$

Gaya geser rencana Pile Cap :

$$Vr = nb \cdot P_{max} - Wt = 8 \cdot 123,2316 - 203,205 = 782,648 \text{ Ton}$$

Untuk lebar pile cap = 19 m

$$Vr = 41,192 \text{ Ton / m}$$

2. PEMBESIAN PILE CAP

INPUT DATA MATERIAL :

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 25 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Modulus elastis baja (E_s)	= 200000 Mpa

Faktor bentuk distribusi tegangan beton (β_1) = 0,85

Faktor beban ultimit = 1,5

Faktor reduksi kekuatan lentur ϕ = 0,8

Faktor reduksi kekuatan geser ϕ = 0,6

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) =$$

$$= 0,85 \cdot \frac{0,85 \cdot 25}{390} \left(\frac{600}{600 + 390} \right) = 0,028069$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) =$$

$$= 0,75 \cdot 0,028069 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,028069 \cdot 390}{0,85 \cdot 25} \right) = 6,6241 \text{ Mpa}$$

Tulangan Lentur

Momen rencana = 93,107 Ton - m

Momen ultimit rencana, M_u = 1,5 . 93,107 = 1396605000 Nmm

Tebal efektif pelat, d = 1950 mm

Ditinjau selebar 1 m, b = 1000 mm

$$Mn = \frac{M}{\phi} = \frac{1396605000}{0,8} = 1745756250 \text{ Nmm}$$

$$Rn = \frac{Mn}{b.d^2} = \frac{1745756250}{1000.1950^2} = 0,459 \text{ Mpa} < R_{\max} \text{ (Ok)}$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85.f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2.Rn}{0,85.f_c'}} \right) = \\ &= \frac{0,85.25}{390} \left(1 - \sqrt{1 - \frac{2.0,459}{0,85.25}} \right) = 0,001188 \end{aligned}$$

$$\rho_{\max} = 0,75. \rho_b = 0,75. 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 < \rho = 0,00118 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = 0,001188$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,00118 \times 1000 \times 1950 = 2316,25 \text{ mm}^2$$

Dipakai tulangan Ø 25

$$A_1 \phi = \frac{1}{4} \pi \cdot 25^2 = 490 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_1 \phi \cdot 1000}{A_s} = \frac{490 \cdot 1000}{2316,25} =$$

$$= 211,55 \text{ mm}$$

Digunakan tulangan **D25 – 180**

Tulangan Geser

$$\text{Gaya geser rencana} = 41,192 \text{ Ton}$$

$$\text{Gaya geser ultimit rencana, } V_u = 1,5 \cdot 41,192 = 617880 \text{ N}$$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'_c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 1950 = 1625000 \text{ N}$$

$$\Phi \cdot V_c = 0,6 \cdot 1625000 = 975000 \text{ N} > V_u \text{ maka tidak perlu tulangan geser}$$

5.7.3.2. PEMBESIAN BREAST WALL**1. TULANGAN AKSIAL TEKAN LENTUR**

Gaya aksial dan momen pada *breast wall* :

Tabel 5.55 Gaya aksial dan momen pada *breast wall*

Kombinasi	P (Ton)	M(Ton-m)	Faktor beban Ult.	Pu (N)	Mu (Nmm)
Kombinasi I	84,762	16,488	1,5	1271430	247320000
Kombinasi II	49,849	34,675	1,5	747735	520125000
Kombinasi III	84,762	46,671	1,5	1271430	700065000
Kombinasi IV	49,849	42,744	1,5	747735	641160000

$$\text{Luas penampang } \textit{breast wall}, A_g = 1 \text{ m}^2 = 1000000 \text{ mm}^2$$

$$\text{Tebal } \textit{breast wall}, h = 1000 \text{ mm}$$

$$\text{Tebal efektif, } d = 900 \text{ mm}$$

$$\text{Kuat tekan beton, } f'_c = 25 \text{ Mpa}$$

$$\text{Tegangan leleh baja, } f_y = 390 \text{ Mpa}$$

Kombinasi	$P/(f_c \cdot A_g)$	$M/(f_c \cdot A_g \cdot h)$
Kombinasi I	0,051	0,0099
Kombinasi II	0,030	0,021
Kombinasi III	0,051	0,029
Kombinasi IV	0,030	0,026

Plot ke Diagram Interaksi diperoleh rasio tulangan kurang dari rasio minimum,
 $\rho < 1\%$

Maka diambil rasio tulangan minimum, $\rho = \frac{1,4}{f_y} = \frac{1,4}{390} = 0,0035897$

Luas Tulangan yang diperlukan :

$$A_s = \rho \cdot b \cdot d = 0,0035897 \cdot 1000 \cdot 900 = 3230,76 \text{ mm}^2$$

Diamter tulangan yang digunakan D 25 mm

$$A_1 \phi = \frac{1}{4} \pi \cdot 25^2 = 490,87 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot 1000}{A_s} = \frac{490,87 \cdot 1000}{3230,76} = \\ &= 151,84 \text{ mm} \end{aligned}$$

Digunakan tulangan **D25 – 150**

2. TULANGAN GESER

Perhitungan geser *bore pile* didasarkan atas momen dan gaya aksial untuk kombinasi beban yang menentukan dalam perhitungan tulangan aksial tekan dan lentur.

Ditinjau *Breast Wall* selebar, $= 1000 \text{ mm}$

Panjang *breast wall*, $L = 1600 \text{ mm}$

Tebal *breast wall* $= 1000 \text{ mm}$

Luas tulangan *breast wall*, $A_s = 3231 \text{ mm}^2$

Faktor reduksi kekuatan geser, $\phi = 0,75$

$P_u = 1271430 \text{ N}$

$M_u = 700065000 \text{ Nmm}$

$F'_c = 25 \text{ Mpa}$

$F_y = 390 \text{ Mpa}$

$V_u = \frac{M_u}{L} = \frac{700065000}{1600} = 437541 \text{ N}$

Tebal efektif *Breast Wall*, $d = 900 \text{ mm}$

$V_{c \max} = 0,2 \cdot F'_c \cdot b \cdot d = 0,2 \cdot 25 \cdot 1000 \cdot 900 = 4500000 \text{ N}$

$\Phi \cdot V_{c \max} = 0,75 \cdot 4500000 = 3375000 \text{ N} > V_u \text{ (Ok)}$

$\beta_1 = 1,4 - \frac{d}{2000} = 1,4 - \frac{900}{2000} = 0,95 < 1 \text{ maka diambil } = 1$

$\beta_2 = 1 + \frac{P_u}{14 \cdot f'_c \cdot b \cdot d} = 1 + \frac{1271430}{14 \cdot 25 \cdot 1000 \cdot 900} = 1,004$

$\beta_3 = 1$

$V_{uc} = \beta_1 \cdot \beta_2 \cdot \beta_3 \cdot b \cdot d \cdot \sqrt{\frac{A_s \cdot F'_c}{b \cdot d}} = 1 \cdot 1,004 \cdot 1 \cdot 1000 \cdot 900 \cdot \sqrt{\frac{3231 \cdot 25}{1000 \cdot 900}} =$

$V_{uc} = 270703,24 \text{ N}$

$V_c = V_{uc} + 0,6 \cdot b \cdot d = 270703,24 + 0,6 \cdot 1000 \cdot 900 = 810703,24 \text{ N}$

$\Phi \cdot V_c = 0,75 \cdot 810703,24 = 608027,43 \text{ N}$

Geser pada beton sepenuhnya dipikul oleh tulangan geser, sehingga :

Untuk tulangan geser digunakan sengkang berpenampang = 5 Diameter = 13

$$A_1 \phi = 5 \cdot \frac{1}{4} \pi \cdot 13^2 = 663,66 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot f_y \cdot d}{V_s} = \frac{663,66 \cdot 390 \cdot 900}{437541} = \\ &= 532,39 \text{ mm} \end{aligned}$$

Digunakan tulangan **D13 – 200**

5.7.3.3. PEMBESIAN BACK WALL DAN CORBELL

INPUT DATA MATERIAL :

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 25 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Modulus elastis baja (E_s)	= 200000 Mpa
Faktor bentuk distribusi tegangan beton (β_1)	= 0,85
Faktor beban ultimit	= 1,5
Faktor reduksi kekuatan lentur ϕ	= 0,8
Faktor reduksi kekuatan geser ϕ	= 0,6

$$\begin{aligned} \rho_b &= \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) = \\ &= 0,85 \cdot \frac{0,85 \cdot 25}{390} \left(\frac{600}{600 + 390} \right) = 0,028069 \end{aligned}$$

$$\begin{aligned}
 R_{max} &= 0,75 \cdot \rho b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho b \cdot f_y}{0,85 \cdot f_c'} \right) = \\
 &= 0,75 \cdot 0,028069 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,028069 \cdot 390}{0,85 \cdot 25} \right) = 6,6241 \text{ Mpa}
 \end{aligned}$$

1. PERHITUNGAN PEMBESIAN BACK WALL POT. – A

1.1. Tulangan Lentur

Momen rencana = 4,682 Ton - m

Momen ultimit rencana, $M_u = 1,5 \cdot 4,682 = 70230000 \text{ Nmm}$

Tebal efektif pelat, $d = 300 \text{ mm}$

Ditinjau selebar 1 m, $b = 1000 \text{ mm}$

$$M_n = \frac{M}{\phi} = \frac{70230000}{0,8} = 87787500 \text{ Nmm}$$

$$R_n = \frac{M_n}{b \cdot d^2} = \frac{87787500}{1000 \cdot 300^2} = 0,975 \text{ Mpa} < R_{max} \text{ (Ok)}$$

$$\begin{aligned}
 \rho_{perlu} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0,85 \cdot f_c'}} \right) = \\
 &= \frac{0,85 \cdot 25}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 0,975}{0,85 \cdot 25}} \right) = 0,00256
 \end{aligned}$$

$$\rho_{max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

Ternyata : $\rho_{min} = 0,00090 < \rho = 0,00256 < \rho_{max} = 0,02096775$

Rasio tulangan yang digunakan $\rho = 0,00256$

Luas tulangan pokok :

$$A_s = p \cdot b \cdot d = 0,00256 \times 1000 \times 300 = 768 \text{ mm}^2$$

Dipakai tulangan Ø 16

$$A_{l\phi} = \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_{l\phi} \cdot 1000}{A_s} = \frac{201,06 \cdot 1000}{768} = \\ &= 261,797 \text{ mm} \end{aligned}$$

Digunakan tulangan **D16 – 200**

1.2. Tulangan Geser

$$\begin{aligned} \text{Gaya geser rencana} &= 1,914 \text{ Ton} \end{aligned}$$

$$\begin{aligned} \text{Gaya geser ultimit rencana, } V_u &= 1,5 \cdot 1,914 = 28710 \text{ N} \end{aligned}$$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'_c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 300 = 250000 \text{ N}$$

$$\begin{aligned} \Phi \cdot V_c &= 0,6 \cdot 250000 = 150000 \text{ N} > V_u \text{ maka tidak perlu tulangan} \\ \text{geser} \end{aligned}$$

2. PERHITUNGAN PEMBESIAN BACK WALL POT. – B

2.1. Tulangan Lentur

$$\text{Momen rencana} = 7,944 \text{ Ton} \cdot \text{m}$$

$$\text{Momen ultimit rencana, } Mu = 1,5 \cdot 7,944 = 119160000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = 500 \text{ mm}$$

$$\text{Ditinjau selebar 1 m, } b = 1000 \text{ mm}$$

$$Mn = \frac{M}{\phi} = \frac{119160000}{0,8} = 148950000 \text{ Nmm}$$

$$Rn = \frac{Mn}{b \cdot d^2} = \frac{148950000}{1000 \cdot 300^2} = 0,5958 \text{ Mpa} < R_{\max} \text{ (Ok)}$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot Rn}{0,85 \cdot f_c'}} \right) = \\ &= \frac{0,85 \cdot 25}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 0,5958}{0,85 \cdot 25}} \right) = 0,00155 \end{aligned}$$

$$\rho_{\max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 < \rho = 0,00155 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = 0,00155$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,00155 \times 1000 \times 500 = 775,21 \text{ mm}^2$$

Dipakai tulangan Ø 16

$$A_1 \phi = \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A1 \phi \cdot 1000}{A_s} = \frac{201,06 \cdot 1000}{775,21} = \\ &= 259,36 \text{ mm} \end{aligned}$$

Digunakan tulangan **D16 – 200**

2.2. Tulangan Geser

$$\text{Gaya geser rencana} = 3,278 \text{ Ton}$$

$$\text{Gaya geser ultimit rencana, } V_u = 1,5 \cdot 3,278 = 49170 \text{ N}$$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'_c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 500 = 416666,67 \text{ N}$$

$$\phi \cdot V_c = 0,6 \cdot 416666,67 = 250000 \text{ N} > V_u \text{ maka tidak perlu tulangan geser}$$

3. PERHITUNGAN PEMBESIAN BACK WALL POT. – C

3.1. Tulangan Lentur

$$\text{Momen rencana} = 3,796 \text{ Ton - m}$$

$$\text{Momen ultimit rencana, } M_u = 1,5 \cdot 3,796 = 56940000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = 500 \text{ mm}$$

Ditinjau selebar 1 m, $b = 1000 \text{ mm}$

$$M_n = \frac{M}{\phi} = \frac{56940000}{0,8} = 71175000 \text{ Nmm}$$

$$R_n = \frac{M_n}{b \cdot d^2} = \frac{71175000}{1000 \cdot 500^2} = 0,2847 \text{ Mpa} < R_{\max} (\text{Ok})$$

$$\begin{aligned}\rho_{perlu} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0,85 \cdot f_c'}} \right) = \\ &= \frac{0,85 \cdot 25}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 0,2847}{0,85 \cdot 25}} \right) = 0,000735\end{aligned}$$

$$\rho_{max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{min} = 0,00090 > \rho = 0,00256 < \rho_{max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = \rho_{min} = 0,00090$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,0009 \times 1000 \times 500 = 450$$

Dipakai tulangan Ø 16

$$A_1 \phi = \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\begin{aligned}\text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot 1000}{A_s} = \frac{201,06 \cdot 1000}{450} = \\ &= 446,8 \text{ mm}\end{aligned}$$

Digunakan tulangan **D16 – 200**

3.2. Tulangan Geser

$$\text{Gaya geser rencana} = 14,547 \text{ Ton}$$

$$\text{Gaya geser ultimit rencana, } V_u = 1,5 \cdot 14,547 = 218205 \text{ N}$$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'_c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 500 = 4166666,67 \text{ N}$$

$$\Phi \cdot V_c = 0,6 \cdot 4166666,67 = 2500000 \text{ N} > V_u \text{ maka tidak perlu tulangan geser}$$

4. PERHITUNGAN PEMBESIAN BACK WALL POT. – D

4.1. Tulangan Lentur

$$\text{Momen rencana} = 29,374 \text{ Ton} \cdot \text{m}$$

$$\text{Momen ultimit rencana, } Mu = 1,5 \cdot 29,374 = 440610000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = 1500 \text{ mm}$$

$$\text{Ditinjau selebar 1 m, } b = 1000 \text{ mm}$$

$$Mn = \frac{M}{\phi} = \frac{440610000}{0,8} = 550762500 \text{ Nmm}$$

$$Rn = \frac{Mn}{b \cdot d^2} = \frac{550762500}{1000 \cdot 1500^2} = 0,245 \text{ Mpa} < R_{\max} (\text{Ok})$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85 \cdot f_c' \left(1 - \sqrt{1 - \frac{2 \cdot Rn}{0,85 \cdot f_c'}} \right)}{f_y} = \\ &= \frac{0,85 \cdot 25 \left(1 - \sqrt{1 - \frac{2 \cdot 0,245}{0,85 \cdot 25}} \right)}{390} = 0,000632 \end{aligned}$$

$$\rho_{\max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 > \rho = 0,00256 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = \rho_{\min} = 0,00090$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,0009 \times 1000 \times 1500 = 1350 \text{ mm}^2$$

Dipakai tulangan Ø 25

$$A_1 \phi = \frac{1}{4} \pi \cdot 25^2 = 490 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A1 \phi \cdot 1000}{A_s} = \frac{490 \cdot 1000}{1350} = \\ &= 363,61 \text{ mm} \end{aligned}$$

Digunakan tulangan **D25 – 200**

4.2. Tulangan Geser

$$\text{Gaya geser rencana} = 73,475 \text{ Ton}$$

$$\text{Gaya geser ultimit rencana, } V_u = 1,5 \cdot 73,475 = 1102125 \text{ N}$$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 1500 = 1250000 \text{ N}$$

$$\phi \cdot V_c = 0,6 \cdot 1250000 = 750000 \text{ N} < V_u \text{ maka perlu tulangan geser}$$

$$\phi \cdot V_s = V_u - \phi \cdot V_c = 1102125 - 750000 = 352125 \text{ N}$$

$$V_s = \frac{352125}{0,6} = 586875 \text{ N}$$

$$\text{Untuk tulangan geser digunakan sengkang Diameter} = 16 \text{ mm}$$

$$\text{Jumlah/m} = 4 \text{ buah sengkang}$$

$$= 1 \text{ buah tulangan sorong}$$

$$\text{Luas tulangan sengkang, } A_{v1} = 8 \cdot \frac{1}{4} \pi \cdot 16^2 = 1608 \text{ mm}^2$$

$$\text{Luas tulangangeser sorong, } A_{v2} = 1 \cdot \frac{1}{4} \pi \cdot 16^2 = 201,06 \text{ mm}^2$$

$$\text{Luas tulangan geser total} = 1608 + 201,06 = 1810 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A1 \phi \cdot f_y \cdot d}{V_s} = \frac{1810 \cdot 390 \cdot 1500}{586875} =$$

$$1804 \text{ mm}$$

Digunakan tulangan **4D16 – 200**

5. PEMBESIAN WING WALL

Input Data Material :

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 25 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Modulus elastis baja (E_s)	= 200000 Mpa

Faktor bentuk distribusi tegangan beton (β_1) = 0,85

Faktor beban ultimit = 1,5

Faktor reduksi kekuatan lentur ϕ = 0,8

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) =$$

$$= 0,85 \cdot \frac{0,85 \cdot 25}{390} \left(\frac{600}{600 + 390} \right) = 0,028069$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) =$$

$$= 0,75 \cdot 0,028069 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,028069 \cdot 390}{0,85 \cdot 25} \right) = 6,6241 \text{ Mpa}$$

5.1. PEMBESIAN WING WALL SISI DALAM

Momen rencana = 1,0835 Ton - m

Momen ultimit rencana, M_u = 1,5 · 1,0835 = 16252500 Nmm

Tebal efektif pelat, d = 450 mm

Ditinjau selebar 1 m, b = 1000 mm

$$M_n = \frac{M}{\phi} = \frac{16252500}{0,8} = 20315625 \text{ Nmm}$$

$$Rn = \frac{Mn}{b.d^2} = \frac{20315625}{1000.450^2} = 0,1003 \text{ Mpa} < R_{\max} (\text{Ok})$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85.f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2.Rn}{0,85.f_c'}} \right) = \\ &= \frac{0,85.25}{390} \left(1 - \sqrt{1 - \frac{2.0,1003}{0,85.25}} \right) = 0,000256 \end{aligned}$$

$$\rho_{\max} = 0,75. \rho_b = 0,75. 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 > \rho = 0,000256 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = \rho_{\min} = 0,00090$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,0009 \times 1000 \times 450 = 405$$

Dipakai tulangan Ø 13

$$A_1 \phi = \frac{1}{4} \pi \cdot 13^2 = 132,73 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot 1000}{A_s} = \frac{132,73 \cdot 1000}{405} = \\ &= 327,73 \text{ mm} \end{aligned}$$

Digunakan tulangan **D13 – 200**

5.2. PEMBESIAN WING WALL SISI LUAR

$$\text{Momen rencana} = 0,688 \text{ Ton} \cdot \text{m}$$

$$\text{Momen ultimit rencana, } Mu = 1,5 \cdot 0,688 = 10320000 \text{ Nmm}$$

$$\text{Tebal efektif pelat, } d = 450 \text{ mm}$$

$$\text{Ditinjau selebar 1 m, } b = 1000 \text{ mm}$$

$$Mn = \frac{M}{\phi} = \frac{10320000}{0,8} = 12900000 \text{ Nmm}$$

$$Rn = \frac{Mn}{b \cdot d^2} = \frac{12900000}{1000 \cdot 450^2} = 0,064 \text{ Mpa} < R_{\max} (\text{Ok})$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot Rn}{0,85 \cdot f_c'}} \right) = \\ &= \frac{0,85 \cdot 25}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 0,064}{0,85 \cdot 25}} \right) = 0,000163 \end{aligned}$$

$$\rho_{\max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Rasio tulangan yang digunakan } \rho = \rho_{\min} = 0,00090$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,0009 \times 1000 \times 450 = 405 \text{ mm}^2$$

Dipakai tulangan Ø 13

$$A_1 \phi = \frac{1}{4} \pi \cdot 13^2 = 132,73 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_1 \phi \cdot 1000}{A_s} = \frac{132,73 \cdot 1000}{405}$$

$$= 327,73 \text{ mm} \quad \text{Digunakan tulangan D13 - 200}$$

5.8. PERHITUNGAN PONDASI PILAR DAN *PILE CAP* PILAR

5.8.1. PONDASI PILAR 1

1. INPUT DATA PONDASI TIANG BOR

Jumlah baris, nb	= 9
Jumlah tiang bor perbaris, nt	= 5
Jarak antara baris, xb	= 2,75 m
Jarak antara bore pile dalam satu baris, xt	= 1,5 m
Diamter tiang bor, ds	= 0,8 m
Panjang efektif tiang bor, Le	= 25 m
Mutu beton, K	= 350 Mpa
Kuat tekan beton, f'_c	= 25 Mpa
Tegangan leleh baja tulangan, f_y	= 390 Mpa
Ukuran Pile Cap :	
B_x	= 8 m
B_y	= 24 m

2. GAYA YANG DITERIMA TIANG BOR

Jumlah bor - pile, n = 45 buah

$X_{max} = (m)$	3		
$X_1 =$	3	$X_1^2 =$	162
$X_2 =$	1,5	$X_2^2 =$	40,5
$X_3 =$	tak ada	$X_3^2 =$	tak ada
$X_4 =$	tak ada	$X_4^2 =$	tak ada
		$\sum X^2 =$	202,5

m^2

$Y_{\max} = (m)$	11		
$Y1 =$	2,75	$Y1^2 =$	75,625
$Y2 =$	5,5	$Y2^2 =$	302,5
$Y3 =$	8,25	$Y3^2 =$	680,625
$Y4 =$	11	$Y4^2 =$	1210
		$\Sigma Y^2 =$	2268,75

m^2

2.1. GAYA AKSIAL PADA TIANG BOR

Gaya aksial yang diderita satu tiang bor :

$$P = \frac{\sum v}{n} + \frac{Mx.X}{\sum X^2} + \frac{Mx.Y}{\sum Y^2} =$$

Tabel 5.56 Gaya aksial yang diterima satu tiang bor

Kombinasi	P	Mx	My	Pmax
Kombinasi 1 (M+(H+K)+TT)	7833,54	1070,78	606,366	192,88203
Kombinasi 2 (M+F+Ah+TT)	4393,97	1421,92	809,63	122,63474
Kombinasi 3 (M+(H+K)+TT+Rm+F+A)	7881,32	1861,69	949,76	207,32593
Kombinasi 4 (M+Gb+TT)	4043,93	562	9562,69	144,55559

note : Gaya Aksial dan Momen diatas diambil dari perhitungan SAP 2000

2.2. GAYA LATERAL PADA TIANG BOR

Beban Mati Struktur Atas

Tabel 5.57 Perhitungan beban mati pada struktur atas

No	Beban Mati	Parameter Volume			n	Berat Sat (ton/m3)	Beban Ton
		b(m)	t(m)	L (m)			
1	Aspal	7	0,1	60	2	2,2	184,8
2	Air hujan	20	0,1	60	1	1	120
3	Slab	20	0,25	60	1	2,5	750
4	Trotoar	1,75	0,2	60	2	2,2	92,4
5	Sandaran	0,15	1,125	60	2	2,5	50,625
6	Balok Induk	0,7	1	60	3	2,5	315
7	Balok Anak	0,4	0,8	60	6	2,5	288
8	Median	2,5	0,2	60	1	2,5	75
9	Balok Lintang	0,4	0,8	15,1	12	2,5	144,96
Total baban mati =							2020,785

Beban Mati Struktur Bawah**Tabel 5.58** Perhitungan beban mati pada struktur bawah

KET	PARAMETER BETON			shape	BJ (Ton/m ³)	JUMLAH	VOLUME (m ³)	BERAT (Ton)
	b	h	L					
KOLOM	1,4	1,4	7,365	1	2,5	3	14,4354	108,2655
PILE CAP								
1	8	1,5	24	1	2,5	1	288	720
2	1,4	1	24	1	2,5	1	33,6	84
3	3,3	1	24	0,5	2,5	2	39,6	198
								1110,2655

BEBAN HIDUPBeban Merata q Lebar prkerasan 1 jalur, $b_1 = 7 \text{ m}$ untuk panjang bentang, $L = 60 \text{ m}$

$$\text{Beban merata, } q = 2,2 - \frac{1,1}{60} \cdot (L - 30) = 2,2 - \frac{1,1}{60} \cdot (40 - 30) =$$

$$2,01667 \text{ Ton/m}$$

$$\text{Beban hidup merata per meter lebar jembatan} = \frac{q}{2,75} \text{ ton/m}^2$$

Beban hidup pada trotoar :

$$q' = 0,5 \text{ Ton/m}^2$$

$$P' = 2 \text{ Ton/m}$$

$$\text{Beban hidup merata } q \text{ pada trotoar} = (P' + b_2 \cdot q') \times 2 \times L =$$

$$= (2 + 1,75 \cdot 0,5) \times 2 \times 60 = 345 \text{ Ton}$$

$$\text{Beban hidup merata } q \text{ pada jalan} =$$

$$\begin{aligned}
&= \left(\left(\frac{q}{2,75} \times 5,5 \times 100 \% \times L \right) + \left(\frac{q}{2,75} \times \left(\frac{\text{Lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times L \right) \right) \times 2 \\
&= \\
&= \left(\left(\frac{2,01667}{2,75} \times 5,5 \times 100 \% \times 60 \right) + \left(\frac{2,01667}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 60 \right) \right) \times 2 = \\
&= 517 \text{ Ton}
\end{aligned}$$

Beban hidup pada *abutment* akibat beban merata $q = 345 + 517 = 862 \text{ Ton}$

Beban Garis P

Besar muatan garis, $P = 12 \text{ Ton}$

$$\text{Beban hidup garis per meter lebar jembatan} = \frac{P}{2,75} = \frac{12}{2,75} = 4,364 \text{ Ton/m}$$

Beban hidup pada *abutment* akibat beban garis :

$$\begin{aligned}
&= \frac{P}{2,75} \times 5,5 \times 100 \% + \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times 2 = \\
&= \frac{12}{2,75} \times 5,5 \times 100 \% + \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 2 = 54,55 \text{ Ton}
\end{aligned}$$

BEBAN GEMPA (G_b)

Diperkirakan waktu getar alami struktur jembatan rangka beton lengkung,

$$T = 0,1 - 1 \text{ detik.}$$

Berdasarkan Peraturan Perencanaan Tahan Gempa untuk wilayah 3 diperoleh :

$$\text{Koefisien gempa dasar, } C_g = 0,18$$

$$\text{Faktor keutamaan struktur, } I = 1,2$$

$$\text{Faktor jenis struktur, } K = 1$$

Beban gempa , $G_b = C_g \cdot I \cdot S \cdot W_t = 0,18 \cdot 1,2 \cdot 1 \cdot W_t = 0,216 \cdot W_t$

Distribusi gaya gempa arah memanjang jembatan :

Tabel 5.59 Perhitungan gaya gempa pada pilar 1

No	Beban Mati Akibat	Wt	Beban	CxIxSxWt
		(Ton)	Gempa	(Ton)
1	P struktur atas	2020,785	Gbp	436,48956
2	P struktur bawah	1110,266	Gba	239,817348
			Gb =	676,306908

BEBAN REM DAN TRAKSI (R_m)

Gaya rem memanjang jembatan diperhitungkan sebesar 5 % beban D (beban hidup tanpa koefisien kejut) :

$R_m = 5 \% \times \text{Beban hidup } D \text{ tanpa koefisien kejut}$

Beban hidup pada abutment akibat beban merata $q = 862 \text{ Ton}$

Beban hidup pada abutment akibat beban garis $= 54,55 \text{ Ton}$

Beban D tanpa koefisien kejut $= 862 + 54,55 = 917 \text{ Ton}$

$R_m = 5 \% \times 917 = 45,85 \text{ Ton}$

BEBAN GESEKAN PADA TUMPUAN (F)

Koefisien gesek pada tumpuan yang berupa elastomer $= 0,18$

Gaya gesek yang timbul hanya ditinjau terhadap beban mati saja.

Beban mati struktur atas $= 2020,785 \text{ Ton}$

Beban gesek = Koefisien gesek x Beban mati =

$F = 0,18 \cdot 2020,785 = 363,74 \text{ Ton}$

BEBAN ALIRAN AIR DAN HANYUTAN

Kecepatan aliran diambil, $Va = 3 \text{ m/det}$

Koefisien aliran, $k = 1,4$

Tekanan aliran, $P = 0,5 \cdot cd \cdot Va^2 = 0,5 \cdot 1,4 \cdot 3^2 = 6,3 \text{ ton/m}^2$

Luas bidang kontak aliran $= 1,96 \text{ m}^2$

Gaya akibat aliran air, $Ah = 6,3 \cdot 1,96 = 12,35 \text{ Ton}$

KOMBINASI PEMBEBANAN

Tabel 5.60 Kombinasi pembebanan I gaya horizontal

KOMBINASI I

KOMBINASI BEBAN		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
H+K	Beban hidup + kejut	
TT	Gaya horizontal akibat tekanan tanah	
		0

Tabel 5.61 Kombinasi pembebanan II gaya horizontal

KOMBINASI II

KOMBINASI BEBAN		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
F	Beban gesekan pada tumpuan	363,74
Ah	Beban aliran dan hanyutan	12,35
TT	beban akibat tekanan tanah	
		376,09

Tabel 5.62 Kombinasi pembebanan III gaya horizontal**KOMBINASI III**

		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
H+K	Beban hidup + kejut	
Ta	Beban akibat tekanan tanah	
Rm	Beban Rem	45,85
F	Beban gesekan pada tumpuan	363,74
A	Beban angin	
		409,59

Tabel 5.63 Kombinasi pembebanan IV gaya horizontal**KOMBINASI IV**

		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
Gb	Beban Gempa	676,307
Ta	beban akibat tekanan tanah	
		676,307

Gaya lateral yang diderita satu tiang bor, $Ph = \frac{\sum H}{n}$

Tabel 5.64 Gaya leteral yang diterima satu tiang bor pada pilar 1

KOMBINASI PEMBEBANAN	$\sum H$ (Ton)	Phmax (m)
Kombinasi - I :	0	0
Kombinasi - II :	376,09	8,358
Kombinasi - III :	409,59	9,102
Kombinasi - VI :	676,307	15,02904444

3. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN BAHAN

$$\text{Kuat Tekan beton, } f_c = 25 \text{ Mpa}$$

$$\text{Tegangan ijin, } f = 0,33 \cdot f_c = 0,33 \cdot 25 = 8,25 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi \cdot D^2 = \frac{1}{4} \pi \cdot 0,8^2 = 0,5026548 \text{ m}^2$$

$$\text{Panjang efektif, } L_e = 25 \text{ m}$$

$$\text{Berat Tiang, } W = A \cdot L_e \cdot 2,4 = 0,5026548 \cdot 25 \cdot 2,4 = 30,16 \text{ Ton}$$

$$\begin{aligned} \text{Daya dukung ijin, } P_{ijin} &= A \cdot f - W = 0,5026548 \cdot 8,25 \cdot 30,16 = \\ P_{ijin} &= 384,5 \text{ Ton} \end{aligned}$$

4. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN TANAH

4.1. DAYA DUKUNG TIANG MENURUT TERZAGHI (DATA PENGUJIAN LAB)

$$Q_{ult} = 1,3 \cdot C \cdot N_c + y \cdot D_f \cdot N_q + 0,6 \cdot y \cdot R \cdot N_g$$

$$D_f = \text{Kedalaman tiang bor} = 25 \text{ m}$$

$$R = \text{Jari - jari penampang tiang} = 0,4 \text{ m}$$

Parameter kekuatan tanah di ujung tiang bor (*end bearing*):

$$y = 1,76 \text{ T/m}^3 \quad \Phi = 40^\circ \quad C = 0,06$$

Dari grafik diperoleh nilai faktor daya dukung :

$$N_c = 95,7 \quad N_q = 81,3 \quad N_g = 100,4$$

$$Q_{ult} = 1,3. C. N_c + y. Df. N_q + 0,6. y. R. N_g$$

$$Q_{ult} = 1,3. 0,06. 95,7 + 1,76. 25. 81,3 + 0,6. 1,76. 0,4. 100,4 = 3627,07 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi D^2 = \frac{1}{4} \pi 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF$$

$$= 2$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.3627,07}{2} = 911,58 \text{ Ton}$$

4.2. DAYA DUKUNG TIANG BOR MENURUT MEYERHOFF (DATA PENGUJIAN SPT)

$$Q_{ult} = 40. N$$

$$N = \text{Nilai SPT} = 50$$

$$Q_{ult} = 40. N = 40. 50 = 2000 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi D^2 = \frac{1}{4} \pi 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF$$

$$= 4$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.2000}{4} = 251 \text{ Ton}$$

4.3. DAYA DUKUNG TIANG BOR MENURUT BAGEMENT (DATA PENGUJIAN CPT

$$P_{ijin} = A. \frac{qc}{3} + K. L. \frac{qf}{4} =$$

$$qc = \text{Nilai konus rata-rata} = 0 \text{ Ton/m}^2$$

$$qf = \text{Nilai hambatan lekat rata-rata} = 0 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 = \frac{1}{4} \pi. 0,8^2 = 0,5026548 \text{ m}^2$$

$$K = \text{Keliling penampang tiang bor} = \pi. ds = \pi. 0,8 = 2,5132741 \text{ m}$$

$$L = \text{Panjang tiang bor} = 25 \text{ m}$$

$$P_{ijin} = 0 \text{ Ton}$$

$$\text{Daya dukung ijin tiang bor terkecil} = 251 \text{ Ton}$$

$$\text{Diambil daya dukung ijin tiang, } P_{ijin} = 200 \text{ Ton}$$

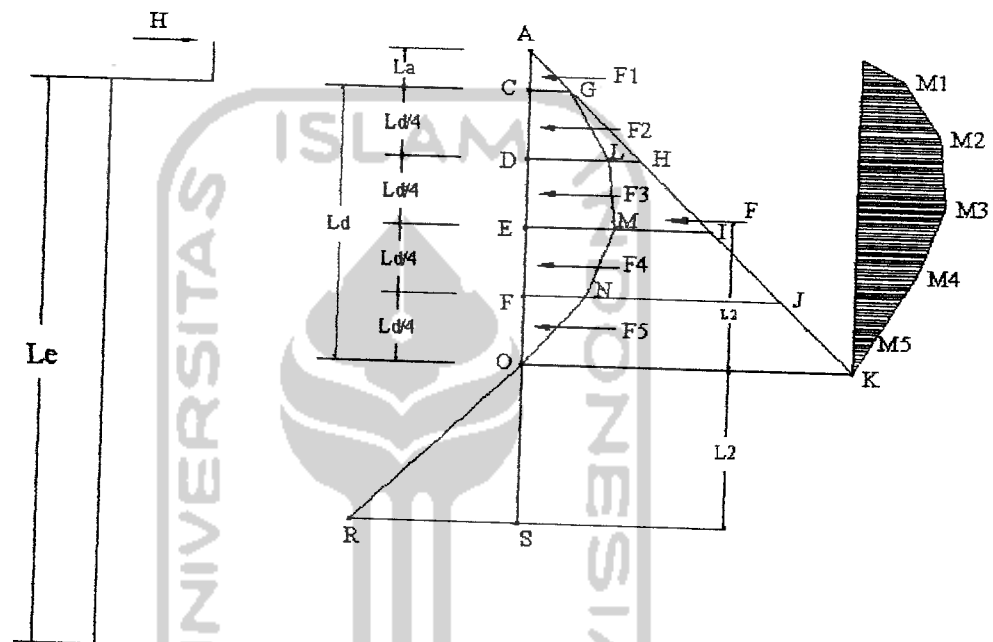
5. DAYA DUKUNG LATERAL IJIN TIANG BOR

$$La = 1,5 \text{ m}$$

$$By = 24 \text{ m}$$

$$y = 1,76 \text{ m}$$

$$\Phi = 40 \text{ derajat}$$



Gambar 5.28 BMD tiang pondasi bor pilar 1

Panjang efektif tiang bor, $le = 25 \text{ m}$

Panjang Jepitan tiang, $Ld = 1/3 \cdot Le = 8,333 \text{ m}$

Koefisien tekanan tanah pasih, $Kp = \tan^2 \left(45 + \frac{\Phi}{2} \right)$

$$Kp = \tan^2 \left(45 + \frac{40}{2} \right) = 4,599$$

Diagram Tekanan Tanah Pasif efektif :

Tabel 5.66 Perhitungan tekanan tanah pasif pada tiang bor pilar 1

Bagian	KEDALAMAN H (m)	H.g.Kp (Ton/m ²)	Bagian	Tekanan (Ton/m ²)
OK	La + Ld = 9,833333333	79,59180123	O	0
FJ	La + 3/4.Ld = 7,75	62,72913147	FN=1/4xFJ	15,68228287
EI	La + 1/2.Ld = 5,666666667	45,86646172	EM=1/2xEI	22,93323086
DH	La + 1/4.Ld = 3,583333333	29,00379197	DL=3/4xDH	21,75284398
CG	La = 1,5	12,14112222	CG	12,14112222

Tabel 5.67 Perhitungan gaya dan momen akibat tekanan tanah

Kode	Teg-1 (Ton/m ²)	Teg-2 (Ton/m ²)	Lebar (m)	Besar gaya (Ton)	Lengan thd. O (m)	Momen (Ton-m)
F1	0	15,68228287	1,5	117,6171215	8,8333	1038,95124
F2	15,68228287	22,93323086	2,08333	402,2449347	7,291667	2933,035982
F3	22,93323086	21,75284398	2,08333	465,4799463	5,20833	2424,37472
F4	21,75284398	12,14112222	2,08333	353,0621479	3,125	1103,319212
F5	12,14112222	0	2,08333	126,4700231	1,38889	175,6528099
				F= 1464,87417	M=	7675,334

$$L_2 = \frac{M}{F} = \frac{7675,334}{1464,87417} = 4,22 \text{ m}$$

$$\text{Gaya lateral, } \Sigma Ms = 0$$

$$H = \frac{F(2.L_2)}{L_2 + L_d + L_a} = \frac{1464,87417(2.4,22)}{4,22 + 8,333 + 1,5} = 79,578398 \text{ Ton}$$

$$\text{Jumlah baris tiang, } nb = 9 \text{ buah}$$

$$\text{Jumlah tiang bor perbaris, } nt = 5 \text{ buah}$$

$$\text{Angka Aman, } SF = 2$$

$$\text{Daya Dukung ijin lateral satu tiang bor, } H_{ijin} = \frac{H/(nb.nt)}{SF}$$

$$H_{ijin} = \frac{879,578398/(8.3)}{2} = 10 \text{ Ton}$$

6. MOMEN MAKSIMUM AKIBAT GAYA LATERAL

6.1. PERHITUNGAN DENGAN CARA BENDING MOMENT DIAGRAM (BMD)

Tabel 5.68 Perhitungan bending moment diagram pada tiang bor pilar 1

Lengan y_h (m)	Momen $M_h = H \cdot Y_h$ (Ton-m)	Lengan y_f (m)	Momen Akibat Gaya F (Ton-m)				
			F1	F2	F3	F4	F5
1	879,7583983	0,5	117,6171215	402,2449347	465,4799463	353,0621479	126,47002
2,0416667	1796,173397	2,04167	58,80856076	240,1349564	201,1224673		
4,125	3629,003393	4,125	485,1706262	821,250075	232,7399731		
6,2083333	5461,83339	6,20833	730,2062961	1659,260356	950,3548903	176,531074	
8,2916667	7294,663386	8,29167	975,2419659	2497,270636	1920,104778	720,8352187	63,235012
10,375	9127,493383	10,375	1220,277636	3335,280917	2889,854666	1456,38136	258,20963
12,458333	10960,32338	12,45833	1465,313306	4173,291197	3859,604554	2191,927502	521,68885

Kode	BMD $H \cdot y_h - \sum (F_i \cdot y_{fi})$ (Ton-m)
M1	820,9498376
M2	1354,915973
M3	2089,842719
M4	1945,480774
M5	1117,975775
M6	-32,51082698
M7	-1251,502025

Momen maksimum, $M_{max} = 2089,8427 \text{ Ton-m}$

Jumlah Baris tiang, $nb = 9 \text{ buah}$

Jumlah tiang bor perbaris, $nt = 5 \text{ buah}$

Angka aman, $SF = 2$

Momen maksimum yang diijinkan untuk satu tiang bor akibat gaya lateral :

$$M_{max \text{ ijin}} = \frac{M_{max} / (nb \cdot nt)}{SF} = \frac{2089,9498 / (9 \cdot 5)}{2} = 23,22 \text{ Ton-m}$$

7. KONTROL GAYA PADA TIANG BOR TERHADAP DAYA DUKUNG

IJIN

7.1. TERHADAP DAYA DUKUNG IJIN AKSIAL

Tabel 5.69 Kontrol gaya terhadap daya dukung ijin aksial tiang bor pilar 1

KOMBINASI PEMBEBANAN	Pmax (Ton)	Pijin (Ton)	Keterangan
Kombinasi - I : 100 %	192,8820304	200	AMAN
Kombinasi - II : 125 %	122,634738	250	AMAN
Kombinasi - III : 140 %	207,325934	280	AMAN
Kombinasi - VI : 150 %	144,5555946	300	AMAN

7.2. TERHADAP DAYA DUKUNG IJIN LATERAL

Tabel 5.70 Kontrol gaya terhadap daya dukung ijin lateral tiang bor pilar 1

KOMBINASI PEMBEBANAN	Hmax (Ton)	H ijin (Ton)	Keterangan
Kombinasi - I : 100%	0	10	AMAN
Kombinasi - II : 125%	8,358	12,5	AMAN
Kombinasi - III : 140%	9,102	14	AMAN
Kombinasi - IV : 150%	15	15	AMAN

8. PEMBESIAN BORE PILE

8.1. Tulangan Aksial Tekan Lentur

Beban maksimum pada *bore pile* :

$$P_{max} = P_{ijin} = 200 \text{ Ton}$$

$$M_{max} = 23,22047465 \text{ Ton-m}$$

$$\text{Faktor beban ultimit} = 1,5$$

$$\text{Beban Ultimit : } P_u = 1,5 \cdot 200 = 3000000 \text{ N}$$

$$M_u = 1,5 \cdot 23,2204 = 348307119,8 \text{ Nmm}$$

$$= 25 \text{ Mpa}$$

$$= 800 \text{ mm}$$

$$= \frac{1}{4} \pi \cdot 800^2 = 502654,82 \text{ mm}^2$$

$$\frac{\Phi \cdot P_n}{(f'c \cdot A_g)} = \frac{3000000}{(25 \cdot 502654,82)} = 0,2387$$

$$\frac{\Phi \cdot M_n}{(f'c \cdot A_g \cdot D)} = \frac{348307119,8}{(25 \cdot 502654,82 \cdot 800)} = 0,034647$$

Plot nilai $\frac{\Phi \cdot P_n}{(f'c \cdot A_g)}$ dan $\frac{\Phi \cdot M_n}{(f'c \cdot A_g)}$ ke dalam diagram interaksi kolom lingkaran diperoleh Rasio tulangan, $\rho = 0,7\%$

$$\text{Luas tulangan yang diperlukan, } A_s = \rho \cdot A_g = 0,007 \cdot 502654,82 = 3519 \text{ mm}^2$$

Dipakai tulangan Ø 19

$$A_{1\phi} = \frac{1}{4} \pi \cdot 19^2 = 283,53 \text{ mm}^2$$

$$\text{Jumlah tulangan} = \frac{A_s}{A_{1\phi}} = \frac{3519}{283,53} = 12 \longrightarrow \text{Digunakan tulangan 12D19}$$

8.2 Tulangan Geser

Perhitungan geser *bore pile* didasarkan atas momen dan gaya aksial untuk kombinasi beban yang menentukan dalam perhitungan tulangan aksial tekan dan lentur.

$$\text{Panjang bore pile, } L = 25000 \text{ mm}$$

$$\text{Diameter bore pile, } D = 800 \text{ mm}$$

$$\text{Luas tulangan bore pile, } A_s = 3519 \text{ mm}^2$$

$$\text{Faktor reduksi kekuatan geser, } \phi = 0,75$$

$$P_u = 3000000 \text{ N}$$

$$M_u = 348307119,8 \text{ Nmm}$$

$$F'_c = 25 \text{ Mpa}$$

$$F_y = 390 \text{ Mpa}$$

$$V_u = \frac{M_u}{L} = \frac{348307119,8}{25000} = 13932,28 \text{ N}$$

$$\text{Tebal efektif, } d = 750 \text{ mm}$$

$$V_{c \max} = 0,2 \cdot F'_c \cdot D \cdot d = 0,2 \cdot 25 \cdot 800 \cdot 750 = 3000000 \text{ N}$$

$$\Phi \cdot V_{c \max} = 0,75 \cdot 3000000 = 2250000 \text{ N} > V_u \text{ (Ok)}$$

$$\beta_1 = 1,4 - \frac{d}{2000} = 1,4 - \frac{750}{2000} = 1,025$$

$$\beta_2 = 1 + \frac{P_u}{14 \cdot f'_c \cdot A_g} = 1 + \frac{3000000}{14 \cdot 25 \cdot 502654,8246} = 1,017$$

$$\beta_3 = 1$$

$$V_{uc} = \beta_1 \cdot \beta_2 \cdot \beta_3 \cdot D \cdot d \cdot \sqrt{\frac{A_s \cdot F'_c}{b \cdot d}} = 1,025 \cdot 1,017 \cdot 1 \cdot 800 \cdot 750 \cdot \sqrt{\frac{3519 \cdot 25}{800 \cdot 750}} =$$

$$V_{uc} = 239497 \text{ N}$$

$$V_c = V_{uc} + 0,6 \cdot D \cdot d = 239497 + 0,6 \cdot 800 \cdot 750 = 599497 \text{ N}$$

$$\Phi \cdot V_c = 0,75 \cdot 599497 = 449622,75 \text{ N} > V_u \text{ (hanya perlu tul geser min)}$$

Geser pada beton sepenuhnya dipikul oleh tulangan geser, sehingga :

$$V_s = V_u = 13932,28 \text{ N}$$

Untuk tulangan geser digunakan sengkang berpenampang = 2 Diameter = 13

$$A_1 \phi = 2 \cdot \frac{1}{4} \pi \cdot 13^2 = 265,46 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot f_y \cdot d}{V_s} = \frac{265,46 \cdot 390 \cdot 750}{13932,28} = \\ &= 5573 \text{ mm} \end{aligned}$$

Digunakan tulangan D13 – 150

9. PEMBESIAN PILE CAP

9.1. MOMEN RENCANA

Tabel 5.71 Gaya axial maks. pada pile cap pilar 1

KOMBINASI PEMBEBANAN	FAKTOR KEKUATAN	Pmax (Ton)	Pmax rencana
Kombinasi - I :	100 %	192,8820304	192,8820304
Kombinasi - II :	125 %	122,634738	98,10779044
Kombinasi - III :	140 %	207,325934	148,0899529
Kombinasi - VI :	150 %	144,5555946	96,37039641

Gaya reaksi maksimum (rencana) tiang bor, $P_{max} = 192,8820304$ Ton

Jumlah baris tiang bor = 9 buah

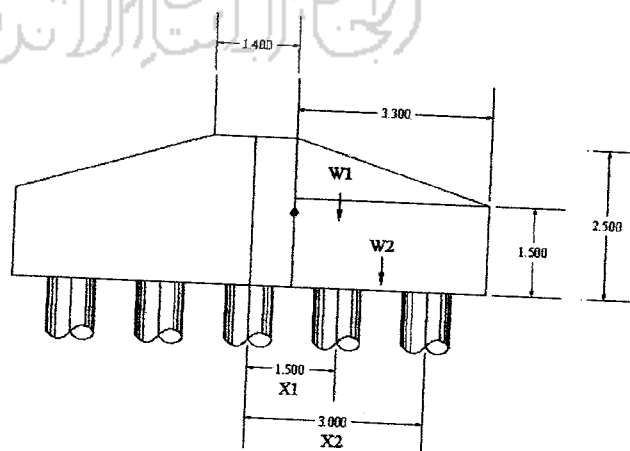
Jarak pusat tiang bor ke tepi luar pile cap, $X_p = \left(\frac{Bx - (nt - 1).xt}{2} \right)$

$$X_p = \left(\frac{(8 - (5 - 1) \cdot 1,5)}{2} \right) = 1 \text{ m}$$

Lengan tiang bor terhadap sisi luar pier, $X = 1,5 + 3 = 4,5$ m

$$M_p = nb \cdot \Sigma P_{max} \cdot X =$$

$$M_p = 9 \cdot (192,8820304 \cdot 4,5) = 7811,722 \text{ Ton-m}$$



Gambar 5.29 Lengan tiang bor terhadap sisi luar pier 1

Tabel 5.72 Berat dan momen pada pile cap pilar 1

No	Parameter Berat Bagian Beton				Berat (Ton)	Lengan (m)	Momen (Ton-m)
	b	h	Lebar	Bj			
W1	3,3	1	24	2,5	198	1,1	217,8
W2	3,3	1,5	24	2,5	297	1,65	490,05
Wbs = (Ton)					495	Mbs = (T-m)	707,85

Momen rencana Pile Cap ;

$$Mr = Mp - Mbs = 7811,722 - 707,85 = 7103,872233 \text{ Ton-m}$$

Untuk lebar pile cap = 24 m

$$Mr = 295,9946764 \text{ Ton-m/m}$$

Gaya geser rencana Pile Cap :

$$Vr = nb \cdot P_{max} - Wt = 9.192,8820304 - 495 = 1240,938274 \text{ Ton}$$

Untuk lebar pile cap = 24 m

$$Vr = 51,7057614 \text{ Ton / m}$$

9.2. PEMBESIAN PILE CAP

INPUT DATA MATERIAL :

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 25 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Modulus elastis baja (E_s)	= 200000 Mpa

Faktor bentuk distribusi tegangan beton (β_1) = 0,85

Faktor beban ultimit = 1,5

Faktor reduksi kekuatan lentur ϕ = 0,8

Faktor reduksi kekuatan geser ϕ = 0,6

$$\rho_b = \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) =$$

$$= 0,85 \cdot \frac{0,85 \cdot 25}{390} \left(\frac{600}{600 + 390} \right) = 0,028069$$

$$R_{max} = 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) =$$

$$= 0,75 \cdot 0,028069 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,028069 \cdot 390}{0,85 \cdot 25} \right) = 6,6241 \text{ Mpa}$$

Tulangan Lentur

Momen rencana = 295,9946764 Ton - m

Momen ultimit rencana, M_u = 1,5 . 295,9946764 = 4439920145 Nmm

Tebal efektif pelat, d = 2400 mm

Ditinjau selebar 1 m, b = 1000 mm

$$Mn = \frac{M}{\phi} = \frac{4439920145}{0,8} = 5549900182 \text{ Nmm}$$

$$Rn = \frac{Mn}{b \cdot d^2} = \frac{5549900182}{1000 \cdot 2400^2} = 0,96352 \text{ Mpa} < R_{\max} \text{ (Ok)}$$

$$\rho_{\text{perlu}} = \frac{0,85 \cdot f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot Rn}{0,85 \cdot f_c'}} \right) =$$

$$= \frac{0,85 \cdot 25}{390} \left(1 - \sqrt{1 - \frac{2 \cdot 0,96352}{0,85 \cdot 25}} \right) = 0,002529279$$

$$\rho_{\max} = 0,75 \cdot \rho_b = 0,75 \cdot 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 < \rho = 0,002529279 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = 0,002529279$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,002529279 \times 1000 \times 2400 = 6070,270609 \text{ mm}^2$$

Dipakai tulangan Ø 32

$$A_{l\phi} = \frac{1}{4} \pi \cdot 32^2 = 804,25 \text{ mm}^2$$

$$\text{Jarak tulangan yang diperlukan (s)} = \frac{A_{l\phi} \cdot 1000}{A_s} = \frac{804,25 \cdot 1000}{6070,270609} =$$

$$= 132,49 \text{ mm}$$

Digunakan tulangan **D32 – 130**

Tulangan Geser

Gaya geser rencana $= 51,70576141 \text{ Ton}$

Gaya geser ultimit rencana, $V_u = 1,5 \cdot 51,70576141 = 775586,4212 \text{ N}$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 2400 = 2000000 \text{ N}$$

$\phi \cdot V_c = 0,6 \cdot 2000000 = 1200000 \text{ N} > V_u$ (hanya perlu tul geser min)

Geser pada beton sepenuhnya dipikul oleh tulangan geser, sehingga :

$$V_s = V_u = 775586,4212 \text{ N}$$

Untuk tulangan geser digunakan sengkang berpenampang = 2 Diameter = 16

$$A_1 \phi = 2 \cdot \frac{1}{4} \pi \cdot 16^2 = 502,65 \text{ mm}^2$$

Untuk jarak Arah Y diambil 400 mm $\rightarrow$ digunakan **D16 – 400**

Jarak tulangan geser yang diperlukan arah X :

$$S = \frac{A_1 \phi \cdot f_y \cdot d}{V_s} = \frac{502,65 \cdot 390 \cdot 2400}{775586,4212} = 606,61 \text{ mm} \rightarrow \text{digunakan } \mathbf{D16 - 500}$$

00

Digunakan tulangan **D16 –**

500	mm
400	mm

5.8.2 PONDASI PILAR 2

1. INPUT DATA PONDASI TIANG BOR

Jumlah baris, nb	= 11
Jumlah tiang bor perbaris, nt	= 5
Jarak antara baris, xb	= 2,0625 m
Jarak antara bore pile dalam satu baris, xt	= 1,5 m
Diamter tiang bor, ds	= 0,8 m
Panjang efektif tiang tiang bor, Le	= 25 m
Mutu beton, K	= 350 Mpa
Kuat tekan beton, f'_c	= 25 Mpa
Tegangan lelah baja tulangan, f_y	= 390 Mpa
Ukuran Pile Cap :	
B_x	= 8 m
B_y	= 22,625 m

2. GAYA YANG DITERIMA TIANG BOR

Jumlah bor - pile, $n = 55$ buah

$X_{max} = (m)$	3		
$X_1 =$	3	$X_1^2 =$	198
$X_2 =$	1,5	$X_2^2 =$	49,5
$X_3 =$	tak ada	$X_3^2 =$	tak ada
$X_4 =$	tak ada	$X_4^2 =$	tak ada
		$\sum X^2 =$	247,5

m^2

Y _{max} = (m)	10,3125		
Y ₁ =	2,0625	Y ₁ ² =	42,53906
Y ₂ =	4,125	Y ₂ ² =	170,1563
Y ₃ =	6,1875	Y ₃ ² =	382,8516
Y ₄ =	8,25	Y ₄ ² =	680,625
Y ₅ =	10,3125	1063,4766	
		ΣY ² =	2339,648 m ²

2.1. GAYA AKSIAL PADA TIANG BOR

Gaya aksial yang diderita satu tiang bor :

$$P = \frac{\sum v}{n} + \frac{Mx.X}{\sum X^2} + \frac{Mx.Y}{\sum Y^2} =$$

Tabel 5.73 Gaya aksial yang diterima satu tiang bor

Kombinasi	P	M _x	M _y	P _{max}
Kombinasi 1 (M+(H+K)+TT)	8518,23	455,16	863,82	164,20147
Kombinasi 2 (M+F+Ah+TT)	5423,427	1689,72	890,351	123,01363
Kombinasi 3 (M+(H+K)+TT+Rm+F+A)	8591,23	1710,19	986,25	181,28087
Kombinasi 4 (M+Gb+TT)	5463,23	670,1	13573,49	167,28193

note : Gaya Aksial dan Momen diatas diambil dar perhitunga SAP 2000

2.2. GAYA LATERAL PADA TIANG BOR

Beban Mati Struktur Atas

Tabel 5.74 Perhitungan beban mati pada struktur atas pilar 2

No	Beban Mati	Parameter Volume			n	Berat Sat (ton/m ³)	Beban Ton
		b(m)	t(m)	L (m)			
1	Aspal	7	0,1	80	2	2,2	246,4
2	Air hujan	20	0,1	80	1	1	160
3	Slab	20	0,25	80	1	2,5	1000
4	Trotoar	1,75	0,2	80	2	2,2	123,2
5	Sandaran	0,15	1,125	80	2	2,5	67,5
6	Balok Induk	0,7	1	80	3	2,5	420
7	Balok Anak	0,4	0,8	80	6	2,5	384
8	Median	2,5	0,2	80	1	2,5	100
9	Balok Lintang	0,4	0,8	15,1	16	2,5	193,28
Total beban mati =							2694,38

Beban Mati Struktur Bawah

Tabel 5.75 Perhitungan beban mati pada struktur bawah pilar 2

KET	PARAMETER			shape	BJ (Ton/m ³)	JUMLAH	VOLUME (m ³)	BERAT (Ton)
	b	h	L					
KOLOM	1,4	1,4	11	1	2,5	3	21,56	161,7
PILE CAP								
1	8	1,5	22,625	1	2,5	1	271,5	678,75
2	1,4	1	22,625	1	2,5	1	31,675	79,1875
3	3,3	1	22,625	0,5	2,5	2	37,33125	186,65625
								1106,2938

BEBAN HIDUP

Beban Merata q

Lebar prkerasan 1 jalur, $b_1 = 7$ m

untuk panjang bentang, $L = 80$ m

Beban merata, $q = 1,1 \cdot \left(1 + \frac{30}{L}\right) = 1,1 \cdot \left(1 + \frac{30}{80}\right) = 1,5125$ Ton/m

Beban hidup merata per meter lebar jembatan = $\frac{q}{2,75}$ ton/m²

Beban hidup pada trotoar :

$q' = 0,5$ Ton/m²

$P' = 2$ Ton/m

Beban hidup merata q pada trotoar $= (P' + b_2 \cdot q') \times 2 \times L =$
 $= (2 + 1,75 \cdot 0,5) \times 2 \times 80 = 460$ Ton

Beban hidup merata q pada jalan =

$$= \left(\left(\frac{q}{2,75} \times 5,5 \times 100 \% \times L \right) + \left(\frac{q}{2,75} \times \left(\frac{\text{Lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times L \right) \right) \times 2$$

=

$$= \left(\left(\frac{1,5125}{2,75} \times 5,5 \times 100 \% \times 80 \right) + \left(\frac{1,5125}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 80 \right) \right) \times 2 =$$

$$= 517 \text{ Ton}$$

Beban hidup pada *abutment* akibat beban merata $q = 460 + 517 = 977 \text{ Ton}$

Beban Garis P

Besar muatan garis, $P = 12 \text{ Ton}$

$$\text{Beban hidup garis per meter lebar jembatan} = \frac{P}{2,75} = \frac{12}{2,75} = 4,364 \text{ Ton/m}$$

Beban hidup pada *abutment* akibat beban garis :

$$= \frac{P}{2,75} \times 5,5 \times 100 \% + \frac{P}{2,75} \times \left(\frac{\text{lebar perkerasan} - 5,5}{2} \right) \times 50 \% \times 2 =$$

$$= \frac{12}{2,75} \times 5,5 \times 100 \% + \frac{12}{2,75} \times \left(\frac{7 - 5,5}{2} \right) \times 50 \% \times 2 = 54,55 \text{ Ton}$$

BEBAN GEMPA (Gb)

Diperkirakan waktu getar alami struktur jembatan rangka beton lengkung,

$$T = 0,1 - 1 \text{ detik.}$$

Berdasarkan Peraturan Perencanaan Tahan Gempa untuk wilayah 3 diperoleh :

$$\text{Koefisien gempa dasar, } C_g = 0,18$$

$$\text{Faktor keutamaan struktur, } I = 1,2$$

Faktor jenis struktur, $K = 1$

Beban gempa, $G_b = C_g \cdot I \cdot S \cdot W_t = 0,18 \cdot 1,2 \cdot 1 \cdot W_t = 0,216 \cdot W_t$

Distribusi gaya gempa arah memanjang jembatan :

Tabel 5.76 Perhitungan gaya gempa pada pilar 2

No	Beban Mati Akibat	Wt (Ton)	Beban Gempa	$C_x I_x S \cdot W_t$ (Ton)
1	P struktur atas	2694,38	Gbp	581,98608
2	P struktur bawah	1106,294	Gba	238,95945
			Gb =	820,94553

BEBAN REM DAN TRAKSI (R_m)

Gaya rem memanjang jembatan diperhitungkan sebesar 5 % beban D (beban hidup tanpa koefisien kejut) :

$R_m = 5 \% \times \text{Beban hidup D tanpa koefisien kejut}$

Beban hidup pada abutment akibat beban merata $q = 977 \text{ Ton}$

Beban hidup pada abutment akibat beban garis $= 54,55 \text{ Ton}$

Beban D tanpa koefisien kejut $= 977 + 54,55 = 1031,55 \text{ Ton}$

$R_m = 5 \% \times 1031,55 = 51,57 \text{ Ton}$

BEBAN GESEKAN PADA TUMPUAN (F)

Koefisien gesek pada tumpuan yang berupa elastomer $= 0,18$

Gaya gesek yang timbul hanya ditinjau terhadap beban mati saja.

Beban mati struktur atas $= 2694,38 \text{ Ton}$

Beban gesek = Koefisien gesek x Beban mati =

$F = 0,18 \cdot 2694,38 = 484,988 \text{ Ton}$

BEBAN ALIRAN AIR DAN HANYUTAN

Kecepatan aliran diambil, $V_a = 3$ m/det

Koefisien aliran, $k = 1,4$

Tekanan aliran, $P = 0,5 \cdot cd \cdot Va^2 = 0,5 \cdot 1,4 \cdot 3^2 = 6,3 \text{ ton/m}^2$

Luas bidang kontak aliran $= 1,96 \text{ m}^2$

Gaya akibat aliran air, $Ah = 6,3 \cdot 1,96 = 12,35 \text{ Ton}$

KOMBINASI PEMBEBANAN

Tabel 5.77 Kombinasi pembebanan I gaya horizontal

KOMBINASI I

KOMBINASI BEBAN		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
H+K	Beban hidup + kejut	
TT	Gaya horizontal akibat tekanan tanah	
		0

Tabel 5.78 Kombinasi pembebanan II gaya horizontal

KOMBINASI II

KOMBINASI BEBAN		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
F	Beban gesekan pada tumpuan	484,988
Ah	Beban aliran dan hanyutan	12.35
TT	beban akibat tekanan tanah	
		497,336

Tabel 5.79 Kombinasi pembebanan III gaya horizontal**KOMBINASI III**

		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
H+K	Beban hidup + kejut	
Ta	Beban akibat tekanan tanah	
Rm	Beban Rem	
F	Beban gesekan pada tumpuan	51,57
A	Beban angin	484,988
		536,558

Tabel 5.80 Kombinasi pembebanan IV gaya horizontal**KOMBINASI IV**

		GAYA H (Ton)
M	Beban Mati struktur atas	
	Beban Mati struktur bawah	
Gb	Beban Gempa	820,945
Ta	beban akibat tekanan tanah	
		820,945

Gaya aksial yang diderita satu tiang bor, $Ph = \frac{\sum H}{n}$

Tabel 5.81 Gaya leteral yang diterima satu tiang bor pada pilar 2

KOMBINASI PEMBEBANAN	$\sum H$ (Ton)	Phmax (m)
Kombinasi - I :	0	0
Kombinasi - II :	497,336	9,0425
Kombinasi - III :	536,558	9,7556
Kombinasi - VI :	820,945	14,92627273

3. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN BAHAN

$$\text{Kuat Tekan beton, } f^c = 25 \text{ Mpa}$$

$$\text{Tegangan ijin, } f = 0,33 \cdot f^c = 0,33 \cdot 25 = 825 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi \cdot D^2 = \frac{1}{4} \pi \cdot 0,8^2 = 0,5026548 \text{ m}^2$$

$$\text{Panjang efektif, } L_e = 25 \text{ m}$$

$$\text{Berat Tiang, } W = A \cdot L_e \cdot 2,4 = 0,5026548 \cdot 25 \cdot 2,4 = 30,16 \text{ Ton}$$

$$\begin{aligned} \text{Daya dukung ijin, } P_{ijin} &= A \cdot f - W = 0,5026548 \cdot 825 \cdot 30,16 = \\ P_{ijin} &= 384,5 \text{ Ton} \end{aligned}$$

4. DAYA DUKUNG IJIN TIANG BOR BERDASARKAN KEKUATAN TANAH

4.1. DAYA DUKUNG TINAG MENURUT TERZAGHI (DATA PENGUJIAN LAB)

$$Q_{ult} = 1,3 \cdot C \cdot N_c + y \cdot D_f \cdot N_q + 0,6 \cdot y \cdot R \cdot N_g$$

$$D_f = \text{Kedalaman tiang bor} = 25 \text{ m}$$

$$R = \text{Jari - jari penampang tiang} = 0,4 \text{ m}$$

Parameter kekuatan tanah di ujung tiang bor (*end bearing*):

$$y = 1,76 \text{ T/m}^3 \quad \Phi = 40^\circ \quad C = 0,06$$

Dari grafik diperoleh nilai faktor daya dukung :

$$N_c = 95,7 \quad N_q = 81,3 \quad N_g = 100,4$$

$$Q_{ult} = 1,3. C. N_c + y. Df. N_q + 0,6. y. R. N_g$$

$$Q_{ult} = 1,3. 0,06. 95,7 + 1,76. 25. 81,3 + 0,6. 1,76. 0,4. 100,4 = 3627,07 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 = \frac{1}{4} \pi. 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF = 2$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.3627,07}{2} = 911,58 \text{ Ton}$$

4.2. DAYA DUKUNG TIANG BOR MENURUT MEYERHOFF (DATA PENGUJIAN SPT)

$$Q_{ult} = 40. N$$

$$N = \text{Nilai SPT} = 50$$

$$Q_{ult} = 40. N = 40. 50 = 2000 \text{ Ton/m}^2$$

$$\text{Daya dukung ijin tiang bor, } P_{ijin} = \frac{A.Q_{ult}}{SF}$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi. D^2 = \frac{1}{4} \pi. 0,8^2 = 0,5026548 \text{ m}^2$$

$$SF = 4$$

$$P_{ijin} = \frac{A.Q_{ult}}{SF} = \frac{0,5026548.2000}{4} = 251 \text{ Ton}$$

4.3. DAYA DUKUNG TIANG BOR MENURUT BAGEMENT (DATA PENGUJIAN CPT

$$P_{ijin} = A. \frac{qc}{3} + K. L. \frac{qf}{4} =$$

$$qc = \text{Nilai konus rata-rata} = 0 \text{ Ton/m}^2$$

$$qf = \text{Nilai hambatan lekat rata-rata} = 0 \text{ Ton/m}^2$$

$$\text{Luas tampang tiang bor, } A = \frac{1}{4} \pi D^2 = \frac{1}{4} \pi 0,8^2 = 0,5026548 \text{ m}^2$$

$$K = \text{Keliling penampang tiang bor} = \pi \cdot ds = \pi \cdot 0,8 = 2,5132741 \text{ m}$$

$$L = \text{Panjang tiang bor} = 25 \text{ m}$$

$$P_{ijin} = 0 \text{ Ton}$$

$$\text{Daya dukung ijin tiang bor terkecil} = 251 \text{ Ton}$$

$$\text{Diambil daya dukung ijin tiang, } P_{ijin} = 200 \text{ Ton}$$

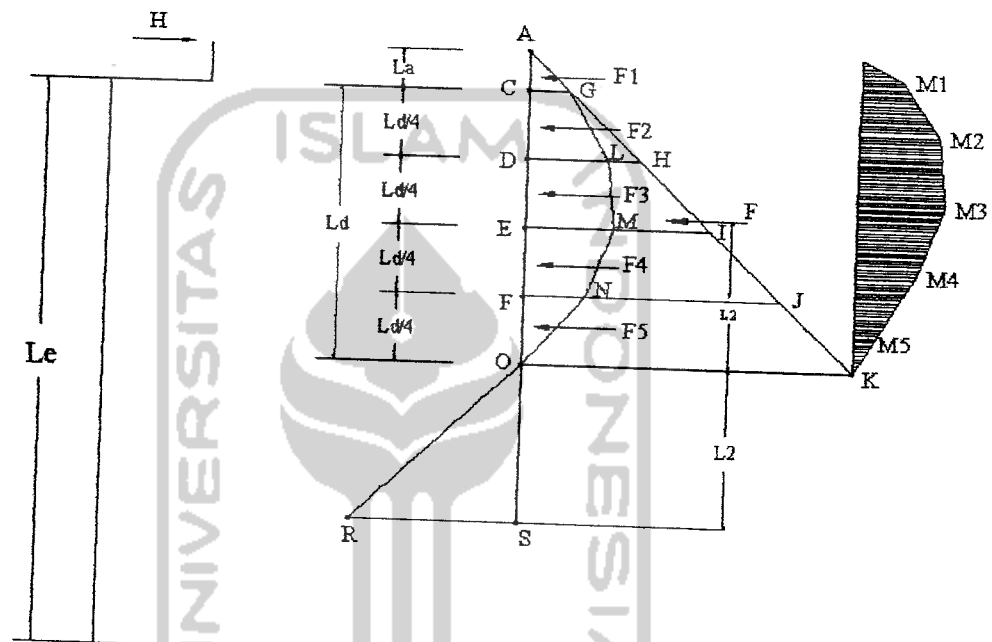
5. DAYA DUKUNG LATERAL IJIN TIANG BOR

$$La = 1,5 \text{ m}$$

$$By = 22,25 \text{ m}$$

$$y = 1,76 \text{ m}$$

$$\Phi = 40 \text{ derajat}$$



Gambar 5.30 BMD tiang pondasi bor pilar 2

Panjang efektif tiang bor, $le = 25 \text{ m}$

Panjang Jepitan tiang, $Ld = 1/3 \cdot Le = 8,333 \text{ m}$

Koefisien tekanan tanah pasih, $Kp = \tan^2 \left(45 + \frac{\Phi}{2} \right)$

$$Kp = \tan^2 \left(45 + \frac{40}{2} \right) = 4,599$$

Diagram Tekanan Tanah Pasif efektif :

Tabel 5.82 Perhitungan tekanan tanah pasif pada tiang bor pilar 2

Bagian	KEDALAMAN H (m)	H.g.Kp (Ton/m ²)	Bagian	Tekanan (Ton/m ²)
OK	La + Ld = 9,833333333	79,59180123	O	0
FJ	La + 3/4.Ld = 7,75	62,72913147	FN=1/4xFJ	15,68228287
EI	La + 1/2.Ld = 5,666666667	45,86646172	EM=1/2xEI	22,93323086
DH	La + 1/4.Ld = 3,583333333	29,00379197	DL=3/4xDH	21,75284398
CG	La = 1,5	12,14112222	CG	12,14112222

Tabel 5.83 Perhitungan gaya dan momen akibat tekanan tanah

Kode	Teg-1 (Ton/m ²)	Teg-2 (Ton/m ²)	Lebar (m)	Besar gaya (Ton)	Lengan thd. O (m)	Momen (Ton-m)
F1	0	15,68228287	1,5	117,6171215	8,8333	1038,95124
F2	15,68228287	22,93323086	2,08333	402,2449347	7,291667	2933,035982
F3	22,93323086	21,75284398	2,08333	465,4799463	5,20833	2424,37472
F4	21,75284398	12,14112222	2,08333	353,0621479	3,125	1103,319212
F5	12,14112222	0	2,08333	126,4700231	1,38889	175,6528099
			F=	1464,87417	M =	7675,334

$$L_2 = \frac{M}{F} = \frac{7675,334}{1464,87417} = 4,22 \text{ m}$$

$$\text{Gaya lateral, } \Sigma Ms = 0$$

$$H = \frac{F(2.L_2)}{L_2 + L_d + L_a} = \frac{1464,87417(2.4,22)}{4,22 + 8,333 + 1,5} = 879,578398$$

Ton

$$\text{Jumlah baris tiang, } nb = 11 \text{ buah}$$

$$\text{Jumlah tiang bor perbaris, } nt = 5 \text{ buah}$$

$$\text{Angka Aman, } SF = 2$$

$$\text{Daya Dukung ijin lateral satu tiang bor, } H_{ijin} = \frac{H l(nb.nt)}{SF}$$

$$H_{ijin} = \frac{879,578398/(11.5)}{2} = 10 \text{ Ton}$$



6. MOMEN MAKSIMUM AKIBAT GAYA LATERAL

6.1. PERHITUNGAN DENGAN CARA BENDING MOMENT DIAGRAM (BMD)

Tabel 5.84 Perhitungan bending moment diagram pada tiang bor pilar 2

Lengan y_h (m)	Momen $M_h = H \cdot Y_h$ (Ton-m)	Lengan y_f (m)	Momen Akibat Gaya F (Ton-m)				
			F1	F2	F3	F4	F5
1	879,7583983	0,5	117,6171215	402,2449347	465,4799463	353,0621479	126,47002
2,0416667	1796,173397	2,04167	58,80856076				
4,125	3629,003393	4,125	240,1349564	201,1224673			
6,2083333	5461,83339	6,20833	485,1706262	821,250075	232,7399731		
8,2916667	7294,663386	8,291667	730,2062961	1659,260356	950,3548903	176,531074	
10,375	9127,493383	10,375	975,2419659	2497,270636	1920,104778	720,8352187	63,235012
12,458333	10960,32338	12,45833	1220,277636	3335,280917	2889,854666	1456,38136	258,20963
			1465,313306	4173,291197	3859,604554	2191,927502	521,68885

Kode	BMD $H \cdot y_h - \sum (F_i \cdot y_{fi})$ (Ton-m)
M1	820,9498376
M2	1354,915973
M3	2089,842719
M4	1945,480774
M5	1117,975775
M6	-32,51082698
M7	-1251,502025

Momen maksimum, $M_{max} = 2089,8427 \text{ Ton-m}$

Jumlah Baris tiang, $nb = 11 \text{ buah}$

Jumlah tiang bor perbaris, $nt = 5 \text{ buah}$

Angka aman, $SF = 2$

Momen maksimum yang diijinkan untuk satu tiang bor akibat gaya lateral :

$$M_{max \text{ ijin}} = \frac{M_{max} / (nb \cdot nt)}{SF} = \frac{2089,9498 / (11 \cdot 5)}{2} = 18,998 \text{ 57017 Ton - m}$$

7. KONTROL GAYA PADA TIANG BOR TERHADAP DAYA DUKUNG

IJIN

7.1. TERHADAP DAYA DUKUNG IJIN AKSIAL

Tabel 5.85 Kontrol gaya terhadap daya dukung ijin lateral tiang bor pilar 2

KOMBINASI PEMBEBANAN	P _{max} (Ton)	P _{ijin} (Ton)	Keterangan
Kombinasi - I : 100 %	192,8820304	200	AMAN
Kombinasi - II : 125 %	122,634738	250	AMAN
Kombinasi - III : 140 %	207,325934	280	AMAN
Kombinasi - VI : 150 %	144,5555946	300	AMAN

7.2. TERHADAP DAYA DUKUNG IJIN LATERAL

Tabel 5.86 Kontrol gaya terhadap daya dukung ijin aksial tiang bor pilar 2

KOMBINASI PEMBEBANAN	H _{max} (Ton)	H _{ijin} (Ton)	Keterangan
Kombinasi - I : 100%	0	10	AMAN
Kombinasi - II : 125%	9,0425	12	AMAN
Kombinasi - III : 140%	9,7556	14	AMAN
Kombinasi - IV : 150%	14,92627273	15	AMAN

8. PEMBESIAN BORE PILE

8.1. Tulangan Aksial Tekan Lentur

Beban maksimum pada bore pile :

$$P_{max} = P_{ijin} = 200 \text{ Ton}$$

$$M_{max} = 18,99857017 \text{ Ton - m}$$

$$\text{Faktor beban ultimit} = 1,5$$

$$\text{Beban Ultimit : } P_u = 1,5 \cdot 200 = 3000000 \text{ N}$$

$$M_u = 1,5 \cdot 12,6511 = 18,97665 \text{ Nm}$$

$$f'_c = 25 \text{ Mpa}$$

$$D = 800 \text{ mm}$$

$$A_g = \frac{1}{4} \pi \cdot 800^2 = 502654,82 \text{ mm}^2$$

$$\frac{\Phi \cdot P_n}{(f'_c \cdot A_g)} = \frac{3000000}{(25 \cdot 502654,82)} = 0,2387$$

$$\frac{\Phi \cdot M_n}{(f'_c \cdot A_g \cdot D)} = \frac{348307119,8}{(25 \cdot 502654,82 \cdot 800)} = 0,02834$$

Plot nilai $\frac{\Phi \cdot P_n}{(f'_c \cdot A_g)}$ dan $\frac{\Phi \cdot M_n}{(f'_c \cdot A_g \cdot D)}$ ke dalam diagram interaksi kolom lingkaran

diperoleh Rasio tulangan, $\rho = 0,7 \%$

$$\text{Luas tulangan yang diperlukan, } A_s = \rho \cdot A_g = 0,007 \cdot 502654,82 = 3519 \text{ mm}^2$$

Dipakai tulangan $\emptyset 19$

$$A_{1\phi} = \frac{1}{4} \pi \cdot 19^2 = 283,53 \text{ mm}^2$$

$$\text{Jumlah tulangan} = \frac{A_s}{A_{1\phi}} = \frac{3519}{283,53} = 12 \longrightarrow \text{Digunakan tulangan } 12D19$$

8.2 Tulangan Geser

Perhitungan geser *bore pile* didasarkan atas momen dan gaya aksial untuk kombinasi beban yang menentukan dalam perhitungan tulangan aksial tekan dan lentur.

$$\text{Panjang bore pile, } L = 25000 \text{ mm}$$

$$\text{Diameter bore pile, } D = 800 \text{ mm}$$

$$\text{Luas tulangan bore pile, } A_s = 3519 \text{ mm}^2$$

$$\text{Faktor reduksi kekuatan geser, } \phi = 0,75$$

$$P_u = 3000000 \text{ N}$$

$$M_u = 284978552,6 \text{ Nmm}$$

$$F'_c = 25 \text{ Mpa}$$

$$F_y = 390 \text{ Mpa}$$

$$V_u = \frac{M_u}{L} = \frac{284978552,6}{25000} = 11400 \text{ N}$$

$$\text{Tebal efektif, } d = 750 \text{ mm}$$

$$V_{c \max} = 0,2 \cdot F'_c \cdot D \cdot d = 0,2 \cdot 25 \cdot 800 \cdot 750 = 3000000 \text{ N}$$

$$\phi \cdot V_{c \max} = 0,75 \cdot 3000000 = 2250000 \text{ N} > V_u \text{ (Ok)}$$

$$\beta_1 = 1,4 - \frac{d}{2000} = 1,4 - \frac{750}{2000} = 1,025$$

$$\beta_2 = 1 + \frac{P_u}{14 \cdot f'_c \cdot A_g} = 1 + \frac{3000000}{14 \cdot 25 \cdot 502654,8246} = 1,017$$

$$\beta_3 = 1$$

$$V_{uc} = \beta_1 \cdot \beta_2 \cdot \beta_3 \cdot D \cdot d \cdot \sqrt{\frac{A_s \cdot F'_c}{b \cdot d}} = 1,025 \cdot 1,017 \cdot 1 \cdot 800 \cdot 750 \cdot \sqrt{\frac{3519 \cdot 25}{800 \cdot 750}} =$$

$$V_{uc} = 239497 \text{ N}$$

$$V_c = V_{uc} + 0,6 \cdot D \cdot d = 239497 + 0,6 \cdot 800 \cdot 750 = 599497 \text{ N}$$

$$\Phi \cdot V_c = 0,75 \cdot 599497 = 449622,75 \text{ N} > V_u \text{ (hanya perlu tul geser min)}$$

Geser pada beton sepenuhnya dipikul oleh tulangan geser, sehingga :

$$V_s = V_u = 11400 \text{ N}$$

Untuk tulangan geser digunakan sengkang berpenampang = 2 Diameter = 13

$$A_1 \phi = 2 \cdot \frac{1}{4} \pi \cdot 13^2 = 265,46 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_1 \phi \cdot f_y \cdot d}{V_s} = \frac{265,46 \cdot 390 \cdot 750}{11400} = \\ &= 6811 \text{ mm} \end{aligned}$$

Digunakan tulangan **D13 – 150**

9. PEMBESIAN PILE CAP

9.1. MOMEN RENCANA

Tabel 5.87 Gaya axial maks. pada pile cap pilar 2

KOMBINASI PEMBEBANAN	FAKTOR KEKUATAN	P _{MAX} (Ton)	P _{Max} rencana
Kombinasi - I :	100	164,2014711	164,2014711
Kombinasi - II :	125	123,0136303	98,41090424
Kombinasi - III :	140	181,280865	129,4863322
Kombinasi - VI :	150	167,2819339	111,5212893

Gaya reaksi maksimum (rencana) tiang bor, $P_{max} = 164,2014711$ Ton

Jumlah baris tiang bor = 11 buah

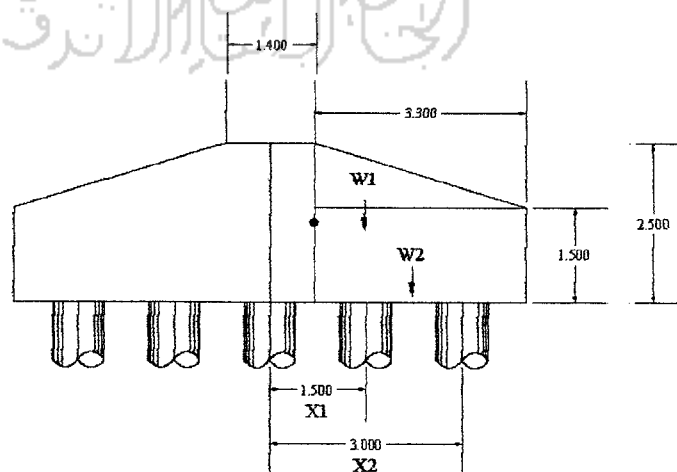
Jarak pusat tiang bor ke tepi luar pile cap, $X_p = \left(\frac{(Bx - (nt - 1).xt)}{2} \right)$

$$X_p = \left(\frac{(8 - (5 - 1).1,5)}{2} \right) = 1 \text{ m}$$

Lengan tiang bor terhadap sisi luar pier, $X = 1,5 + 3 = 4,5$ m

$$M_p = nb. \sum P_{max}. X =$$

$$M_p = 11. (164,2014711. 4,5) = 8127,972818 \text{ Ton-m}$$



Gambar 5.31 Lengan tiang bor terhadap sisi luar pier 2

Tabel 5.88 Berat dan momen pada pile cap pilar 2

No	Parameter Berat Bagian Beton				Berat (Ton)	Lengan (m)	Momen (Ton-m)
	b	h	Lebar	Bj			
W1	3,3	1	22,625	2,5	186,65625	1,1	205,32188
W2	3,3	1,5	22,625	2,5	279,984375	1,65	461,97422
				Wbs = (Ton)	466,640625	Mbs = (T-m)	667,2961

Momen rencana Pile Cap ;

$$Mr = Mp - Mbs = 8127,972818 - 667,2961 = 7460,676724 \text{ Ton-m}$$

Untuk lebar pile cap = 22,625 m

$$Mr = 329,7536674 \text{ Ton - m/m}$$

Gaya geser rencana Pile Cap :

$$Vr = nb \cdot P_{max} - Wt = 11.164,2014711 - 466,64 = 1339,575557 \text{ Ton}$$

Untuk lebar pile cap = 22,625 m

$$Vr = 59,20775942 \text{ Ton / m}$$

9.2. PEMBESIAN PILE CAP

INPUT DATA MATERIAL :

Mutu beton	= K - 300
Kuat tekan beton, f_c'	= 25 Mpa
Tegangan leleh baja, f_y	= 390 Mpa
Modulus elastis baja (E_s)	= 200000 Mpa

Faktor bentuk distribusi tegangan beton (β_1) = 0,85

Faktor beban ultimit = 1,5

Faktor reduksi kekuatan lentur ϕ = 0,8

Faktor reduksi kekuatan geser ϕ = 0,6

$$\begin{aligned}
 \rho_b &= \beta_1 \frac{0,85 \cdot f_c'}{f_y} \left(\frac{600}{600 + f_y} \right) = \\
 &= 0,85 \cdot \frac{0,85 \cdot 25}{390} \left(\frac{600}{600 + 390} \right) = 0,028069 \\
 R_{max} &= 0,75 \cdot \rho_b \cdot f_y \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot \rho_b \cdot f_y}{0,85 \cdot f_c'} \right) = \\
 &= 0,75 \cdot 0,028069 \cdot 390 \cdot \left(1 - \frac{1/2 \cdot 0,75 \cdot 0,028069 \cdot 390}{0,85 \cdot 25} \right) = 6,6241 \text{ Mpa}
 \end{aligned}$$

Tulangan Lentur

Momen rencana = 329,7536674 Ton - m

Momen ultimit rencana, M_u = 1,5 . 329,7536674 = 4946305011 Nmm

Tebal efektif pelat, d = 2400 mm

Ditinjau selebar 1 m, b = 1000 mm

$$Mn = \frac{Mu}{\phi} = \frac{4946305011}{0,8} = 6182881263 \text{ Nmm}$$

$$Rn = \frac{Mn}{b.d^2} = \frac{6182881263}{1000.2400^2} = 1,07341688 \text{ Mpa} < R_{\max} \text{ (Ok)}$$

$$\begin{aligned} \rho_{\text{perlu}} &= \frac{0,85.f_c'}{f_y} \left(1 - \sqrt{1 - \frac{2.Rn}{0,85.f_c'}} \right) = \\ &= \frac{0,85.25}{390} \left(1 - \sqrt{1 - \frac{2.1,07341688}{0,85.25}} \right) = 0,00282562 \end{aligned}$$

$$\rho_{\max} = 0,75. \rho_b = 0,75. 0,028069 = 0,021052$$

$$\rho_{\min} = 25 \% \cdot \frac{1,4}{f_y} = \frac{1,4}{390} = 0,00090$$

$$\text{Ternyata : } \rho_{\min} = 0,00090 < \rho = 0,00282562 < \rho_{\max} = 0,02096775$$

$$\text{Rasio tulangan yang digunakan } \rho = 0,00282562$$

Luas tulangan pokok :

$$A_s = \rho \cdot b \cdot d = 0,00282562 \times 1000 \times 2400 = 6781,481 \text{ mm}^2$$

Dipakai tulangan Ø 32

$$A_{l\phi} = \frac{1}{4} \pi \cdot 32^2 = 804,25 \text{ mm}^2$$

$$\begin{aligned} \text{Jarak tulangan yang diperlukan (s)} &= \frac{A_{l\phi} \cdot 1000}{A_s} = \frac{804,25 \cdot 1000}{6781,481} = \\ &= 118,534 \text{ mm} \end{aligned}$$

Digunakan tulangan **D32 – 110**

Tulangan Geser

Gaya geser rencana $= 59,20775942$

Ton

Gaya geser ultimit rencana, $V_u = 1,5 \cdot 59,20775942 = 888116,3913 \text{ N}$

$$V_c = \frac{1}{6} \cdot (\sqrt{f'_c}) \cdot b \cdot d = \frac{1}{6} \cdot (\sqrt{25}) \cdot 1000 \cdot 2400 = 2000000 \text{ N}$$

$\Phi \cdot V_c = 0,6 \cdot 2000000 = 1200000 \text{ N} > V_u$ (hanya perlu tul geser min)

Geser pada beton sepenuhnya dipikul oleh tulangan geser, sehingga :

$$V_s = V_u = 888116,3913 \text{ N}$$

Untuk tulangan geser digunakan sengkang berpenampang = 2 Diameter = 16

$$A_1 \phi = 2 \cdot \frac{1}{4} \pi \cdot 16^2 = 502,65 \text{ mm}^2$$

Untuk jarak Arah Y diambil 400 mm $\longrightarrow$ digunakan **D16 – 400**

Jarak tulangan geser yang diperlukan arah X :

$$S = \frac{A_1 \phi \cdot f_y \cdot d}{V_s} = \frac{502,65 \cdot 390 \cdot 2400}{888116,3913} = 529,75 \text{ mm} \longrightarrow \text{digunakan } \mathbf{D16 - 500}$$

00

Digunakan tulangan **D16 – 500 mm**

400 mm

BAB VI

PEMBAHASAN

6.1 Umum

Dalam perencanaan/disain Jembatan Kretek II ini menggunakan struktur beton bertulang, spesifikasi bahan yang dipakai pada penulisan Tugas Akhir ini, untuk beton dipakai $K - 300$ atau $f'_c = 24,9$ Mpa, untuk baja tulangan dipakai mutu baja tulangan $U - 39$ atau $f_y = 390$ Mpa untuk baja tulangan ulir atau *deform* dan $U - 24$ atau $f_y = 240$ Mpa untuk baja tulangan polos.

Pada penulisan Tugas Akhir ini digunakan program *SAP 2000* untuk mencari momen, geser dan aksial yang terjadi pada struktur. Hasil-hasil tersebut difaktorkan yang digunakan sebagai perhitungan perencanaan.

6.2 Balok

Pada perencanaan balok Jembatan Kretek II dibagi menjadi 2 bagian yaitu struktur balok lengkung dan balok induk. Balok direncanakan menggunakan tulangan rangkap, agar memenuhi persyaratan *SK - SNI* bahwa untuk struktur tahan gempa harus direncanakan tulangan desak $\geq 0,5$ tulangan tarik.

6.2.1 Balok Induk

Perencanaan dimensi balok induk berdasarkan momen dan gaya geser terbesar pada gelagar. Dimana momen terbesar pada elemen 550 dan 660 sehingga diperoleh dimensi yang seragam pada sepanjang bentang. Berdasarkan perhitungan pada bab 5 diperoleh dimensi yang aman terhadap momen dan geser adalah balok dengan dimensi (1000 x 700) mm², yang digunakan pada gelagar balok induk tepi dan tengah.

Untuk memudahkan pekerjaan di lapangan menggunakan tulangan Ø 25 dengan $f_y = 390$ Mpa dan untuk tulangan geser menggunakan tulangan Ø 13 dengan $f_y 390$ Mpa. Penggunaan tualangan *deform* pada sengkang balok induk dimaksudkan untuk mendapatkan jarak antar sengkang yang tidak terlalu rapat. Penulangan minimum balok dengan dimensi (1000x700) mm² diperoleh 8D25 untuk tulangan tarik dan 5D25 untuk tulangan desak dengan ρ penulangan min = 0,00358974. Dari hasil analisis struktur dengan program SAP 2000 dengan perhitungan seperti pada bab 5 dapat diperoleh hasil tulangan seperti pada tabel 6.1 dan 6.2.

Tabel 6.1 Tabel perhitungan tulangan balok induk tepi

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
124 dan 435	1000 / 700	15 D 25	9 D 25	9 D 25	5 D 25	2D13-75	2D13-100
136 dan 434	1000 / 700	11 D 25	5 D 25	11 D 25	6 D 25	2D13-100	2D13-200
135 dan 433	1000 / 700	12 D 25	7 D 25	8 D 25	5 D 25	2D13-150	2D13-200
134 dan 451	1000 / 700	11 D 25	7 D 25	8 D 25	5 D 25	2D13-200	D13-200
149 dan 450	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-180	D13-200
148 dan 449	1000 / 700	11 D 25	6 D 25	8 D 25	5 D 25	2D13-170	D13-200

147 dan 455	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150	D13-190
146 dan 454	1000 / 700	13 D 25	7 D 25	8 D 25	5 D 25	2D13-190	D13-200
319 dan 460	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-80	2D13-130
318 dan 459	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-100	2D13-160
314 dan 471	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-90	2D13-140
313 dan 470	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-80	D13-120
305 dan 475	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75	2D13-100
304 dan 474	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-80	2D13-130
248 dan 408	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-120	2D13-200
247 dan 407	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-170	D13-200
272 dan 419	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
292 dan 418	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
291 dan 396	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
290 dan 395	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-200	13-200
289 dan 394	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
299 dan 382	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
298 dan 381	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-170	D13-200
297 dan 380	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-160	D13-200

Tabel 6.2 Tabel perhitungan tulangan balok induk tengah

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
550 dan 660	1000 / 700	17 D 25	11 D 25	10 D 25	5 D 25	2D13-65	2D13-90
554 dan 659	1000 / 700	13 D 25	8 D 25	12 D 25	7 D 25	2D13-100	2D13-170
553 dan 658	1000 / 700	14 D 25	9 D 25	8 D 25	5 D 25	2D13-150	D13-180
652 dan 669	1000 / 700	12 D 25	8 D 25	8 D 25	5 D 25	2D13-100	2D13-170
559 dan 668	1000 / 700	16 D 25	10 D 25	8 D 25	5 D 25	2D13-190	D13-200
558 dan 667	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-170	D13-200
557 dan 672	1000 / 700	17 D 25	11 D 25	8 D 25	5 D 25	2D13-180	D13-200
556 dan 671	1000 / 700	15 D 25	10 D 25	8 D 25	5 D 25	2D13-190	D13-200
612 dan 675	1000 / 700	12 D 25	7 D 25	8 D 25	5 D 25	2D13-80	2D13-130
611 dan 674	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-80	2D13-120
609 dan 681	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-80	2D13-120
608 dan 680	1000 / 700	12 D 25	7 D 25	8 D 25	5 D 25	2D13-75	2D13-190
604 dan 684	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70	2D13-100
603 dan 683	1000 / 700	12 D 25	7 D 25	8 D 25	5 D 25	2D13-70	2D13-100
581 dan 651	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100	2D13-160
580 dan 650	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-170	D13-200
584 dan 657	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
595 dan 656	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200

594 dan 647	1000 / 700	11 D 25	5 D 25	9 D 25	5 D 25	2D13-200	D13-200
593 dan 646	1000 / 700	11 D 25	5 D 25	9 D 25	5 D 25	2D13-200	D13-200
592 dan 645	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
600 dan 640	1000 / 700	9 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
599 dan 639	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200
598 dan 638	1000 / 700	8 D 25	5 D 25	8 D 25	5 D 25	2D13-200	D13-200

Pemasangan tulangan pada balok induk dibuat tulangan menerus untuk mengantisipasi beban bergerak di atas jembatan. selain itu tidak terdapat penulangan lapangan geser hal ini disebabkan karena besarnya dimensi balok (1000x700) mm² dan kolom (1200x1200) mm². Sehingga tulangan terpasang pada balok induk pada jembatan Kretek II dapat dilihat pada tabel berikut.

Tabel 6.3 Tabel tulangan terpasang balok induk tepi

Elemen	Ukuran Balok	TULANGAN POKOK				Tulangan Geser
		Tulangan Tumpuan		Tulangan Lapangan		
		Tarik	Desak	Tarik	Desak	
124 dan 435	1000 / 700	15 D 25	9 D 25	11 D 25	6 D 25	2D13-75
136 dan 434	1000 / 700	15 D 25	9 D 25	11 D 25	6 D 25	2D13-75
135 dan 433	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
134 dan 451	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
149 dan 450	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
148 dan 449	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
147 dan 455	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
146 dan 454	1000 / 700	15 D 25	9 D 25	8 D 25	5 D 25	2D13-150
319 dan 460	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
318 dan 459	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
314 dan 471	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
313 dan 470	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
305 dan 475	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
304 dan 474	1000 / 700	12 D 25	6 D 25	8 D 25	5 D 25	2D13-75
248 dan 408	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
247 dan 407	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
272 dan 419	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
292 dan 418	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
291 dan 396	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
290 dan 395	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120

289 dan 394	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
299 dan 382	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
298 dan 381	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120
297 dan 380	1000 / 700	10 D 25	5 D 25	8 D 25	5 D 25	2D13-120

Tabel 6.4 Tabel tulangan terpasang balok induk tengah

Elemen	Ukuran Balok	TULANGAN POKOK				Tulangan Geser
		Tulangan Tumpuan		Tulangan Lapangan		
		Tarik	Desak	Tarik	Desak	
550 dan 660	1000 / 700	17 D 25	11 D 25	12 D 25	7 D 25	2D13-65
554 dan 659	1000 / 700	14 D 25	9 D 25	12 D 25	7 D 25	2D13-100
553 dan 658	1000 / 700	14 D 25	9 D 25	8 D 25	5 D 25	2D13-100
652 dan 669	1000 / 700	14 D 25	9 D 25	8 D 25	5 D 25	2D13-100
559 dan 668	1000 / 700	16 D 25	10 D 25	8 D 25	5 D 25	2D13-100
558 dan 667	1000 / 700	16 D 25	10 D 25	8 D 25	5 D 25	2D13-100
557 dan 672	1000 / 700	17 D 25	11 D 25	8 D 25	5 D 25	2D13-70
556 dan 671	1000 / 700	17 D 25	11 D 25	8 D 25	5 D 25	2D13-70
612 dan 675	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70
611 dan 674	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70
609 dan 681	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70
608 dan 680	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70
604 dan 684	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-70
603 dan 683	1000 / 700	13 D 25	8 D 25	8 D 25	5 D 25	2D13-100
581 dan 651	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
580 dan 650	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
584 dan 657	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
595 dan 656	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
594 dan 647	1000 / 700	11 D 25	5 D 25	9 D 25	5 D 25	2D13-100
593 dan 646	1000 / 700	11 D 25	5 D 25	9 D 25	5 D 25	2D13-100
592 dan 645	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
600 dan 640	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
599 dan 639	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100
598 dan 638	1000 / 700	11 D 25	5 D 25	8 D 25	5 D 25	2D13-100

6.2.2 Balok Anak

Balok anak direncanakan di antara balok induk tengah dan balok induk tepi dengan jarak antar balok anak 2,06 m dengan dimensi (800x400) mm².

Untuk memudahkan pekerjaan di lapangan menggunakan tulangan Ø 19 dengan $f_y = 390$ Mpa dan untuk tulangan geser menggunakan tulangan Ø 10 dengan $f_y 390$ Mpa. Penggunaan tulangan *deform* pada sengkang balok anak dimaksudkan untuk mendapatkan jarak antar sengkang yang tidak terlalu rapat. Perencanaan penulangan pada balok anak digunakan penulangan minimum dengan ρ penulangan min = 0,00358974. Dari hasil analisis struktur dengan program SAP 2000 dengan perhitungan seperti pada bab 5 dapat diperoleh hasil tulangan seperti pada tabel 6.5.

Tabel 6.5 Tabel tulangan balok anak

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
SEMUA BALOK ANAK	800 / 400	6 D19	4 D 19	6 D19	4 D 19	2 D10-140	2D10-200

6.2.3 Balok Lintang

Balok lintang pada Jembatan Kretek II menggunakan dimensi (800x400) mm² dengan menggunakan tulangan Ø 22 dengan $f_y = 390$ Mpa dan untuk tulangan geser menggunakan tulangan Ø 10 dengan $f_y 390$ Mpa. Dari hasil analisis struktur

dengan program *SAP* 2000 dengan perhitungan seperti pada bab 5 dapat diperoleh hasil tulangan seperti pada tabel 6.6, 6.7, dan 6.8.

Tabel 6.6 Tabel tulangan balok lintang atas jenis 1

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
9	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
10	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
11	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
16	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
17	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
18	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
19	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
20	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
21	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
22	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
23	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
24	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
27	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
28	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
30	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
31	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
32	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
33	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
34	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
35	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
36	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
38	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
39	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
40	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
41	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
42	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
43	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
44	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
45	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
46	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
47	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
48	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
51	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
52	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180

952	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
953	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
954	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
955	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
956	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
957	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
958	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
959	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
960	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
961	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
962	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
963	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
964	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
965	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
968	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
969	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180
970	800 / 400	9 D 22	6 D 22	6 D 22	4 D 22	2D10-100	2D10-180

Tabel 6.7 Tabel tulangan balok lintang atas jenis 2

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
8	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
29	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
37	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
49	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
50	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
69	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
70	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
77	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
78	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
85	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
86	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
89	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
90	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
101	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
102	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
111	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
112	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
113	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
114	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170

115	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
116	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
117	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
131	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
132	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
172	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
189	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
322	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
330	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
334	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
335	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
374	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
387	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
402	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
403	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
691	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
723	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
724	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
740	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
761	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
762	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
918	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
922	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
926	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
927	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
930	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
931	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
938	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
939	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
946	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
966	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170
967	800 / 400	12 D 22	8 D 22	7 D 22	4 D 22	2D10-90	2D10-170

Tabel 6.8 Tabel tulangan balok lintang bagian bawah

Elemen	Ukuran Balok	TULANGAN POKOK				TULANGAN GESER	
		Tulangan Tumpuan		Tulangan Lapangan		Tumpuan	Lapangan
		Tarik	Desak	Tarik	Desak		
SEMUA BALOK LINTANG	800 / 400	6 D 22	4 D 22	6 D 22	4 D 22	D10-100	D10-200

6.2.4 Balok Lengkung

Balok lengkung pada Jembatan Kretek II merupakan struktur utama yang menahan beban-beban yang bekerja pada struktur di atasnya. Sehingga direncanakan lebih kuat dari struktur utama lainnya. Dimensi balok lengkung adalah (1000x1600) mm², dimensi balok lengkung tengah direncanakan samadengan balok lengkung tepi.

Untuk memudahkan pekerjaan di lapangan menggunakan tulangan Ø 25 dengan $f_y = 390$ Mpa dan untuk tulangan geser menggunakan tulangan Ø 13 dengan $f_y 390$ Mpa. Perencanaan penulangan balok lengkung dianggap sebagai kolom hal ini dikarenakan adanya gaya aksial yang besar. Dari hasil perhitungan seperti pada bab 5 dapat diperoleh tulangan seperti pada tabel 6.9 dan 6.10.

Tabel 6.9 Tulangan balok lengkung tepi

Elemen	Ukuran Balok	Tulangan Pokok	TULANGAN GESER	
			Tumpuan	Lapangan
20 dan 365	1000x1600	68D25	2 D13-100	2D13-200
19 dan 366	1000x1600	68D25	2 D13-100	2D13-200
164 dan 367	1000x1600	68D25	2 D13-100	2D13-200
533 dan 368	1000x1600	68D25	2 D13-100	2D13-200
532 dan 369	1000x1600	68D25	2 D13-100	2D13-200
15 dan 370	1000x1600	68D25	2 D13-100	2D13-200
14 dan 371	1000x1600	68D25	2 D13-100	2D13-200
13 dan 372	1000x1600	68D25	2 D13-100	2D13-200
213 dan 354	1000x1600	68D25	2 D13-100	2D13-200
214 dan 342	1000x1600	68D25	2 D13-100	2D13-200
215 dan 343	1000x1600	68D25	2 D13-100	2D13-200
216 dan 344	1000x1600	68D25	2 D13-100	2D13-200
217 dan 345	1000x1600	68D25	2 D13-100	2D13-200

218 dan 346	1000x1600	68D25	2 D13-100	2D13-200
219 dan 347	1000x1600	68D25	2 D13-100	2D13-200
221 dan 348	1000x1600	68D25	2 D13-100	2D13-200
236 dan 349	1000x1600	68D25	2 D13-100	2D13-200
235 dan 350	1000x1600	68D25	2 D13-100	2D13-200
224 dan 351	1000x1600	68D25	2 D13-100	2D13-200
231 dan 352	1000x1600	68D25	2 D13-100	2D13-200
230 dan 326	1000x1600	68D25	2 D13-100	2D13-200
227 dan 325	1000x1600	68D25	2 D13-100	2D13-200
187 dan 324	1000x1600	68D25	2 D13-100	2D13-200
167 dan 323	1000x1600	68D25	2 D13-100	2D13-200

Tabel 6.10 Tulangan balok lengkung tengah

Elemen	Ukuran Balok	Tulangan Pokok	TULANGAN GESER	
			Tumpuan	Lapangan
549 dan 630	1000x1600	72D25	2 D13-100	2D13-200
548 dan 631	1000x1600	68D25	2 D13-100	2D13-200
563 dan 632	1000x1600	68D25	2 D13-100	2D13-200
772 dan 633	1000x1600	68D25	2 D13-100	2D13-200
771 dan 634	1000x1600	68D25	2 D13-100	2D13-200
547 dan 635	1000x1600	68D25	2 D13-100	2D13-200
546 dan 636	1000x1600	68D25	2 D13-100	2D13-200
545 dan 637	1000x1600	68D25	2 D13-100	2D13-200
566 dan 629	1000x1600	68D25	2 D13-100	2D13-200
567 dan 618	1000x1600	68D25	2 D13-100	2D13-200
568 dan 619	1000x1600	68D25	2 D13-100	2D13-200
569 dan 620	1000x1600	68D25	2 D13-100	2D13-200
570 dan 621	1000x1600	68D25	2 D13-100	2D13-200
571 dan 622	1000x1600	68D25	2 D13-100	2D13-200
572 dan 623	1000x1600	68D25	2 D13-100	2D13-200
573 dan 624	1000x1600	68D25	2 D13-100	2D13-200
579 dan 625	1000x1600	68D25	2 D13-100	2D13-200
578 dan 626	1000x1600	68D25	2 D13-100	2D13-200
574 dan 627	1000x1600	68D25	2 D13-100	2D13-200

577 dan 628	1000x1600	68D25	2 D13-100	2D13-200
576 dan 617	1000x1600	68D25	2 D13-100	2D13-200
575 dan 616	1000x1600	68D25	2 D13-100	2D13-200
565 dan 613	1000x1600	68D25	2 D13-100	2D13-200
564 dan 614	1000x1600	68D25	2 D13-100	2D13-200

6.3 Kolom

Kolom-kolom pada Jembatan Kretek II direncanakan tiap jarak 5 m dengan ketinggian bervariasi setiap kolom. Dimensi kolom disesuaikan dengan tingginya untuk mendapatkan angka kelangsingan yang aman, serta berdasarkan keamanan terhadap geser. Dimensi kolom direncanakan lebih besar dari dimensi balok induk untuk mendapatkan kekakuan yang baik. Pada penulisan Tugas Akhir ini direncanakan dimensi kolom yang bervariasi, yaitu $(1400 \times 1400) \text{ mm}^2$ untuk kolom yang berfungsi sebagai pilar 1 dan 2 dan untuk kolom lainnya digunakan ukuran $(1200 \times 1200) \text{ mm}^2$. Khusus untuk dua kolom dari tepi jembatan dengan tinggi 0,359 m dan 0,875 m dan 3 kolom di tengah bentang dengan tinggi 1,049 m, 0,902 m dan 1 m, direncanakan monolit dengan balok lengkung dan induk sehingga kolom tersebut ditiadakan.

Perhitungan tulangan kolom menggunakan *SK-SNI* dengan menggunakan tulangan pokok $\varnothing 25$ dengan $f_y = 390 \text{ Mpa}$ dan untuk tulangan geser menggunakan tulangan $\varnothing 13$ dengan $f_y 390 \text{ Mpa}$. Penggunaan tulangan *deform* pada sengkang kolom dimaksudkan untuk mendapatkan jarak antar sengkang yang tidak terlalu rapat. Perhitungan tulangan kolom digunakan tulangan minimum untuk kolom

dengan ρ penulangan 1 % dari grafik $M_n - P_n$. Dari hasil perhitungan seperti pada bab 5 dapat diperoleh tulangan seperti pada tabel 6.11 dan 6.12.

Tabel 6.11 Tulangan kolom tepi

Elemen	Ukuran Kolom	Tinggi Kolom	Tulangan Pokok	TULANGAN GESER	
				Tumpuan	Lapangan
128 dan 440	1200x1200	0,359	60D25	2D13-60	2D13-100
137 dan 438	1200x1200	0,875	60D25	2D13-100	2D13-200
321 dan 436	1200x1200	1,549	68D25	2D13-50	2D13-80
535 dan 446	1200x1200	2,383	72D25	2D13-60	2D13-80
151 dan 444	1200x1200	3,378	72D25	2D13-80	2D13-150
153 dan 442	1200x1200	4,538	68D25	2D13-100	2D13-200
155 dan 453	1200x1200	5,866	68D25	2D13-100	2D13-200
12 dan 457	1400x1400	7,365	80D25	2D13-100	2D13-200
41 dan 2	1200x1200	5,624	60D25	2D13-100	2D13-200
309 dan 462	1200x1200	4,172	60D25	2D13-100	2D13-200
311 dan 467	1200x1200	2,999	60D25	2D13-100	2D13-200
301 dan 465	1200x1200	2,093	60D25	2D13-60	2D13-100
303 dan 472	1200x1200	1,445	60D25	2D13-40	2D13-50
307 dan 414	700x700	1,049	52D25	2D13-30	2D13-30
274 dan 412	700x700	0,902	20D25	2D13-60	2D13-80
275 dan 411	700x700	1	20D25	2D13-70	2D13-80
278 dan 416	1200x1200	1,344	60D25	2D13-50	2D13-70
281 dan 401	1200x1200	1,935	60D25	2D13-60	2D13-90
283 dan 398	1200x1200	2,777	60D25	2D13-80	2D13-90
285 dan 393	1200x1200	3,873	60D25	2D13-100	2D13-200
287 dan 389	1200x1200	5,245	60D25	2D13-100	2D13-200
294 dan 386	1200x1200	6,864	60D25	2D13-100	2D13-200
296 dan 385	1200x1200	8,781	60D25	2D13-100	2D13-200
1	1400x1400	11	80D25	2D13-100	2D13-200

Tabel 6.12 Tulangan kolom tengah

Elemen	Ukuran Kolom	Tinggi Kolom	Tulangan Pokok	TULANGAN GESER	
				Tumpuan	Lapangan
551 dan 663	1200x1200	0,359	60D25	2D13-50	2D13-70
555 dan 662	1200x1200	0,875	60D25	2D13-80	2D13-130
613 dan 661	1200x1200	1,549	72D25	2D13-40	2D13-50
773 dan 666	1200x1200	2,383	88D25	2D13-50	2D13-60
560 dan 665	1200x1200	3,378	88D25	2D13-100	2D13-200
561 dan 664	1200x1200	4,538	88D25	2D13-70	2D13-130
562 dan 670	1200x1200	5,866	88D25	2D13-90	2D13-180
544 dan 673	1400x1400	7,365	80D25	2D13-100	2D13-200
43 dan 4	1200x1200	5,624	60D25	2D13-100	2D13-200
606 dan 676	1200x1200	4,172	60D25	2D13-100	2D13-200
607 dan 679	1200x1200	2,999	60D25	2D13-90	2D13-170
601 dan 678	1200x1200	2,093	60D25	2D13-50	2D13-70
602 dan 682	1200x1200	1,445	60D25	2D13-40	2D13-50
605 dan 654	700x700	1,049	56D25	2D13-30	2D13-40
585 dan 653	700x700	0,902	20D25	2D13-60	2D13-70
586 dan 652	700x700	1	24D25	2D13-50	2D13-60
587 dan 655	1200x1200	1,344	60D25	2D13-40	2D13-60
588 dan 649	1200x1200	1,935	60D25	2D13-50	2D13-70
589 dan 648	1200x1200	2,777	60D25	2D13-70	2D13-120
590 dan 644	1200x1200	3,873	60D25	2D13-100	2D13-200
591 dan 642	1200x1200	5,245	60D25	2D13-100	2D13-200
596 dan 642	1200x1200	6,864	60D25	2D13-100	2D13-200
597 dan 641	1200x1200	8,781	60D25	2D13-100	2D13-200
543	1400x1400	11	80D25	2D13-100	2D13-200

6.4 Pondasi

Pondasi merupakan struktur yang menghubungkan antara tanah dengan struktur di atasnya, dalam perencanaan ini terdiri dari dua jenis pondasi, yaitu pondasi pilar dan *abutment*.

1. Pondasi Pilar

Untuk menghindari terjadinya overlap dari dimensi ketiga pilar, maka dalam perencanaan ini digunakan pondasi gabungan. Selain menerima gaya vertikal, pondasi juga memikul momen dari arah X dan arah Y yang cukup besar. Sehingga pondasi direncanakan menggunakan tiang bor untuk mendapatkan kuat dukung yang lebih aman.

a. Pile cap

Pile cap merupakan struktur balok beton bertulang yang didesain khusus untuk mengikat dan mempersatukan pondasi, juga berfungsi sebagai tempat duduk kolom atau pilar serta untuk menyebarkan beban vertikal dan beban horizontal dari setiap momen guling pada semua tiang bor dalam kelompok tersebut. Pile cap pada pilar 1 direncanakan memakai ukuran $(8000 \times 24000) \text{ mm}^2$, dengan ketebalan 2500 mm, berdasarkan perhitungan dipakai tulangan lentur dan bagi D32-130 untuk bagian bawah pile cap dan D16-200 untuk tulangan bagian atas pile cap. untuk keamanan terhadap geser maka dipakai tulangan geser minimum D13-400/300. Sedangkan pile cap pada pilar 2 direncanakan memakai ukuran $(8000 \times 22625) \text{ mm}^2$, dengan ketebalan

2500 mm, berdasarkan perhitunagan dipakai tulangan lentur dan bagi D32-110 untuk bagian bawah pile cap dan D16-200 untuk tulangan bagian atas pile cap. untuk keamanan terhadap geser maka dipakai tulangan geser minimum D13-400/300.

b. *Tiang Bor*

Pada prencanaan ini digunakan tiang bor diamter 800 mm dengan panjang 25 m. Dari hasil perhitungan diperoleh tulangan pokok 12D19 dan tulangan geser D13 – 150, sedangkan jumlah tiang bor yang digunakan pada pilar 1 sebanyak 45 tiang bor dan pada pilar 2 sebanyak 55 tiang bor.

2. *Abutment*

Untuk mendapatkan kuat dukung tanah yang baik pada kedalaman 30 m, maka *abutment* didukung oleh pondasi tiang bor, dimana tinggi *abutment* itu sendiri direncanakan 7,05 m dan tiang bor direncanakan panjang nya 25 m.

a. *Telapak Abutment*

Telapak *abutment* dianggap sebagai kantilever yang menerima beban dari bawah, dengan dimensi $(7000 \times 19000) \text{ mm}^2$, didapatkan tulangan pokok D25-180, tulangan bagi D16-200 untuk bagian bawah dan untuk bagian bagian atas didapatkan tulangan pokok D16-200 dan tulangan bagi D13-200, sedangkan untuk tulangan geser D16-600.

b. *Breast Wall*

Dimensi *breast wall* direncanakan dengan ukuran $(1000 \times 19000) \text{ mm}^2$, dari hasil perhitungan diperoleh tulangan pokok D25-150, tulangan bagi D16-200 dan tulangan geser D13-200.

c. *Back Wall dan Corbell*

Dari hasil hitungan diperoleh untuk potongan A tulangan pokok D16 200, bagi D13-200, dan tulangan geser D13-450, potongan B tulangan pokok D16-200, tulangan bagi D13-200, dan tulangan geser D13-450, potongan C tulangan pokok D16-200, tulangan bagi D13-200, dan tulangan geser D13-450, potongan D tulangan pokok D25-200, tulangan bagi 4D16 dan untuk tulangan geser 4D16-200.

d. *Wing wall*

Wing wall direncanakan dengan tebal 0,5 m, dari hasil hitungan diperoleh tulangan pokok D13-200 untuk *wing wall* sisi dalam dan D13-200 untuk *wing wall* sisi luar.

6.5 Pelat

Elemen struktur yang memakai pelat dalam perencanaan ini adalah trotoar dan lantai jembatan. Trotoar dalam perencanaan ini merupakan pelat kantilever dengan tebal pelat 250 mm, dari hasil analisis diperoleh penulangan lentur D16-180 dan penulangan susut D13-200, sedangkan pada perencanaan pelat lantai pembebanan diasumsikan pelat hanya ditumpu pada kedua sisi pelat sehingga tidak

terdapat penulangan tumpuan Y, untuk penulangan pokok arah arah x menggunakan tulangan D16-100 dan untuk tulangan arah y menggunakan tulangan susut D13-130.

6.6 Tiang Sandaran

Tiang sandaran direncanakan memakai ukuran $(150 \times 150) \text{ mm}^2$, dengan tulangan tarik As 2D10 dan tulangan tekan As' 2D10. Tulangan geser menggunakan P8-200.

6.7 Perhitungan volume beton

Kebutuhan beton balok induk dengan jumlah 3 buah berdimensi $(1000 \times 700) \text{ mm}^2$ dan panjang bentang 240 m adalah 504 m^3 , balok anak dengan jumlah 6 buah berdimensi $(800 \times 400) \text{ mm}^2$ dan panjang bentang 240 m kebutuhan betonnya adalah $460,8 \text{ m}^3$, sedangkan kebutuhan beton untuk balok lintang yang mempunyai dimensi $(800 \times 400) \text{ mm}^2$ panjang bentang 16,5 m dengan jumlah 94 buah adalah $496,32 \text{ m}^3$.

Balok lengkung berdimensi $(1000 \times 1600) \text{ mm}^2$ mempunyai panjang 40,5768 m berjumlah 6 buah dan 80,2117 m berjumlah 6 buah sehingga volume beton untuk balok lengkung adalah $1159,5696 \text{ m}^3$.

Pada Jembatan Kretek II ini digunakan beton dengan kombinasi balok lengkung sehingga membentuk kolom dengan tinggi yang bervariasi, begitu pula dengan dimensinya, dari hasil perhitungan diperoleh untuk dimensi kolom $(1400 \times$

1400)mm² sebanyak 3 buah dengan tinggi 11 m dan 6 buah untuk tinggi 7,365 m adalah 151,2924 m³, dan kolom berdimensi (1200 x1200) mm² adalah 571,104 m³, sedangkan kolom berdimensi (700 x700) mm² adalah 8,67594m³ dan total seluruh volume beton untuk kolom adalah 731,0723.

Pelat lantai jembatan dengan tebal 0,25 m dengan lebar 16,5 m dengan panjang bentang 240 m volume betonnya adalah 990 m³, dan pelat trotoar volume betonnya adalah 295,74 m³, dan median volume betonnya adalah 120 m³ sedangkan volume beton tiang sandaran adalah 5,94 m³.

Kebutuhan beton untuk *abutment* dengan jumlah 2 buah sepanjang 19 m adalah 654,7032 m³, tiang bor pile *abutment* volume betonnya adalah 376,991 m³ sedangkan pondasi pilar 1 dengan jumlah 2 buah dan pondasi pilar 2 dengan jumlah 1 buah volume betonnya adalah 3626,047 m³. Jadi kebutuhan beton seluruhnya adalah 9421,183 m³.

BAB VII

KESIMPULAN DAN SARAN

7.1 Kesimpulan

Berdasarkan hasil perhitungan dan pembahasan pada bab-bab sebelumnya dapat diambil kesimpulan :

1. dari hasil perhitungan didapat ukuran untuk balok induk memanjang adalah $1000 \times 700 \text{ mm}^2$, kolom $1200 \times 1200 \text{ mm}^2$, balok anak dan lintang $800 \times 400 \text{ mm}^2$, balok lengkung $1600 \times 1000 \text{ mm}^2$, tiang sandaran $150 \times 150 \text{ mm}^2$ dan tebal pelat lantai jembatan 250 mm,
2. untuk struktur atas jembatan balok induk menggunakan tulangan pokok D25 dan tulangan geser D13, balok anak menggunakan tulangan pokok D19 dan tulangan geser D10, balok lintang menggunakan tulangan pokok D22 dan tulangan geser D10, balok lengkung menggunakan tulangan pokok D25 dan tulangan geser D13, kolom menggunakan tulangan pokok D25 dan tulangan geser D13, pelat lantai jembatan menggunakan tulangan pokok D16 dan tulangan susut D13, dan tiang sandaran menggunakan tulangan pokok D10 dan tulangan geser P8,
3. untuk struktur bawah jembatan *abutment* menggunakan tulangan D25, D16, dan D13,

4. tiang bor pile *abutment* dan pilar menggunakan tulangan pokok D19 dan tulangan geser D13 dengan diameter tiang bore pile 800 mm dan panjang bore pile 25 m,
5. pile cap pada pilar 1 dipakai ukuran (8000x24000) mm² dengan ketebalan 2500 mm, dan pile cap pada pilar 2 digunakan ukuran (8000x22625) mm² dengan ketebalan 2500 mm,
- 6 total volume beton jembatan seluruhnya adalah 9421,183 m³, dan
7. adanya pemakaian tulangan minimum pada balok dan kolom.

7.2 Saran

Dengan memperhatikan hal-hal tersebut di atas, maka dapat diberikan beberapa saran antara lain sebagai berikut ini :

1. Perlu dilakukan perhitungan sampai tahap akhir yaitu RAB pada tugas akhir ini, sehingga penghematan dari segi biaya dapat diketahui dengan jelas.
2. Perlu dilakukan *redesain* untuk Tugas Akhir ini dengan peningkatan spesifikasi bahan yang lain atau mendesain ulang jembatan ini dengan bentuk dan tipe yang lain misalnya dengan gelagar lengkung atas atau dengan struktur beton masif, sehingga diketahui sejauh mana efisiensi bahan yang digunakan.

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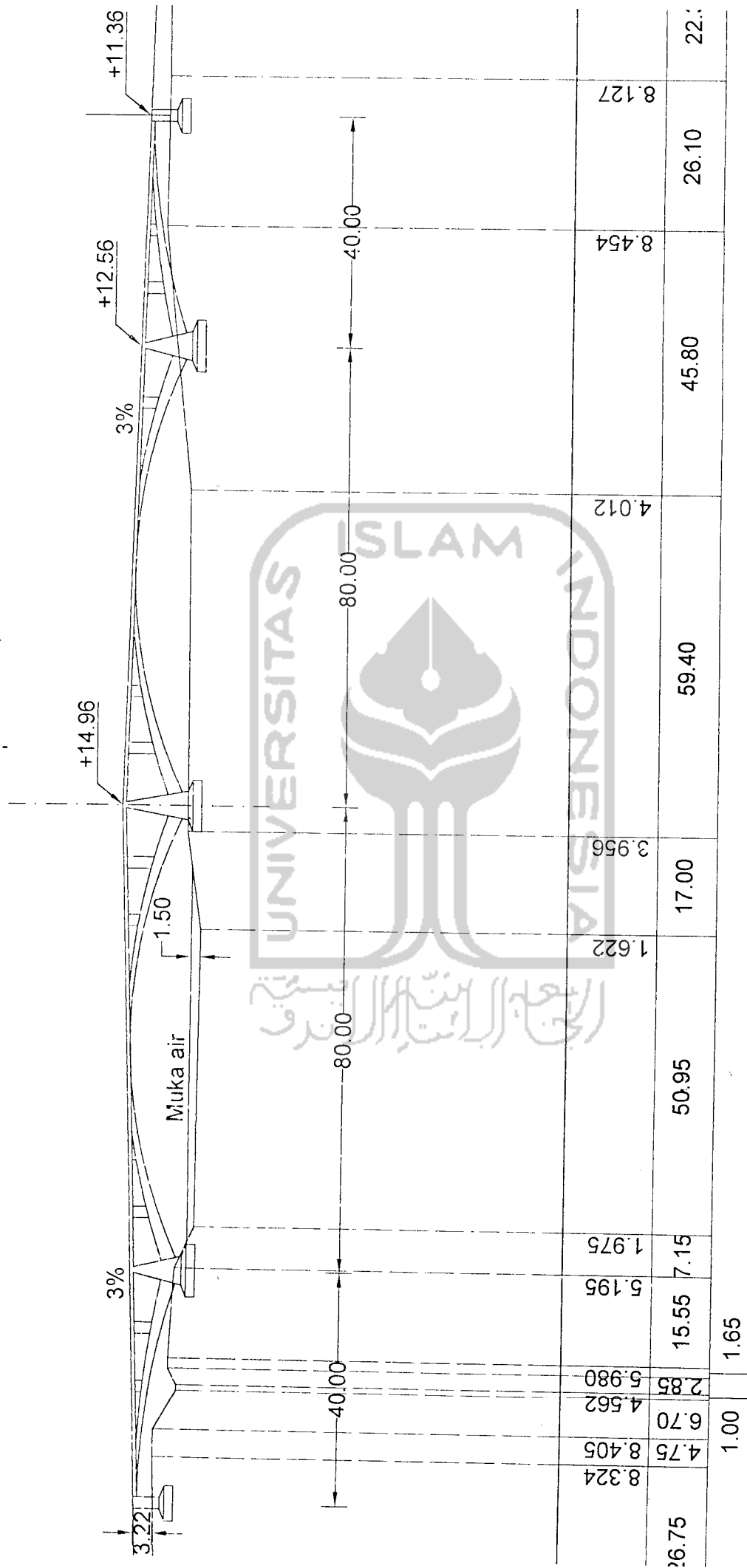
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LAMPIRAN

SURAT-SURAT TUGAS AKHIR





POTONGAN MEMANJANG JEMBATAN

KATA PENGANTAR

Untuk mendapatkan data-data fisik dan teknik batuan / tanah pada rencana lokasi Jembatan Kretek II, maka telah dilakukan pemboran bermesin (*rotary drilling machine*). Penyelidikan ini didasarkan atas metode antara lain :

- Tone Boring Corporation & Co
- ASTM D.2113-70
- ASSHO T.225-68
- BS 4019

disertai dengan uji penetrasi (SPT) dan uji laboratorium mekanika tanah. Sedangkan perhitungan untuk daya dukung tanahnya digunakan acuan dari buku "*Foundation Analysis*".

Selama pelaksanaan penyelidikan mengalami hambatan karena terjadinya bencana alam berupa gempa bumi tektonik berkekuatan 5,9 SR, yang bersumber di pantai selatan. Oleh karena lokasi penyelidikan berada pada daerah rawan gempa (dengan koefisien zona $[z] = 0,8 - 1,2$) maka laporan ini dilengkapi dengan koefisien gempa untuk desain. Perhitungannya didasarkan pada peta kegempaan yang dikeluarkan oleh Badan Penelitian dan Pengembangan Departemen Pekerjaan Umum tahun 1996.

Semoga laporan ini dapat dipergunakan sebagai acuan perencana, pengawas dan pelaksana, agar dapat menghasilkan konstruksi jembatan yang kokoh dan tahan gempa.

Jakarta,

PT. Ganes Engineering Consultant

RINGKASAN

Pekerjaan penyelidikan tanah Jembatan Kretek II meliputi :

1. pemboran bermesin di 5 titik bor pada rencana tumpuan dan pilar jembatan dengan total kedalaman 180 meter.
2. uji penetrasi (SPT) sebanyak 101 kali
3. uji fisik di laboratorium mekanika tanah sebanyak 5 sampel. Masing-masing titik bor diwakili 1 sampel sepanjang 1,00 meter

Hasil pemboran inti berupa material endapan sungai (pasir, kerikil, kerakal) dan material hasil vulkanisme berupa pasir dan lempung hitam.

Dari hasil uji penetrasi maka diketahui lapisan pasir yang sangat padat ($N > 50$ pukulan) yaitu pada kedalaman :

- titik bor DH-1 mulai kedalaman 36,00 meter
- titik bor DH-2 mulai kedalaman 32,00 meter
- titik bor DH-3 mulai kedalaman 28,50 meter
- titik bor DH-4 mulai kedalaman 33,00 meter
- titik bor DH-5 mulai kedalaman 33,00 meter

Daya dukung tanahnya berkisar antara 14,3 – 16,3 kg/cm². Koefisien gempa untuk desain sebesar 0,223 gal.

Hasil uji laboratorium mekanika tanah adalah sbh :

- NWC : 5,97 – 26,48 %
- Porositas : 0,434 – 0,579 %
- Butiran : 0,94 – 8,62
- γ_n : 1,4 – 1,96 gr/cm³
- γ_d : 1,189 – 1,55 gr/cm³

Harga C (*cohesi*) pasir berkisar 0,02 – 0,08. Sedangkan harga ϕ (sudut geser dalam) berkisar 42° – 45° dari N (hasil uji SPT).

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BAB I. PENDAHULUAN

I.1. Latar Belakang

Pesatnya pertumbuhan masyarakat membutuhkan tersedianya sarana jalan dan jembatan yang memadai guna mempermudah arus transportasi barang dan manusia. Selama ini kita mengenal jalur pantura, yaitu jalur jalan yang menghubungkan kota-kota di sepanjang pesisir utara pulau Jawa. Sebagai alternatif transportasi, maka dipandang perlu untuk membangun jalan di sepanjang pesisir selatan pulau Jawa, yang disebut jalur pantai selatan. Jalur ini banyak melewati sungai-sungai, baik besar maupun kecil. Salah satu sungai yang dilewati adalah Kali Opak di daerah Kretek, Bantul. Oleh karena itu pembangunan Jembatan Kretek II (yang berada di hilir Jembatan Kretek sekarang) menjadi mutlak diperlukan sebagai sarana penghubung pada ruas jalur yang baru tersebut.

I.2. Maksud dan Tujuan

Penyelidikan geoteknik ini bertujuan untuk menyelidiki dan menentukan jenis, sifat, tebal dan kemampuan daya dukung lapisan tanah di bawah permukaan, yang diperlukan dalam perencanaan konstruksi, sehingga bangunan yang dihasilkan akan kokoh, stabil dan optimal.

Ruang lingkup penyelidikannya sendiri mencakup : pemboran inti, *Standard Penetration Test (SPT)*, *sampling* batuan, uji laboratorium dan penyusunan laporan.

I.3. Lokasi dan Kesempaian Daerah

Jembatan Kretek II terletak di Kecamatan Kretek, Kabupaten Bantul, DIY, kurang lebih 20 kilometer sebelah selatan kota Yogyakarta (ke arah pantai Parangtritis). Untuk mencapainya dapat menggunakan kendaraan roda empat atau lebih sampai ke areal penambangan pasir rakyat, di dataran banjir kali Opak yang cukup lebar.

I.4. Jenis Pekerjaan

Pekerjaan penyelidikan geoteknik di Jembatan Kali Kretek II dapat diuraikan sbb :

1. Pemboran inti di 5 (lima) titik bor, yaitu DH-1, DH-2, DH-3, DH-4 dan DH-5, dengan total kedalaman 180 meter :

- DH-1 sedalam 40 meter, pada rencana tumpuan (abutment) kiri jembatan
 - DH-2 sedalam 35 meter, pada rencana pilar kiri jembatan
 - DH-3 sedalam 35 meter, pada rencana pilar tengah jembatan
 - DH-4 sedalam 35 meter, pada rencana pilar kanan jembatan
 - DH-5 sedalam 35 meter, pada rencana tumpuan (abutment) kanan jembatan
2. SPT sebanyak total 101 kali :
- Di titik DH-1 dilakukan sebanyak 22 kali
 - Di titik DH-2 dilakukan sebanyak 20 kali
 - Di titik DH-3 dilakukan sebanyak 20 kali
 - Di titik DH-4 dilakukan sebanyak 20 kali
 - Di titik DH-5 dilakukan sebanyak 19 kali

Test Laboratorium



BAB II. GEOLOGI

II.1. Fisiografi Regional

Secara fisiografi, Pulau Jawa dapat dibagi menjadi 7 (tujuh) zona, sebagaimana diuraikan oleh van Bemmelen (1949), meliputi :

1. Gunungapi Kuartar
2. Dataran Aluvial Jawa Utara
3. Antiklinorium Rembang – Madura
4. Antiklinorium Bogor – Serayu Utara – Kendeng
5. Kubah dan Punggungan pada Zona Depresi Tengah
6. Zona Depresi Tengah Jawa dan Zona Randublatung
7. Pegunungan Selatan

Daerah penelitian (Jembatan Kali Kretek II) terletak di zona fisiografi yang ke-6 yaitu Zona Depresi Tengah Jawa, lebih spesifik lagi terletak pada morfologi dataran banjir kali Opak.

II.2. Stratigrafi Regional

Secara regional, stratigrafi daerah Yogyakarta dan sekitarnya tersusun oleh (dari tua ke muda) :

1. Batuan Sedimen dan Batuan Vulkanik yang berselang-seling, berumur Eosen sampai Pliosen
2. Batuan Terobosan, berumur Miosen
3. Endapan Gunung Merapi Masakini, berumur Kuartar
4. Batuan Vulkanik, berumur Kuartar
5. Endapan Permukaan

Dari hasil korelasi dengan Peta Geologi Lembar Yogyakarta (Wartono R, dkk), diketahui bahwa stratigrafi daerah penelitian termasuk dalam formasi Endapan Gunungapi Merapi Masakini dan Endapan Permukaan.

Formasi Endapan Gunungapi Merapi Masakini terwakili oleh satuan endapan vulkanik merapi muda yang mengandung tuf, abu, breksi, aglomerat dan leleran lava.

Sedangkan Formasi Endapan Permukaan terwakili oleh satuan aluvium, yang tersusun atas kerakal, pasir, lanau dan lempung sepanjang sungai yang besar dan dataran pantai.

II.3. Kondisi Geologi Daerah Penelitian

Daerah penelitian sebagian besar tersusun atas lapisan aluvial berupa material pasir, kerikil, dan kerakal. Pada umumnya berwarna abu-abu muda sampai tua, dengan ketebalan belasan meter. Material-material ini adalah hasil pengendapan oleh medium aliran air Kali Opak. Oleh karena itu banyak dijumpai struktur silang siur, yang mencirikan hasil pengendapan oleh air. Endapan aluvial ini dapat disebut juga dengan istilah endapan sungai (*river deposits*). Di atas lapisan ini terdapat lapisan soil hasil pelapukan berukuran lempung berwarna coklat, dan mengandung material-material organik dengan ketebalan beberapa meter. Sedangkan paling bawah dijumpai lapisan pasir hasil vulkanisme Gunung Merapi berukuran pasir halus sampai kasar, berwarna abu-abu tua kehitaman, dengan ketebalan sampai berpuluh-puluh meter. Setempat dijumpai lapisan lempung hitam yang sangat padat. Jadi dapat disimpulkan stratigrafi daerah penelitian dari tua ke muda adalah sbb :

1. Material hasil vulkanisme : pasir dan lempung hitam
2. Aluvial hasil pengendapan aliran air : pasir, kerikil, kerakal
3. Soil penutup : lempung coklat

Morfologi daerah penelitian adalah berupa dataran banjir kali Opak, dengan penampang lembah sungai berbentuk "U" yang mengindikasikan bahwa erosi horisontal lebih kuat dibanding erosi vertikal. Dataran banjir kali Opak ini cukup lebar, lebih lebar dibandingkan dengan tubuh sungainya sendiri, dan banyak dijumpai gosong pasir di kanan-kiri sungai. Oleh penduduk dataran banjir ini dimanfaatkan sebagai sumber bahan galian pasir untuk bahan bangunan.

Struktur geologi mayor adalah Sesar Opak, sebagai sesar utama yang membentang dari Kretek sampai ke Prambanan. Aliran sungai Opak ini (yang berarah timurlaut – baratdaya) diyakini sebagai bidang sesar/patahan berjenis sesar turun, dengan blok sebelah barat relatif turun dari blok timur. Salah satu indikasi adanya sesar ini adalah kenampakan "triangular facet" pada perbukitan di sebelah timur/tenggara Kali Opak. Jadi rencana Jembatan Kretek II tepat berada pada zona sesar/patahan mayor.

BAB III. GEOLOGI TEKNIK

III.1. Umum

Rencana jembatan Kretek II sebagai sarana pendukung jalur selatan, akan membentang di atas kali Opak sepanjang ± 240 meter. Jembatan akan ditopang oleh 3 pilar dengan jarak sekitar 80 meter dilengkapi dengan 2 tumpuan. Untuk mendukung perencanaan pondasinya maka dilakukan penelitian untuk menentukan kedalaman dan tipe pondasi yang cocok dengan kondisi batuananya.

Macam-macam penelitian yang dilakukan antara lain :

- pengamatan permukaan
- pengeboran inti / *coring*
- Standard Penetration Test / SPT
- Uji laboratorium Mekanika Tanah, meliputi uji fisik
- analisa daya dukung tanah
- koefisien kegempaan
- sumber cadangan bahan bangunan

III.2. Pengamatan Permukaan

Wilayah seluas $0,25 \text{ km}^2$ di sekitar rencana jembatan telah diperiksa kondisi batuan permukaannya. Hasilnya berupa peta geologi skala 1 : 2000

III.3. Pemboran Inti

Lima titik bor yang akan memberikan data pada rencana pondasi telah ditentukan posisi dan kedalamannya untuk keperluan perencanaan. Mesin bor putar (*rotary drilling machine*) digunakan dalam penelitian ini dan dilengkapi dengan pemasangan *casing* sedalam 20 – 30 meter. Cara kerja / metodenya adalah sbb : pada bagian atas dekat permukaan tanah sampai kedalaman 7,50 m dilakukan bor *casing* dengan diameter 4 inchi, menggunakan cairan bentonit. Dari dasar casing dilakukan SPT, kemudian *sampling* dilakukan sedalam 1,50 m. Tahap selanjutnya pasang *casing* lagi, lalu dari dasar *casing* dilakukan SPT, dan seterusnya.

Melalui 5 (lima) titik bor di lokasi rencana as Jembatan Kali Kretek II, maka diketahui jenis, sifat dan variasi batuan pada masing-masing titik bor. Urutan selengkapnya adalah sbb :

Tabel 1. Hasil pemboran inti di titik bor DH-1

Kedalaman (m)	Deskripsi
0,00 – 7,50	<u>Lempung pasiran</u> , berwarna kecoklatan, berukuran butir lempung – pasir halus. Di bagian atas terdapat bahan-bahan organik seperti akar tanaman.
7,50 – 20,00	<u>Pasir</u> , berwarna abu-abu muda, berukuran butir pasir halus – kasar, mengandung sedikit kerikil.
20,00 – 40,00	<u>Pasir vulkanik</u> , berwarna abu-abu tua kehitaman, berukuran butir pasir sedang – sangat kasar

Tabel 2. Hasil pemboran inti di titik bor DH-2

Kedalaman (m)	Deskripsi
0,00 – 9,00	<u>Pasir kerikilan</u> , berwarna abu-abu, berukuran pasir halus – kasar, mengandung kerikil berdiameter max 4 mm.
9,00 – 21,50	<u>Pasir vulkanik</u> , berwarna abu-abu muda – tua, berbutir pasir sedang – kasar
21,50 – 35,00	<u>Pasir vulkanik</u> , berwarna abu-abu tua, berukuran butir pasir kasar – sangat kasar

Tabel 3. Hasil pemboran inti di titik bor DH-3

Kedalaman (m)	Deskripsi
0,00 – 15,50	<u>Pasir kerikilan</u> , berwarna abu-abu kecoklatan, berukuran butir pasir sedang, mengandung kerikil
15,50 – 25,50	<u>Pasir vulkanik</u> , berwarna abu-abu tua, berbutir pasir sedang-kasar
25,50 – 35,00	<u>Pasir vulkanik</u> , berwarna abu-abu tua kehitaman, berbutir sangat kasar dengan permukaan runcing-runcing

Tabel 4. Hasil pemboran inti di titik bor DH-4

Kedalaman (m)	Deskripsi
0,00 – 18,00	<u>Pasir halus</u> , berwarna abu-abu kecoklatan, berukuran pasir halus, mengandung kerikil ± 10 %. Di bagian atas terdapat bahan-bahan organik seperti akar tanaman.
18,00 – 25,00	<u>Lempung pasiran</u> , berwarna abu-abu kecoklatan, berbutir lempung – pasir halus
25,00 – 32,50	<u>Pasir lempungan</u> , berwarna abu-abu kecoklatan, berukuran butir lempung – pasir kasar
32,50 – 35,00	<u>Lempung hitam</u> , sangat padat

Tabel 5. Hasil pemboran inti di titik bor DH-5

Kedalaman (m)	Deskripsi
0,00 – 19,50	<u>Lempung pasiran</u> , berwarna abu-abu kecoklatan, berukuran lempung – pasir halus, mengandung kerikil-berangkal. Di bagian atas terdapat bahan-bahan organik seperti akar tanaman.
19,50 – 32,00	<u>Pasir</u> , berwarna abu-abu muda – tua, berukuran butir pasir sedang – kasar
32,00 – 35,00	<u>Lempung hitam</u> , sangat padat

III.4. Standard Penetration Test (SPT)

Percobaan penetrasi dilakukan dengan interval 1,5 meter, dengan memukul *split spoon sampler* berukuran diameter luar 2 inch dan diameter dalam $1 \frac{3}{8}$ inch, dengan beban seberat 140 lbs (= 63,50 kg) dan ketinggian jatuh 75 cm. banyaknya pukulan (N) yang diperlukan untuk memasukkan *split spoon sampler* sedalam 30 cm dicatat setelah ekstra pukulan 15 cm yang pertama. Prosedur pelaksanaan mengacu ASTM D.1586-67 dan ASSHO T 206-70.

Hasil selengkapnya tersaji dalam tabel berikut.

Tabel 6. Hasil SPI

Titik Bor	Kedalaman	Jumlah Pukulan			Nilai N	Densitas
		I	II	III		
DH-1	7,50 – 7,95	6	8	8	16	Sedang
	9,00 – 9,45	7	9	7	16	Sedang
	10,50 – 10,95	3	8	9	17	Sedang
	12,00 – 12,45	5	11	15	26	Sedang
	13,50 – 13,95	10	18	27	45	Padat
	15,00 – 15,45	11	14	21	35	Padat
	16,50 – 16,95	9	12	15	27	Sedang
	18,00 – 18,45	9	11	19	30	Padat
	19,50 – 19,95	8	11	13	24	Sedang
	21,00 – 21,45	11	16	19	35	Padat
	22,50 – 22,95	17	15	16	31	Padat
	24,00 – 24,45	15	19	19	38	Padat
	25,50 – 25,95	14	20	20	40	Padat
	27,00 – 27,45	21	22	23	45	Padat
	28,50 – 28,95	19	23	23	46	Padat
	30,00 – 30,45	18	16	25	41	Padat
	31,50 – 31,95	15	18	27	45	Padat
	33,00 – 33,45	17	22	26	48	Padat
	34,50 – 34,95	18	24	23	47	Padat
	36,00 – 36,45	21	23	27	50	Sangat Padat
	37,50 – 37,95	19	25	26	51	Sangat Padat
	39,00 – 39,45	22	26	27	53	Sangat Padat
DH-2	6,00 – 6,45	3	6	7	13	Sedang
	7,50 – 7,95	3	7	8	15	Sedang
	9,00 – 9,45	4	7	7	14	Sedang
	10,50 – 10,95	5	8	9	17	Sedang
	12,00 – 12,45	7	11	15	26	Sedang
	13,50 – 13,95	9	18	21	39	Padat
	15,00 – 15,45	11	14	21	35	Padat
	16,50 – 16,95	10	12	13	25	Sedang
	18,00 – 18,45	6	15	20	35	Padat
	19,50 – 19,95	11	12	18	30	Padat
	21,00 – 21,45	17	15	16	31	Padat
	22,50 – 22,95	18	20	21	41	Padat
	24,00 – 24,45	15	23	24	47	Padat
	25,50 – 25,95	19	25	25	50	Sangat Padat
	27,00 – 27,45	20	24	28	52	Sangat Padat
	28,50 – 28,95	18	16	16	32	Padat
	30,00 – 30,45	17	20	23	43	Padat
	31,50 – 31,95	15	23	27	50	Sangat Padat
	33,00 – 33,45	19	25	25	50	Sangat Padat
	34,50 – 34,95	20	24	28	52	Sangat Padat
DH-3	6,00 – 6,45	3	3	6	9	Lunak
	7,50 – 7,95	2	6	8	14	Sedang
	9,00 – 9,45	4	7	4	11	Sedang
	10,50 – 10,95	3	6	6	12	Sedang
	12,00 – 12,45	5	7	9	16	Sedang
	13,50 – 13,95	5	9	10	19	Sedang
	15,00 – 15,45	6	10	14	24	Sedang

	16,50 – 16,95	10	12	14	26	Sedang
	18,00 – 18,45	9	12	18	30	Padat
	19,50 – 19,95	11	15	18	33	Padat
	21,00 – 21,45	13	18	21	39	Padat
	22,50 – 22,95	15	20	21	41	Padat
	24,00 – 24,45	15	24	25	49	Padat
	25,50 – 25,95	11	22	26	48	Padat
	27,00 – 27,45	14	20	28	48	Padat
	28,50 – 28,95	17	23	27	50	Sangat Padat
	30,00 – 30,45	16	24	29	53	Sangat Padat
	31,50 – 31,95	13	23	28	51	Sangat Padat
	33,00 – 33,45	15	25	27	52	Sangat Padat
	34,50 – 34,95	16	26	28	54	Sangat Padat
DH-4	6,00 – 6,45	7	11	12	23	Sedang
	7,50 – 7,95	8	6	5	11	Sedang
	9,00 – 9,45	9	4	3	7	Lunak
	10,50 – 10,95	7	5	7	12	Sedang
	12,00 – 12,45	6	6	8	14	Sedang
	13,50 – 13,95	5	7	8	15	Sedang
	15,00 – 15,45	7	8	9	17	Sedang
	16,50 – 16,95	8	10	9	19	Sedang
	18,00 – 18,45	6	9	11	20	Sedang
	19,50 – 19,95	5	6	18	23	Sedang
	21,00 – 21,45	7	8	15	23	Sedang
	22,50 – 22,95	6	9	11	20	Sedang
	24,00 – 24,45	9	9	10	19	Sedang
	25,50 – 25,95	11	14	16	30	Padat
	27,00 – 27,45	15	16	17	33	Padat
	28,50 – 28,95	13	15	23	38	Padat
	30,00 – 30,45	8	19	21	40	Padat
	31,50 – 31,95	16	21	28	49	Padat
	33,00 – 33,45	11	17	35	52	Sangat Padat
	34,50 – 34,95	15	23	31	54	Sangat Padat
DH-5	7,50 – 7,95	3	4	4	8	Lunak
	9,00 – 9,45	9	10	15	25	Sedang
	10,50 – 10,95	5	8	11	19	Sedang
	12,00 – 12,45	5	6	5	11	Sedang
	13,50 – 13,95	8	9	7	16	Sedang
	15,00 – 15,45	6	6	8	14	Sedang
	16,50 – 16,95	7	7	13	20	Sedang
	18,00 – 18,45	8	11	23	34	Padat
	19,50 – 19,95	9	10	14	24	Sedang
	21,00 – 21,45	8	11	16	27	Sedang
	22,50 – 22,95	8	12	17	29	Sedang
	24,00 – 24,45	11	13	14	27	Sedang
	25,50 – 25,95	10	12	13	25	Sedang
	27,00 – 27,45	9	11	11	22	Sedang
	28,50 – 28,95	5	7	15	22	Sedang
	30,00 – 30,45	8	14	15	29	Sedang
	31,50 – 31,95	10	18	20	38	Padat
	33,00 – 33,45	17	19	32	51	Sangat Padat
	34,50 – 34,95	20	25	28	53	Sangat Padat

III.5. Analisa Daya Dukung Tanah

Untuk perhitungan daya dukung tanah memakai gabungan dari hasil pemboran dengan tabel-tabel yang relevan, seperti di bawah ini :

Tabel 7. Nilai empiris untuk D_r , ϕ , dan *Unit Weight*

Description	Very Loose (sangat urai)	Loose (urai)	Medium (sedang)	Dense (padat)	Very Dense (sangat padat)
Relative Density (D_r)	0	15	35	0,65	0,85
Standard Penetration (N)	-	-	10	30	50
Approx. angle of Material friction ϕ	$25^\circ - 30^\circ$	$27^\circ - 32^\circ$	$30^\circ - 35^\circ$	$35^\circ - 40^\circ$	$38^\circ - 43^\circ$
Approx. range moist unit weight (γ_p) of (kN/m ³)	70 - 100 (11-16)	90 - 115 (14 - 18)	-	110 - 140 (17 - 22)	130 - 150 (20 - 23)

Diambil dari USBR dalam Gibbs and Holtz (1957) dengan modifikasi

Selain tabel tersebut, dipakai pula nilai-nilai *bearing capacity factor* sebagaimana tercantum dalam tabel berikut :

Tabel 8. *Bearing Capacity Factors*

ϕ (..... $^\circ$)	N_c	N_q	N_y
40.0	95.7	81.3	100.4
40.5	103.4	90.5	120.1
41.0	111.0	99.7	139.8
41.5	118.7	108.9	159.5
42.0	126.3	118.1	179.2
42.5	134.0	127.3	199.0
43.0	141.7	136.5	218.7
43.5	149.3	145.7	238.4
44.0	157.0	154.9	258.1
44.5	164.6	164.1	277.8
45.0	172.3	173.3	297.5

2.2.

Maka dengan menggunakan tabel-tabel diatas beserta panduan dalam buku "*Foundation Analysis*", dapat dilakukan perhitungan daya dukung tanah di rencana Jembatan Kretek II sbb :

$$N_c = 149,3 \quad N_q = 145,7 \quad N_y = 238,4$$

$$\begin{aligned} q_{ult} &= (0,03 \times 149,3) + (1,60 \times 145,7) + \frac{1}{2} (1,60 \times 1 \times 238,4) \\ &= 4,5 + 233,12 + 190,72 \\ &= 428,34 \text{ ton/m}^2 \end{aligned}$$

$$\begin{aligned} q_{izin} &= 428,34 / 3 \\ &= 142,78 \text{ ton/m}^2 \\ &= 14,28 \text{ kg/cm}^2 \end{aligned}$$

c. Pilar tengah (DH-3)

c.1. Kedalaman 25,00 – 30,00 meter $\rightarrow$ N rata-rata = $(48+48+50+53) / 4 = 50$

$$N = 50; D_r = 0,85; \varphi = 43^\circ$$

$$\varphi = \frac{25 + (25 \times 0,85) + 43}{2} = 44,6^\circ$$

C diambil 0,02 dan $q = 1,50$:

$$N_c = 164,6 \quad N_q = 164,1 \quad N_y = 277,8$$

$$\begin{aligned} q_{ult} &= (0,02 \times 164,6) + (1,50 \times 164,1) + \frac{1}{2} (1,50 \times 1 \times 277,8) \\ &= 3,3 + 246,15 + 208,35 \\ &= 457,8 \text{ ton/m}^2 \end{aligned}$$

$$\begin{aligned} q_{izin} &= 457,8 / 3 \\ &= 152,6 \text{ ton/m}^2 \\ &= 15,26 \text{ kg/cm}^2 \end{aligned}$$

c.2. Kedalaman 30,00 – 35,00 meter $\rightarrow$ N rata-rata = $(53+51+52+54) / 4 = 52,5$

$$N = 52,5; D_r = 0,87; \varphi = 43^\circ$$

$$\varphi = \frac{25 + (25 \times 0,87) + 43}{2} = 44,87^\circ$$

C diambil 0,03 dan $q = 1,50$:

$$N_c = 172,3 \quad N_q = 173,3 \quad N_y = 297,5$$

$$\begin{aligned} q_{ult} &= (0,03 \times 172,3) + (1,50 \times 173,3) + \frac{1}{2} (1,50 \times 1 \times 297,5) \\ &= 5,2 + 259,95 + 223,12 \\ &= 488,27 \text{ ton/m}^2 \end{aligned}$$

$$\begin{aligned} q_{izin} &= 488,27 / 3 \\ &= 162,75 \text{ ton/m}^2 \\ &= 16,28 \text{ kg/cm}^2 \end{aligned}$$

d. Pilar kanan (DH-4)

Kedalaman 32,00 – 35,00 meter $\rightarrow N \text{ rata-rata} = (49+52+54) / 3 = 52$

$$N = 52; D_r = 0,86; \varphi = 43^\circ$$

$$\varphi = \frac{25 + (25 \times 0,86) + 43}{2} = 44,75^\circ$$

C diambil 0,03 dan $q = 1,50$:

$$N_c = 168,45 \quad N_q = 168,7 \quad N_y = 287,65$$

$$\begin{aligned} q_{ult} &= (0,03 \times 168,45) + (1,50 \times 168,7) + \frac{1}{2} (1,50 \times 1 \times 287,65) \\ &= 5 + 253,05 + 215,74 \\ &= 473,79 \text{ ton/m}^2 \end{aligned}$$

$$\begin{aligned} q_{izin} &= 473,79 / 3 \\ &= 157,93 \text{ ton/m}^2 \\ &= 15,79 \text{ kg/cm}^2 \end{aligned}$$

e. Tumpuan kanan (DH-5)

Kedalaman 33,00 – 35,00 meter $\rightarrow N \text{ rata-rata} = (51+53) / 2 = 52$

$$N = 52; D_r = 0,86; \varphi = 43^\circ$$

$$\varphi = \frac{25 + (25 \times 0,86) + 43}{2} = 44,75^\circ$$

C diambil 0,03 dan $q = 1,55$:

$$N_c = 168,45 \quad N_q = 168,7 \quad N_y = 287,65$$

$$\begin{aligned} q_{ult} &= (0,03 \times 168,45) + (1,55 \times 168,7) + \frac{1}{2} (1,55 \times 1 \times 287,65) \\ &= 5 + 261,1 + 222,93 \\ &= 489,03 \text{ ton/m}^2 \end{aligned}$$

$$\begin{aligned} q_{izin} &= 489,03 / 3 \\ &= 163,01 \text{ ton/m}^2 \\ &= 16,30 \text{ kg/cm}^2 \end{aligned}$$

Dari perhitungan di atas dapat dibuat tabel sbb :

Tabel 9. Hasil analisa perhitungan daya dukung tanah

Titik Bor	Posisi	Kedalaman (m)	$q_{izin} \text{ (kg/cm}^2\text{)}$
DH-1	Tumpuan kiri	30,00 – 35,00	12,26
		35,00 – 40,00	14,37
DH-2	Pilar kiri	25,00 – 30,00	11,16
		30,00 – 35,00	14,28
DH-3	Pilar tengah	25,00 – 30,00	15,26
		30,00 – 35,00	16,28
DH-4	Pilar kanan	33,00 – 35,00	15,79
DH-5	Tumpuan kanan	33,00 – 35,00	16,30

III.6. Koefisien Kegempaan

Gempa terjadi karena blok batuan yang satu menekan blok batuan yang lain, lalu timbul tegangan. Jika batas kelenturan / elastisitas batuan dilampaui maka terjadilah patahan. Getaran akibat patahan inilah yang disebut gempa.

Gempa tektonik yang melanda Yogyakarta dan sekitarnya pada 27 Mei 2006 yll terjadi karena gerakan blok sesar (patahan) yang dipicu oleh penunjaman lempeng tektonik di laut selatan, berpusat di 37 km selatan kota Yogya pada kedalaman 33 km.

Getaran gempa akibat patahan ini merambat ke segala arah, termasuk mengenai zona Sesar Opak (yang memanjang dari Kretek sampai Prambanan), dan terus merambat ke zona Sesar Jiwo. Zona-zona sesar itu masih bersifat labil karena blok batuannya pernah patah di masa lampau, sehingga dampak bencana pasti akan lebih besar di kanan kiri zona-zona sesar tersebut (misalnya daerah Kretek, Bambang Lipuro, Jetis, Imogiri, Piyungan, Berbah, Kalasan, Prambanan).

Berdasarkan teori tektonik lempeng, seluruh pantai selatan Jawa, dari Ujung Kulon sampai Banyuwangi termasuk Yogyakarta, adalah pertemuan lempeng Indo-Australia dengan lempeng Eurasia. Ini berarti seluruh pantai selatan Jawa adalah daerah rawan gempa. Oleh karena itu, agar bangunan-bangunan yang berada di daerah ini relatif tahan gempa (termasuk Jembatan Kretek II), maka perlu dihitung Koefisien Gempa untuk Desain Konstruksi. Harga koefisien ini mengandung banyak parameter seperti : periode ulang gempa, zona gempa dasar, percepatan gempa dasar dan faktor koreksi jenis tanah.

Rumus yang digunakan (berdasarkan Badan Penelitian dan Pengembangan PU, Puslitbang Pengairan, untuk perencanaan bangunan tahan gempa) adalah sbb :

$$ad = z \cdot ac \cdot w$$

dan

$$K = ad/g$$

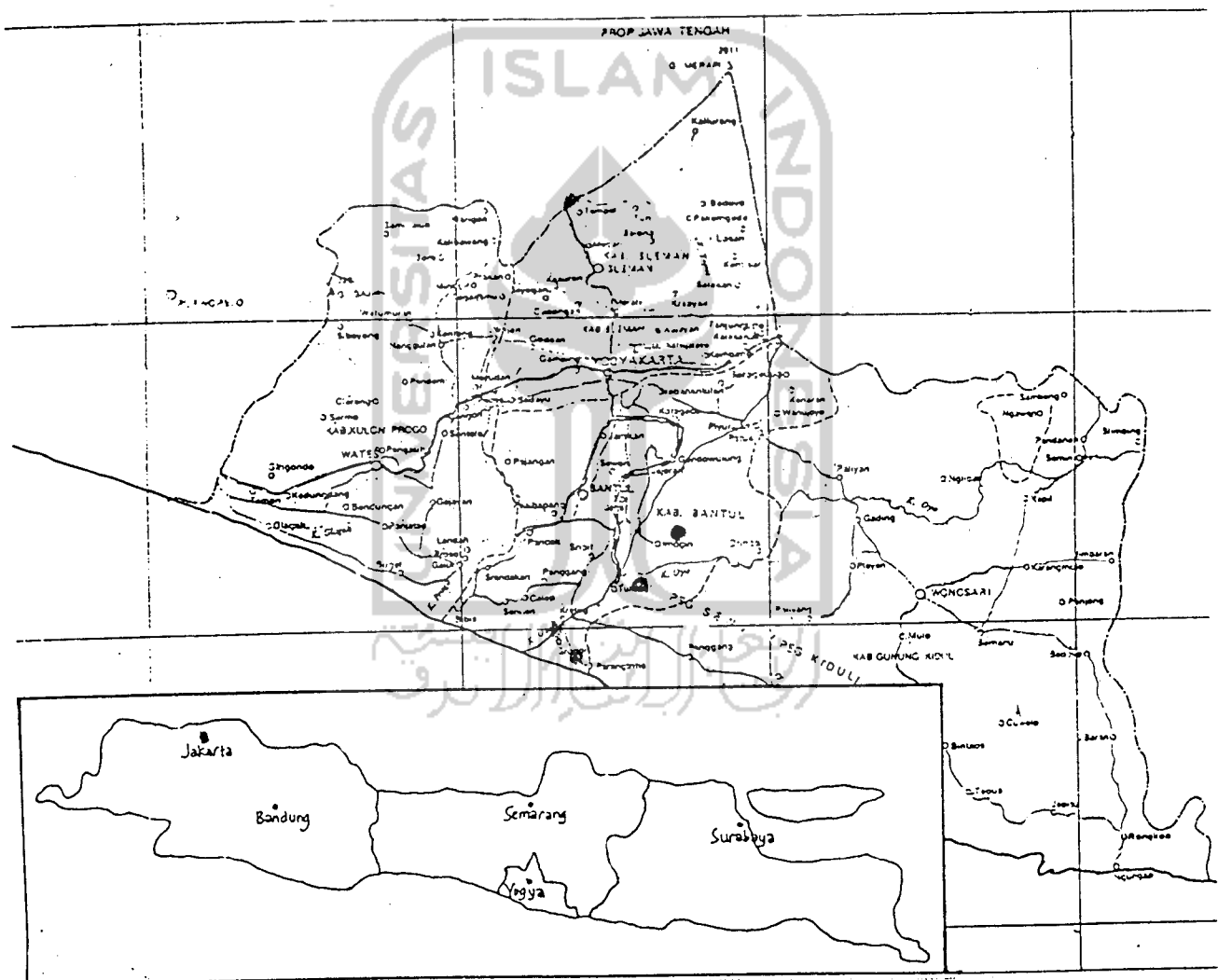
dimana :
ad = percepatan gempa untuk desain (gal)
z = koefisien zone
ac = percepatan gempa dasar
w = faktor koreksi jenis tanah setempat
K = koefisien gempa
g = gravitasi $\rightarrow 980 \text{ cm/det}^2$

Pulau Jawa, sebagian Sumatra bagian tengah, Bali, Lombok dan Sumbawa mempunyai angka koefisien zona (z) antara 0,8 - 1,2. Sedangkan periode ulang gempa (T) 50 tahun, dengan percepatan gempa dasar (ac) sebesar 151,72 gal, dan faktor koreksi jenis tanah aluvial (Ts) > 0,75 menghasilkan faktor koreksi (w) sebesar 1,20.

Dari angka-angka tersebut dapat dihitung koefisien gempa (K) untuk desain Jembatan Kretek II sbb :

$$\begin{aligned} ad &= z \cdot ac \cdot w \\ &= 1,2 \times 151,72 \times 1,20 \end{aligned}$$

sekitar 40 – 50 km ke arah Gunung Merapi sebagai sumbernya. Pasir untuk beton perlu disaring dan dicuci dulu, dan bongkah andesit perlu dihancurkan dulu dengan mesin pemecah batu. Lokasi di atas disarankan, karena endapan pasir di sekitar lokasi penelitian kurang baik mutunya baik dalam hal kualitas maupun kuantitas.



Gambar 2. Lokasi sumber cadangan bahan-bahan bangunan

- : rencana lokasi Jembatan Kretek II
- : lokasi material

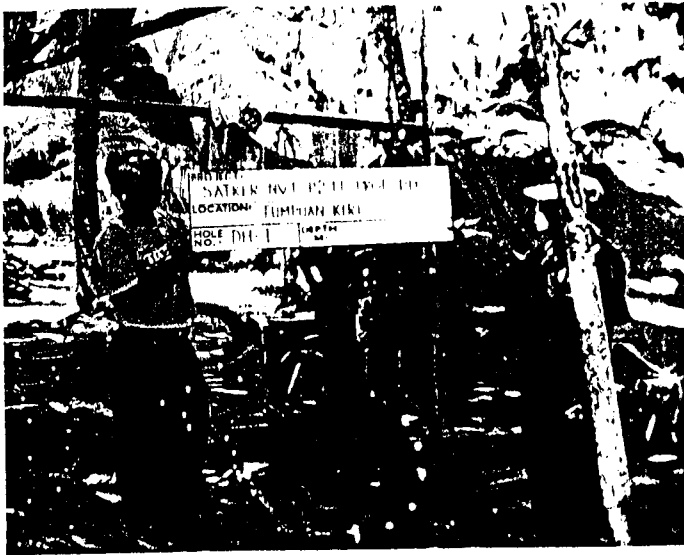


Foto 1. Lokasi titik bor DH-1 (tumpuan kiri)



Foto 2. Lokasi titik bor DH-2 (pilar kiri)

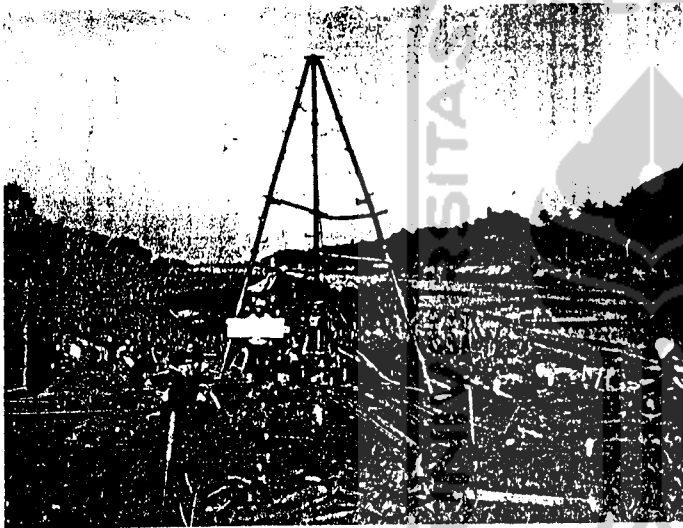


Foto 3. Lokasi titik bor DH-3 (pilar tengah)



Foto 4. Lokasi titik bor DH-4 (pilar kanan)



Foto 5. Lokasi titik bor DH-5 (tumpuan kanan)

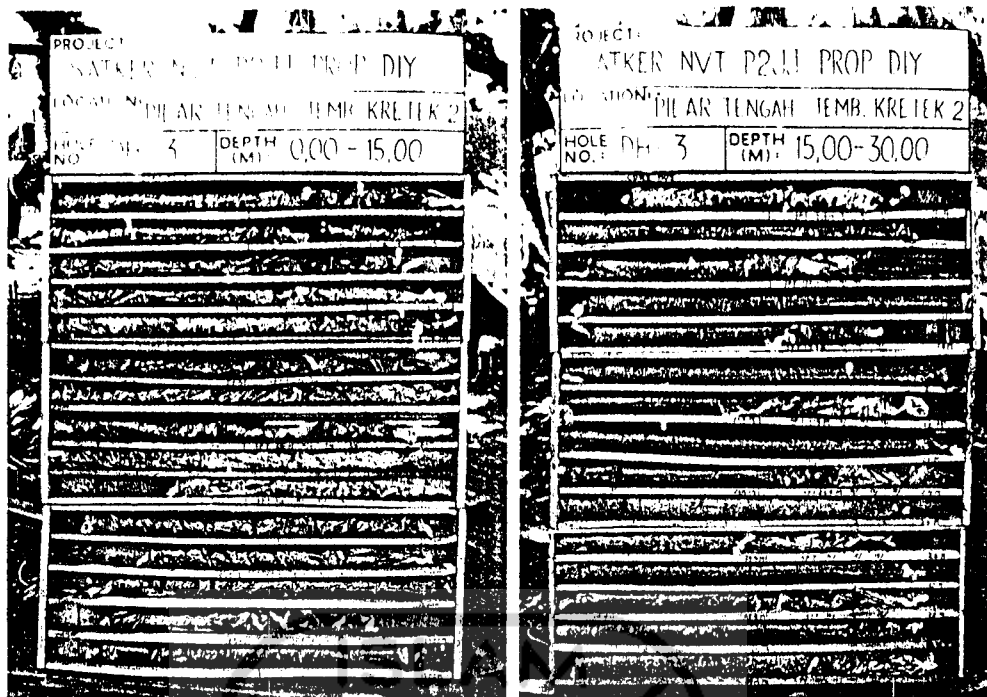


Foto 6. Contoh hasil pengeboran di titik bor DH-3 kedalaman 0,00 – 30,00 m

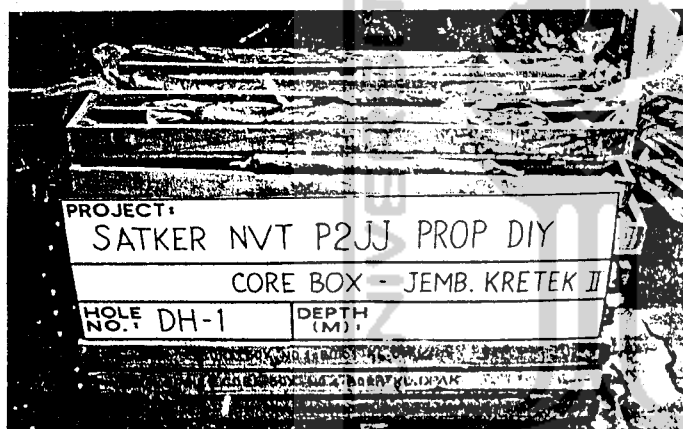


Foto 7. Core box hasil pengeboran di DH-1

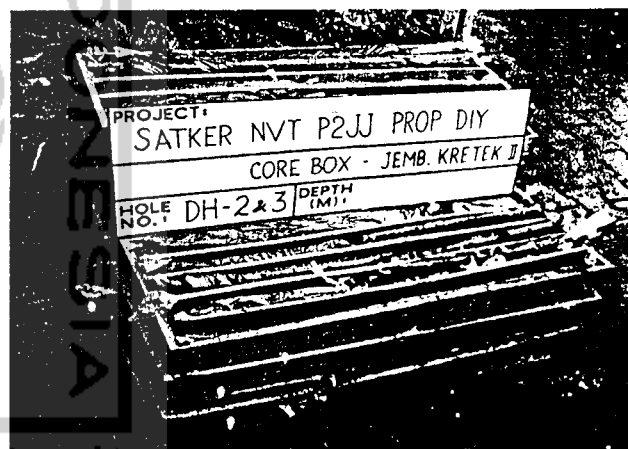


Foto 8. Core box hasil pengeboran di DH-2 & 3

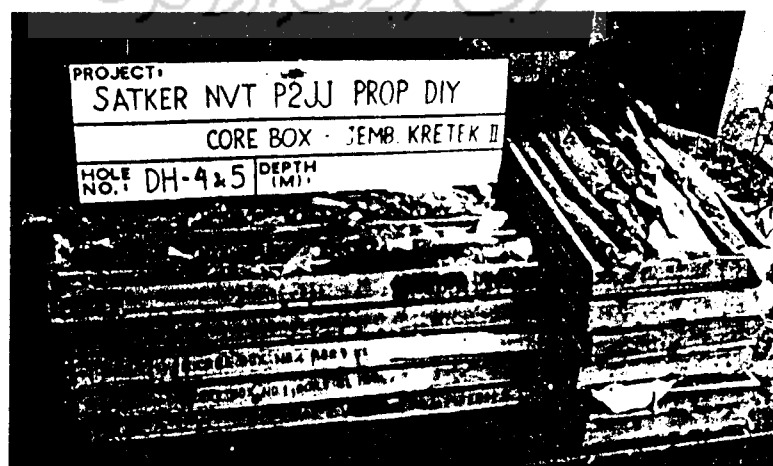


Foto 9. Core box hasil pengeboran di DH-4 & 5

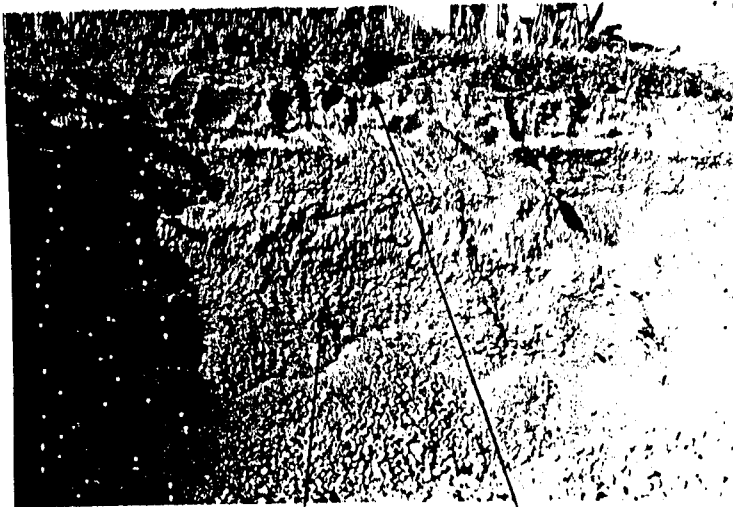


Foto 10. Kenampakan satuan lempung pasir di atas satuan aluvial (pasir, kerikil, kerakal)

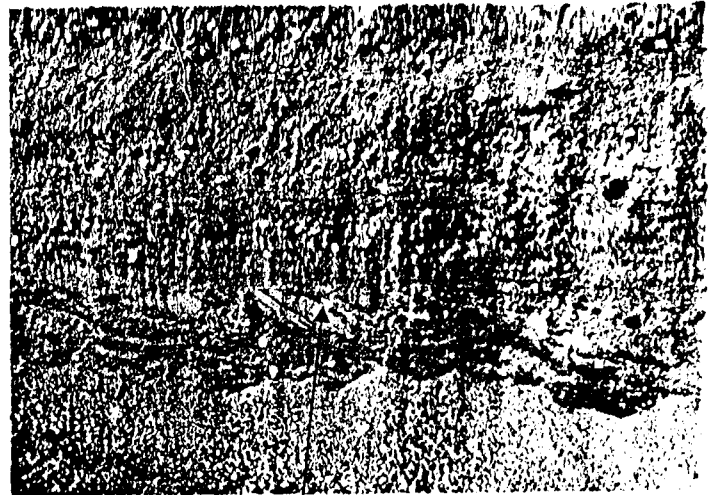


Foto 11. Struktur silang siur pada satuan aluvial penciri proses pengendapan dgn media air



Foto 12. Sumber material tanah urug di daerah Pucung, Wukirsari, Imogiri



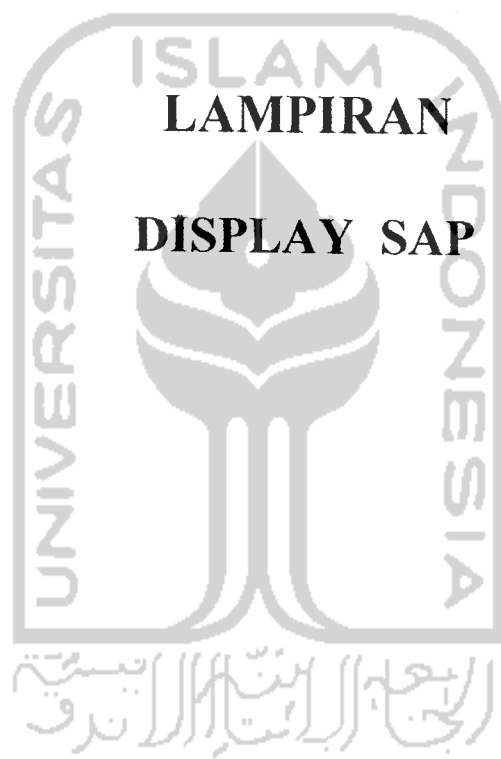
Foto 13. Sumber material tanah urug di daerah Pucung, Wukirsari, Imogiri



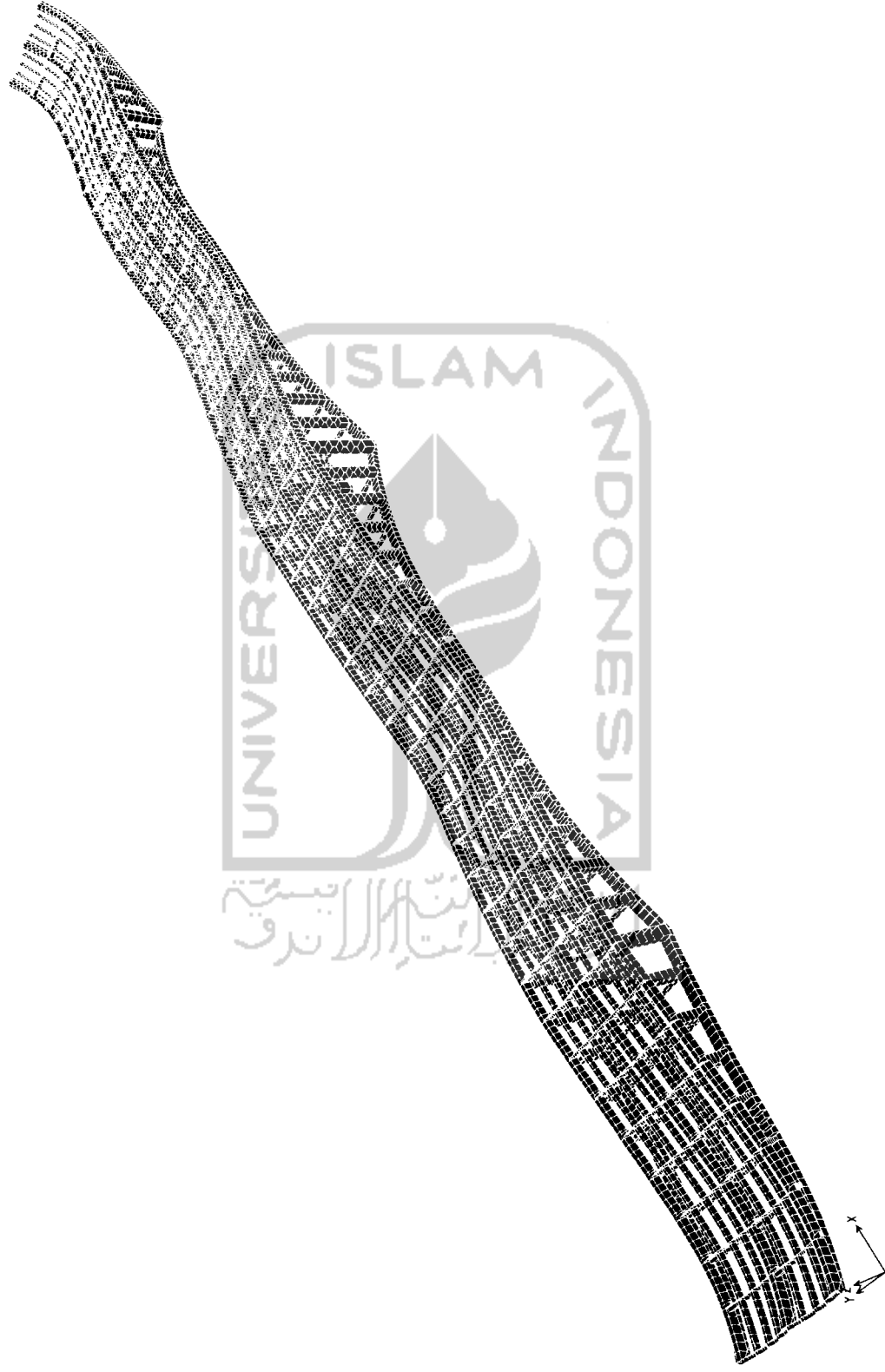
Foto 14. Sumber material tanah urug di daerah Siluk, Imogiri

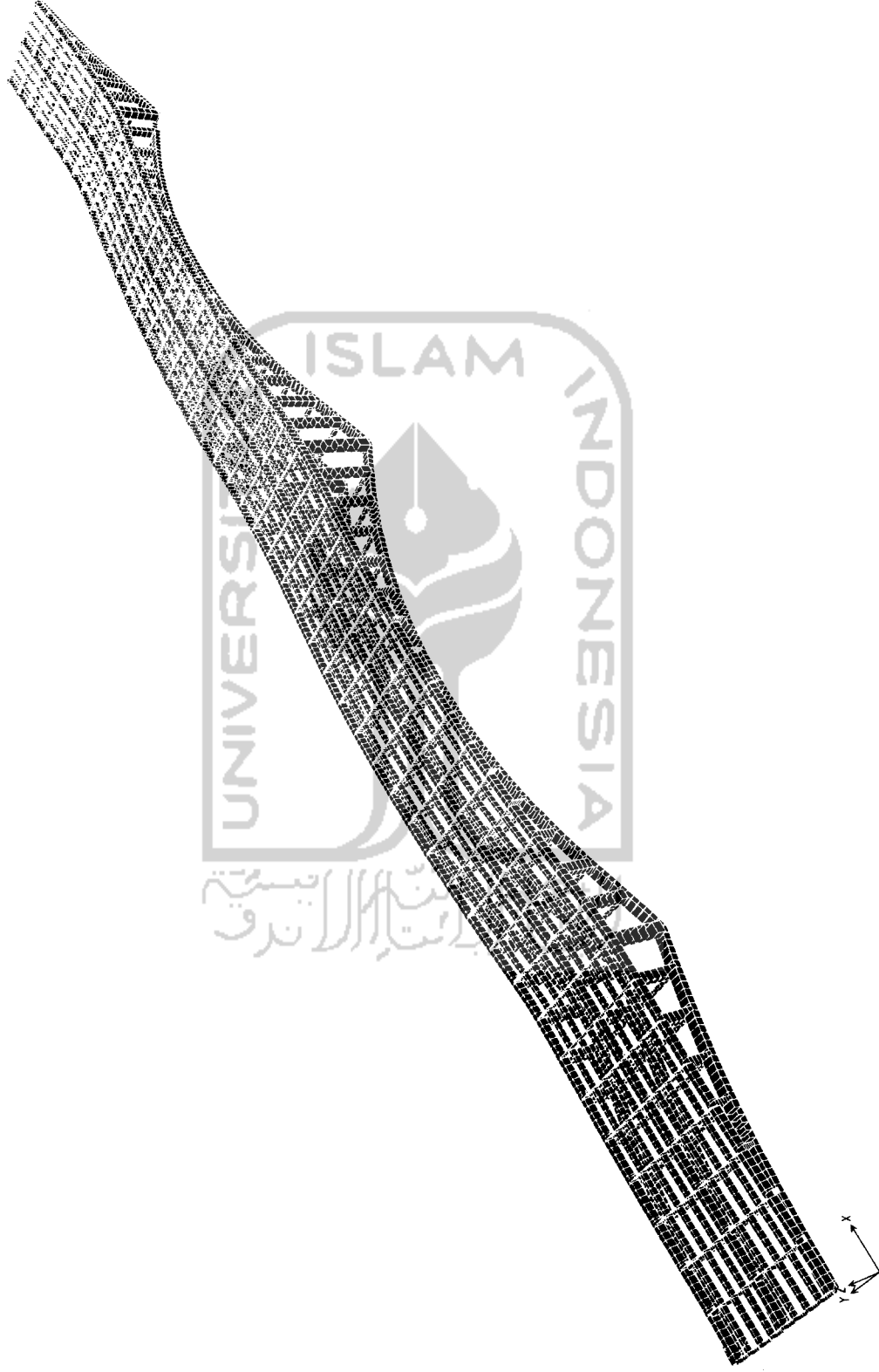


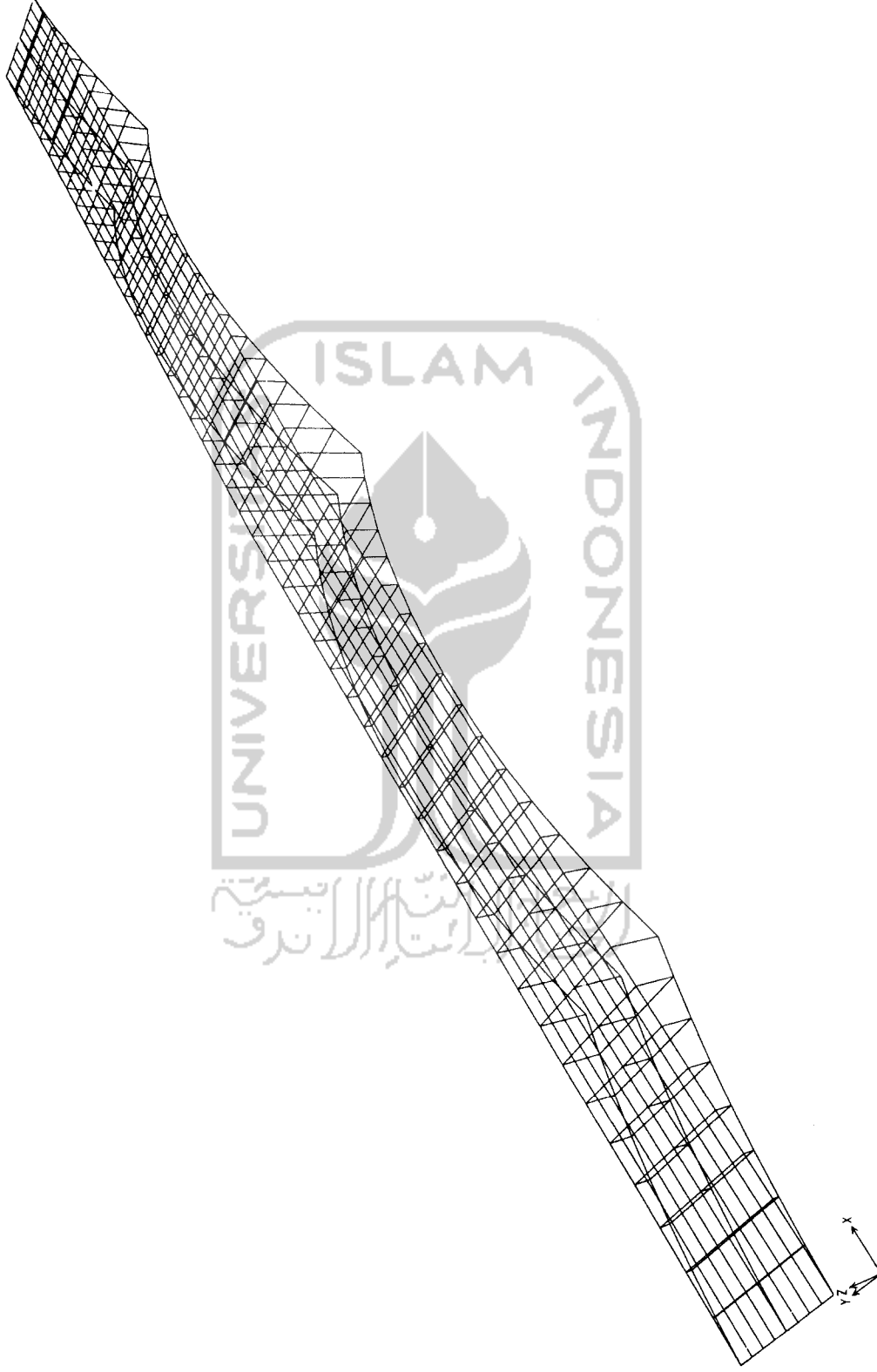
Foto 15. Sumber material pasir urug di daerah Grogol, Parangtritis

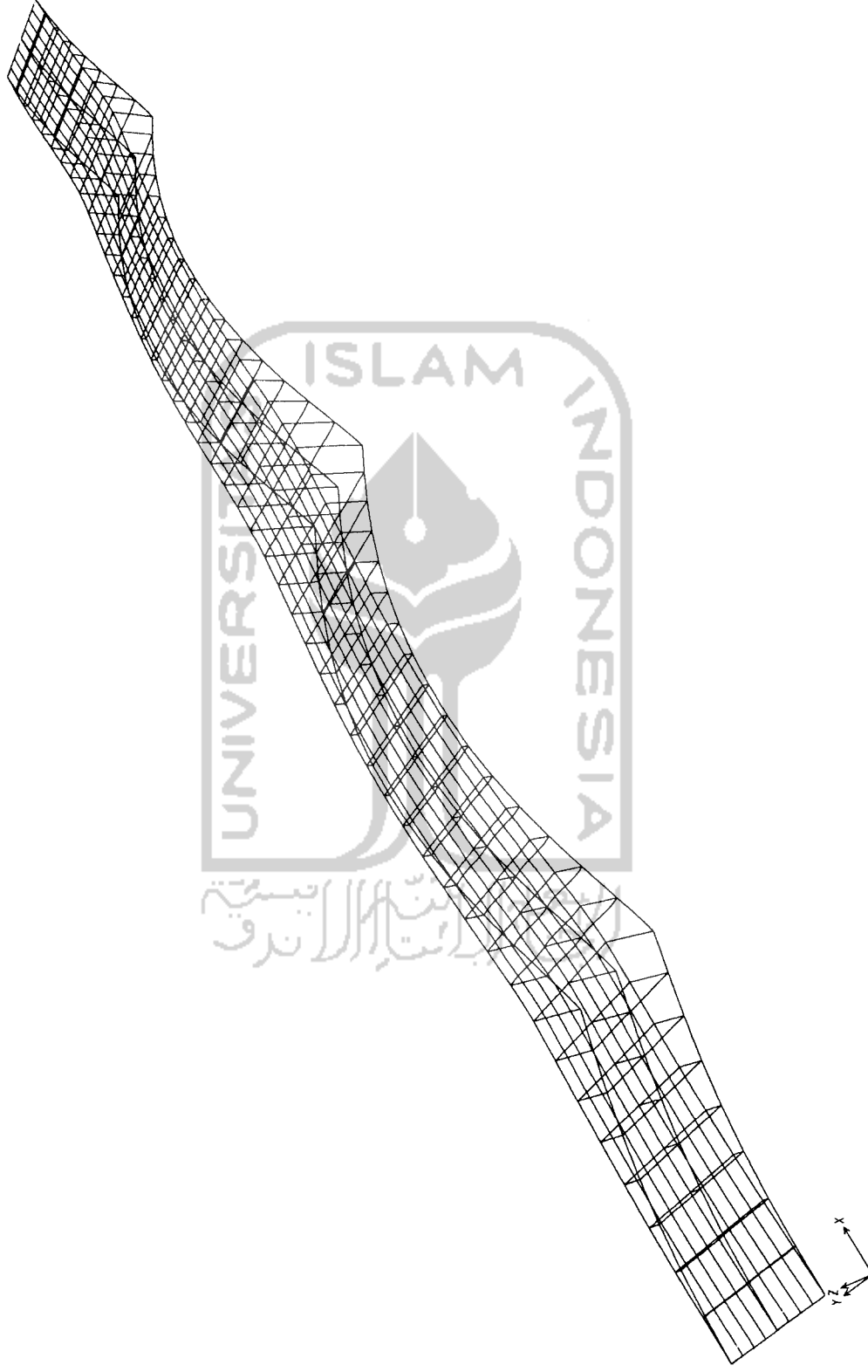


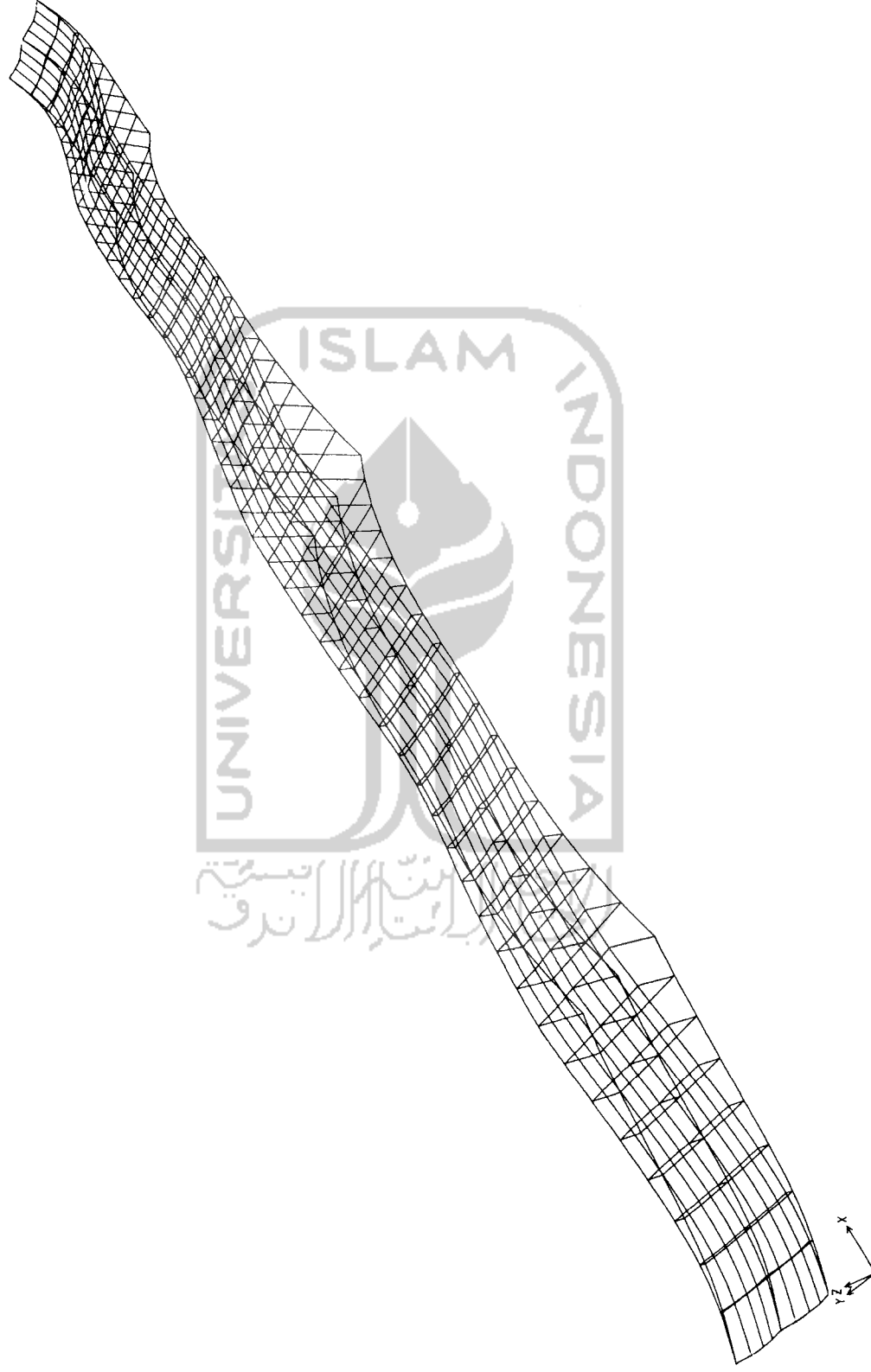


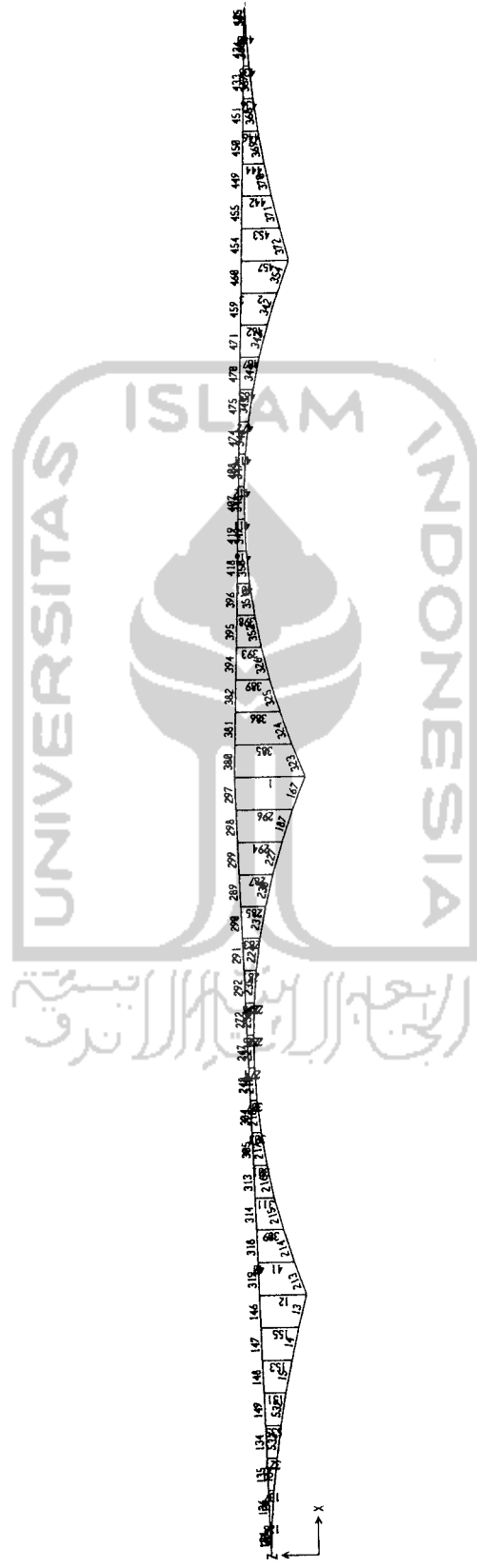


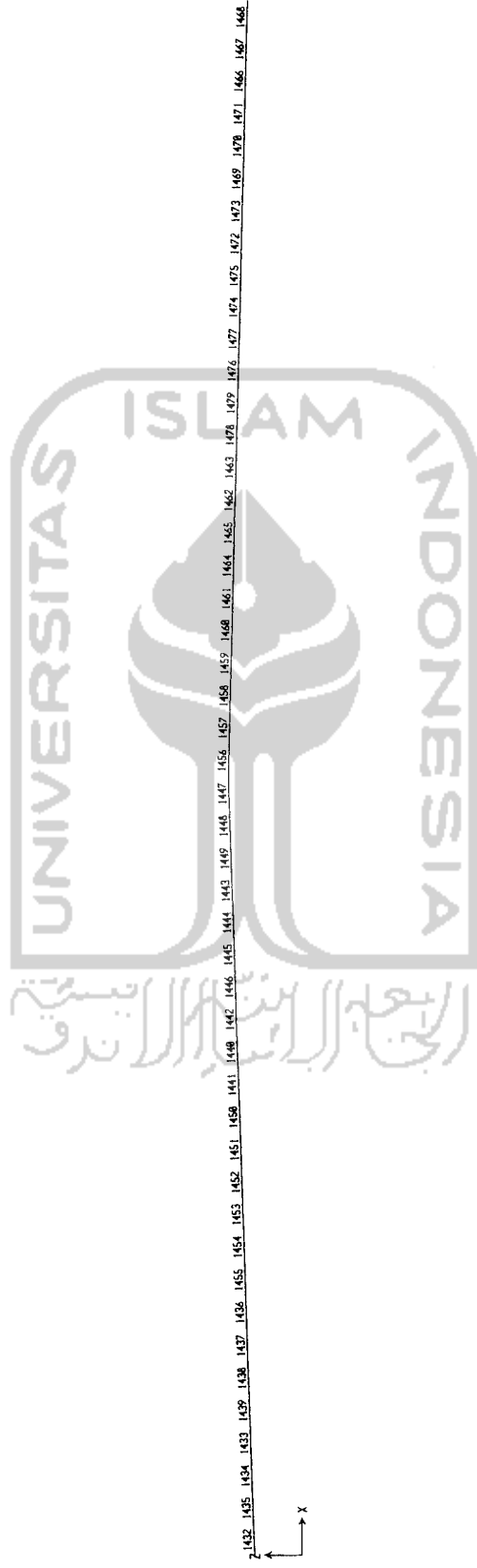


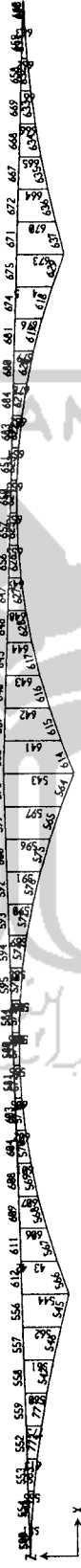


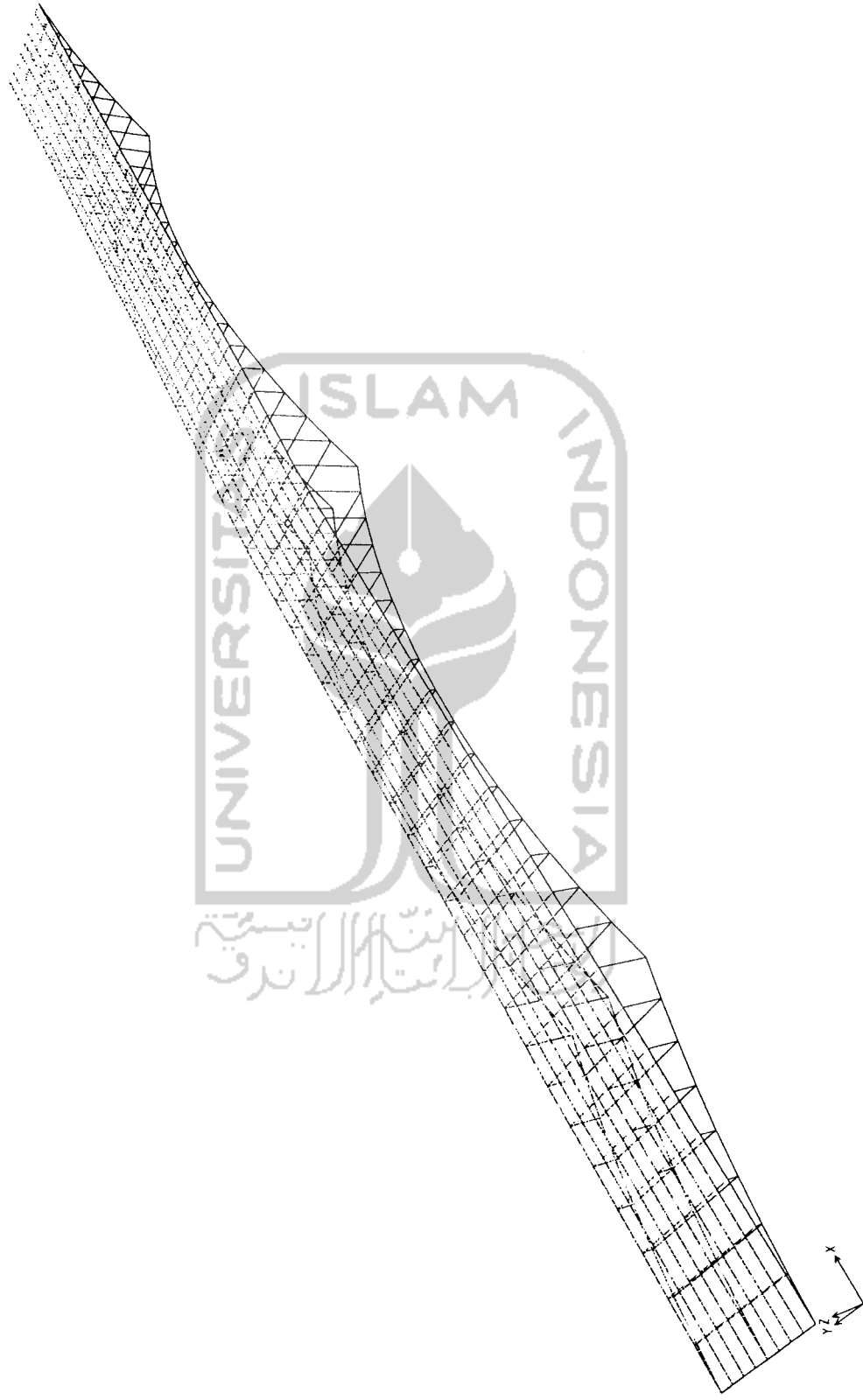


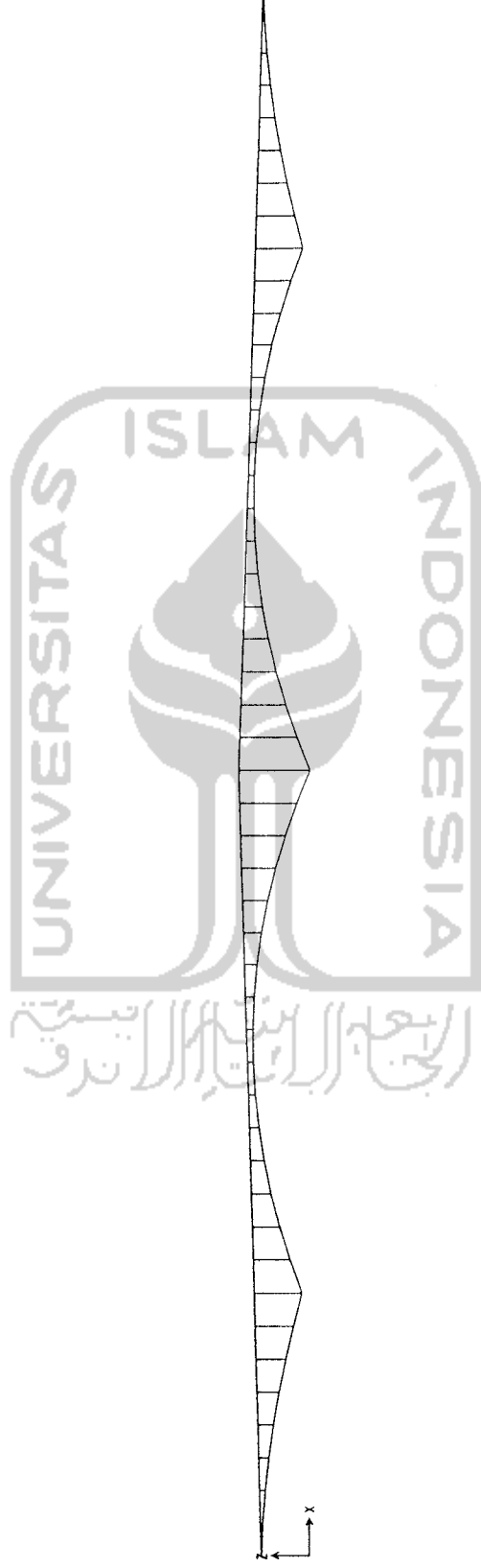






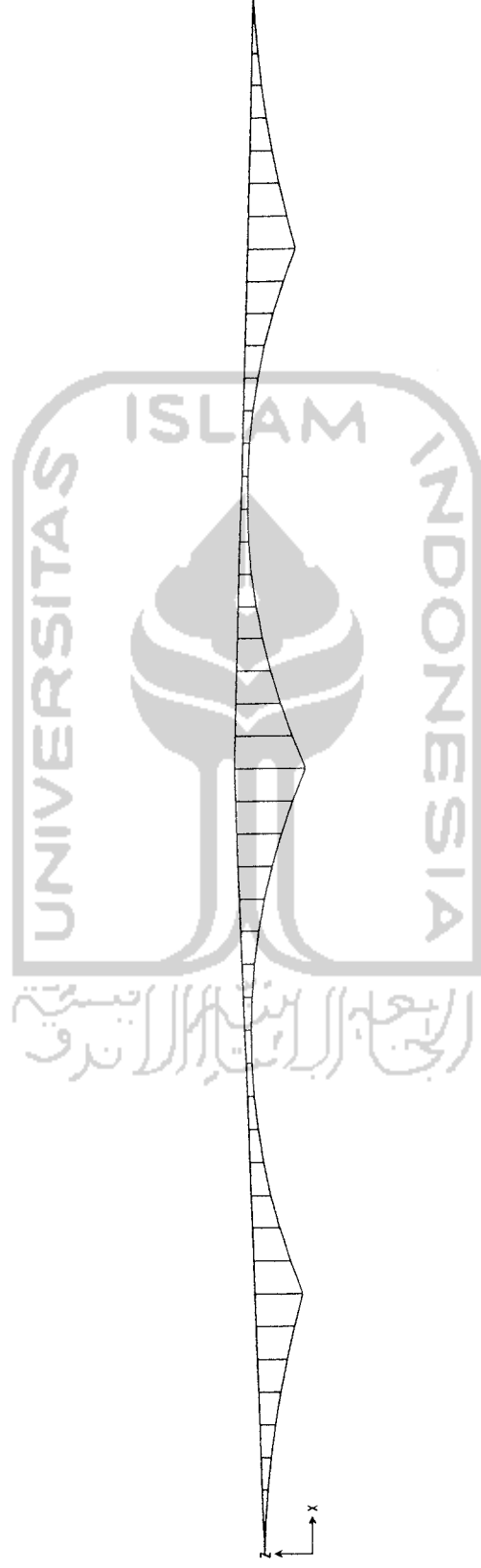


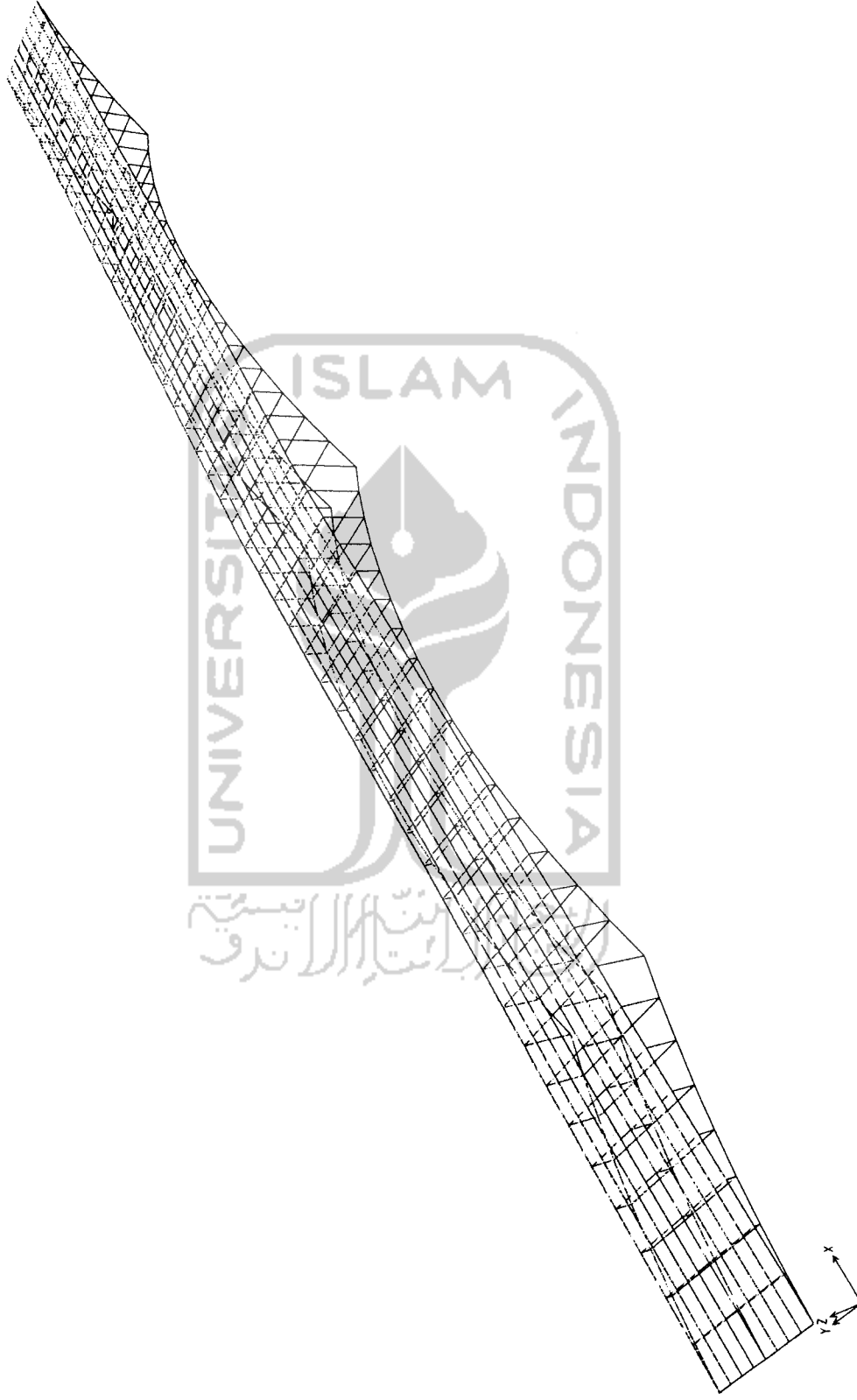


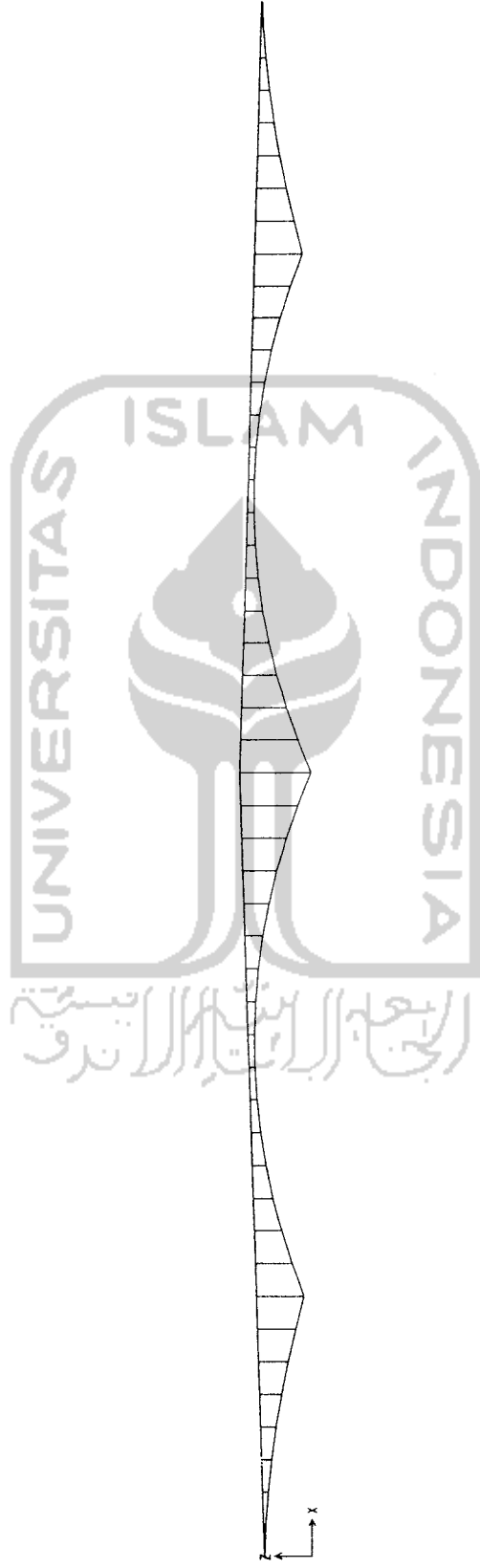






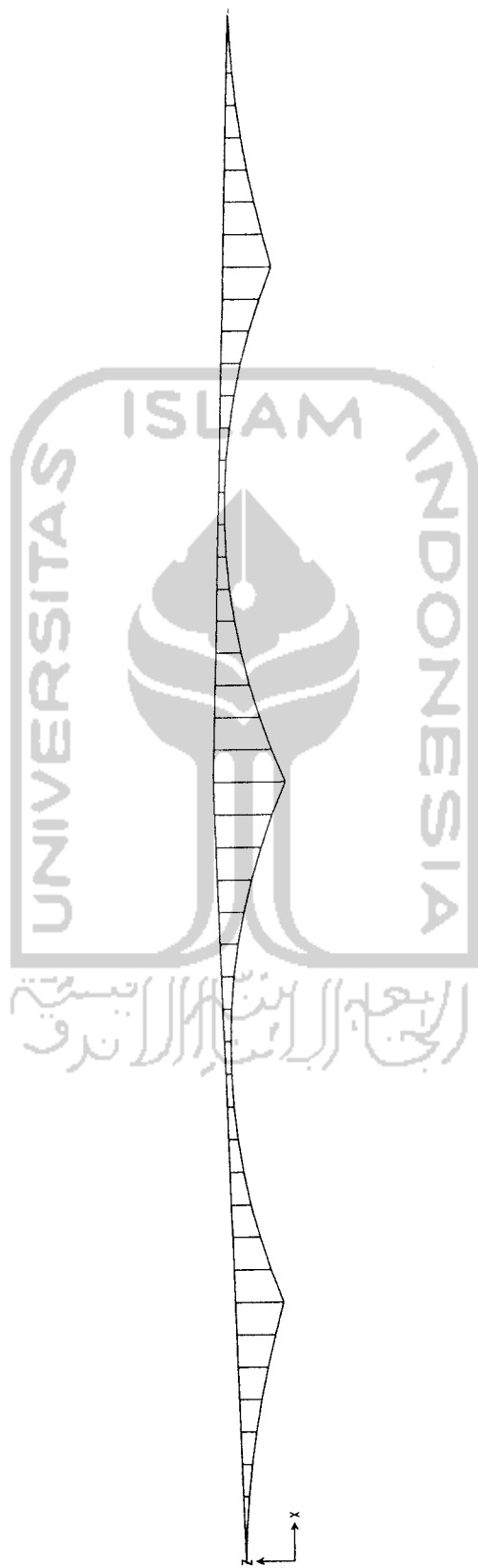


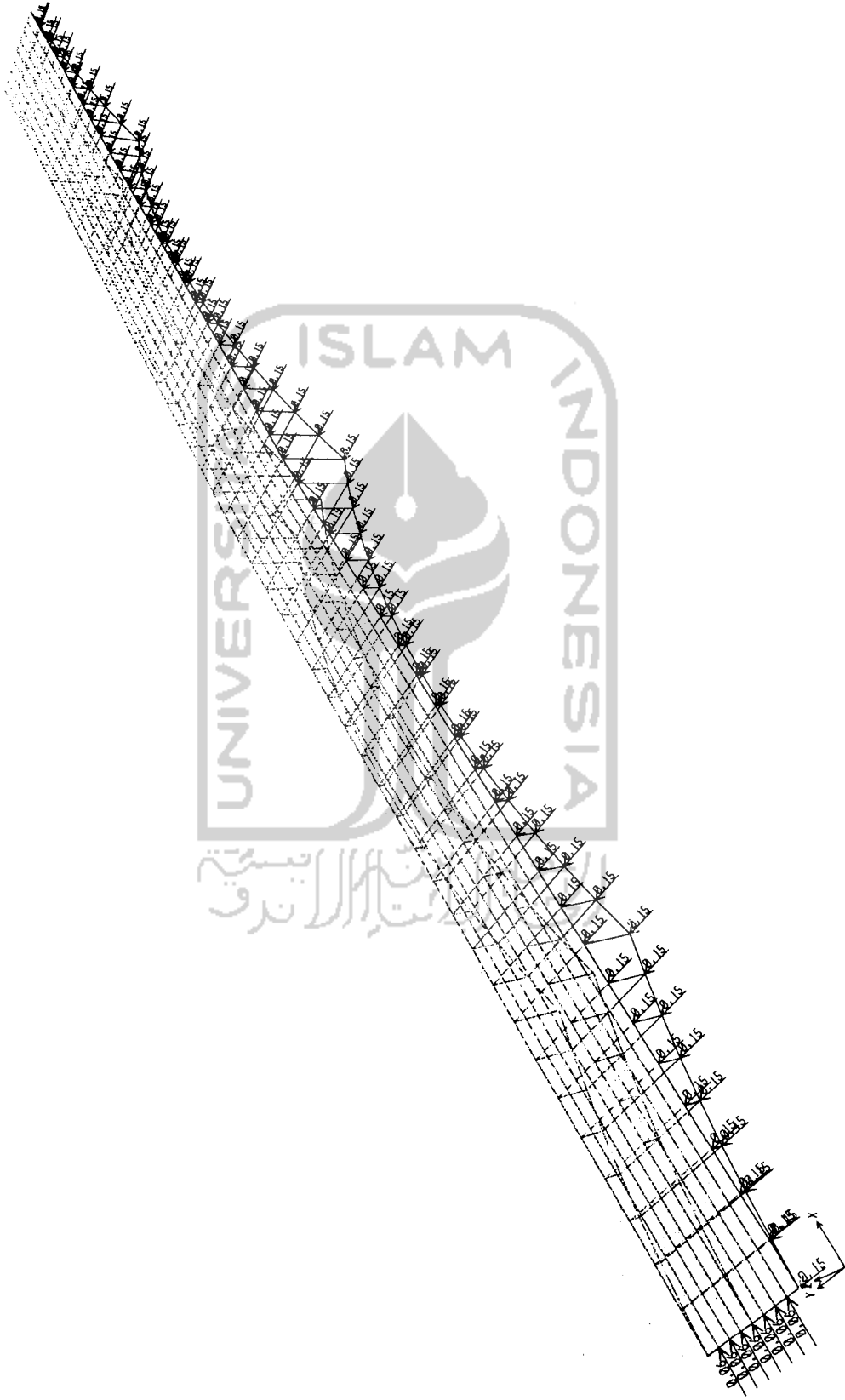


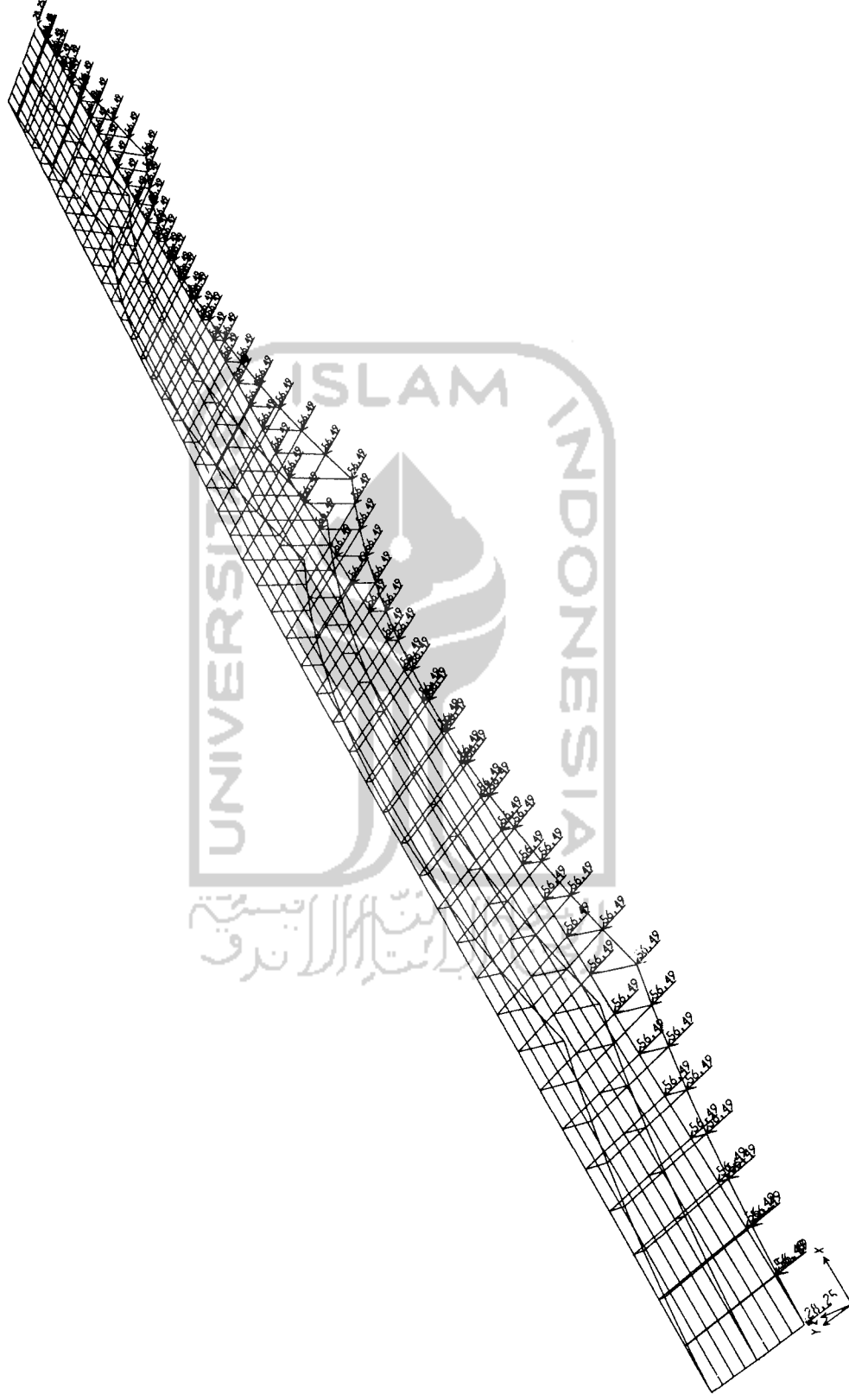


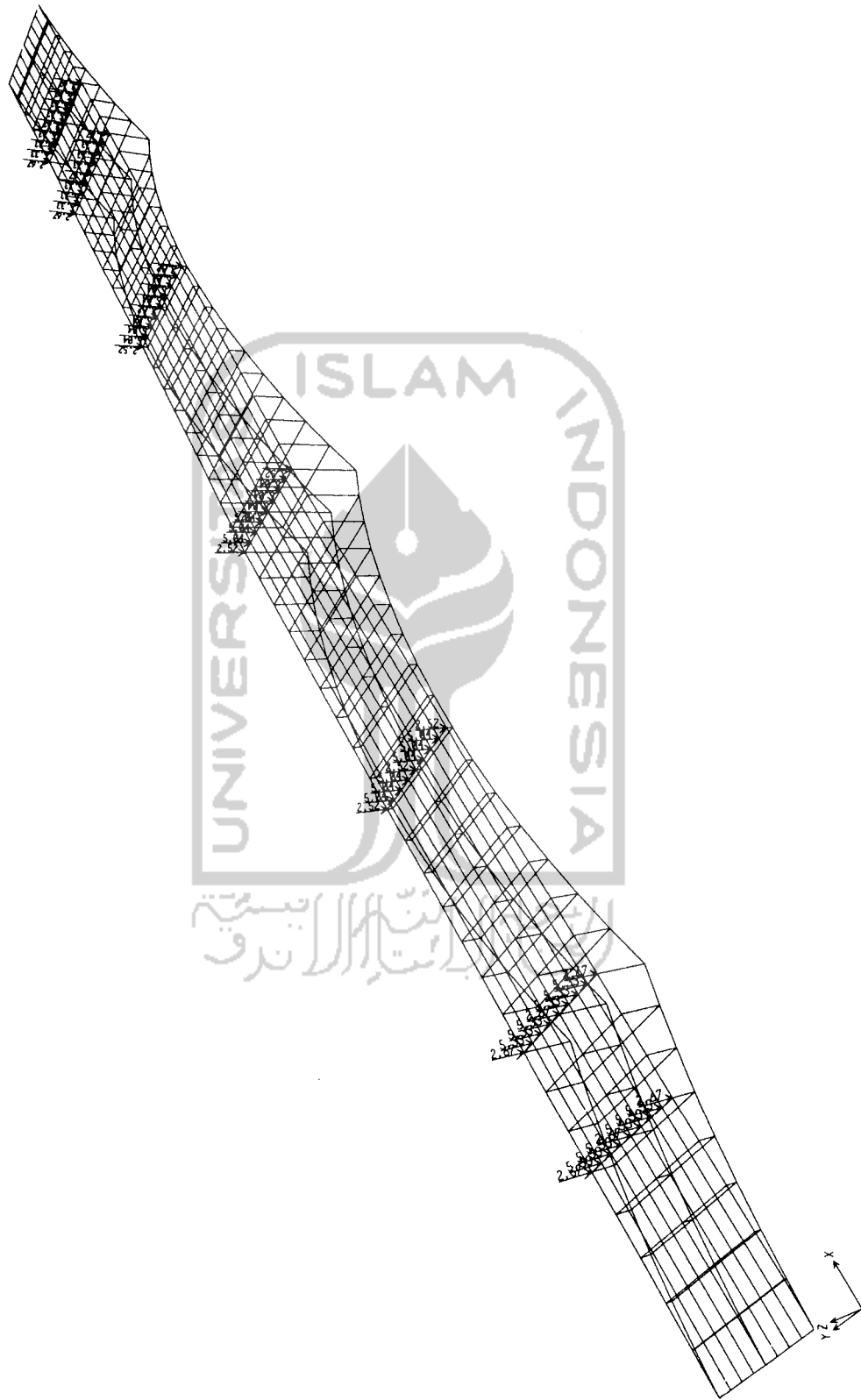




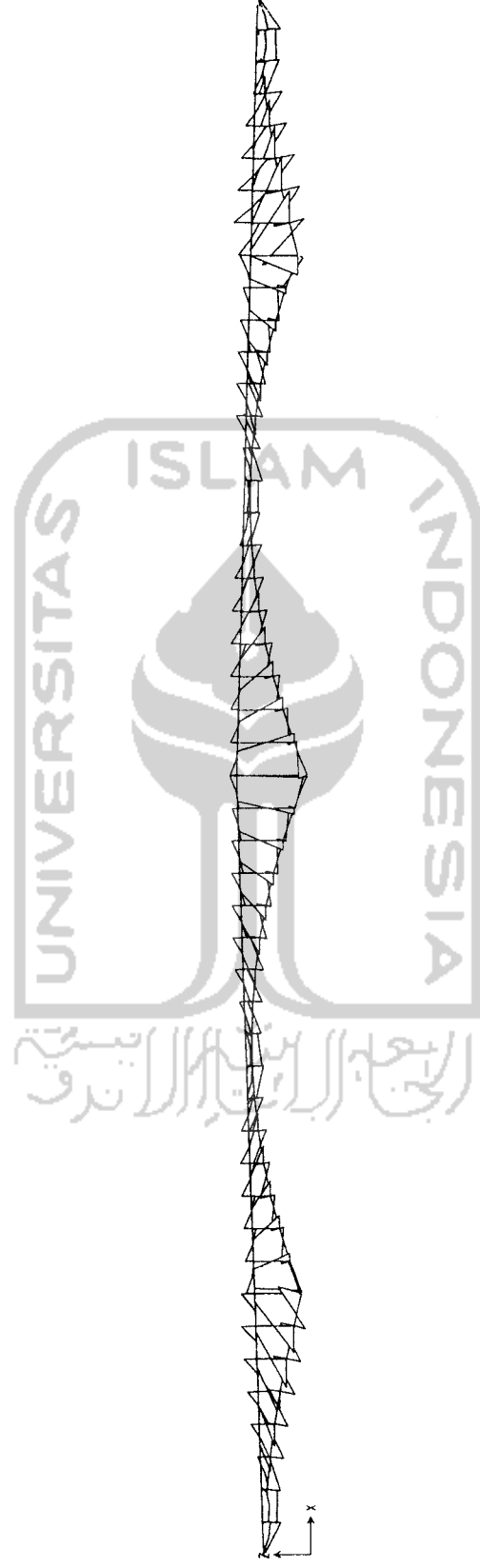


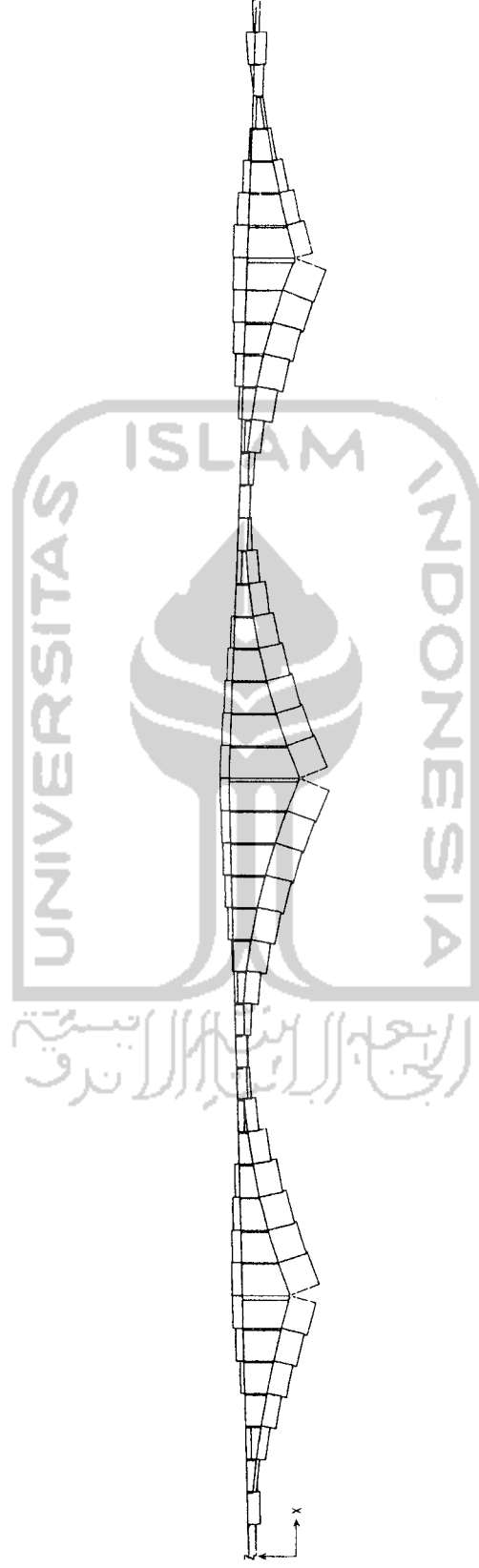


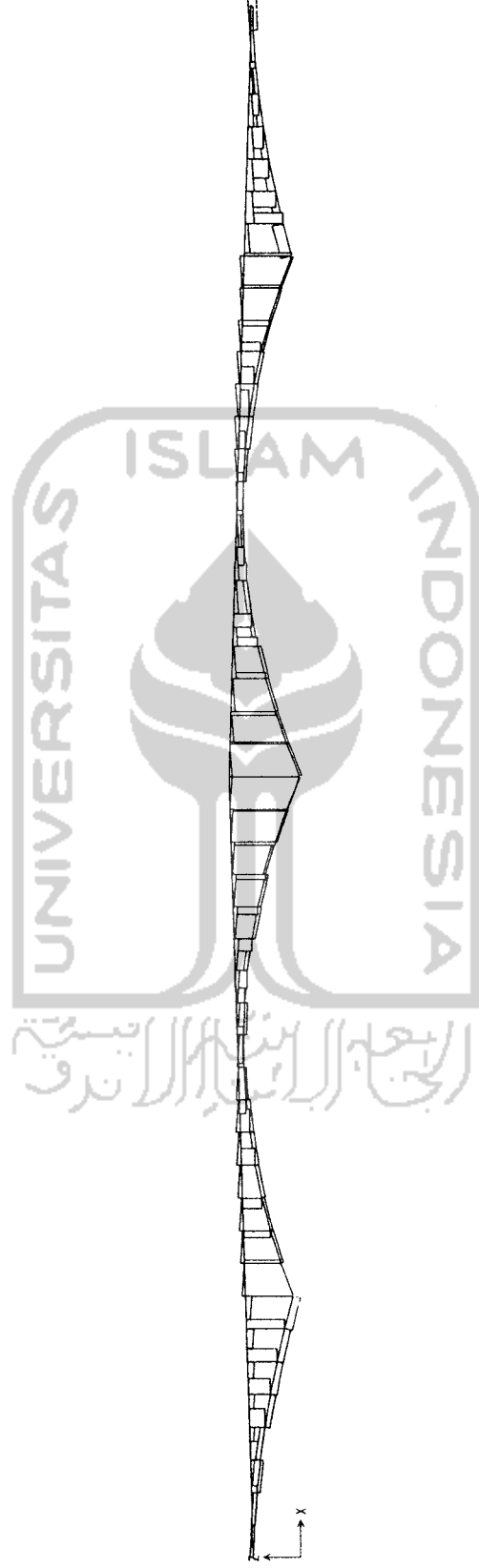


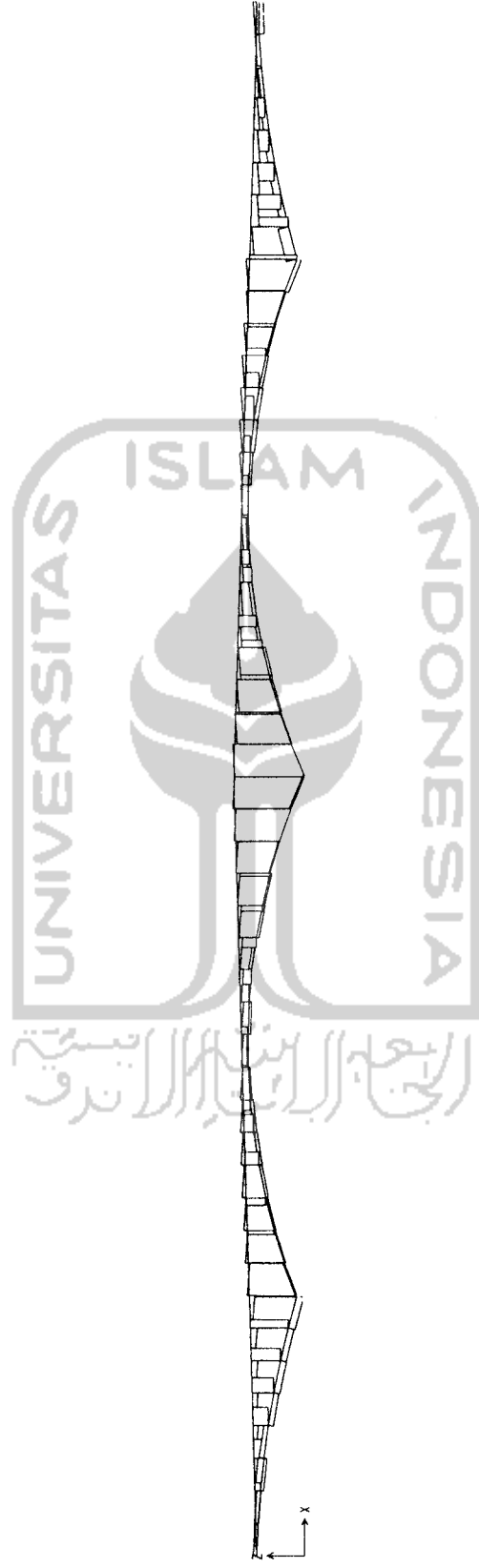












LAMPIRAN

OUTPUT SAP :

MOMEN BALOK INDUK TEPI

MOMEN BALOK INDUK TENGAH

MOMEN BALOK ANAK

MOMEN BALOK LINTANG

MOMEN BALOK LENGKUNG TEPI

MOMEN BALOK LENGKUNG TENGAH

MOMEN KOLOM TEPI

MOMEN KOLOM TENGAH

TABEL MOMEN BALOK INDUK TEPI

FRAME	STA	ML			ML TOT	ME		COMB1 1,3MD + 2 (MQ-MP)	COMB 2 1,3MD + 2 (MQ-MP)+1MEX		COMB 3 1,3MD + 2 (MQ-MP)+1MEY
		MD	ML merata	ML Koef kejut		ME X	ME Y				
124	0	535,2117	303,64624	2,04495327	305,6912	-14,5217	-0,758731	1307,157637	1292,635959		1306,398906
124	2,5011	345,9231	153,777902	1,137777597	154,9157	-7,68432	-0,36132	759,5314171	751,8470956		759,1700976
124	5,0023	-19,8012	3,90956423	0,230601924	4,140166	-0,84696	0,036092	-17,46124523	-18,30820971		-17,42515308
134	0	-535,522	-210,84322	6,495138255	-204,348	-1,73566	0,341503	-1104,874443	-1106,610101		-1104,532941
134	2,5011	91,47183	47,547837	3,88382443	51,43166	-1,90042	0,155984	221,7767036	219,8762843		221,9326873
134	5,0023	542,0297	305,938889	1,272510606	307,2114	-2,06518	-0,029535	1319,061408	1316,996228		1319,031873
135	0	-232,885	-51,965772	6,253556885	-45,7122	-6,61749	0,545839	-394,1747135	-400,7922084		-393,6288744
135	2,5011	215,0822	110,661396	3,268994577	113,9304	-5,22294	0,328166	507,4676914	502,2447477		507,7958573
135	5,0023	486,6136	273,288563	0,284423268	273,573	-3,82839	0,110493	1179,743654	1175,915262		1179,854147
136	0	254,4975	189,329846	5,389639429	194,7195	-14,373	1,066898	720,2856869	705,9126635		721,3525846
136	2,5011	424,4235	211,09368	2,894512862	213,9882	-9,74008	0,231819	979,7268904	969,9868087		979,9887093
136	5,0023	417,9137	232,857514	0,399396296	233,2569	-5,10714	-0,60326	1009,801652	1004,694512		1009,198392
146	0	-559,366	-397,15515	-57,2942477	-454,449	-3,91381	1,645545	-1636,075092	-1639,9889		-1634,429547
146	2,5011	-45,2303	-47,829302	-3,40277155	-51,2321	0,418471	0,608213	-161,2635662	-160,8450955		-160,6553532
146	5,0023	292,47	301,496545	50,48870463	351,9852	4,750749	-0,429119	1084,181518	1088,932267		1083,752399
147	0	-357,317	-400,24609	-82,044536	-482,291	2,191096	-0,253168	-1429,093332	-1426,902236		-1429,3465
147	2,5011	26,76579	4,80106111	2,024616792	6,825678	1,26574	-0,061351	48,44687944	49,71261916		48,38552816
147	5,0023	234,4128	409,848209	86,09376963	495,942	0,340383	0,130465	1296,620649	1296,961032		1296,751114
148	0	-221,381	-343,50538	-77,8216528	-421,327	0,995086	0,307544	-1130,449645	-1129,454559		-1130,142101
148	2,5011	-27,2413	18,4750967	12,8154731	31,29057	0,416198	0,063096	27,16741134	27,58360952		27,23650783
148	5,0023	-9,53718	380,455577	103,452599	483,9082	-0,16269	-0,181351	955,4180251	955,2553354		955,2366742
149	0	-724,622	-293,13916	-1,90594691	-295,045	0,360996	0,347869	-1532,098676	-1531,73768		-1531,750807
149	2,5011	6,61756	23,9800744	10,04421589	34,02429	-0,28791	0,078924	76,6514083	76,36349621		76,73033243
149	5,0023	561,4213	341,099313	21,99437869	363,0937	-0,93682	-0,190021	1456,035051	1455,098231		1455,84503
247	0	142,9608	79,8195563	6,371488173	86,19104	0,154802	8,815171	358,2311123	358,3859144		367,0462834
247	2,5011	301,7247	106,006447	45,13214689	151,1386	-1,67616	3,186675	694,5193358	692,8431749		697,7060112
247	5,0022	284,0531	132,193337	83,89280561	216,0861	-3,50712	-2,44182	801,4413749	797,9342512		798,9995547
248	0	358,9445	172,758552	92,3519651	265,1105	-3,78165	4,336695	996,8488415	993,0671907		1001,185536
248	2,5011	271,1984	90,7013567	42,09320447	132,7946	-1,84442	-0,200064	618,1469989	616,3025839		617,9469349
248	5,0022	7,01674	8,64416137	-8,16555616	0,478605	0,092821	-4,736823	10,07897208	10,17179288		5,342149121
272	0	-275,824	-89,119539	-50,2357076	-139,355	6,154891	1,196565	-637,2813172	-631,1264265		-636,0847519
272	2,5011	127,3661	36,9482679	1,883564548	38,83183	1,088625	3,790237	243,2395309	244,3281557		247,0297683
272	5,0022	354,1203	163,016075	54,00283669	217,0189	-3,97764	6,383909	894,3941948	890,4165537		900,7781042

289	0	-500,513	-186,26412	4,590810838	-181,673	6,611317	0,435144	-1014,01366	-1007,402343	-1013,578515
289	2,5011	-14,3904	-14,977157	-8,37798683	-23,3551	1,273253	0,775588	-65,41775087	-64,14449835	-66,19333891
289	5,0022	295,2969	156,309807	-21,3467845	134,963	4,06481	-1,986321	653,8119737	649,7471615	651,8256532
290	0	-556,598	-205,8308	-9,1689812	-215	7,656641	-1,489202	-1153,576617	-1145,919975	-1155,065818
290	2,5011	-16,1427	-17,230309	-8,67553352	-25,9058	1,675413	0,913104	-72,79723109	-71,12181859	-73,71033538
290	5,0022	347,8768	171,370181	-8,18208584	163,1881	4,30582	0,337007	778,6159701	774,3101539	778,2789633
291	0	-568,583	-209,13722	-25,9098982	-235,047	8,428592	-5,37794	-1209,252226	-1200,823635	-1214,630167
291	2,5011	-5,84735	-14,235249	-8,84566118	-23,0809	1,961857	0,673522	-53,76337489	-51,80151795	-54,43689668
291	5,0022	380,4528	180,666719	8,218575878	188,8853	4,50488	4,030897	872,352923	867,8544146	876,3901889
292	0	-488,448	-176,10964	-42,2480569	-218,358	8,162668	-8,512387	-1071,697213	-1063,534544	-1080,2096
292	2,5011	43,19181	4,34639725	-6,0179525	-1,67156	1,783562	1,186681	52,80624369	54,58980564	53,99292488
292	5,0022	398,3957	184,80243	30,21215188	215,0146	4,59554	10,88575	947,9435159	943,3479715	958,8292652
297	0	-317,612	-171,79279	27,14577593	-144,647	19,99837	1,8877	-702,1898351	-682,1914603	-700,3021355
297	2,5011	-72,9067	-50,774859	2,653970255	-48,1209	5,449759	-0,077642	-191,0204485	-185,5706897	-191,0980904
297	5,0022	-4,63671	70,2430743	-21,8378354	48,40524	9,09886	-2,042983	90,78275373	81,68389661	88,73977052
298	0	-327,081	-131,60385	26,52225856	-105,082	2,172559	1,317478	-635,3688011	-633,1962426	-634,0513227
298	2,5011	-21,2056	-12,864128	-6,31296953	-19,1771	-0,32125	-0,523241	-65,92144187	-66,24269597	-66,44468298
298	5,0022	108,2346	105,875596	-39,1481976	66,7274	-2,81507	-2,363961	274,159733	271,3446663	271,7957724
299	0	-431,031	-163,84554	15,28108006	-148,564	6,072968	1,135275	-857,4694937	-851,3965261	-856,3342191
299	2,5011	-16,0731	-13,340713	-8,40453456	-21,7452	1,069878	-0,633082	-64,38548766	-63,31560993	-65,01856922
299	5,0022	222,4495	137,164117	-32,0901492	105,074	-3,93321	-2,401438	499,3323341	495,399122	496,9308964
304	0	345,5323	161,410232	54,02298001	215,4332	-4,32576	0,022938	880,0584668	875,7327053	880,0814048
304	2,5011	51,0266	-2,700626	-5,6756035	-8,37623	0,495327	-1,743229	49,58211838	50,07744567	47,83888941
304	5,0022	-419,915	-166,81148	-65,374187	-232,186	5,316416	-3,509396	-1010,260414	-1004,943998	-1013,76981
305	0	370,5695	173,128375	28,30159074	201,43	-4,88494	-1,235438	884,6002566	879,7153123	883,3648187
305	2,5011	-2,7137	-20,514362	-10,2413063	-30,7557	0,693503	-1,097096	-65,03914405	-64,34564151	-66,13624029
305	5,0022	-552,432	-214,1571	-48,7842033	-262,941	6,271949	-0,958755	-1244,044729	-1237,77278	-1245,003484
313	0	326,4533	157,727174	3,296408438	161,0236	-4,67548	-1,742409	746,4364879	741,7610046	744,694079
313	2,5011	-35,123	-30,581479	-11,8726336	-42,4541	0,696067	-0,735921	-130,5681264	-129,8720591	-131,3040476
313	5,0022	-573,135	-218,89013	-27,0416757	-245,932	6,067618	0,270567	-1236,938925	-1230,871307	-1236,668358
314	0	260,1084	138,739757	-16,305064	122,4347	-4,50098	-1,475708	583,0103223	578,5093401	581,5346141
314	2,5011	-34,6404	-30,009619	-11,0812323	-41,0909	0,458974	-0,531991	-127,2141957	-126,7552216	-127,7461868
314	5,0022	-505,825	-198,75899	-5,85740047	-204,616	5,41893	0,411726	-1066,804898	-1061,385968	-1066,393172
318	0	263,0019	103,827541	-25,5246292	78,30291	-4,04184	-1,252362	498,5083294	494,4664863	497,2559674
318	2,5011	-36,2419	-24,394473	-8,56162297	-32,9561	-0,21513	-0,607912	-113,0266948	-113,2418296	-113,6346068
318	5,0022	-511,921	-152,61649	8,401383291	-144,215	3,611573	0,036538	-953,9279033	-950,3163298	-953,8913653
319	0	-27,8685	88,6667389	-28,0006748	60,66606	-7,0467	-6,342825	85,10310445	78,05640543	78,76027934
319	2,5011	-101,55	-76,72075	-10,8882451	-87,609	1,375828	-0,48822	-307,2326168	-305,8567888	-307,720837
319	5,0022	-351,666	-242,10824	6,224184543	-235,884	9,798355	5,366385	-928,9345223	-919,1361674	-923,5681377
380	0	-305,842	-164,64358	27,97730859	-136,666	16,68741	-0,421712	-670,9269494	-654,2395381	-671,3486616

380	2,5011	-59,0955	-40,626513	3,845003951	-36,7815	0,671309	0,106837	-150,3871995	-149,7158905	-150,2803621
380	5,0022	11,21528	83,390552	-20,2873007	63,10325	-15,3448	0,635387	140,7863662	125,4415727	141,4217531
381	0	-396,59	-185,45089	20,17830535	-165,273	27,78569	-0,432776	-846,1118424	-818,3261569	-846,5446189
381	2,5011	-17,4671	-10,034663	-5,98062133	-16,0153	-1,65052	0,008862	-54,73780304	-56,38832416	-54,72914074
381	5,0022	185,22	165,381564	-32,139548	133,242	-31,0867	0,450101	507,270052	476,1833243	507,7201531
382	0	-470,401	-195,15447	11,58433198	-183,57	21,04672	-0,285715	-978,6614122	-957,6146907	-978,9471274
382	2,5011	-1,49292	-2,397422	7,11681625	-9,51424	-4,11311	-0,006863	-20,96927024	-25,0823765	-20,97613313
382	5,0022	290,9795	190,359627	-25,8179645	164,5417	-29,2729	0,271989	707,3566874	678,0837534	707,6286769
394	0	-531,684	-211,54707	1,605627069	-209,941	18,71074	-0,251219	-1111,071937	-1092,361194	-1111,323156
394	2,5011	0,950675	-3,5968393	-7,03775341	-10,6346	-4,12481	-0,027829	-20,03330742	-24,15811526	-20,06113652
394	5,0022	357,1497	204,353388	-15,6811339	188,6723	-26,9604	0,195561	841,6391377	814,6787789	841,8346987
395	0	-570,202	-218,43027	-10,6549532	-229,085	13,70275	-0,278039	-1199,433664	-1185,730912	-1199,711703
395	2,5011	2,384558	-3,6176432	-7,07242084	-10,6901	-4,78479	-0,046553	-18,28020242	-23,06499122	-18,32675504
395	5,0022	398,5361	211,194986	-3,48988852	207,7051	-23,2723	0,184933	933,5070749	910,2347449	933,6920083
396	0	-556,771	-203,10382	-25,1950282	-228,299	5,550703	-0,277997	-1180,399788	-1174,849085	-1180,677784
396	2,5011	17,98651	3,34575485	-6,77814796	-3,43239	-6,39796	-0,057909	16,51767511	10,11971258	16,459766
396	5,0022	416,3083	209,795328	11,63873232	221,4341	-18,3466	0,162178	984,0689538	965,722326	984,2311322
407	0	202,6526	137,306317	13,09500442	150,4013	-27,1665	-0,096215	564,2510606	537,0845949	564,1548457
407	2,5011	311,5336	112,974913	45,92507819	158,9	-4,98198	0,046692	722,793631	717,8116459	722,8403228
407	5,0022	243,979	88,6435097	78,75515197	167,3987	17,2025	0,189598	651,9700172	669,1725147	652,1596156
408	0	410,6118	205,313729	96,12399364	301,4377	-19,0536	0,019385	1136,670825	1117,617245	1136,69021
408	2,5011	249,4504	71,1294524	39,77208914	110,9015	7,48515	0,096935	546,0885591	553,5737094	546,1854938
408	5,0022	-88,1466	-63,054824	-16,5798154	-79,6346	34,02388	0,174485	-273,8598911	-239,8360102	-273,6854066
418	0	-445,1	-144,79782	-38,605332	-183,403	-7,20756	-0,260959	-945,436381	-952,6439409	-945,6973398
418	2,5011	73,86662	27,1225634	-3,32983487	23,79273	-8,96722	-0,058244	143,6120642	134,6448483	143,5538205
418	5,0022	416,3978	199,042947	31,94566228	230,9886	-10,7269	0,144471	1003,294325	992,5674533	1003,438797
419	0	-188,52	-24,589605	-42,6017295	-67,1913	-24,1197	-0,243501	-379,4588028	-403,5785114	-379,7023037
419	2,5011	164,8023	67,1292474	5,445799529	72,57505	-13,1404	-0,054731	359,3930368	346,2526493	359,3383055
419	5,0022	341,6891	158,848099	53,49332857	212,3414	-2,16107	0,134038	868,8786921	866,7176257	869,0127304
433	0	-171,156	-22,99444	9,654396276	-13,34	-20,2821	0,028039	-249,1829116	-269,465006	-249,1548722
433	2,5011	306,827	170,65046	10,29021458	180,9407	-33,2976	-0,006979	760,7564282	727,4588719	760,7494495
433	5,0023	608,3743	364,295361	10,92603289	375,2214	-46,313	-0,041997	1541,329326	1495,016308	1541,287329
434	0	424,7632	292,823528	17,51296204	310,3365	-62,9315	-0,019837	1172,865086	1109,933561	1172,845249
434	2,5011	568,2432	304,047209	13,76323692	317,8104	-53,1262	-0,024811	1374,337097	1321,210899	1374,312287
434	5,0023	535,2876	315,27089	10,0135118	325,2844	-43,3209	-0,029784	1346,442667	1303,121795	1346,412882
435	0	728,7521	426,710195	16,41112634	443,1213	-71,6843	-0,04009	1833,620383	1761,936054	1833,580293
435	2,5011	441,7934	214,770032	8,264174141	223,0342	-36,0753	-0,020957	1020,399894	984,3246198	1020,378937
435	5,0023	-21,6009	2,8298693	0,117221943	2,947091	-0,46622	-0,001824	-22,18703743	-22,65325608	-22,18886175
449	0	-300,284	-412,33161	-85,9412064	-498,273	33,82919	0,076112	-1386,914334	-1353,085147	-1386,838222
449	2,5011	-7,28348	35,4634124	14,79742841	50,26084	-7,47107	0,031744	91,05316029	83,58209161	91,08490467

449	5,0023	109,2809	483,258436	115,5360632	598,7945	-48,7713	-0,012623	1339,654213	1290,882888	1339,641589
450	0	-789,79	-350,64511	-8,67868766	-359,324	27,67812	0,114377	-1745,374349	-1717,696228	-1745,259972
450	2,5011	36,87361	46,5049384	12,67712124	59,18206	-10,794	0,013361	166,2998116	155,5057895	166,3131727
450	5,0023	687,1013	443,654986	34,03293013	477,6879	-49,2662	-0,087655	1848,60753	1799,341364	1848,519875
451	0	-551,909	-234,79402	3,669847694	-231,124	9,681355	0,068304	-1179,729606	-1170,048252	-1179,661303
451	2,5011	143,0016	82,6418055	7,990149271	90,63195	-18,311	0,003995	367,1659472	348,8549887	367,1699423
451	5,0023	661,4761	400,077628	12,31045085	412,3881	-46,3033	-0,060314	1684,695059	1638,391787	1684,634745
454	0	-484,423	-371,92474	-54,379872	-426,305	-15,2656	0,636439	-1482,359077	-1497,624678	-1481,722638
454	2,5011	-21,2436	-31,033444	-1,44740911	-32,4809	-7,31003	0,369301	-92,5784063	-99,88843812	-92,20910485
454	5,0023	265,5	309,857854	51,48505381	361,3429	0,645538	0,102164	1067,835822	1068,48136	1067,937986
455	0	-486,696	-509,06226	-94,821703	-603,884	53,51826	-0,343129	-1840,47265	-1786,954392	-1840,81578
455	2,5011	22,67004	5,7218553	2,124777281	7,846633	0,907339	-0,021662	45,16431883	46,07165789	45,14265655
455	5,0023	355,6003	520,505974	99,07125755	619,5772	-51,7036	0,299805	1701,434846	1649,731266	1701,734651
459	0	200,3973	52,0428874	-31,7394061	20,30348	21,55178	0,883984	301,1234983	322,6752769	302,0074822
459	2,5011	-43,706	-29,202351	-9,12705646	-38,3294	2,046034	-0,275922	-133,4765858	-131,4305521	-133,7525073
459	5,0022	-464,245	-110,44759	13,48529318	-96,9623	-17,4597	-1,435827	-797,4428541	-814,9025655	-798,878681
460	0	33,03431	125,163609	-23,9044634	101,2591	-22,7056	-4,920008	245,4628999	222,7573137	240,5428918
460	2,5011	-144,435	-106,84859	-14,3872079	-121,236	15,21505	-0,316791	-430,2368961	-415,0218427	-430,5536872
460	5,0022	-498,34	-338,86079	-4,86995242	-343,731	53,13569	4,286426	-1335,302876	-1282,167183	-1331,016451
470	0	296,238	128,847984	-0,20775504	128,6402	9,950194	0,332277	642,3898288	652,340023	642,7221061
470	2,5011	-69,8674	-54,672966	-14,691066	-69,364	11,96982	0,03723	-229,5556508	-217,5858273	-229,518421
470	5,0022	-612,408	-238,19392	-29,174377	-267,368	13,98945	-0,257818	-1330,867315	-1316,877862	-1331,125132
471	0	219,2277	102,026872	-20,7416862	81,28519	13,98922	0,668899	447,5663757	461,5555927	448,2350747
471	2,5011	-63,1926	-49,624383	-13,3744318	-62,9988	9,620859	0,009237	-208,1480709	-198,5272119	-208,1388334
471	5,0022	-522,049	-201,27584	-6,00717734	-207,283	5,252501	-0,650224	-1093,228702	-1087,976201	-1093,878926
474	0	347,6703	157,707853	53,53728414	211,2451	-2,24576	0,114562	874,4616277	872,2158696	874,5761893
474	2,5011	-6,77229	-45,064094	-10,6461232	-55,7102	20,46164	0,092303	-120,224414	-99,76277117	-120,1321115
474	5,0022	-537,65	-247,83604	-74,8295305	-322,666	43,16904	0,070044	-1344,27664	-1301,107596	-1344,206597
475	0	357,9118	157,41744	26,38162294	183,7991	3,187958	0,215736	832,8834634	836,0714211	833,0991996
475	2,5011	-46,8157	-51,761365	-13,9024147	-65,6638	15,36737	0,05108	-192,1879253	-176,8205597	-192,1368454
475	5,0022	-627,979	-260,94017	-54,1864523	-315,127	27,54677	-0,113576	-1446,625498	-1419,078725	-1446,739075

TABEL MOMEN BALOK INDUK TENGAH

FRAME	STA	ML		ML TOT	ME		COMB1	COMB 2	COMB 3	
		MD	ML merata		ML Koef kejut	ME X				ME Y
550		0	730,1409	402,08774	-0,70053629	401,387	-18,7974	1,22423	1,3MD + 2 (MLQ+MLP)+1MEY	1753,181826
550	2,501		444,4654	201,02387	-0,24497683	200,779	-9,99058	0,61783	1733,160177	979,9805833
550	5,002		-24,7616	-0,040004	0,210582632	0,17058	-1,18374	0,01143	969,3721745	-31,83751856
552	0		-646,289	-263,2379	14,87804657	-248,36	-9,13702	-0,14353	-33,03268682	-1337,038404
552	2,501		103,5148	48,331305	3,572453916	51,9038	-2,51732	-0,04918	-1346,031895	238,3275473
552	5,002		669,7667	359,90049	-7,73313874	352,167	4,10238	0,04517	235,8594088	1575,07664
553	0		-299,68	-91,66434	7,350118625	-84,314	-14,7547	-0,19096	1579,133854	-572,9666637
553	2,501		258,4338	125,83377	1,535654829	127,369	-6,95367	0,05718	-558,2119772	-558,4029333
553	5,002		632,9957	343,33188	-4,27880897	339,053	0,84734	0,30532	590,7027327	583,7490604
554	0		316,1399	210,16751	2,647227546	212,815	-22,8143	0,09814	1501,000584	1501,847926
554	2,501		536,8045	262,55994	0,459599766	263,02	-12,3697	0,51618	836,6113456	813,7970803
554	5,002		573,9177	314,95237	-1,72802801	313,224	-1,9251	0,93421	1223,884978	1211,515296
556	0		-750,776	-436,8945	-78,7322322	-515,63	-11,3235	-5,2844	1372,541751	1370,616653
556	2,501		-68,5359	-53,82189	-4,50426394	-58,326	-0,2276	-0,9132	-2007,261778	-2018,585252
556	5,002		430,1524	329,25072	69,72370432	398,974	-0,2276	-0,9132	-205,7489519	-205,9765496
557	0		-518,653	-432,7026	-110,758372	-543,46	10,8683	3,458	1357,147015	1368,015294
557	2,501		32,85729	3,7441251	2,679742729	6,42387	-2,36861	0,4509	-1761,170622	-1763,53923
557	5,002		400,816	440,19081	116,1178574	556,309	1,82912	0,22767	55,56221217	57,39132927
558	0		-359,789	-378,5334	-108,624423	-487,16	6,02684	0,00443	1633,678187	1639,705029
558	2,501		-17,624	16,796556	18,88334796	35,6799	-5,24658	0,19948	-1442,041846	-1447,28843
558	5,002		140,99	412,12649	146,3911189	558,518	0,6845	-0,09956	48,44859281	49,13308969
559	0		-830,264	-336,6791	6,503988499	-330,18	6,61558	-0,3986	1300,322173	1306,93775
559	2,501		12,35197	21,670581	14,30310906	35,9737	-6,44152	-0,13289	-1739,69366	-1746,135179
559	5,002		671,4167	380,02027	22,10222962	402,122	-0,25314	-0,08997	88,00494071	87,75179572
580	0		155,0471	84,751396	1,327039774	86,0784	5,93523	-0,04705	1677,086682	1683,021911
580	2,501		342,3428	116,28943	60,57501865	176,864	-0,85265	-11,0187	373,7181104	372,8654605
580	5,002		346,0873	147,82747	119,8229975	267,65	-2,04122	-5,71052	798,7745827	796,7333616
581	0		437,622	189,70984	129,7461059	319,456	-3,22979	-0,40237	981,984672	984,8120898
581	2,501		309,8554	101,10304	57,33656113	158,44	-5,36419	-8,09624	1207,820455	1202,456262
581	5,002		-1,46237	12,496241	-15,0729837	-2,5767	-1,94949	-0,99366	719,6912428	717,7417529
584	0		-354,018	-107,7399	-72,6220859	-180,36	1,46521	6,10891	-7,054560241	-5,589347311
584	2,501		129,7992	38,083916	-1,2205008	36,8634	6,10149	-0,28096	-820,9468184	-814,8453317
							0,83298	-5,23585	242,4657719	243,2987553
										237,2299215

584	5,002	430,0647	183,90777	70,18108432	254,089	-4,43552	-10,1907	1067,261771	1062,826252	1057,071029
592	0	-593,879	-198,4774	8,35383278	-190,12	8,04968	-0,6061	-1152,290286	-1144,240607	-1152,896384
592	2,501	-10,5471	-16,34318	-10,0212309	-26,364	1,27439	1,51757	-66,44003856	-65,16565264	-64,92246379
592	5,002	389,234	165,79103	-28,3962946	137,395	-5,50091	3,64125	780,7936186	775,2927112	784,4348655
593	0	-654,5	-223,3048	-6,62106865	-229,93	9,07528	3,84675	-1310,701355	-1301,626078	-1306,854605
593	2,501	-19,7501	-19,37566	-10,8806006	-30,256	1,71692	1,65784	-86,1876723	-84,47075361	-84,52983009
593	5,002	431,4482	184,55352	-15,1401325	169,413	-5,64144	-0,53107	899,7094195	894,0679804	899,1783542
594	0	-675,976	-232,5749	-27,361937	-259,94	9,70946	10,4838	-1398,642639	-1388,933183	-1388,158864
594	2,501	-13,6277	-16,77195	-12,0230759	-28,795	2,01055	0,87058	-75,30601122	-73,29546493	-74,43542658
594	5,002	465,1697	199,03095	3,315785141	202,347	-5,68836	-8,74261	1009,414026	1003,725662	1000,67142
595	0	-594,655	-201,4834	-52,4516635	-253,94	9,02675	11,8918	-1280,922121	-1271,895371	-1269,030333
595	2,501	37,80203	2,9201975	-9,91440373	-6,9942	1,7518	-1,79348	35,15422184	36,90601871	33,3607419
595	5,002	486,7082	207,32379	32,62285604	239,947	-5,52316	-15,4787	1112,613974	1107,090818	1097,135226
598	0	-571,613	-186,0512	25,72806513	-160,32	22,2242	-6,56039	-1063,742639	-1041,518429	-1070,303025
598	2,501	-108,493	-54,02328	3,567086113	-50,456	5,89028	0,08797	-241,9531314	-236,0628479	-241,8651655
598	5,002	171,0756	78,004621	-18,5938929	59,4107	-10,4436	6,73632	341,2197857	330,7761424	347,9561036
599	0	-468,521	-140,0697	32,47363634	-107,6	3,53322	-2,84566	-824,2693078	-820,7360892	-827,1149699
599	2,501	-1,32281	-13,10849	-6,91383006	-20,022	-0,35813	1,23009	-41,76429	-42,12241606	-40,53420231
599	5,002	282,3241	113,85268	-46,3012965	67,5514	-4,24947	5,30584	502,1241371	497,8746664	507,4299746
600	0	-532,704	-173,184	19,61139162	-153,57	7,48758	-2,08471	-999,6608866	-992,1733066	-1001,745596
600	2,501	-1,45396	-13,93155	-9,82282762	-23,754	1,0321	1,26491	-49,39889723	-48,36679881	-48,13398928
600	5,002	346,2452	145,32093	-39,2570469	106,064	-5,42338	4,61453	662,2465014	656,8231182	666,8610268
603	0	434,1015	184,51659	71,32801292	255,845	-6,07098	-1,20224	1076,021223	1069,95024	1074,818984
603	2,501	43,72056	-2,207367	-9,60983091	-11,817	1,42268	2,43163	33,20233202	34,62501331	35,63395819
603	5,002	-530,212	-188,9313	-90,5476747	-279,48	8,91635	6,06549	-1248,233149	-1239,316804	-1242,167658
604	0	477,3496	198,0625	32,19364787	230,256	-7,81399	1,44612	1081,066813	1073,252824	1082,512929
604	2,501	-11,9118	-21,92916	-14,4522906	-36,381	1,38458	1,5754	-88,24822232	-86,8636433	-86,67282068
604	5,002	-684,724	-241,9208	-61,098229	-303,02	10,5831	1,70469	-1496,179848	-1485,596701	-1494,475161
608	0	431,1928	178,43071	-0,97220818	177,459	-8,21898	2,23412	915,4676687	907,248684	917,7017928
608	2,501	-44,5208	-32,988	-15,5207024	-48,509	1,249	1,04098	-154,8944537	-153,6454535	-153,8534782
608	5,002	-703,786	-244,4067	-30,0691966	-274,48	10,717	-0,15217	-1463,873167	-1453,156182	-1464,02534
609	0	368,0835	155,00363	-24,221692	130,782	-8,29651	1,83767	740,0723874	731,7758781	741,9100582
609	2,501	-32,6359	-32,22051	-13,6803655	-45,901	0,84894	0,84276	-134,2284316	-133,379492	-133,385669
609	5,002	-616,907	-219,4447	-3,13903909	-222,58	9,99439	-0,15215	-1247,145841	-1237,151453	-1247,297987
611	0	497,1242	113,62949	-29,1511423	84,4783	-6,99257	3,79517	815,2181479	808,2255779	819,0133137
611	2,501	-30,7746	-26,62461	-9,93425442	-36,559	-0,20052	1,64862	-113,1246781	-113,3252012	-111,4760589
611	5,002	-742,225	-166,8787	9,282633443	-157,6	6,59152	-0,49793	-1280,084095	-1273,492571	-1280,582022
612	0	39,92452	100,0091	-33,5814374	66,4277	-11,3609	14,0533	184,7572036	173,3963256	198,8105294
612	2,501	-142,439	-83,30389	-13,8083069	-97,112	2,22195	0,63101	-379,3952585	-377,173305	-378,7642482

612	5,002	-508,354	-266,6169	5,96482362	-260,65	15,8048	-12,7913	-1182,164311	-1166,359526	-1194,955616
638	0	-561,926	-177,657	26,7640982	-150,89	17,9766	-2,63071	-1032,289618	-1014,313055	-1034,920329
638	2,501	-97,067	43,26371	4,844692941	-38,419	0,64959	-0,41843	-203,0251079	-202,3755183	-203,4435414
638	5,002	184,2408	91,129592	-17,0747123	74,0549	-16,6774	1,79384	387,6228115	370,9454275	389,4166553
639	0	-522,965	-192,256	26,34278117	-165,91	28,4275	0,96722	-1011,6815	-983,2539991	-1010,714283
639	2,501	1,73496	-10,13115	-6,56420403	-16,695	-1,81013	0,21846	-31,13525154	-32,94538573	-30,91679542
639	5,002	342,8842	171,99369	-39,4711892	132,522	-32,0478	-0,53031	710,7944067	678,7466369	710,2641013
640	0	-563,087	-202,6518	16,17749604	-186,47	21,3534	0,72998	-1104,96123	-1083,607847	-1104,231251
640	2,501	10,13063	-2,848858	-8,51670204	-11,366	-4,30939	-0,05239	-9,561298204	-13,87068761	-9,613687721
640	5,002	399,7967	196,95405	-33,2109001	163,743	-29,9722	-0,83476	847,222043	817,2498809	846,3872848
645	0	-617,812	-221,6182	5,664838259	-215,95	18,8879	0,42356	-1235,062549	-1216,174647	-1234,638989
645	2,501	1,472611	-4,809816	-8,66443302	-13,474	-4,2738	-0,03485	-25,0341039	-29,3079033	-25,06895203
645	5,002	437,2061	211,99859	-22,9937043	189,005	-27,4355	-0,49326	946,3777501	918,9422499	945,8844938
646	0	-665,21	-233,3789	-7,77989278	-241,16	13,6707	0,36443	-1347,090018	-1333,419337	-1346,725589
646	2,501	-5,36841	-5,58766	-9,25950091	-14,847	-4,92164	0,01054	-36,67324921	-41,59489355	-36,66270737
646	5,002	470,9215	222,20359	-10,739109	211,464	-23,514	-0,34335	1035,126929	1011,612959	1034,783584
647	0	-667,689	-223,5481	-26,2999442	-249,85	5,13918	0,32531	-1367,691383	-1362,552199	-1367,36607
647	2,501	5,012763	1,0311262	-9,93185899	-8,9007	-5,58038	0,0233	-11,28487328	-17,86525513	-11,26156875
647	5,002	494,1629	225,61038	6,436226191	232,047	-18,2999	-0,2787	1106,505046	1088,205098	1106,226342
650	0	221,6825	144,34107	8,41302663	152,754	-29,5312	0,04167	593,695451	564,1642805	593,7371254
650	2,501	349,902	123,20791	61,42281071	184,631	-5,46249	-0,1045	824,1340511	818,6715567	824,0295514
650	5,002	294,5703	102,07474	114,4325948	216,507	18,6062	-0,25067	815,9560604	834,5622423	815,7053868
651	0	473,6792	224,39297	133,9097949	358,303	-22,3759	-0,04769	1332,388454	1310,012524	1332,340764
651	2,501	287,9426	81,601825	55,0399961	136,642	7,28107	-0,165	647,6090063	654,8900793	647,4440108
651	5,002	-81,3452	-61,18932	-23,8298027	-85,019	36,9381	-0,2823	-275,7870322	-238,8489558	-276,0693327
656	0	-561,788	-166,5865	-48,4609798	-215,05	-8,41622	0,25427	-1160,419026	-1168,835245	-1160,164761
656	2,501	62,74682	25,896086	-7,18382644	18,7123	-9,24069	0,0134	118,9953859	109,7546978	119,0087878
656	5,002	503,7301	218,3787	34,09332696	252,472	-10,0652	-0,22746	1159,793207	1149,72805	1159,565746
657	0	-279,745	-39,59025	-64,5515126	-104,14	-26,309	0,18967	-571,9522794	-598,2612695	-571,762607
657	2,501	164,2504	68,941175	2,478624624	71,4198	-13,893	-0,00073	356,3651827	342,4721775	356,3644575
657	5,002	424,6949	177,4726	69,50876185	246,981	-1,47702	-0,19112	1046,066054	1044,589034	1045,874931
658	0	-268,18	-62,0246	10,86587765	-51,159	-29,0882	-0,13987	-450,9517942	-480,04004	-451,0916598
658	2,501	321,7225	185,27798	8,605976192	193,884	-35,8466	-0,07137	806,0071353	770,1605232	805,9357621
658	5,002	728,0738	432,58056	6,346074734	438,927	-42,605	-0,00288	1824,349206	1781,744228	1824,346325
659	0	423,2054	311,16945	14,62345686	325,793	-71,5664	-0,12783	1201,752859	1130,186477	1201,625024
659	2,501	631,8818	351,87133	11,09465237	362,966	-55,8869	-0,08205	1547,378259	1491,491346	1547,296213
659	5,002	657,0067	392,57322	7,565847892	400,139	-40,2074	-0,03626	1654,3868	1614,179356	1654,350543
660	0	853,2714	517,50896	13,08096929	530,59	-75,3839	-0,09446	2170,432678	2095,048826	2170,338214
660	2,501	505,0673	257,97436	6,543580462	264,518	-37,8018	-0,04594	1185,623407	1147,821568	1185,577466

660	5,002	-26,6882	-1,560249	0,006191639	-1,5541	-0,21983	0,00258	-37,80272217	-38,02254882	-37,80014004
667	0	-432,17	-448,3674	-116,777725	-565,15	27,2262	0,31744	-1692,111372	-1664,885153	-1691,793935
667	2,501	1,430107	34,486292	21,00241194	55,4887	-8,0655	-0,0859	112,836546	104,7710474	112,7506431
667	5,002	251,4789	517,33998	158,7825488	676,123	-43,3572	-0,48924	1679,167605	1635,810389	1678,678363
668	0	-891,419	-395,418	-0,37384803	-395,79	21,0595	-0,09686	-1950,427984	-1929,368435	-1950,524846
668	2,501	37,40416	45,039148	17,09412328	62,1333	-11,7233	-0,08629	172,8919492	161,1686215	172,8056601
668	5,002	782,6756	485,49629	34,56209459	520,058	-44,5062	-0,07572	2057,595024	2013,088819	2057,519307
669	0	-671,524	-287,7209	12,03092028	-275,69	2,12556	-0,163	-1424,36149	-1422,235928	-1424,524489
669	2,501	141,6811	84,069876	7,830193863	91,9001	-19,956	-0,06355	367,9855412	348,0295369	367,9219901
669	5,002	771,335	455,86065	3,629467445	459,49	-42,0376	0,0359	1921,715713	1879,678143	1921,751611
671	0	-722,553	-412,4501	-75,6463087	-488,1	-24,7729	-4,89382	-1915,511728	-1940,284625	-1920,405544
671	2,501	-49,3172	-36,32759	-2,37544109	-38,703	-9,14525	-0,69943	-141,5183971	-150,6636476	-142,2178264
671	5,002	440,3673	339,7949	70,89542651	410,69	6,4824	3,49496	1393,858075	1400,340471	1397,353032
672	0	-632,199	-540,7298	-123,488773	-664,22	49,0797	0,62279	-2150,296288	-2101,216613	-2149,673497
672	2,501	34,71613	5,3033658	2,87864812	8,18201	0,93207	0,26197	61,49499684	62,42706755	61,75696927
672	5,002	518,0801	551,33656	129,2460689	680,583	-47,2155	-0,09885	2034,669423	1987,453889	2034,570576
674	0	442,7411	59,319702	-35,3601812	23,9595	17,0674	0,66961	623,4824855	640,5498623	624,1520932
674	2,501	-36,2127	-31,74713	-10,5515154	-42,299	2,32224	1,02973	-131,6738378	-129,3516022	-130,6441079
674	5,002	-698,718	-122,814	14,25715037	-108,56	-12,4229	1,38985	-1125,446752	-1137,869657	-1124,0569
675	0	79,86683	135,10011	-29,2593232	105,841	-30,3675	11,2055	315,5084539	285,1409765	326,713993
675	2,501	-175,514	-113,7031	-17,4840228	-131,19	17,5282	0,4505	-490,5418577	-473,0136446	-490,0913602
675	5,002	-614,445	-362,5064	-5,70872241	-368,22	65,4239	-10,3045	-1535,20876	-1469,784856	-1545,513304
680	0	403,8789	150,43559	-4,08253487	146,353	3,31458	-0,83659	817,7487327	821,0633085	816,9121414
680	2,501	-70,3713	-57,27318	-18,4194388	-75,693	13,1058	-0,17129	-242,8679333	-229,7621501	-243,0392245
680	5,002	-728,173	-264,982	-32,7563428	-297,74	22,897	0,49401	-1542,10119	-1519,204199	-1541,607181
681	0	332,7521	119,11565	-28,2888521	90,8268	6,94825	-1,40061	614,2313254	621,1795803	612,8307195
681	2,501	-53,7689	-52,0485	-16,0511383	-68,1	10,5643	-0,00883	-206,0988812	-195,5345781	-206,1077146
681	5,002	-623,841	-223,2127	-3,81342456	-227,03	14,1804	1,38294	-1265,045678	-1250,865327	-1263,662739
683	0	431,4762	183,17523	71,2304834	254,406	-6,07131	-0,15292	1069,730459	1063,659146	1069,57754
683	2,501	-2,53177	-45,20997	-14,7316159	-59,942	22,2365	-0,19304	-123,1744752	-100,9379684	-123,3675162
683	5,002	-620,091	-273,5952	-100,693715	-374,29	50,5443	-0,23316	-1554,696	-1504,151674	-1554,929163
684	0	464,1178	185,3102	30,77523565	216,085	-2,85089	-0,32538	1035,524035	1032,673149	1035,198659
684	2,501	-45,4499	-53,35935	-18,1995246	-71,559	16,659	-0,16271	-202,202604	-185,5436255	-202,3653094
684	5,002	-738,569	-292,0289	-67,1742848	-359,2	36,1688	-3,5E-05	-1678,545834	-1642,376991	-1678,545869

TABEL MOMEN BALOK ANAK-1

FRAME	STA	ML			ML TOT	ME		COMB1		COMB2		COMB3	
		MD	ML merata	ML Koef kejut		ME X	ME Y	1,3MD + 2 (MLQ+MLP)	1,3MD + 2 (MLQ+MLP)+1MEY	1,3MD + 2 (MLQ+MLP)+1MEY	1,3MD + 2 (MLQ+MLP)+1MEY	1,3MD + 2 (MLQ+MLP)+1MEY	1,3MD + 2 (MLQ+MLP)+1MEY
1432	0	100,584	69,859534	0,001978819	69,86151	-0,97293	0,070765	270,4821813	269,5092466	270,5529459	270,5529459	270,5529459	270,5529459
1432	2,501	109,7779	34,721227	-0,00946409	34,71176	-0,45873	0,031825	212,1347324	211,6760004	212,1665576	212,1665576	212,1665576	212,1665576
1432	5,002	-9,354819	-0,4170791	-0,020907	-0,43799	0,055471	-0,00711	-13,03723686	-12,98176607	-13,04435102	-13,04435102	-13,04435102	-13,04435102
1433	0	-43,80628	3,6561448	-4,88239364	-1,22625	-0,08031	-0,06573	-59,40065796	-59,48096739	-59,46638619	-59,46638619	-59,46638619	-59,46638619
1433	2,501	43,52529	14,172065	-2,82890616	11,34316	-0,14532	-0,02976	79,26919938	79,12388013	79,23943702	79,23943702	79,23943702	79,23943702
1433	5,002	2,530311	24,687985	-0,77541868	23,91257	-0,21033	0,006204	51,11453632	50,90420726	51,12073983	51,12073983	51,12073983	51,12073983
1434	0	-11,16265	18,25341	-0,40989431	17,84352	-0,2658	-0,02576	21,17557987	20,90978353	21,14982052	21,14982052	21,14982052	21,14982052
1434	2,501	86,94908	35,168309	-0,10641587	35,06189	-0,39665	-0,01219	183,1575895	182,7609402	183,1454012	183,1454012	183,1454012	183,1454012
1434	5,002	56,73426	52,083208	0,197062563	52,28027	-0,5275	0,001383	178,3150786	177,7875764	178,3164616	178,3164616	178,3164616	178,3164616
1435	0	54,55174	51,226912	0,38277552	51,60969	-0,61217	-0,01002	174,1366408	173,5244752	174,1266221	174,1266221	174,1266221	174,1266221
1435	2,501	138,163	58,699591	0,162238574	58,86183	-0,7374	0,026998	297,3365983	296,5981963	297,3625958	297,3625958	297,3625958	297,3625958
1435	5,002	93,44776	66,172271	-0,05829837	66,11397	-0,86264	0,064014	253,7100354	252,8473969	253,7740491	253,7740491	253,7740491	253,7740491
1436	0	-196,851	-40,873284	7,22032891	-33,653	0,003018	-0,16347	-323,2121983	-323,2091805	-323,3756687	-323,3756687	-323,3756687	-323,3756687
1436	2,501	-49,91871	-20,872184	-1,61712849	-22,4893	0,072381	0,233045	-109,8729414	-109,8005606	-109,6398968	-109,6398968	-109,6398968	-109,6398968
1436	5,002	-31,31297	-0,8710839	-10,4545859	-11,3257	0,141744	0,62956	-63,3582049	-63,21646107	-62,72864532	-62,72864532	-62,72864532	-62,72864532
1437	0	-49,73261	-11,848317	-12,0528045	-23,9011	0,114496	0,464402	-112,454636	-112,3401405	-111,9902342	-111,9902342	-111,9902342	-111,9902342
1437	2,501	25,48536	-0,3187982	-8,5021428	-8,82094	0,086211	0,157338	15,48908516	15,57529599	15,64642338	15,64642338	15,64642338	15,64642338
1437	5,002	-27,62323	11,210721	-4,95148112	6,25924	0,057926	-0,14973	-23,39171408	-23,33378793	-23,54143944	-23,54143944	-23,54143944	-23,54143944
1438	0	-38,34034	-0,0830174	-9,4189482	-9,50197	0,029822	-0,08895	-68,84636883	-68,81654645	-68,93532186	-68,93532186	-68,93532186	-68,93532186
1438	2,501	7,906327	5,3333994	9,508121837	14,84152	0,030121	-0,07816	39,96126802	39,99138943	39,88311106	39,88311106	39,88311106	39,88311106
1438	5,002	-74,17356	10,749816	28,43519188	39,18501	0,03042	-0,06736	-18,05561552	-18,02519509	-18,12297643	-18,12297643	-18,12297643	-18,12297643
1439	0	-87,6097	0,522305	26,47140198	26,99371	-0,00254	-0,11691	-59,90519082	-59,90772701	-60,02209949	-60,02209949	-60,02209949	-60,02209949
1439	2,501	8,132626	6,5707645	10,11887106	16,68964	-0,02158	-0,06509	43,95168494	43,93010259	43,88659689	43,88659689	43,88659689	43,88659689
1439	5,002	-24,45161	12,619224	-6,23365986	6,385564	-0,04063	-0,01327	-19,0159597	-19,05658821	-19,02922713	-19,02922713	-19,02922713	-19,02922713
1440	0	18,2139	23,099224	-1,71230863	21,38691	-0,07678	-0,34608	66,45189734	66,37511597	66,10581682	66,10581682	66,10581682	66,10581682
1440	2,501	94,41917	27,493499	17,94649954	45,44	-0,12096	-0,24485	213,6249233	213,5039665	213,3800777	213,3800777	213,3800777	213,3800777
1440	5,002	42,29804	31,887775	37,6053077	69,49308	-0,16513	-0,14361	193,9736164	193,8084842	193,8300058	193,8300058	193,8300058	193,8300058
1441	0	43,82387	32,515478	37,76556675	70,28104	-0,17777	-0,1493	197,5331237	197,3535351	197,383822	197,383822	197,383822	197,383822
1441	2,501	86,61321	23,786404	17,15457117	40,94098	-0,11305	-0,02775	194,4791231	194,3660749	194,4513734	194,4513734	194,4513734	194,4513734
1441	5,002	1,076136	15,057331	-3,45642441	11,60091	-0,04832	0,093802	24,60078965	24,55246588	24,69459197	24,69459197	24,69459197	24,69459197
1442	0	-33,51493	3,8670427	-5,12697577	-1,25993	0,07371	0,020566	-46,08927934	-46,01556966	-46,06871289	-46,06871289	-46,06871289	-46,06871289
1442	2,501	57,84179	13,985846	-2,38320814	11,60264	-0,00417	-0,16416	98,39960047	98,39543523	98,23544474	98,23544474	98,23544474	98,23544474
1442	5,002	20,8721	24,10465	0,360559488	24,46521	-0,08204	-0,34888	76,06414742	75,98210727	75,71526952	75,71526952	75,71526952	75,71526952
1443	0	-60,09901	-6,5307016	-2,19600106	-8,7267	0,08042	0,020518	-95,58211307	-95,50169294	-95,5615948	-95,5615948	-95,5615948	-95,5615948

1443	2,501	10,10644	-4,4944414	-2,57900193	-7,07344	0,07127	0,038272	-1,008509482	-0,937239551	-0,970237824
1443	5,002	-48,01452	-2,4581811	-2,96200281	-5,42018	0,06212	0,056025	-73,25923875	-73,19711901	-73,2032137
1444	0	-62,97463	-7,7108723	-2,71051653	-10,4214	0,106855	0,054837	-102,7097928	-102,6029381	-102,6549554
1444	2,501	8,865002	-4,9172312	-2,96991831	-7,88715	0,093193	0,071617	-4,249796032	-4,156602811	-4,178179129
1444	5,002	-47,62178	-2,1235901	-3,22932009	-5,35291	0,079532	0,088396	-72,61413212	-72,53460034	-72,52573568
1445	0	-63,32243	-7,8386538	-3,47613051	-11,3148	0,127287	0,109067	-104,9487336	-104,821447	-104,8396662
1445	2,501	12,55836	-3,4507731	-3,3611378	-6,81191	0,101794	0,120921	2,702049285	2,803843133	2,822970684
1445	5,002	-39,88725	0,9371075	-3,24614509	-2,30904	0,076301	0,132775	-56,47150069	-56,33872524	-56,33872524
1446	0	-54,90856	-4,6238226	-4,12236013	-8,74618	0,122313	0,179038	-88,87348867	-88,75117599	-88,69445099
1446	2,501	26,27353	1,9135099	-3,69648459	-1,78297	0,079099	0,086045	30,58963741	30,66873627	30,67568277
1446	5,002	-20,8708	8,4508424	-3,27060905	5,180233	0,035885	-0,00695	-16,77156937	-16,73568432	-16,77851632
1447	0	-115,2924	-23,589077	19,69362135	-3,89546	0,429423	0,026736	-157,6710295	-157,2416069	-157,644293
1447	2,501	-19,37832	-14,722157	5,801132143	-8,92103	0,239616	0,029834	-43,03386623	-42,79425068	-43,00403247
1447	5,002	-51,79065	-5,8552376	-8,09135707	-13,9466	0,049808	0,032931	-95,22103583	-95,17122734	-95,18810475
1448	0	-64,75717	-8,7151481	-6,36131918	-15,0765	0,077374	0,001194	-114,3372526	-114,2598787	-114,3360583
1448	2,501	9,124108	-5,3329886	-4,99421633	-10,3272	0,051783	-0,00604	-8,793069239	-8,741286723	-8,799104728
1448	5,002	-45,32103	-1,9508291	-3,62711348	-5,57794	0,026191	-0,01327	-70,07321878	-70,04702759	-70,08648405
1449	0	-58,78873	-5,9088213	-2,7403621	-8,64918	0,06478	-0,02195	-93,72370994	-93,65893032	-93,74565869
1449	2,501	11,76656	-3,9059514	-2,7755896	-6,68154	0,05195	0,003533	1,985396607	1,985396607	1,936979413
1449	5,002	-46,00456	-1,9030815	-2,81081711	-4,7139	0,039121	0,029015	-69,19460932	-69,19460932	-69,20471534
1450	0	6,135808	17,017265	-1,13920701	15,87806	-0,07393	0,062465	39,7326659	39,65873152	39,79513068
1450	2,501	40,58331	5,6599408	-4,09718711	1,562754	0,009503	0,08265	55,88380589	55,89330874	55,96645629
1450	5,002	-53,2956	-5,6973834	-7,05516722	-12,7526	0,09294	0,102836	-94,78938696	-94,69644688	-94,68655095
1451	0	-37,64763	0,0765139	-4,92241805	-4,8459	0,032652	0,099662	-58,63372638	-58,60107484	-58,53406466
1451	2,501	12,88691	-5,1371852	-4,98945345	-10,1266	0,063744	0,079401	-3,50029522	-3,436551338	-3,420894659
1451	5,002	-64,90496	-10,350884	-5,05648885	-15,4074	0,094836	0,059139	-115,1911969	-115,0963607	-115,1320575
1452	0	-48,98056	-4,5358608	-4,13761288	-8,67347	0,036223	0,130342	-81,02168137	-80,98545877	-80,89133952
1452	2,501	4,002311	-7,8754838	-4,3274372	-12,2029	0,060217	0,110042	-19,20283769	-19,14262085	-19,09279548
1452	5,002	-71,34122	-11,215107	-4,51726152	-15,7324	0,084211	0,089743	-124,2083269	-124,1241158	-124,1185843
1453	0	-53,42846	-5,9120144	-4,34940754	-10,2614	0,028856	0,350075	-89,97984231	-89,95098604	-89,62976719
1453	2,501	-28,85869	-6,6351205	-6,04113645	-12,6763	0,032974	-0,15124	-62,86881612	-62,83584234	-63,02005146
1453	5,002	-132,6153	-7,3582265	-7,73286536	-15,0911	0,037091	-0,65255	-202,5821228	-202,5450315	-203,2346686
1454	0	-135,9697	-1,3737289	-8,5984603	-9,97219	-0,01903	-0,405	-196,7050361	-196,724071	-197,1100403
1454	2,501	37,64971	-10,257083	-4,52775989	-14,7848	0,006706	-0,26564	19,37493294	19,38163924	19,10929198
1454	5,002	82,94274	-19,140438	-0,45705948	-19,5975	0,032447	-0,12628	68,63056913	68,66301662	68,50429137
1455	0	82,94274	-19,140438	-0,45705948	-19,5975	0,032447	-0,12628	68,63056913	68,66301662	68,50429137
1455	2,501	-0,090634	-28,023792	3,613640936	-24,4102	0,058189	0,013085	-48,93812754	-48,87993885	-48,92504209

1455	5,002	-211,4504	-36,907147	7,684341348	-29,2228	0,08393	0,152449	-333,3311571	-333,2472272	-333,1787084
1456	0	-114,8461	-23,271453	19,73147497	-3,53998	0,393638	0,009891	-156,3799117	-155,9862737	-156,3700208
1456	2,501	-19,66638	-14,941857	5,775532658	-9,16632	0,26301	0,038927	-43,89893795	-43,63592763	-43,86001095
1456	5,002	-52,81304	-6,6122598	-8,18040965	-14,7927	0,132383	0,067963	-98,24229706	-98,1099144	-98,17433394
1457	0	-66,78449	-10,564597	-6,57934611	-17,1439	0,284836	0,02177	-121,1077192	-120,8228834	-121,0859488
1457	2,501	9,694359	-4,7560511	-4,92598577	-9,68204	-0,0152	-0,00606	-6,761407729	-6,776605673	-6,767470404
1457	5,002	-42,15321	1,0524951	-3,27262543	-2,22013	-0,31523	-0,0339	-59,23942915	-59,55466078	-59,27332484
1458	0	-56,82207	-4,0774751	-2,52369966	-6,60117	-0,14416	-0,03405	-87,07104546	-87,21520918	-87,10509661
1458	2,501	14,56776	-1,3430295	-2,47337451	-3,8164	-0,23848	-0,02832	11,30528149	11,0668043	11,27696263
1458	5,002	-42,36881	1,391416	-2,42304936	-1,03163	-0,33279	-0,02259	-57,14272442	-57,47551508	-57,16531098
1459	0	-57,56139	-4,2376573	-1,92564767	-6,1633	-0,17927	-0,01506	-87,1564112	-87,33568315	-87,17146853
1459	2,501	13,39377	-1,5465346	-2,23211917	-3,77865	-0,26167	-0,01673	9,85458937	9,59291539	9,837858385
1459	5,002	-43,97749	1,144588	-2,53859066	-1,394	-0,34408	-0,0184	-59,95874291	-60,30281892	-59,97714755
1460	0	-59,78557	-4,8574181	-2,37489091	-7,23231	-0,21603	-0,01244	-92,18586103	-92,40188978	-92,19829873
1460	2,501	12,85757	-1,3495737	-2,55115229	-3,90073	-0,31031	-0,01872	8,913384106	8,603074146	8,894665295
1460	5,002	-42,82571	2,1582708	-2,72741367	-0,58914	-0,40459	-0,025	-56,81170361	-57,21629478	-56,83670353
1461	0	-58,97294	-3,9380621	-3,01908189	-6,95714	-0,31528	-0,02109	-90,57910864	-90,8943881	-90,6001981
1461	2,501	17,61541	1,1947659	-2,81864445	-1,62388	-0,4272	-0,02795	19,65227932	19,22508275	19,62433223
1461	5,002	-34,12265	6,3275939	-2,618207	3,709387	-0,53911	-0,0348	-36,94066556	-37,47977926	-36,97547029
1462	0	23,94546	28,908991	-1,01203171	27,89696	-0,73473	-0,03684	86,92301434	86,18827968	86,88617415
1462	2,501	96,75797	29,446193	18,18599665	47,63219	-0,34537	-0,02612	221,0497439	220,7043714	221,0236262
1462	5,002	41,24408	29,983396	37,38402502	67,36742	0,04399	-0,0154	188,3521406	188,3961302	188,3367453
1463	0	43,43609	31,744903	37,68113059	69,42603	-0,10184	-0,0113	195,318986	195,2171476	195,3076872
1463	2,501	81,13905	19,164197	16,60902831	35,77323	0,402431	-0,00273	177,0272156	177,4296463	177,0244831
1463	5,002	-9,484402	6,5834915	-4,46307397	2,120417	0,9067	0,005834	-8,088887594	-7,182187946	-8,083053833
1464	0	-49,12699	0,8524435	-3,48660482	-2,63416	-0,50672	-0,03292	-69,13341158	-69,64012822	-69,16632852
1464	2,501	33,55473	8,2222961	-2,94951004	5,272786	-0,62961	-0,03646	54,16672083	53,53711304	54,13025749
1464	5,002	-12,08996	15,592149	-2,41241526	13,17973	-0,7525	-0,04001	10,6425204	9,890021443	10,60251065
1465	0	-23,31306	11,914494	-4,16352306	7,750971	-0,82006	-0,036	-14,80503949	-15,62510346	-14,84103522
1465	2,501	65,61511	20,49978	-1,60060716	18,89917	-0,732	-0,03975	123,0979856	122,3659906	123,0582327
1465	5,002	26,21687	29,085066	0,962308734	30,04737	-0,64393	-0,04351	94,17667787	93,53275176	94,13316779
1466	0	2,14639	29,532013	0,926496476	30,45851	-1,54532	-0,02458	63,70732622	62,16200374	63,68274667
1466	2,501	105,0234	50,389271	1,697603071	52,08687	-2,12476	-0,03181	240,7041865	238,5794262	240,6723777
1466	5,002	79,57388	71,246529	2,468709666	73,71524	-2,7042	-0,03904	250,8765263	248,1723283	250,8374883
1467	0	77,68065	70,777449	2,702450762	73,4799	-2,83839	-0,03551	247,9446441	245,1062502	247,9091307
1467	2,501	161,0128	78,290621	2,49047498	80,7811	-2,97454	-0,03116	370,8787698	367,9042266	370,8476078
1467	5,002	116,0183	85,803794	2,278499197	88,08229	-3,11069	-0,02681	326,9883752	323,8776826	326,9615645

1468	0	123,05	90,057099	2,413954207	92,47105	-3,30367	-0,01571	344,9071439	341,6034759	344,8914341
1468	2,501	121,8194	45,106002	1,225406147	46,33141	-1,64572	-0,01528	251,0280892	249,3823707	251,0128125
1468	5,002	-7,737702	0,1549052	0,036858088	0,191763	0,012231	-0,01484	-9,675485979	-9,663254888	-9,690329521
1469	0	-36,44818	2,2213009	-9,14545073	-6,92415	-0,23846	-0,03473	-61,23093807	-61,46940004	-61,26566987
1469	2,501	12,15737	9,3560752	9,986277578	19,34235	-0,43178	-0,04383	54,48928639	54,05750875	54,44546025
1469	5,002	-67,56363	16,49085	29,11800588	45,60886	-0,62509	-0,05292	3,384990455	2,759897152	3,332069967
1470	0	-83,70834	4,0946175	26,89617405	30,99079	-0,41023	-0,01998	-46,83925818	-47,24949022	-46,95924054
1470	2,501	14,82097	12,401411	10,81116875	23,21258	-0,68595	-0,02396	65,69242346	65,00647217	65,66846605
1470	5,002	-14,97627	20,708204	-5,27383655	15,43437	-0,96167	-0,02793	11,39958471	10,43791415	11,37165223
1471	0	-36,42755	10,016611	-4,12747773	5,889133	-0,80514	-0,01462	-35,57754352	-36,38267969	-35,59216315
1471	2,501	54,38699	23,420066	-1,7327933	21,68727	-1,19538	-0,0222	114,0776303	112,8822532	114,0554278
1471	5,002	16,87497	36,823521	0,661891122	37,48541	-1,58562	-0,02979	96,90828376	95,3226657	96,8784984
1472	0	-198,0824	-42,210449	7,06046452	-35,15	0,165383	0,388957	-327,8071065	-327,6417231	-327,4181493
1472	2,501	-52,74891	-23,024005	-1,8676801	-24,8917	0,312631	-0,05352	-118,3569585	-118,0443272	-118,4104789
1472	5,002	-35,74197	-3,8375617	-10,7958247	-14,6334	0,459879	-0,496	-75,73133089	-75,27145178	-76,22732891
1473	0	-56,0563	-16,855458	-12,6398601	-29,4953	0,674346	-0,25996	-131,8638315	-131,1894855	-132,1237964
1473	2,501	24,6997	-0,4598588	-8,5147675	-8,97463	0,092584	-0,17669	14,16035397	14,25293755	13,98366749
1473	5,002	-22,87086	15,93574	-4,38967489	11,54607	-0,48918	-0,09341	-6,639980948	-7,129159782	-6,733389051
1474	0	-137,3103	-3,1705082	-8,82262985	-11,9931	0,192814	0,33386	-202,4897132	-202,2968996	-202,1558529
1474	2,501	35,62241	-12,402267	-4,79122583	-17,1935	0,260365	0,282559	11,92214752	12,18251213	12,20470657
1474	5,002	80,22875	-21,634026	-0,7598218	-22,3938	0,327916	0,231258	59,50967539	59,83759097	59,74093315
1475	0	80,22875	-21,634026	-0,7598218	-22,3938	0,327916	0,231258	59,50967539	59,83759097	59,74093315
1475	2,501	-3,491327	-30,865784	3,271582222	-27,5942	0,395467	0,179956	-59,72712959	-59,33166303	-59,54717312
1475	5,002	-215,5378	-40,097543	7,302986247	-32,7946	0,463018	0,128655	-345,7882674	-345,3252499	-345,6596122
1476	0	-57,00448	-11,428574	-4,96858005	-16,3972	0,826405	-0,08494	-106,9001388	-106,0737334	-106,9850795
1476	2,501	-3,098459	-14,062027	-5,06160569	-19,1236	0,762471	-0,09581	-42,27526217	-41,51279152	-42,37107375
1476	5,002	-77,51884	-16,69548	-5,15463133	-21,8501	0,698536	-0,10668	-144,4747184	-143,7761825	-144,5814008
1477	0	-59,91983	-11,721013	-5,02048756	-16,7415	0,668672	-0,39357	-111,3787846	-110,7101127	-111,7723517
1477	2,501	-32,99644	-10,434132	-6,4917787	-16,9259	0,465182	0,090458	-76,74719884	-76,28201697	-76,65674112
1477	5,002	-134,3995	-9,1472509	-7,96306985	-17,1103	0,261692	0,574483	-208,939946	-208,6782541	-208,3654634
1478	0	-3,068912	9,4372819	-2,03648403	7,400798	0,774138	-0,00084	10,81201019	11,58614771	10,81171758
1478	2,501	30,28068	-3,3276578	-5,16066904	-8,48833	1,020717	0,006802	22,38823288	23,40894999	22,39503462
1478	5,002	-64,69613	-16,092597	-8,28485405	-24,3775	1,267297	0,014442	-132,8598773	-131,5925806	-132,8454352
1479	0	-47,93535	-9,2386309	-6,01625703	-15,2549	1,072027	-0,01874	-92,82572716	-91,75370058	-92,84447069
1479	2,501	3,591842	-13,367211	-5,96933252	-19,3365	0,99846	-0,00686	-34,0036926	-33,00523257	-34,01055214
1479	5,002	-73,20738	-17,495792	-5,92240801	-23,4182	0,924893	0,005024	-142,0059909	-141,0810974	-142,0009665

TABEL MOMEN BALOK LINTANG STRUKTUR ATAS

FRAME	STA	MD		ML		ML TOT	ME		COMB1 1,3MD + 2 (MLQ+MLP)	COMB 2 1,3MD + 2 (MLQ+MLP)+1MEX	COMB 3 1,3MD + 2 (MLQ+MLP)+1MEY
		MD	ML merata	ML Koef kejut	ML		ME X	ME Y			
8	0	-301,2943	-155,4718	-0,63777205	-156,11	0,034178	0,565046	-703,9016632	-703,8674847	-703,3366171	
8	1,0313	-134,608	-48,627	-0,49048606	-49,1175	0,022839	0,46167	-273,22533	-273,202491	-272,7636596	
8	2,0625	32,07836	26,55627	-0,34320008	26,2131	0,0115	0,358295	94,12800725	94,13950675	94,48630178	
9	0	31,95049	27,59487	-0,12305033	27,4718	0,012479	0,28076	96,47927239	96,49175186	96,76003212	
9	1,0313	98,44031	71,59764	-0,0149432	71,5827	0,000504	0,154458	271,1377934	271,138297	271,2922516	
9	2,0625	164,9301	84,1044	0,09316392	84,1976	-0,011472	0,028157	382,8042929	382,7928206	382,8324495	
10	0	162,1899	84,17079	0,24902827	84,4198	-0,010949	-0,03295	379,6865319	379,6755827	379,6535815	
10	1,0313	127,0887	64,74422	0,32733501	65,0716	-0,012634	-0,174747	295,3583931	295,3457594	295,183646	
10	2,0625	91,98742	13,82165	0,40564176	14,2273	-0,014318	-0,316544	148,0382327	148,0239147	147,721689	
11	0	87,02495	13,00046	0,44028788	13,4408	-0,013514	-0,356725	140,0139407	140,0004268	139,6572155	
11	1,0313	-52,32286	-54,30108	0,46569432	-53,8354	-0,017148	-0,492285	-175,6904942	-175,7076419	-176,182779	
11	2,0625	-191,6707	-122,1708	0,49110075	-121,68	-0,020782	-0,627844	-492,5312746	-492,5520562	-493,1591191	
16	0	-176,7288	-122,2548	0,49110075	-121,764	-0,020782	-0,045236	-473,274924	-473,2957056	-473,3201604	
16	1,0313	-38,46391	-54,27035	0,46569432	-53,8047	-0,017148	-0,016923	-157,6123923	-157,6295401	-157,6293153	
16	2,0625	99,801	13,04731	0,44028788	13,4876	-0,013514	0,01139	156,7165116	156,7029977	156,727902	
17	0	99,24729	13,86878	0,40564176	14,2744	-0,014318	-0,040611	157,5703219	157,5560038	157,5297104	
17	1,0313	132,0025	64,77589	0,32733501	65,1032	-0,012634	-0,018492	301,8097161	301,7970824	301,7912237	
17	2,0625	164,7577	84,18699	0,24902827	84,436	-0,010949	0,003627	383,0570887	383,0461394	383,0607155	
18	0	161,8631	84,1208	0,09316392	84,214	-0,011472	-0,031939	378,8500078	378,8385355	378,8180688	
18	1,0313	92,95129	71,5986	-0,0149432	71,5837	0,000504	-0,02576	264,0039974	264,004501	263,9782374	
18	2,0625	24,03945	27,58039	-0,12305033	27,4573	0,012479	-0,019581	86,16596542	86,17844489	86,14638446	
21	0	18,89145	26,54176	-0,34320008	26,1986	0,0115	-0,025506	76,95601791	76,96751741	76,93051217	
21	1,0313	-149,2569	-48,65683	-0,49048606	-49,1473	0,022839	-0,035193	-292,3286619	-292,3058229	-292,3638549	
21	2,0625	-317,4053	-155,5169	-0,63777205	-156,155	0,034178	-0,04488	-724,9363378	-724,9021593	-724,9812179	
22	0	-283,049	-153,2309	0,51097346	-152,72	0,024099	0,424793	-673,403524	-673,3794249	-672,9787307	
22	1,0313	-121,8965	-47,33407	0,34163084	-46,9924	0,018652	0,34478	-252,4502769	-252,4316252	-252,1054972	
22	2,0625	39,25609	26,90124	0,17228822	27,0735	0,013204	0,264766	105,1799743	105,1931785	105,4447403	
23	0	38,58441	27,80739	0,28707107	28,0945	0,012114	0,207914	106,3486522	106,3607663	106,5565662	
23	1,0313	100,0704	71,08895	0,11061852	71,1996	0,003899	0,122914	272,4906529	272,494552	272,6135668	
23	2,0625	161,5564	82,8745	-0,06583403	82,8087	-0,004316	0,037914	375,6406321	375,6363161	375,6785458	
24	0	158,4919	82,93908	0,04214473	82,9812	-0,00437	-0,024582	372,0019354	371,9975658	371,9773539	
24	1,0313	119,5164	63,19852	-0,11080063	63,0877	-0,008083	-0,113702	281,5468239	281,5387407	281,4331219	

24	2,0625	80,54098	11,96196	-0,26374598	11,6982	-0,011797	-0,202822	128,0996908	128,087894	127,8968684
25	0	75,62365	11,24311	-0,20945956	11,0336	-0,010021	-0,256317	120,3780446	120,3680235	120,1217274
25	1,0313	-67,06775	-56,20141	-0,37285248	-56,5743	-0,017986	-0,34069	-200,3366037	-200,3545897	-200,6772936
25	2,0625	-209,7591	-124,2141	-0,53624539	-124,75	-0,025951	-0,425063	-522,1875975	-522,2135484	-522,6126603
26	0	-177,5929	-124,296	-0,53624539	-124,832	-0,025951	0,334003	-480,5353232	-480,5612741	-480,2013204
26	1,0313	-40,17744	-56,16899	-0,37285248	-56,5418	-0,017986	0,265823	-165,3143633	-165,3323493	-165,0485401
26	2,0625	97,23805	11,29121	-0,20945956	11,0818	-0,010021	0,197644	148,5729688	148,5629477	148,7706125
27	0	96,40604	12,0103	-0,26374598	11,7466	-0,011797	0,159102	148,8209612	148,8091643	148,9800635
27	1,0313	128,7346	63,23098	-0,11080063	63,1202	-0,008083	0,08444	293,5953101	293,5872268	293,6797496
27	2,0625	161,0631	82,95564	0,04214473	82,9978	-0,00437	0,009777	375,3776374	375,3732678	375,3874141
28	0	158,1284	82,89126	-0,06583403	82,8254	-0,004316	-0,023309	371,2178104	371,2134945	371,1945014
28	1,0313	89,85848	71,08981	0,11061852	71,2004	0,003899	-0,102828	259,2168865	259,2207857	259,1140582
28	2,0625	21,58853	27,79235	0,28707107	28,0794	0,012114	-0,182348	84,22394111	84,23605527	84,04159339
29	0	16,82923	26,88623	0,17228822	27,0585	0,013204	-0,207551	75,99503534	76,00823959	75,78748423
29	1,0313	-150,0838	-47,36488	0,34163084	-47,0232	0,018652	-0,286746	-289,1553951	-289,1367434	-289,4421407
29	2,0625	-316,9968	-153,2775	0,51097346	-152,767	0,024099	-0,36594	-717,6288215	-717,6047224	-717,9947617
30	0	-252,1746	-149,5236	1,4623208	-148,061	0,015312	0,373592	-623,9494824	-623,9341707	-623,57589
30	1,0313	-98,892	-44,61516	0,82958824	-43,7856	0,014423	0,285002	-216,1307358	-216,116313	-215,8457341
30	2,0625	54,3906	28,63176	0,19685568	28,8286	0,013534	0,196411	128,3650147	128,3785486	128,5614258
31	0	52,97152	29,24778	0,33268935	29,5805	0,012926	0,159082	128,0239253	128,0368516	128,1830071
31	1,0313	106,7402	71,62785	-0,10759881	71,5203	0,006883	0,083515	281,8027878	281,8096705	281,8863032
31	2,0625	160,5089	82,51191	-0,54788697	81,964	0,000839	0,007949	372,5896287	372,5904679	372,5975776
32	0	157,1536	82,55724	-0,46800056	82,0892	0,000452	-0,045065	368,4781976	368,47865	368,4331326
32	1,0313	111,2173	62,20163	-0,47884656	61,7228	-0,00408	-0,10823	268,0280655	268,0239856	267,9198353
32	2,0625	65,28097	10,35002	-0,48969256	9,86032	-0,008612	-0,171395	104,5859117	104,5772997	104,4145164
33	0	60,76376	9,850105	-0,49094818	9,35916	-0,00807	-0,225468	97,71120285	97,70313241	97,48573451
33	1,0313	-88,64618	-58,11982	-0,35708494	-58,4769	-0,01904	-0,281842	-232,193851	-232,2128907	-232,4756928
33	2,0625	-238,0561	-126,6579	-0,2232217	-126,881	-0,030009	-0,338215	-563,2352504	-563,2652594	-563,5734656
34	0	-172,8313	-126,7377	-0,2232217	-126,961	-0,030009	0,636579	-478,6024537	-478,6324628	-477,9658743
34	1,0313	-37,19075	-58,08556	-0,35708494	-58,4426	-0,01904	0,480377	-165,2332646	-165,2523043	-164,7528878
34	2,0625	98,4498	9,899728	-0,49094818	9,40878	-0,00807	0,324174	146,8022968	146,7942263	147,1264708
35	0	97,33696	10,39982	-0,48969256	9,91012	-0,008612	0,295824	146,3582888	146,3496768	146,6541124
35	1,0313	128,1467	62,23521	-0,47884656	61,7564	-0,00408	0,138491	290,1033999	290,0993201	290,2418906
35	2,0625	158,9564	82,57459	-0,46800056	82,1066	0,000452	-0,018842	370,8564895	370,8569419	370,8376471
36	0	156,3846	82,52944	-0,54788697	81,9815	0,000839	-0,04799	367,2630733	367,2639124	367,2150831

36	1,0313	87,44222	71,62912	-0,10759881	71,5215	0,006883	-0,196275	256,7179296	256,7248123	256,5216546
36	2,0625	18,49985	29,23279	0,33268935	29,5655	0,012926	-0,34456	83,18076427	83,1936906	82,83620449
37	0	14,83131	28,61684	0,19685568	28,8137	0,013534	-0,37955	76,90809928	76,92162321	76,52853908
37	1,0313	-152,4528	-44,64626	0,82958824	-43,8167	0,014423	-0,513047	-285,8220417	-285,8076189	-286,3350885
37	2,0625	-319,737	-149,5709	1,4623208	-148,109	0,015312	-0,646544	-711,8751686	-711,859857	-712,5217122
38	0	-203,499	-144,0943	1,85166975	-142,243	-0,027567	0,326799	-549,0340635	-549,0616309	-548,7072641
38	1,0313	-62,79925	-40,86659	0,6086169	-40,258	-0,003965	0,25472	-162,1549758	-162,1589404	-161,9002561
38	2,0625	77,9005	30,69967	-0,63443596	30,0652	0,019638	0,18264	161,4011158	161,4207542	161,5837558
39	0	76,4641	31,22952	0,58427584	31,8138	0,007994	0,172371	163,0309196	163,0389137	163,2032908
39	1,0313	117,8099	72,15038	-0,02570159	72,1247	0,023367	0,116218	297,4022047	297,425572	297,5184229
39	2,0625	159,1557	81,57523	-0,63567902	80,9396	0,03874	0,060065	368,7814683	368,8202086	368,8415334
46	0	-20,60179	-106,6257	0,56221472	-106,064	-2,91809	1,036268	-238,909397	-241,8274868	-237,8731293
46	1,0313	49,3517	33,13637	0,54263787	33,679	-0,861097	0,828623	131,5152214	130,6541247	132,343844
46	2,0625	119,3052	130,3752	0,52306102	130,898	1,195896	0,620978	416,8931982	418,0890945	417,5141757
47	0	128,417	130,3807	0,55671668	130,937	1,236116	0,601731	428,8170711	430,0531868	429,4188023
47	1,0313	131,7308	170,5254	0,3821956	170,908	1,92706	0,389412	513,0652301	514,9922902	513,4546418
47	2,0625	135,0445	164,7819	0,20767452	164,99	2,618005	0,177092	505,5369338	508,1549384	505,7140261
48	0	146,1848	170,1139	0,28455347	170,398	2,589685	0,141322	530,8372404	533,426925	530,9785619
48	1,0313	82,35643	108,5813	0,10892074	108,69	1,604371	-0,081313	324,4437748	326,0481458	324,3624616
48	2,0625	18,52802	1,160427	-0,066712	1,09372	0,619057	-0,303948	26,27385396	26,89291134	25,969906
49	0	26,7206	8,686608	0,01952396	8,70613	0,511545	-0,355715	52,14904888	52,6605941	51,79333422
49	1,0313	-114,4506	-138,9704	-0,27385936	-139,244	-1,810656	-0,537239	-427,2741704	-429,0848264	-427,8114093
49	2,0625	-255,6218	-287,4547	-0,56724267	-288,022	-4,132857	-0,718763	-908,352262	-912,4851192	-909,071025
50	0	-252,4882	-287,5192	-0,56724267	-288,086	-4,132857	0,381758	-904,4076384	-908,5404956	-904,0258807
50	1,0313	-112,23	-138,8813	-0,27385936	-139,155	-1,810656	0,358368	-424,2092762	-426,0199322	-423,8509083
50	2,0625	28,02816	8,785628	0,01952396	8,80515	0,511545	0,334978	54,04690955	54,55845477	54,38188774
51	0	20,20885	1,259568	-0,066712	1,19286	0,619057	0,227794	28,65721539	29,27627277	28,88500948
51	1,0313	83,04082	108,6506	0,10892074	108,76	1,604371	0,149955	325,4720616	327,0764326	325,6220168
51	2,0625	145,8728	170,1534	0,28455347	170,438	2,589685	0,072116	530,5104526	533,1001371	530,5825689
52	0	135,2349	164,8259	0,20767452	165,034	2,618005	-0,051407	505,8725101	508,4905147	505,8211035
52	1,0313	130,8415	170,5427	0,3821956	170,925	1,92706	-0,13695	511,943854	513,8709142	511,806904
52	2,0625	126,4482	130,3713	0,55671668	130,928	1,236116	-0,222494	426,2387427	427,4748584	426,0162492
53	0	117,8074	130,3707	0,52306102	130,894	1,195896	-0,375952	414,9371223	416,1330186	414,5611706
53	1,0313	46,51671	33,10452	0,54263787	33,6472	-0,861097	-0,369566	127,7660335	126,9049368	127,3964674
53	2,0625	-24,77399	-106,685	0,56221472	-106,123	-2,91809	-0,363181	-244,4516969	-247,3697866	-244,8148774

54	0	-161,4661	-165,1479	0,01782817	-165,13	-0,811418	0,256485	-540,1660652	-540,9774828	-539,9095805
54	1,0313	-47,63616	-77,90362	0,21568741	-77,6879	-0,667732	0,299867	-217,302866	-217,9705983	-217,0029991
54	2,0625	66,19379	8,36957	0,41354664	8,78312	-0,524047	0,343249	103,6181568	103,0941098	103,9614058
55	0	71,96292	14,0176	0,24865107	14,2662	-0,002649	0,087852	122,0842931	122,0816437	122,1721452
55	1,0313	109,6881	92,66955	0,28918212	92,9587	0,20812	0,117135	328,5120351	328,7201552	328,6291701
55	2,0625	147,4133	125,4333	0,32971318	125,763	0,41889	0,146418	443,1633219	443,5822114	443,3097397
56	0	153,3888	128,5219	0,22218337	128,744	0,402364	-0,142328	456,8935569	457,2959207	456,7512289
56	1,0313	115,5067	127,706	0,23210076	127,938	0,479837	-0,062536	406,0348881	406,5147254	405,9723518
56	2,0625	77,6246	81,00187	0,24201816	81,2439	0,557311	0,017255	263,399764	263,9570749	263,4170193
57	0	82,02069	80,53961	0,23179558	80,7714	0,004874	-0,259926	268,1697013	268,1745756	267,9097753
57	1,0313	-34,81887	-0,250909	0,16238039	-0,08853	0,138003	-0,075577	-45,44158473	-45,30358154	-45,51716218
57	2,0625	-151,6584	-123,5647	0,0929652	-123,472	0,271132	0,108771	-444,0995123	-443,8283803	-443,9907413
58	0	-161,6579	-165,1592	0,01782817	-165,141	-0,811418	-0,418935	-540,4380799	-541,2494975	-540,8570151
58	1,0313	-47,91943	-77,92557	0,21568741	-77,7099	-0,667732	-0,392755	-217,7150385	-218,3827708	-218,1077939
58	2,0625	65,81907	8,336971	0,41354664	8,75052	-0,524047	-0,366575	103,0658264	102,5417794	102,699251
59	0	71,82597	13,98414	0,24865107	14,2328	-0,002649	-0,174522	121,8393498	121,8367004	121,6648281
59	1,0313	109,6218	92,63835	0,28918212	92,9275	0,20812	-0,078088	328,3634245	328,5715446	328,2853368
59	2,0625	147,4177	125,4043	0,32971318	125,734	0,41889	0,018346	443,1110439	443,5293335	443,1293901
60	0	153,5664	128,4979	0,22218337	128,72	0,402364	0,200532	457,0764555	457,4788193	457,2769876
60	1,0313	115,7596	127,6912	0,23210076	127,923	0,479837	0,349331	406,3340727	406,8139101	406,6834038
60	2,0625	77,95279	80,99628	0,24201816	81,2383	0,557311	0,49813	263,8152347	264,3725457	264,3133648
61	0	82,42679	80,53835	0,23179558	80,7701	0,004874	0,674566	268,6995115	268,6999893	269,3696807
61	1,0313	-34,41709	-0,242837	0,16238039	-0,08046	0,138003	0,859722	-44,90313092	-44,76512774	-44,04340895
61	2,0625	-151,261	-123,5473	0,0929652	-123,454	0,271132	1,044878	-443,5480184	-443,2768864	-442,5031401
62	0	-253,2072	-185,5901	-0,28627074	-185,876	0,860432	0,288307	-700,9220976	-700,0616654	-700,6337905
62	1,0313	-98,16826	-41,7625	-0,48755554	-42,2501	0,370978	0,370872	-212,1188389	-211,7478606	-211,7479665
62	2,0625	56,87072	59,54176	-0,68884034	58,8529	-0,118476	0,453438	191,6377783	191,5193026	192,0912159
63	0	52,42236	58,03108	-0,52255349	57,5085	0,274939	0,241811	183,1661336	183,4410726	183,4079446
63	1,0313	113,6416	117,568	-0,44657416	117,121	0,020801	0,208959	381,9767792	381,9975799	382,1857381
63	2,0625	174,8608	131,2166	-0,37059482	130,846	-0,233338	0,176107	489,0109695	488,777632	489,1870763
64	0	170,2806	129,0289	-0,23304162	128,796	-0,212518	-0,046547	478,9564512	478,7439332	478,9099046
64	1,0313	136,4916	101,2646	0,35519841	101,62	-0,227652	-0,107552	380,6787436	380,4510912	380,571192
64	2,0625	102,7026	27,61214	0,94343844	28,5556	-0,242787	-0,168557	190,6245807	190,3817938	190,4560241
65	0	99,84774	25,92435	0,99694854	26,9213	-0,591389	-0,373886	183,6446565	183,0532678	183,2707704
65	1,0313	-32,77319	-67,94673	1,7659446	-66,1808	-0,375071	-0,409676	-174,9667259	-175,3417966	-175,376402

65	2,0625	-165,3941	-162,6452	2,53494067	-160,11	-0,158753	-0,445466	-535,2329804	-535,3917333	-535,6784467
66	0	-166,2199	-162,7595	2,53494067	-160,225	-0,158753	0,519433	-536,5349801	-536,6937329	-536,015547
66	1,0313	-33,25783	-67,90053	1,7659446	-66,1346	-0,375071	0,488634	-175,5043482	-175,879419	-175,0157143
66	2,0625	99,70423	25,98736	0,99694854	26,9843	-0,591389	0,457835	183,5841072	182,9927186	184,041942
67	0	102,29	27,67467	0,94343844	28,6181	-0,242787	0,250317	190,2132082	189,9704213	190,4635256
67	1,0313	136,3205	101,3069	0,35519841	101,662	-0,227652	0,169332	380,5407853	380,3131329	380,7101175
67	2,0625	170,351	129,0508	-0,23304162	128,818	-0,212518	0,088347	479,0919071	478,8793891	479,1802541
68	0	174,7502	131,2389	-0,37059482	130,868	-0,233338	-0,12905	488,9117587	488,6784211	488,7827087
68	1,0313	113,7923	117,575	-0,44657416	117,128	0,020801	-0,229445	382,1869437	382,2077445	381,9574991
68	2,0625	52,83449	58,02297	-0,52255349	57,5004	0,274939	-0,329839	183,6856735	183,9606125	183,3558341
69	0	57,15765	59,53308	-0,68884034	58,8442	-0,118476	-0,540669	191,9934282	191,8749524	191,4527593
69	1,0313	-97,54881	-41,7849	-0,48755554	-42,2725	0,370978	-0,668945	-211,3583658	-210,9873876	-212,0273113
69	2,0625	-252,2553	-185,6262	-0,28627074	-185,912	0,860432	-0,797222	-699,7568014	-698,8963692	-700,5540234
70	0	-309,4325	-225,6262	-1,99662654	-227,623	0,838458	0,893093	-857,5078961	-856,6694382	-856,6148027
70	1,0313	-136,0385	-68,9171	-2,3859821	-71,3031	0,393229	0,758628	-319,4562369	-319,063008	-318,6976087
70	2,0625	37,35547	45,26867	-2,77533766	42,4933	-0,052	0,624163	133,5487808	133,4967806	134,1729438
71	0	35,89877	44,92469	-1,38712125	43,5376	0,237864	0,448553	133,7435242	133,9813884	134,192077
71	1,0313	106,7035	111,6869	-0,87234444	110,815	-0,010974	0,27405	360,3435567	360,3325824	360,6176063
71	2,0625	177,5082	132,5608	-0,35756763	132,203	-0,259813	0,099546	495,1671339	494,9073212	495,2666803
72	0	175,5331	131,7555	-0,29870336	131,457	-0,243901	-0,085264	491,1066546	490,862754	491,0213907
72	1,0313	142,1502	103,8472	1,21025802	105,057	-0,256064	-0,250076	394,9101845	394,6541205	394,6601087
72	2,0625	108,7673	30,05064	2,71921941	32,7699	-0,268227	-0,414888	206,9372592	206,6690318	206,5223714
73	0	107,2496	29,44803	1,48685758	30,9349	-0,525589	-0,592989	201,2942315	200,7686425	200,7012424
73	1,0313	-34,1986	-70,36935	3,72858797	-66,6408	-0,345537	-0,713921	-177,7397175	-178,0852542	-178,4536387
73	2,0625	-175,6468	-171,0142	5,97031836	-165,044	-0,165484	-0,834853	-558,4285388	-558,5940232	-559,2633919
74	0	-176,9584	-171,1474	5,97031836	-165,177	-0,165484	1,075452	-560,4000237	-560,5655081	-559,3245713
74	1,0313	-35,01226	-70,33054	3,72858797	-66,602	-0,345537	0,887737	-178,7198472	-179,0653839	-177,8321099
74	2,0625	106,9339	29,51519	1,48685758	31,002	-0,525589	0,700022	201,0181529	200,4925639	201,7181751
75	0	108,213	30,11695	2,71921941	32,8362	-0,268227	0,521071	206,3492999	206,0810725	206,870371
75	1,0313	141,9305	103,8938	1,21025802	105,104	-0,256064	0,284788	394,7178247	394,4617607	395,0026129
75	2,0625	175,6479	131,7825	-0,29870336	131,484	-0,243901	0,048505	491,3098943	491,0659937	491,3583995
76	0	177,5045	132,5876	-0,35756763	132,23	-0,259813	-0,146799	495,2159187	494,956106	495,0691198
76	1,0313	107,0141	111,6933	-0,87234444	110,821	-0,010974	-0,375151	360,7603107	360,7493365	360,3851593
76	2,0625	36,52377	44,91079	-1,38712125	43,5237	0,237864	-0,603504	134,5282475	134,7661117	133,9247436
77	0	37,86164	45,25467	-2,77533766	42,4793	-0,052	-0,790387	134,1787968	134,1267966	133,3884096

77	1,0313	-135,1443	-68,95152	-2,3859821	-71,3375	0,393229	-0,962788	-318,3625525	-317,9693236	-319,3253405
77	2,0625	-308,1502	-225,681	-1,99662654	-227,678	0,838458	-1,135189	-855,9505433	-855,1120853	-857,0857321
78	0	-309,2405	-233,431	-28,781258	-262,212	0,720216	1,842107	-926,4371837	-925,7169677	-924,5950772
78	1,0313	-144,3548	-77,15075	-13,9653035	-91,1161	0,361666	1,476313	-369,8933897	-369,5317236	-368,4170762
78	2,0625	20,53085	36,60618	0,85065102	37,4568	0,003116	1,11052	101,6037629	101,6068789	102,7142832
79	0	24,08127	37,60356	2,37020041	39,9738	0,230191	1,014259	111,2531703	111,4833616	112,2674295
79	1,0313	94,19766	104,8735	9,66805035	114,542	0,015708	0,576262	351,5401064	351,5558144	352,1163681
79	2,0625	164,314	126,2553	16,9659003	143,221	-0,198775	0,138264	500,0505872	499,851812	500,1888514
80	0	163,3454	126,0272	16,754237	142,781	-0,18936	0,021726	497,9118793	497,7225197	497,9336053
80	1,0313	132,049	99,24802	12,7696139	112,018	-0,202752	-0,437545	395,6990251	395,496273	395,2614805
80	2,0625	100,7527	26,5806	8,78499075	35,3656	-0,216145	-0,896815	201,7097156	201,4935711	200,8129005
81	0	95,96234	25,50395	7,00465924	32,5086	-0,422114	-1,014653	189,7682673	189,3461537	188,7536139
81	1,0313	-35,22114	-72,09126	-4,48750155	-76,5788	-0,298354	-1,4418	-198,9450183	-199,2433725	-200,3868185
81	2,0625	-166,4046	-170,5139	-15,9796623	-186,494	-0,174595	-1,868947	-589,313176	-589,4877709	-591,1821231
82	0	-167,8152	-170,6458	-15,9796623	-186,625	-0,174595	2,110185	-591,4105892	-591,5851841	-589,3004037
82	1,0313	-36,09527	-72,05296	-4,48750155	-76,5405	-0,298354	1,644256	-200,0047885	-200,3031427	-198,3605321
82	2,0625	95,62461	25,56876	7,00465924	32,5734	-0,422114	1,178327	189,4588357	189,0367222	190,6371631
83	0	100,2178	26,64538	8,78499075	35,4304	-0,216145	1,07571	201,143888	200,9277435	202,219598
83	1,0313	131,8271	99,29324	12,7696139	112,063	-0,202752	0,562855	395,5009939	395,2982418	396,0638491
83	2,0625	163,4365	126,0529	16,754237	142,807	-0,18936	0,050001	498,0816444	497,8922848	498,1316449
84	0	164,3493	126,2807	16,9659003	143,247	-0,198775	-0,053448	500,1473198	499,9485446	500,0938716
84	1,0313	94,51337	104,8782	9,66805035	114,546	0,015708	-0,572368	351,9599004	351,9756084	351,3875324
84	2,0625	24,67742	37,58749	2,37020041	39,9577	0,230191	-1,091288	111,9960257	112,226217	110,9047379
85	0	21,00952	36,58969	0,85065102	37,4403	0,003116	-1,202121	102,1930521	102,1961681	100,9909315
85	1,0313	-143,4607	-77,18865	-13,9653035	-91,154	0,361666	-1,683717	-368,8067998	-368,4451337	-370,4905171
85	2,0625	-307,9309	-233,4903	-28,781258	-262,272	0,720216	-2,165314	-924,8532932	-924,1330772	-927,0186074
86	0	-346,2691	-227,8498	-94,1820735	-322,032	0,547115	3,67296	-1094,213556	-1093,666442	-1090,540596
86	1,0313	-153,0507	-75,05069	-35,9928804	-111,044	0,278534	2,892465	-421,0530355	-420,7745018	-418,16057
86	2,0625	40,16767	35,22513	22,1963128	57,4214	0,009953	2,111971	167,060844	167,0707965	169,1728145
87	0	35,88909	36,25218	15,9163736	52,1686	0,193941	2,140378	150,992925	151,1868659	153,1333032
87	1,0313	109,1817	101,6197	34,2366366	135,856	0,027419	1,220308	413,648816	413,6762352	414,8691235
87	2,0625	182,4743	121,0989	52,5568997	173,656	-0,139103	0,300237	584,5282518	584,3891493	584,8284886
88	0	181,6022	121,0572	52,1056405	173,163	-0,133771	0,361496	582,4085616	582,2747905	582,7700577
88	1,0313	140,8704	94,39014	36,9816641	131,372	-0,138919	-0,613502	445,8751488	445,7362294	445,2616467
88	2,0625	100,1387	21,83482	21,8576877	43,6925	-0,144068	-1,5885	217,5652808	217,421213	215,9767805

89	0	102,763	20,87229	27,1483131	48,0206	-0,312528	-1,545795	229,6330984	229,3205702	228,0873032
89	1,0313	-62,1495	-75,03968	-27,1478814	-102,188	-0,223044	-2,547598	-285,1694777	-285,3925213	-287,7170759
89	2,0625	-227,062	-171,7791	-81,4440759	-253,223	-0,133559	-3,549401	-801,626926	-801,7604851	-805,1763272
90	0	-228,1312	-171,9131	-81,4440759	-253,357	-0,133559	3,470598	-803,2850599	-803,418619	-799,8144618
90	1,0313	-62,74912	-75,00105	-27,1478814	-102,149	-0,223044	2,578175	-286,0947631	-286,0947631	-283,2935442
90	2,0625	102,633	20,93995	27,1483131	48,0883	-0,312528	1,685752	229,5994445	229,2869163	231,285197
91	0	99,82694	21,90094	21,8576877	43,7586	-0,144068	1,747315	445,7811425	445,642223	446,6602885
91	1,0313	140,7282	94,43558	36,9816641	131,417	-0,138919	0,879146	582,4935489	582,3597778	582,5045263
91	2,0625	181,6295	121,082	52,1056405	173,188	-0,133771	0,010977	584,5928321	584,4537296	584,6996006
92	0	182,4851	121,1242	52,5568997	173,681	-0,139103	0,106768	413,9080338	413,9080338	413,1309315
92	1,0313	109,3541	101,6235	34,2366366	135,86	0,027419	-0,749683	151,5858827	151,5858827	149,7858072
92	2,0625	36,22312	36,23457	15,9163736	52,1509	0,193941	-1,606135	167,3000065	167,3000065	165,7336789
93	0	40,36935	35,20864	22,1963128	57,405	0,009953	-1,556375	-420,0426564	-420,0426564	-422,7325482
93	1,0313	-152,4299	-75,08827	-35,9928804	-111,081	0,278534	-2,411358	-1092,979076	-1092,431961	-1096,245417
93	2,0625	-345,2292	-227,9085	-94,1820735	-322,091	0,547115	-3,266341	-818,1414823	-818,1414823	-812,1198356
94	0	-258,8976	-215,3459	-25,6252824	-240,971	0,367847	6,389493	-312,3946797	-312,2148576	-307,8008731
94	1,0313	-115,2898	-68,05697	-13,2020269	-81,259	0,179822	4,593807	108,6651256	108,6651256	111,4714478
94	2,0625	28,31808	36,70869	-0,77877145	35,9299	-0,008202	2,79812	120,5091632	120,5091632	123,4095549
95	0	30,93816	37,89064	2,18387347	40,0745	0,140522	3,040914	329,7374495	329,7374495	331,4227232
95	1,0313	86,53173	100,0947	8,51812798	108,613	0,02064	1,705914	447,1892805	447,1892805	447,6594363
95	2,0625	142,1253	116,4104	14,8523825	131,263	-0,099243	0,370913	445,5600298	445,5600298	446,3162741
96	0	141,2451	116,4234	14,5949266	131,018	-0,09516	0,661084	342,7449008	342,7449008	342,2617782
96	1,0313	108,1879	89,54425	11,5476868	101,092	-0,083233	-0,566356	148,1533165	148,1533165	146,4308271
96	2,0625	75,13069	16,77691	8,50044704	25,2774	-0,071306	-1,793795	134,0384077	134,0384077	132,7269454
97	0	71,13684	15,60684	5,27608799	20,8829	-0,205339	-1,516802	-234,3307147	-234,47022	-237,2880483
97	1,0313	-54,32008	-77,94281	-3,91449857	-81,8573	-0,139505	-2,957334	-604,6337199	-604,6337199	-608,9579142
97	2,0625	-179,777	-172,3199	-13,1050851	-185,425	-0,073671	-4,397865	-604,0006353	-604,0743063	-600,2447295
98	0	-179,183	-172,4263	-13,1050851	-185,531	-0,073671	3,755906	-233,4912347	-233,63074	-230,8863436
98	1,0313	-53,74126	-77,8993	-3,91449857	-81,8138	-0,139505	2,604891	135,0759895	134,87065	136,529866
98	2,0625	71,70044	15,65662	5,27608799	20,9327	-0,205339	1,453877	148,8567945	148,7854886	150,6191135
99	0	75,54023	16,8268	8,50044704	25,3272	-0,071306	1,762319	343,1059779	343,0227449	343,9835334
99	1,0313	108,3584	89,57235	11,5476868	101,12	-0,083233	0,877555	445,5787061	445,4835459	445,571498
99	2,0625	141,1765	116,4297	14,5949266	131,025	-0,09516	-0,007208	447,1032129	447,0039703	447,393007
100	0	141,9687	116,4195	14,8523825	131,272	-0,099243	0,289794	329,2660785	329,2867185	328,7160526
100	1,0313	86,18945	100,0918	8,51812798	108,61	0,02064	-0,550026			

100	2,0625	30,41016	37,87577	2,18387347	40,0596	0,140522	-1,389846	119,6524889	119,7930113	118,2626429
101	0	27,61182	36,69492	-0,77877145	35,9162	-0,008202	-1,137459	107,727666	107,7194636	106,5902066
101	1,0313	-115,7872	-68,08033	-13,2020269	-81,2824	0,179822	-2,121987	-313,0880596	-312,9082374	-315,2100468
101	2,0625	-259,1862	-215,3789	-25,6252824	-241,004	0,367847	-3,106515	-818,9504267	-818,58258	-822,0569418
102	0	-212,7468	-207,4272	-20,2584668	-227,686	0,292796	-1,04126	-731,9420747	-731,6492787	-732,9833348
102	1,0313	-92,4543	-62,61725	-10,1417047	-72,759	0,109656	-0,54249	-265,708486	-265,5988298	-266,2509757
102	2,0625	27,83818	39,66935	-0,02494264	39,6444	-0,073484	-0,043719	115,4784611	115,4049776	115,4347419
103	0	40,2683	41,37842	4,21696261	45,5954	0,063402	-0,398267	143,539567	143,6029687	143,1413004
103	1,0313	86,21729	101,9438	9,15190048	111,096	-0,028427	0,124785	334,2738994	334,2454727	334,3986845
103	2,0625	132,1663	116,621	14,0868384	130,708	-0,120255	0,647837	433,2317766	433,1115214	433,8796134
104	0	132,8974	116,9625	14,1058642	131,068	-0,116909	0,416158	434,9034418	434,7865324	435,3195996
104	1,0313	95,49613	87,90185	10,1679376	98,0698	-0,074379	0,83121	320,2845472	320,210168	321,1157576
104	2,0625	58,09481	12,95296	6,23001114	19,183	-0,031849	1,246263	113,8891973	113,8573484	115,1354603
105	0	46,20285	11,52669	2,0747644	13,6015	-0,157008	0,841316	87,26662342	87,10961581	88,10793958
105	1,0313	-67,85305	-83,61655	-6,80434778	-90,4209	-0,022012	1,059378	-269,0507553	-269,072767	-267,9913769
105	2,0625	-181,9089	-179,5872	-15,68346	-195,271	0,112984	1,277441	-627,0230062	-626,910022	-625,7455655
106	0	-187,8803	-179,6938	-15,68346	-195,377	0,112984	-3,112642	-634,9988971	-634,8859128	-638,111539
106	1,0313	-72,9624	-83,58093	-6,80434778	-90,3853	-0,022012	-2,103306	-275,6216759	-275,6436876	-277,7249822
106	2,0625	41,95554	11,56082	2,0747644	13,6356	-0,157008	-1,093971	81,81336894	81,65636132	80,71939814
107	0	53,90294	12,98453	6,23001114	19,2145	-0,031849	-1,425816	108,502901	108,4710521	107,0770853
107	1,0313	93,42447	87,91385	10,1679376	98,0818	-0,074379	-0,237024	317,6153874	317,5410083	317,3783635
107	2,0625	132,946	116,9549	14,1058642	131,061	-0,116909	0,951768	434,9514186	434,8345092	435,9031864
108	0	132,3986	116,62	14,0868384	130,707	-0,120255	0,854724	433,5319515	433,4116963	434,3866753
108	1,0313	88,54703	101,9398	9,15190048	111,092	-0,028427	1,787348	337,2945676	337,2661409	339,0819159
108	2,0625	44,6954	41,37139	4,21696261	45,5884	0,063402	2,719973	149,2807285	149,3441303	152,0007012
109	0	32,36798	39,66731	-0,02494264	39,6424	-0,073484	2,409848	121,3631034	121,2896199	123,7729511
109	1,0313	-87,14924	-62,61852	-10,1417047	-72,7602	0,109656	2,587061	-258,8144635	-258,7048072	-256,227403
109	2,0625	-206,6664	-207,4277	-20,2584668	-227,686	0,292796	2,764273	-724,038672	-723,7458759	-721,2743986
110	0	-413,8229	-237,9614	-106,522805	-344,484	0,074134	14,29429	-1226,938193	-1226,864059	-1212,643904
110	1,0313	-148,5755	-73,76647	-38,177003	-111,943	-0,006873	10,26006	-417,0351211	-417,0419936	-406,7750622
110	2,0625	116,6719	47,90514	30,1687991	78,0739	-0,087879	6,225828	307,8213094	307,7334305	314,0471378
111	0	109,2546	45,67231	24,1547386	69,8271	0,002277	6,675293	281,6851324	281,6874089	288,3604257
111	1,0313	190,1717	110,5984	44,70695	155,305	-0,03267	3,563246	557,83388	557,8012097	561,3971258
111	2,0625	271,0889	129,6362	65,2591615	194,895	-0,067617	0,451198	742,061724	742,1385552	742,6573706
112	0	277,4415	130,4715	65,7423585	196,214	-0,06237	1,130192	753,1016634	753,039293	754,2318555

112	1,0313	180,353	96,30132	43,1551926	139,457	-0,01661	-1,657135	513,3719459	513,353359	511,7148105
112	2,0625	83,26452	16,24292	20,5680267	36,8109	0,029151	-4,44463	181,865773	181,8949236	177,4213103
113	0	100,9446	19,85269	27,1772709	47,03	-0,045254	-3,881482	225,2879523	225,2426987	221,4064703
113	1,0313	-196,8626	-96,26724	-43,8694219	-140,137	0,027206	-6,866281	-536,194663	-536,1674571	-543,0609441
113	2,0625	-494,6698	-213,2146	-114,916115	-328,131	0,099665	-9,85108	-1299,33215	-1299,232485	-1309,183231
114	0	-460,8157	-213,3262	-114,916115	-328,242	0,099665	5,918758	-1255,544997	-1255,445332	-1249,626239
114	1,0313	-172,0542	-96,2274	-43,8694219	-140,097	0,027206	4,487295	-503,8641111	-503,8369052	-499,3768162
114	2,0625	116,7072	19,90032	27,1772709	47,0776	-0,045254	3,055832	245,8745984	245,8293448	248,9304303
115	0	100,695	16,2903	20,5680267	36,8583	0,029151	3,312263	204,6201626	204,6493132	207,9324258
115	1,0313	188,4519	96,32699	43,1551926	139,482	-0,01661	2,052835	523,9518498	523,9352399	526,0046844
115	2,0625	276,2088	130,4755	65,7423585	196,218	-0,06237	0,793406	751,5070818	751,4447113	752,3004877
116	0	272,062	129,6445	65,2591615	194,904	-0,067617	1,152914	743,4879858	743,4203686	744,6409
116	1,0313	181,6234	110,5949	44,70695	155,302	-0,03267	-0,06112	546,7140863	546,681416	546,6529659
116	2,0625	91,18475	45,65704	24,1547386	69,8118	0,002277	-1,275155	258,1637316	258,1660081	256,8885765
117	0	100,269	47,89311	30,1687991	78,0619	-0,087879	-0,764981	286,4734896	286,3856107	285,7085089
117	1,0313	-174,4811	-73,78847	-38,177003	-111,965	-0,006873	-2,168317	-450,7564085	-450,763281	-452,9247259
117	2,0625	-449,2312	-237,9934	-106,522805	-344,516	0,074134	-3,571654	-1273,032948	-1272,958814	-1276,604602
118	0	16,65557	-147,067	0,92992299	-146,137	-0,119486	23,64207	-270,6219415	-270,7414274	-246,9798739
118	1,0313	12,93168	-42,25645	0,72213341	-41,5343	-0,089302	18,05947	-66,25744369	-66,3467459	-48,19797652
118	2,0625	9,20779	30,89262	0,51434383	31,407	-0,059119	12,47687	74,78405814	74,72493957	87,2609248
119	0	9,20779	30,89262	0,51434383	31,407	-0,059119	12,47687	74,78405814	74,72493957	87,2609248
119	1,0313	5,483895	72,5457	0,30655415	72,8522	-0,028935	6,894263	152,8046271	152,8046271	159,7278253
119	2,0625	1,760001	82,70273	0,09876447	82,8015	0,001249	1,31166	167,8909804	167,8922292	169,2026404
120	0	1,760001	82,70273	0,09876447	82,8015	0,001249	1,31166	167,8909804	167,8922292	169,2026404
120	1,0312	-1,963891	61,36374	-0,10902508	61,2547	0,031432	-4,27094	119,9563671	119,9877995	115,6854275
120	2,0625	-5,687783	8,52875	-0,31681462	8,21194	0,061616	-9,853539	9,029753458	9,091369479	-0,823785662
121	0	-5,687783	8,52875	-0,31681462	8,21194	0,061616	-9,853539	9,029753458	9,091369479	-0,823785662
121	1,0312	-9,411674	-61,04853	-0,52460413	-61,5731	0,0918	-15,43614	-135,2896403	-135,2896403	-150,8175777
121	2,0625	-13,13557	-131,194	-0,73239364	-131,926	0,121983	-21,01874	-280,9289789	-280,8069957	-301,9477153
122	0	38,53202	-131,2788	-0,73239364	-132,011	0,121983	18,54097	-213,9306639	-213,8086806	-195,3896949
122	1,0313	29,11822	-61,018	-0,52460406	-61,5426	0,0918	13,98001	-85,23153704	-85,1397374	-71,25152255
122	2,0625	19,70441	8,575929	-0,31681448	8,25911	0,061616	9,41906	42,13396196	42,19557796	51,55302201
123	0	19,70441	8,575929	-0,31681448	8,25911	0,061616	9,41906	42,13396196	42,19557796	51,55302201
123	1,0313	10,2906	61,39601	-0,1090248	61,287	0,031432	4,858103	135,9517467	135,983179	140,80985
123	2,0625	0,876789	82,72005	0,09876489	82,8188	0,001249	0,297147	166,7774459	166,7786946	167,0745925

125	0	0,876789	82,72005	0,09876489	82,8188	0,001249	0,297147	166,7774459	166,7786946	167,0745925
125	1,0312	-8,537016	72,54806	0,30655443	72,8546	-0,028935	-4,263807	134,6111028	134,5821678	130,3472957
125	2,0625	-17,95082	30,88007	0,51434398	31,3944	-0,059119	-8,824761	39,45275938	39,39364079	30,62799857
126	0	-17,95082	30,88007	0,51434398	31,3944	-0,059119	-8,824761	39,45275938	39,39364079	30,62799857
126	1,0312	-27,36462	-42,2839	0,72213348	-41,5618	-0,089302	-13,38571	-118,6975523	-118,7868545	-132,083266
126	2,0625	-36,77843	-147,1094	0,92992299	-146,179	-0,119486	-17,94667	-340,1708167	-340,2903025	-358,1174833
127	0	-447,5415	-145,2422	-8,0185678	-153,261	-0,162496	-11,71124	-888,3254688	-888,4879643	-900,036707
127	1,0313	-191,1165	-43,53257	-3,46408092	-46,9967	-0,154322	-8,687621	-342,4447683	-342,59909	-351,1323891
127	2,0625	65,30851	26,51553	1,09040596	27,6059	-0,146148	-5,664003	140,1129362	139,9667884	134,4489329
129	0	55,89432	28,95728	2,89189197	31,8492	-0,087238	-5,657387	136,3609455	136,2737079	130,7035582
129	1,0313	149,8043	69,93071	4,75168674	74,6824	-0,053996	-2,810787	344,1104034	344,0564077	341,2996164
129	2,0625	243,7143	79,40813	6,6114815	86,0196	-0,020754	0,035813	488,8678397	488,847086	488,9036529
130	0	240,7615	79,58366	6,71433277	86,298	-0,021493	-0,299282	485,5858957	485,5844024	485,2866137
130	1,0313	179,7601	60,15961	4,19934658	64,359	0,057279	2,552392	362,405988	362,463267	364,9583797
130	2,0625	118,7586	9,239563	1,68436039	10,9239	0,136051	5,404065	176,2340588	176,37011	181,6381241
131	0	123,1596	7,206607	0,05976899	7,26638	0,078831	5,271523	174,6402848	174,7191159	179,9118082
131	1,0313	-105,2195	-56,64295	-4,84033546	-61,4833	0,181867	8,364359	-259,7519801	-259,5701136	-251,3876211
131	2,0625	-333,5987	-121,1593	-9,7404399	-130,9	0,284902	11,45719	-695,4778727	-695,1929708	-684,0206783
132	0	-406,9295	-121,0965	-9,7404399	-130,837	0,284902	-11,3597	-790,6821071	-790,3972052	-802,0418103
132	1,0313	-156,4878	-56,67591	-4,84033546	-61,5162	0,181867	-8,257383	-326,4665799	-326,2847134	-334,7239633
132	2,0625	93,95392	7,176481	0,05976899	7,23625	0,078831	-5,155064	136,6126016	136,6914327	131,4575381
133	0	84,348	9,20908	1,68436039	10,8934	0,136051	-5,15657	131,439281	131,5753322	126,282711
133	1,0313	164,6885	60,13773	4,19934658	64,3371	0,057279	-2,280565	342,7692151	342,8264941	340,4886504
133	2,0625	245,029	79,57037	6,71433277	86,2847	-0,021493	0,595441	491,1071277	491,0856344	491,7025682
138	0	241,7871	79,39519	6,6114815	86,0067	-0,020754	0,413668	486,3366309	486,3158772	486,7502984
138	1,0313	167,0207	69,9298	4,75168674	74,6815	-0,053996	3,10799	366,4898954	366,4358997	369,5978858
138	2,0625	92,25427	28,9684	2,89189197	31,8603	-0,087238	5,802313	183,6511383	183,5639007	189,4534517
139	0	96,76002	26,52644	1,09040596	27,6168	-0,146148	5,831816	181,021718	180,8755701	186,853534
139	1,0313	-138,3338	-43,50885	-3,46408092	-46,9729	-0,154322	8,34331	-273,7798392	-273,9341609	-265,4365292
139	2,0625	-373,4277	-145,2056	-8,0185678	-153,224	-0,162496	10,8548	-791,9043924	-792,066888	-781,0495883
140	0	-252,7147	-155,878	1,807098	-154,071	-0,205701	4,171297	-636,6708028	-636,8765041	-632,4995054
140	1,0313	-108,0328	-47,51781	0,47499371	-47,0428	-0,199261	3,234393	-234,5283013	-234,7275624	-231,2939085
140	2,0625	36,64903	29,18084	-0,85711059	28,3237	-0,192821	2,297488	104,2912041	104,0983833	106,5886924
141	0	46,46338	28,65286	-0,06884492	28,584	-0,126085	2,235151	117,5704389	117,4443539	119,8055896
141	1,0313	99,40303	71,97185	-0,71143192	71,2604	-0,081858	1,179802	271,7447673	271,6629095	272,9245688

141	2,0625	152,3427	83,79482	-1,35401893	82,4408	-0,037631	0,124452	362,9270741	362,8894434	363,0515265
142	0	155,5939	83,84187	-1,18442819	82,6574	-0,039438	-0,064711	367,5869318	367,5474936	367,5222208
142	1,0313	113,3971	64,09709	-0,53237427	63,5647	0,063229	-1,10386	274,545728	274,610957	273,441868
142	2,0625	71,20041	12,85631	0,11967965	12,976	0,169896	-2,143009	118,5125027	118,6823987	116,3694937
143	0	68,82119	13,6707	-0,34557531	13,3251	0,104649	-2,278663	116,1178038	116,2224524	113,8391412
143	1,0313	-70,75166	-56,23291	0,8341883	-55,3987	0,247375	-3,117452	-202,7746065	-202,5272317	-205,8920582
143	2,0625	-210,3245	-126,7047	2,01395191	-124,691	0,390101	-3,956241	-522,8033623	-522,4132613	-526,7596032
144	0	-164,0887	-126,7803	2,01395191	-124,766	0,390101	4,291433	-462,8478932	-462,4577922	-458,5564598
144	1,0313	-39,16374	-56,2003	0,8341883	-55,3661	0,247375	3,346327	-161,6450888	-161,397714	-158,2987622
144	2,0625	85,76119	13,71284	-0,34557531	13,3673	0,104649	-2,40122	138,2240878	138,3287363	140,6253075
145	0	95,19756	12,8985	0,11967965	13,0182	0,169896	2,321795	149,7931731	149,9630691	152,1149683
145	1,0313	123,3358	64,12317	-0,53237427	63,5908	0,065229	1,148244	287,5181445	287,5833734	288,6663883
145	2,0625	151,4741	83,85183	-1,18442819	82,6674	-0,039438	-0,025308	362,2510944	362,2116562	362,2257868
150	0	155,0435	83,80594	-1,35401893	82,4519	-0,037631	-0,164509	366,4604547	366,422824	366,2959457
150	1,0313	88,03627	71,97037	-0,71143192	71,2589	-0,081858	-1,328995	256,9650165	256,8831587	255,6360218
150	2,0625	21,02899	28,63878	-0,06884492	28,5699	-0,126085	-2,493481	84,47756675	84,35147172	81,98407625
152	0	18,1633	29,16739	-0,85711059	28,3103	-0,192821	-2,564867	80,23284433	80,04002352	77,6679775
152	1,0313	-141,0873	-47,54328	0,47499371	-47,0683	-0,199261	-3,509242	-277,5501063	-277,7493674	-281,0593484
152	2,0625	-300,338	-155,9154	1,807098	-154,108	-0,205701	-4,453618	-698,8617543	-698,6329786	-703,1096705
154	0	-317,696	-156,3291	-1,37831244	-157,707	-0,213458	-1,575369	-728,4195205	-728,6329786	-729,9948893
154	1,0313	-143,6246	-47,47949	-1,14537234	-48,6249	-0,194308	-1,199807	-283,961688	-284,1559964	-285,1614954
154	2,0625	30,44678	29,7086	-0,91243225	28,7962	-0,175159	-0,824246	97,17314861	96,99798967	96,34890257
156	0	25,87114	29,53237	-0,60634664	28,926	-0,125822	-0,811516	91,48452567	91,35870389	90,67300962
156	1,0313	95,92639	73,58573	-0,38698008	73,1987	-0,075095	-0,454003	271,1017981	271,0267034	270,6477949
156	2,0625	165,9816	86,14307	-0,16761351	85,9755	-0,024368	-0,09649	387,7270489	387,7026813	387,6305587
157	0	162,5262	86,1674	0,07988922	86,2473	-0,026917	-0,011056	383,7786551	383,7517377	383,7675996
157	1,0313	133,3055	66,27723	0,70915989	66,9864	0,074104	0,336136	307,2699544	307,3440587	307,6060909
157	2,0625	104,0848	14,89105	1,33843056	16,2295	0,175126	0,683328	167,7692322	167,9443581	168,4525607
158	0	102,2047	15,28718	1,49091289	16,7781	0,124564	0,723065	166,4222421	166,5468058	167,1453075
158	1,0313	-36,48301	-53,67417	1,97873397	-51,6954	0,255601	1,073605	-150,8187732	-150,563172	-149,7451685
158	2,0625	-175,1707	-123,3023	2,46655506	-120,836	0,386639	1,424144	-469,3934164	-469,0067776	-467,9692723
159	0	-205,9115	-123,2384	2,46655506	-120,772	0,386639	-1,548652	-509,2286288	-508,84199	-510,7772807
159	1,0313	-56,22335	-53,7055	1,97873397	-51,7268	0,255601	-1,197334	-176,5438792	-176,288278	-177,7412132
159	2,0625	93,46476	15,25925	1,49091289	16,7502	0,124564	-0,846016	155,0045247	155,1290884	154,1585088
160	0	88,18479	14,8621	1,33843056	16,2005	0,175126	-0,793808	147,0412963	147,2164221	146,2474885

160	1,0313	127,3074	66,25632	0,70915989	66,9655	0,074104	-0,43453	299,4306009	299,5047051	298,9960707
160	2,0625	166,43	86,15452	0,07988922	86,2344	-0,026917	-0,075252	388,8278839	388,8009665	388,7526314
161	0	163,0531	86,13101	-0,16761351	85,9634	-0,024368	0,0359	383,8958606	383,8714929	383,9317604
161	1,0313	103,0209	73,58462	-0,38698008	73,1976	-0,075095	0,418589	280,3224408	280,2473461	280,7410301
161	2,0625	42,98867	29,54221	-0,60634664	28,9359	-0,125822	0,801279	113,6311776	113,6311776	114,5582783
162	0	40,43633	29,71914	-0,91243225	28,8067	-0,175159	0,856807	110,1806407	110,0054818	111,0374478
162	1,0313	-122,5328	-47,45716	-1,14537234	-48,6025	-0,194308	1,269166	-256,4977716	-256,6920801	-255,2286054
162	2,0625	-285,502	-156,295	-1,37831244	-157,673	-0,213458	1,681525	-686,4991799	-686,7126379	-684,8176546
163	0	-301,8098	-158,4854	-6,35671314	-164,842	-0,130956	0,655316	-722,0369905	-722,1679469	-721,3816748
163	1,0313	-126,0681	-45,89998	-3,81008163	-49,7101	-0,1365	0,524202	-263,3086954	-263,4451955	-262,7844936
163	2,0625	49,67355	35,02394	-1,26345012	33,7605	-0,142044	0,393088	132,0966036	131,9545599	132,4896917
165	0	50,06732	33,98843	-0,13401538	33,8544	-0,099312	0,301672	132,7963462	132,6970341	133,0980185
165	1,0313	116,2506	78,83839	1,34097994	80,1794	-0,064298	0,135537	311,484502	311,4202043	311,6200393
165	2,0625	182,4339	92,19234	2,81597526	95,0083	-0,029284	-0,030598	427,1806363	427,1513528	427,1500384
166	0	184,9457	91,8528	2,9671799	94,82	-0,032661	-0,111699	430,0693482	430,0366869	429,9576489
166	1,0313	143,4655	70,85679	3,79707555	74,6539	0,056017	-0,285551	335,8128663	335,8688838	335,527315
166	2,0625	101,9853	18,36476	4,6269712	22,9917	0,144696	-0,459403	178,5643628	178,709059	178,1049596
168	0	108,1029	19,25273	3,9875791	23,2403	0,09737	-0,505373	187,0144389	187,1118091	186,5090662
168	1,0313	-49,4679	-53,57256	3,3512468	-50,2213	0,231129	-0,650964	-164,750888	-164,5197595	-165,401852
168	2,0625	-207,0387	-126,966	2,71491449	-124,251	0,364887	-0,796555	-517,6525606	-517,2876735	-518,4491157
169	0	-181,5693	-127,0518	2,71491449	-124,337	0,364887	0,105408	-484,7137829	-484,3488959	-484,6083752
169	1,0313	-33,88036	-53,54339	3,3512468	-50,1921	0,231129	0,065749	-144,4287526	-144,197624	-144,3630032
169	2,0625	113,8086	19,29816	3,9875791	23,2857	0,09737	0,026091	194,5226499	194,62002	194,548741
170	0	114,1778	18,41021	4,6269712	23,0372	0,144696	-0,022234	194,505522	194,6502182	194,4832881
170	1,0313	147,5947	70,88802	3,79707555	74,6851	0,056017	-0,059042	341,2432803	341,2992977	341,184238
170	2,0625	181,0116	91,86981	2,9671799	94,837	-0,032661	-0,095851	424,9890169	424,9563556	424,8931664
171	0	184,9319	92,20957	2,81597526	95,0255	-0,029284	-0,144177	430,4625925	430,4333089	430,3184156
171	1,0313	110,4668	78,84174	1,34097994	80,1827	-0,064298	-0,189144	303,9723529	303,9080551	303,7832088
171	2,0625	36,00177	33,97791	-0,13401538	33,8439	-0,099312	-0,234111	114,4900917	114,3907796	114,2559805
172	0	42,59395	35,01345	-1,26345012	33,75	-0,142044	-0,232644	122,872142	122,7300982	122,6394981
172	1,0313	-143,8482	-45,92496	-3,81008163	-49,735	-0,1365	-0,290592	-286,4727451	-286,6092452	-286,7633368
172	2,0625	-330,2904	-158,5249	-6,35671314	-164,882	-0,130956	-0,348539	-759,1406283	-759,2715847	-759,4891678
173	0	-246,5095	-127,6302	-23,9959978	-151,626	-0,093312	0,309247	-623,7148013	-623,8081137	-623,4055543
173	1,0313	-89,01459	-25,8988	-9,66569352	-35,5645	-0,080752	0,162979	-186,8479532	-186,9287053	-186,6849746
173	2,0625	68,48032	44,17113	4,66461073	48,8357	-0,068192	0,01671	186,6958988	186,627707	186,7126091

174	0	67,74847	43,14237	5,69997943	48,8423	-0,035085	-0,073593	185,7226202	185,6841128
174	1,0313	126,0949	83,23827	12,4110247	95,6493	-0,013301	-0,210561	355,2086705	355,0114107
174	2,0625	184,4414	91,83816	19,1220699	110,96	0,008482	-0,34753	461,7026993	461,3466872
175	0	185,7582	91,86766	18,7887839	110,656	0,010432	-0,374234	462,7985908	462,4243569
175	1,0313	145,8273	70,37127	14,8539214	85,2252	0,055997	-0,45934	360,0258694	359,5665298
175	2,0625	105,8964	17,37887	10,9190589	28,2979	0,101562	-0,544445	194,2611265	193,7166811
176	0	109,4198	18,00876	9,43833964	27,4471	0,071335	-0,556399	197,1398885	196,5834893
176	1,0313	-35,2369	-51,34698	-2,00217646	-53,3492	0,126387	-0,5879	-152,5062775	-153,094177
176	2,0625	-179,8936	-121,2709	-13,4426926	-134,714	0,181439	-0,6194	-503,2887891	-503,908189
177	0	-160,2533	-121,3403	-13,4426926	-134,783	0,181439	-0,456755	-477,7137562	-478,3519494
177	1,0313	-22,94177	-51,30365	-2,00217646	-53,3058	0,126387	-0,425936	-136,435957	-136,8618927
177	2,0625	114,3698	18,06615	9,43833964	27,5045	0,071335	-0,395117	203,6896531	203,2945363
178	0	115,2933	17,43544	10,9190589	28,3545	0,101562	-0,489685	206,5902402	206,1005556
178	1,0313	147,5928	70,41126	14,8539214	85,2652	0,055997	-0,425722	362,4009394	361,9752175
178	2,0625	179,8922	91,89107	18,7887839	110,68	0,010432	-0,361759	455,219617	454,8578578
179	0	182,5056	91,86155	19,1220699	110,984	0,008482	-0,45828	459,2329706	458,7662085
179	1,0313	117,238	83,24592	12,4110247	95,6569	-0,013301	-0,332874	343,7232857	343,3904121
179	2,0625	51,97041	43,13429	5,69997943	48,8343	-0,035085	-0,207468	165,2300617	165,0225941
180	0	57,20465	44,16333	4,66461073	48,8279	-0,068192	-0,221888	171,9537401	171,8000442
180	1,0313	-105,5927	-25,92177	-9,66569352	-35,5875	-0,080752	-0,044517	-208,526177	-208,489942
180	2,0625	-268,39	-127,6684	-23,9959978	-151,664	-0,093312	0,132854	-652,3290902	-652,1029243
181	0	-191,913	-119,0696	-73,412701	-192,482	-0,082868	-1,004291	-634,5343397	-635,4557632
181	1,0313	-56,64817	-21,81936	-23,304086	-45,1234	-0,041889	-1,120537	-163,9314	-165,0100481
181	2,0625	78,61668	43,76935	26,8045289	70,5739	-0,000909	-1,236782	243,3494529	242,1126709
182	0	77,60514	43,51272	20,5971772	64,1099	0,021684	-1,190831	229,1064743	227,9156437
182	1,0313	127,5473	81,92037	35,8589356	117,779	0,034101	-1,093418	401,3700556	400,2766371
182	2,0625	177,4894	88,83202	51,120694	139,953	0,046518	-0,996006	510,6416153	509,645609
183	0	177,5339	88,47225	50,5122726	138,985	0,054726	-0,969636	508,818746	507,7935122
183	1,0313	140,0737	68,26439	36,6161338	104,881	0,05478	-0,782405	391,9116711	391,0744861
183	2,0625	102,6135	16,56051	22,719995	39,2805	0,054833	-0,595175	212,0134461	211,3634386
184	0	101,6162	15,88456	27,2944391	43,179	0,045348	-0,612104	218,504386	217,8469339
184	1,0313	-28,38947	-47,3106	-20,944982	-68,2556	0,010281	-0,42124	-173,4071867	-173,8387077
184	2,0625	-158,3951	-111,0739	-69,1844032	-180,258	-0,024787	-0,230377	-566,4303176	-566,6606948
185	0	-122,3049	-111,1453	-69,1844032	-180,33	-0,024787	-0,150039	-519,6556852	-519,8057241
185	1,0313	-4,301683	-47,2673	-20,944982	-68,2123	0,010281	-0,324901	-142,0167453	-142,3416464

185	2,0625	113,7015	15,94386	27,2944391	43,2383	0,045348	-0,499763	234,2885667	234,3339152	233,7888035
186	0	116,5865	16,61866	22,719995	39,3387	0,054833	-0,581443	230,2398042	230,2946372	229,6583611
186	1,0313	143,6052	68,30651	36,6161338	104,923	0,05478	-0,765764	396,5320982	396,5868779	395,7663338
186	2,0625	170,6239	88,49835	50,5122726	139,011	0,054726	-0,950086	499,8323706	499,887097	498,8822849
188	0	173,0931	88,8575	51,120694	139,978	0,046518	-1,081599	504,9774174	505,0239351	503,8958181
188	1,0313	111,389	81,92995	35,8589356	117,789	0,034101	-1,171739	380,3834998	380,4176005	379,2117611
188	2,0625	49,68495	43,50639	20,5971772	64,1036	0,021684	-1,261878	192,7975605	192,8192443	191,5356826
189	0	51,30918	43,76283	26,8045289	70,5674	-0,000909	-1,405384	207,836658	207,8357487	206,431274
189	1,0313	-99,5204	-21,84123	-23,304086	-45,1453	-0,041889	-1,253378	-219,6671632	-219,7090518	-220,9205411
189	2,0625	-250,35	-119,1068	-73,412701	-192,519	-0,082868	-1,101372	-710,4939804	-710,5768483	-711,5953523
190	0	-247,0741	-124,2771	-23,484935	-147,762	0,004945	-5,135747	-616,7203596	-616,7154143	-621,8561071
190	1,0313	-91,57029	-25,13165	-9,67635423	-34,808	0,003192	-3,927871	-188,6573848	-188,6541925	-192,5852558
190	2,0625	63,93352	42,35228	4,13222655	46,4845	0,001439	-2,719994	176,082594	176,0840333	173,3625996
191	0	61,71342	42,20752	5,31639218	47,5239	0,023259	-2,622506	175,2752782	175,2985377	172,6527718
191	1,0313	122,2018	81,90683	12,0457435	93,9526	0,013122	-1,873333	346,7675377	346,7806594	344,8942043
191	2,0625	182,6902	90,11013	18,7750948	108,885	0,002984	-1,12416	455,2677756	455,2707595	454,1436153
192	0	180,398	90,11002	18,3974313	108,507	0,010809	-1,237306	451,53222337	451,5430423	450,2949272
192	1,0313	145,068	69,30189	14,674761	83,9767	0,008544	-0,784405	356,5417022	356,5502458	355,7572974
192	2,0625	109,738	16,99776	10,9520908	27,9498	0,006279	-0,331503	198,5591491	198,5654277	198,2276461
193	0	107,1897	16,68893	9,20772309	25,8967	-0,002001	-0,447183	191,1398962	191,137895	190,6927128
193	1,0313	-26,23734	-49,5522	-1,33904171	-50,8912	-0,015906	-0,107154	-135,8910219	-135,9069276	-135,998176
193	2,0625	-159,6644	-116,3615	-11,8858065	-128,247	-0,02981	0,232875	-464,0582856	-464,0880958	-463,8254104
194	0	-150,1232	-116,4309	-11,8858065	-128,317	-0,02981	0,426527	-451,7935456	-451,8233559	-451,3670189
194	1,0313	-18,26634	-49,50921	-1,33904171	-50,8482	-0,015906	0,079089	-125,4427354	-125,4586411	-125,3636466
194	2,0625	113,5905	16,74566	9,20772309	25,9534	-0,002001	-0,268349	199,5744471	199,5724459	199,306098
195	0	113,5795	17,05385	10,9520908	28,0059	0,006279	-0,234388	203,6652577	203,6715363	203,4308692
195	1,0313	145,7085	69,34162	14,674761	84,0164	0,008544	-0,716665	357,4538445	357,4623881	356,73718
195	2,0625	177,8375	90,13338	18,3974313	108,531	0,010809	-1,198941	448,2504097	448,2612184	447,0514691
196	0	177,2506	90,13326	18,7750948	108,908	0,002984	-1,167938	448,2454839	448,2454839	447,0745618
196	1,0313	114,4757	81,91461	12,0457435	93,9604	0,013122	-1,959278	336,7391607	336,7522824	334,7798823
196	2,0625	51,70088	42,19994	5,31639218	47,5163	0,023259	-2,750619	162,2437998	162,2670593	159,4931813
197	0	51,36649	42,34454	4,13222655	46,4768	0,001439	-2,923075	159,7299583	159,7313976	156,806883
197	1,0313	-102,7396	-25,15399	-9,67635423	-34,8303	0,003192	-4,171345	-203,2221661	-203,2189738	-207,3935116
197	2,0625	-256,8457	-124,314	-23,484935	-147,799	0,004945	-5,419616	-629,4972866	-629,4923413	-634,9169023
198	0	-304,445	-153,2993	-5,76345009	-159,063	0,067031	-0,394814	-713,903959	-713,8369281	-714,2987729

198	1,0313	-130,634	-44,18952	-3,80725306	-47,9968	0,031084	-0,624932	-265,8177602	-265,7866757	-266,4426925
198	2,0625	43,17702	33,25871	-1,85105603	31,4077	-0,004862	-0,855051	118,9454427	118,9405808	118,090392
199	0	41,89213	33,51482	-0,49373847	33,0211	0,0116	-0,868232	120,5019262	120,5135263	119,6336941
199	1,0313	112,2343	77,97735	1,04843676	79,0258	-0,011403	-0,876489	303,9561887	303,9447853	303,0796995
199	2,0625	182,5765	90,94387	2,590612	93,5345	-0,034407	-0,884746	424,4184296	424,3840226	423,5336834
200	0	179,8637	90,63417	2,70551906	93,3397	-0,02964	-0,877175	420,5022113	420,4725715	419,6250368
200	1,0313	144,9543	70,12142	3,74637224	73,8678	-0,024014	-0,747906	336,1761632	336,1521496	335,4282573
200	2,0625	110,0449	18,11265	4,78722542	22,8999	-0,018387	-0,618637	188,8580935	188,8397062	188,2394563
201	0	106,7301	17,62796	3,80493279	21,4329	-0,025699	-0,640788	181,6149704	181,5892717	180,9741828
201	1,0313	-35,20593	-51,66879	4,11736384	-47,5514	-0,009503	-0,472458	-140,870569	-140,8800718	-141,3430268
201	2,0625	-177,142	-121,5337	4,42979489	-117,104	0,006693	-0,304128	-464,4924539	-464,4857608	-464,7965821
202	0	-170,5349	-121,6234	4,42979489	-117,194	0,006693	0,094096	-456,0826243	-456,0759312	-455,9885282
202	1,0313	-28,51136	-51,64052	4,11736384	-47,5232	-0,009503	-0,13707	-132,1110812	-132,120584	-132,2481511
202	2,0625	113,5122	17,67554	3,80493279	21,4805	-0,025699	-0,368236	190,5268342	190,5011355	190,1585982
203	0	112,6223	18,16029	4,78722542	22,9475	-0,018387	-0,420925	192,3040055	192,2856183	191,8830805
203	1,0313	146,8781	70,15527	3,74637224	73,9016	-0,024014	-0,628681	338,7448706	338,720857	338,1161899
203	2,0625	181,134	90,65423	2,70551906	93,3598	-0,02964	-0,836436	422,193714	422,1640742	421,3572777
204	0	179,9037	90,96357	2,590612	93,5542	-0,034407	-0,915468	420,9831894	420,9487824	420,0677214
204	1,0313	108,8271	77,98217	1,04843676	79,0306	-0,011403	-0,999979	299,5364497	299,5250463	298,536471
204	2,0625	37,75051	33,50475	-0,49373847	33,011	0,0116	-1,084489	115,0976885	115,1092886	114,0131991
205	0	35,49213	33,24817	-1,85105603	31,3971	-0,004862	-1,137561	108,9340093	108,9291474	107,7964487
205	1,0313	-138,8104	-44,21545	-3,80725306	-48,0227	0,031084	-1,01399	-276,4988751	-276,4677906	-277,5128649
205	2,0625	-313,1128	-153,3406	-5,76345009	-159,104	0,067031	-0,890419	-725,2547554	-725,1877246	-726,1451745
206	0	-306,0843	-154,3995	-2,05006601	-156,45	0,047481	0,756328	-710,8087309	-710,76125	-710,052403
206	1,0313	-136,738	-47,32023	-1,65542295	-48,9757	0,02782	0,523897	-275,7106824	-275,6828624	-275,1867849
206	2,0625	32,60835	28,09754	-1,26077989	26,8368	0,008159	0,291467	96,0643701	96,07252919	96,35583723
207	0	32,80421	29,16614	-0,76777806	28,3984	0,013275	0,193249	99,44219589	99,45547103	99,63544499
207	1,0313	102,0267	73,56243	-0,24870292	73,3137	-0,004156	-0,012846	279,2621194	279,2579635	279,249273
207	2,0625	171,2491	86,46271	0,27037223	86,7331	-0,021587	-0,218942	396,0900212	396,0684345	395,8710794
208	0	168,7449	86,45832	0,48182685	86,9402	-0,019584	-0,238563	393,2487297	393,2291456	393,0101669
208	1,0313	135,1199	66,95745	1,11208957	68,0695	-0,0185	-0,39002	311,7949614	311,7764616	311,4049417
208	2,0625	101,4949	15,96057	1,74235228	17,7029	-0,017416	-0,541477	167,3491716	167,331756	166,8076949
209	0	96,62457	15,0437	1,62274385	16,6664	-0,018244	-0,540584	158,9448277	158,9265833	158,4042439
209	1,0313	-41,58845	-52,49425	2,30104615	-50,1932	-0,016256	-0,645508	-154,4513875	-154,467644	-155,0968955
209	2,0625	-179,8015	-120,6004	2,97934844	-117,621	-0,014269	-0,750432	-468,9839483	-468,9982168	-469,7343804

210	0	-172,52	-120,6859	2,97934844	-117,707	-0,014269	-0,277085	-459,6891185	-459,703387	-459,9662035
210	1,0313	-33,61538	-52,46473	2,30104615	-50,1637	-0,016256	-0,25255	-144,027361	-144,0436174	-144,279911
210	2,0625	105,2893	15,08961	1,62274385	16,7124	-0,018244	-0,228015	170,3007687	170,2825243	170,0727536
211	0	105,1332	16,00687	1,74235228	17,7492	-0,017416	-0,31338	172,1716533	172,1542377	171,8582731
211	1,0313	138,0901	66,98892	1,11208957	68,101	-0,0185	-0,259296	315,7191996	315,7006997	315,4599038
211	2,0625	171,0471	86,47495	0,48182685	86,9568	-0,019584	-0,205211	396,2747243	396,2551402	396,0695129
212	0	168,6176	86,47941	0,27037223	86,7498	-0,021587	-0,273738	392,7023901	392,6808034	392,428652
212	1,0313	98,58258	73,56433	-0,24870292	73,3156	-0,004156	-0,167069	274,7886035	274,7844476	274,6215345
212	2,0625	28,5476	29,15324	-0,76777806	28,3855	0,013275	-0,0604	93,88279522	93,89607036	93,82239544
220	0	23,63133	28,08436	-1,26077989	26,8236	0,008159	-0,042296	84,36788343	84,37604252	84,32558724
220	1,0313	-145,4912	-47,34809	-1,65542295	-49,0035	0,02782	0,103923	-287,1455672	-287,1177472	-287,0416438
220	2,0625	-314,6137	-154,442	-2,05006601	-156,492	0,047481	0,250143	-721,9820139	-721,934533	-721,7318708
222	0	155,763	81,63109	-0,6414854	80,9896	0,038306	-0,002441	364,4711079	364,5094143	364,4686671
222	1,0313	99,51459	60,99145	-0,30345708	60,688	0,014228	-0,076007	250,7449574	250,7591852	250,66895
222	2,0625	43,26619	8,855796	0,03457124	8,89037	-0,009851	-0,149574	74,02678531	74,01693443	73,87721128
223	0	39,22464	8,391135	-1,10769752	7,28344	0,00055	-0,220025	65,55890189	65,55945225	65,33887705
223	1,0313	-119,9441	-59,49371	-0,20892288	-59,7026	-0,032304	-0,305728	-275,3325602	-275,3648639	-275,6382883
223	2,0625	-279,1128	-127,9467	0,68985176	-127,257	-0,065158	-0,391431	-617,3603679	-617,4255257	-617,7517993
225	0	-157,0571	-128,0243	0,68985176	-127,334	-0,065158	0,700689	-458,8431823	-458,9083401	-458,1424937
225	1,0313	-27,54074	-59,4576	-0,20892288	-59,6665	-0,032304	0,532475	-155,1360094	-155,1683132	-154,603534
225	2,0625	101,9756	8,442314	-1,10769752	7,33462	0,00055	0,364262	147,2375356	147,238086	147,6017978
226	0	101,5621	8,90704	0,03457124	8,94161	-0,009851	0,368578	149,913995	149,9041441	150,2825732
226	1,0313	128,0396	61,02613	-0,30345708	60,7227	0,014228	0,190459	287,8967873	287,9110151	288,0872461
226	2,0625	154,517	81,64921	-0,6414854	81,0077	0,038306	0,012339	362,887558	362,9258645	362,8998975
228	0	152,6176	81,59352	-0,63567902	80,9578	0,03874	0,015609	360,3186009	360,3573412	360,3342096
228	1,0313	82,46397	72,15221	-0,02570159	72,1265	0,023367	-0,183899	251,4561828	251,47955	251,2722839
228	2,0625	12,31032	31,21489	0,58427584	31,7992	0,007994	-0,383407	79,60174313	79,60973724	79,21833652
229	0	9,544435	30,68522	-0,63443596	30,0508	0,019638	-0,425143	72,50934198	72,52898031	72,08419913
229	1,0313	-158,1675	-40,89743	0,6086169	-40,2888	-0,003965	-0,634696	-286,1954131	-286,1993776	-286,8301092
229	2,0625	-325,8795	-144,1416	1,85166975	-142,29	-0,027567	-0,844249	-708,2231642	-708,2507316	-709,0674136
232	0	-135,1885	-139,4842	-19,0595887	-158,544	0,002264	0,634538	-492,8326127	-492,8303484	-492,198075
232	1,0313	-11,63889	-38,36191	-7,53234463	-45,8943	0,031682	0,695178	-106,9190601	-106,887378	-106,2238825
232	2,0625	111,9107	31,09888	3,99489943	35,0938	0,0611	0,755818	215,6714965	215,7325963	216,4273141
233	0	114,1773	32,69944	5,66980127	38,3692	-0,010585	0,708725	225,1689408	225,1583558	225,877666
233	1,0313	137,3155	73,3806	10,4266831	83,8073	-0,036554	0,537701	346,1247569	346,0882031	346,6624575

233	2,0625	160,4538	82,56575	15,1835649	97,7493	-0,062523	0,366676	404,0885515	404,0260288	404,4552274
277	0	160,3517	82,79106	15,096013	97,8871	-0,065867	0,309899	404,2314126	404,1655453	404,5413116
277	1,0313	84,11523	60,88473	9,51992425	70,4047	-0,033685	0,042352	250,159116	250,1254315	250,2014678
277	2,0625	7,87872	7,482396	3,94383548	11,4262	-0,001502	-0,225196	33,09479793	33,09329608	32,8696024
322	0	4,265815	6,086009	2,11344191	8,19945	0,065775	-0,264264	21,94446223	22,01023719	21,6801985
322	1,0313	-167,9747	-61,58408	-9,77417015	-71,3583	0,028332	-0,530953	-361,0835926	-361,0552611	-361,6145458
322	2,0625	-340,2152	-129,8223	-21,6617822	-151,484	-0,009112	-0,797643	-745,2479931	-745,2571049	-746,0456357
327	0	-136,7251	-129,8971	-21,6617822	-151,559	-0,009112	0,08996	-480,8603218	-480,8694336	-480,7703623
327	1,0313	-14,32073	-61,54631	-9,77417015	-71,3205	0,028332	0,131579	-161,2579141	-161,2295825	-161,1263351
327	2,0625	108,0836	6,137629	2,11344191	8,25107	0,065775	0,173198	157,0108658	157,0766408	157,1840642
328	0	110,455	7,534332	3,94383548	11,4782	-0,001502	0,172968	166,5478028	166,546301	166,720771
328	1,0313	132,5013	60,91963	9,51992425	70,4396	-0,033685	0,235592	313,1307613	313,0970768	313,3663534
328	2,0625	154,5476	82,80892	15,096013	97,9049	-0,065867	0,298216	396,7216983	396,655831	397,0199142
329	0	153,0671	82,58397	15,1835649	97,7675	-0,062523	0,316727	394,522309	394,4597864	394,8390357
329	1,0313	76,70221	73,38233	10,4266831	83,809	-0,036554	0,285175	267,3308895	267,2943357	267,6160644
329	2,0625	0,337314	32,68467	5,66980127	38,3545	-0,010585	0,253623	77,14744854	77,13686354	77,40107155
330	0	-4,176834	31,08426	3,99489943	35,0792	0,0611	0,254232	64,72842864	64,78952839	64,9826609
330	1,0313	-173,2419	-38,39213	-7,53234463	-45,9245	0,031682	0,005641	-317,0633839	-317,0317019	-317,0577426
330	2,0625	-342,3069	-139,53	-19,0595887	-158,59	0,002264	-0,24295	-762,1781924	-762,1759281	-762,4211421
331	0	-101,8758	-179,6692	-84,248176	-263,917	1,575278	3,843709	-660,2733752	-658,6980977	-656,4296661
331	1,0313	28,10785	-53,42376	-29,0540508	-82,4778	0,547447	2,74973	-128,4154162	-127,8679693	-125,6656863
331	2,0625	158,0915	41,16023	26,1400744	67,3003	-0,480384	1,655751	340,1195468	339,6391631	341,7752976
332	0	159,4297	38,79821	20,2460099	59,0442	-0,354739	1,639525	325,3470452	324,9923059	326,9865704
332	1,0313	172,584	84,74151	35,9400252	120,682	-0,65626	0,994805	465,7223194	465,0660591	466,717124
332	2,0625	185,7384	99,1888	51,6340405	150,823	-0,957781	0,350084	543,1055721	542,1477907	543,455656
333	0	194,8893	99,36156	51,7723999	151,134	-0,968982	0,473237	555,6240432	554,655061	556,0972804
333	1,0313	93,46	72,94595	34,2442678	107,19	-0,65359	0,045242	335,878425	335,2248355	335,9236674
333	2,0625	-7,969329	15,03432	16,7161357	31,7505	-0,338197	-0,382752	53,14078522	52,80258836	52,75803288
334	0	3,030058	17,8786	22,6976101	40,5762	-0,481792	-0,275961	85,09149085	84,60969865	84,81553019
334	1,0313	-251,3732	-74,08499	-35,0275957	-109,113	0,650628	-0,706204	-545,0103678	-544,3597394	-545,7165719
334	2,0625	-505,7765	-166,6168	-92,7528014	-259,37	1,783049	-1,136447	-1176,248572	-1174,465523	-1177,38502
335	0	-168,9063	-166,7007	-92,7528014	-259,454	1,783049	-1,084811	-738,4851612	-736,7021122	-739,5699722
335	1,0313	-8,967746	-74,05276	-35,0275957	-109,08	0,650628	-0,652638	-229,8187773	-229,1681489	-230,471415
335	2,0625	150,9708	17,92838	22,6976101	40,626	-0,481792	-0,220464	277,5139787	277,0321865	277,2935144
336	0	143,8826	15,08452	16,7161357	31,8007	-0,338197	-0,323693	250,648722	250,3105252	250,3250293

336	1,0313	165,7644	72,98083	34,2442678	107,225	-0,65359	0,098406	429,9439471	429,2903576	430,0423531
336	2,0625	187,6462	99,38113	51,7723999	151,154	-0,968982	0,520505	546,2471506	545,2781684	546,7676554
337	0	187,9795	99,20885	51,6340405	150,843	-0,957781	0,40969	546,0591218	545,1013405	546,4688119
337	1,0313	92,59662	84,74455	35,9400252	120,685	-0,65626	1,016323	361,7447467	361,0884864	362,7610692
337	2,0625	-2,786259	38,78423	20,2460099	59,0302	-0,354739	1,622955	114,43835	114,0836107	116,061305
338	0	1,101159	41,14695	26,1400744	67,287	-0,480384	1,658803	136,0055574	135,5251737	137,66436
338	1,0313	-233,8382	-53,45765	-29,0540508	-82,5117	0,547447	2,630745	-469,0130967	-468,4656498	-466,3823519
338	2,0625	-468,7776	-179,7238	-84,248176	-263,972	1,575278	3,602687	-1137,354747	-1135,779469	-1133,75206
339	0	-134,7206	-142,2459	-19,3971225	-161,643	0,347343	-0,110883	-498,4229245	-498,0755817	-498,5338078
339	1,0313	-10,00222	-39,4076	-7,66423671	-47,0718	0,174408	0,105076	-107,1465486	-106,9721403	-107,0414726
339	2,0625	114,7162	31,76923	4,06864906	35,8379	0,001474	0,321035	220,8068313	220,8083051	221,1278665
340	0	116,4822	33,00698	5,69971602	38,7067	-0,026832	0,31958	228,840254	228,8134218	229,1598336
340	1,0313	139,2797	74,19126	10,5195063	84,7108	-0,119561	0,312894	350,4851022	350,3655408	350,7979962
340	2,0625	162,0771	83,87953	15,3392966	99,2188	-0,212291	0,306208	409,1379288	408,9256382	409,4441373
341	0	161,9506	84,05977	15,2453166	99,3051	-0,207669	0,292167	409,1459904	408,9383211	409,4381579
341	1,0313	84,44203	61,87886	9,64032678	71,5192	-0,15468	0,196791	252,8130243	252,6583448	253,0098151
341	2,0625	6,933444	8,201943	4,03533694	12,2373	-0,10169	0,101414	33,48803671	33,38634689	33,5894507
353	0	3,639513	7,075205	2,23611137	9,31132	-0,062927	0,106674	23,35399961	23,29107218	23,46067373
353	1,0313	-171,2375	-62,07309	-9,82277704	-71,8959	0,056613	0,037914	-366,4004518	-366,3438386	-366,3625375
353	2,0625	-346,1145	-131,7896	-21,8816654	-153,671	0,176154	-0,030845	-757,2912488	-757,1150951	-757,3220943
355	0	-134,6341	-131,8663	-21,8816654	-153,748	0,176154	-0,843596	-482,5202642	-482,3441104	-483,3638598
355	1,0313	-11,83917	-62,03667	-9,82277704	-71,8595	0,056613	-0,562179	-159,1098188	-159,0532056	-159,6719975
355	2,0625	110,9557	7,126155	2,23611137	9,36227	-0,062927	-0,280762	162,9669988	162,9040714	162,686237
356	0	113,0974	8,252969	4,03533694	12,2883	-0,10169	-0,241796	171,6032482	171,5015584	171,3614526
356	1,0313	134,3532	61,91347	9,64032678	71,5538	-0,15468	0,036141	317,7667148	317,6120353	317,8028562
356	2,0625	155,6089	84,07796	15,2453166	99,3233	-0,207669	0,314078	400,9381599	400,7304905	401,2522381
357	0	154,2273	83,89785	15,3392966	99,2371	-0,212291	0,367234	398,9698218	398,7575312	399,3370557
357	1,0313	76,36618	74,1936	10,5195063	84,7131	-0,119561	0,544899	268,7022441	268,5826827	269,2471436
357	2,0625	-1,494963	32,99333	5,69971602	38,693	-0,026832	0,722565	75,44264492	75,41581265	76,16520991
358	0	-5,720727	31,7556	4,06864906	35,8242	0,001474	0,76176	64,21154699	64,21302079	64,97330746
358	1,0313	-177,3128	-39,4366	-7,66423671	-47,1008	0,174408	0,716214	-324,7083152	-324,5339069	-323,9921015
358	2,0625	-348,9049	-142,2903	-19,3971225	-161,687	0,347343	0,670667	-776,9511734	-776,6038306	-776,2805066
359	0	-197,9303	-143,8011	1,86313706	-141,938	0,004198	-0,733027	-541,1852651	-541,181067	-541,9182921
359	1,0313	-59,20646	-41,14974	0,55857971	-40,5912	0,074569	-0,548038	-158,1507133	-158,0761448	-158,698751
359	2,0625	79,51739	29,8401	-0,74597764	29,0941	0,144939	-0,363048	161,5608424	161,7057814	161,197794

360	0	78,15674	30,46651	0,48287766	30,9494	0,12576	-0,321227	163,5025386	163,6282986	163,1813115
360	1,0313	118,3933	71,51221	-0,10609054	71,4061	0,109543	-0,15158	296,7234724	296,8330151	296,5718921
360	2,0625	158,6298	81,0619	-0,69505873	80,3668	0,093325	0,018067	366,9523846	367,0457099	366,9704512
361	0	155,2313	81,06728	-0,70812028	80,3592	0,102288	0,017936	362,5189813	362,6212689	362,536917
361	1,0313	98,13154	60,79475	-0,32066413	60,4741	0,019623	0,162028	248,5191703	248,538793	248,6811983
361	2,0625	41,03179	9,026211	0,06679203	9,093	-0,063042	0,30612	71,52733774	71,46429563	71,83345796
362	0	36,81278	8,388396	-1,09668818	7,29171	-0,030684	0,304857	62,44002417	62,40933967	62,74488124
362	1,0313	-122,4269	-58,40787	-0,06342644	-58,4713	-0,2035	0,434674	-276,0976182	-276,3011186	-275,6629441
362	2,0625	-281,6667	-125,7723	0,96983531	-124,802	-0,376316	0,564491	-615,7716062	-616,1479225	-615,2071151
363	0	-149,2277	-125,8529	0,96983531	-124,883	-0,376316	-0,520715	-443,7621099	-444,1384261	-444,2828245
363	1,0313	-22,25334	-58,37391	-0,06342644	-58,4373	-0,2035	-0,399291	-145,8040037	-146,0075041	-146,2032951
363	2,0625	104,721	8,438286	-1,09668818	7,3416	-0,030684	-0,277868	150,8204746	150,7897901	150,5426065
364	0	104,515	9,075891	0,06679203	9,14268	-0,063042	-0,217206	154,1548507	154,0918086	153,937645
364	1,0313	129,1878	60,82871	-0,32066413	60,508	0,019623	-0,109873	288,9602101	288,9798328	288,8503373
364	2,0625	153,8606	81,08552	-0,70812028	80,3774	0,102288	-0,00254	360,7735479	360,8758354	360,771008
373	0	152,0913	81,07999	-0,69505873	80,3849	0,093325	0,046258	358,4885332	358,5818585	358,5347907
373	1,0313	80,38288	71,51472	-0,10609054	71,4086	0,109543	0,139762	247,3150082	247,4245508	247,4547701
373	2,0625	8,674484	30,45344	0,48287766	30,9363	0,12576	0,233266	73,14946164	73,27522166	73,38272784
374	0	5,809481	29,8269	-0,74597764	29,0809	0,144939	0,230983	65,71417518	65,8591142	65,94515862
374	1,0313	-162,8523	-41,17826	0,55857971	-40,6197	0,074569	0,346534	-292,9473057	-292,8727372	-292,6007713
374	2,0625	-331,514	-143,8449	1,86313706	-141,982	0,004198	0,462085	-714,9317827	-714,9275846	-714,4696973
375	0	-248,8609	-150,4876	1,31776253	-149,17	0,204069	-0,581263	-621,8588672	-621,6547979	-622,4401299
375	1,0313	-96,30136	-45,33112	0,72249687	-44,6086	0,153646	-0,465508	-214,40902	-214,2553735	-214,8745276
375	2,0625	56,25814	28,1639	0,1272312	28,2911	0,103223	-0,349753	129,7178313	129,8210548	129,3680786
376	0	54,58584	28,63218	0,24458934	28,8768	0,122254	-0,311218	128,7151418	128,8373958	128,4039242
376	1,0313	107,5794	71,30431	-0,15289232	71,1514	0,061462	-0,182319	282,1560179	282,2174803	281,9736994
376	2,0625	160,5729	82,48043	-0,55037397	81,9301	0,000671	-0,05342	372,6048725	372,6055432	372,551453
377	0	157,1696	82,48382	-0,47653693	82,0073	0,008524	-0,017754	368,3350524	368,3435762	368,3172987
377	1,0313	110,4193	62,41252	-0,44562463	61,9669	-0,049462	0,120976	267,4789357	267,429474	267,5999121
377	2,0625	63,66909	10,8452	-0,41471233	10,4305	-0,107447	0,259707	103,6307974	103,5233504	103,890504
378	0	59,22853	10,41912	-0,40784533	10,0113	-0,112993	0,291363	97,01964453	96,90665112	97,31100752
378	1,0313	-90,89309	-57,22518	-0,22775765	-57,4529	-0,181074	0,429777	-233,0668868	-233,2479611	-232,6371103
378	2,0625	-241,0147	-125,4376	-0,04766997	-125,485	-0,249155	0,56819	-564,2897637	-564,538919	-563,7215737
379	0	-166,237	-125,5207	-0,04766997	-125,568	-0,249155	-0,452047	-467,2447061	-467,4938614	-467,6967533
379	1,0313	-32,25654	-57,19326	-0,22775765	-57,421	-0,181074	-0,362797	-156,7755277	-156,9566602	-157,1383247

379	2,0625	101,7239	10,46734	-0,40784533	10,0595	-0,112993	-0,273547	152,3600229	152,2470295	152,0864761
383	0	100,5461	10,89331	-0,41471233	10,4786	-0,107447	-0,232426	151,6671654	151,5597184	151,4347399
383	1,0313	129,6699	62,44533	-0,44562463	61,9997	-0,049462	-0,136232	292,5702851	292,5208235	292,4340531
383	2,0625	158,7937	82,50134	-0,47653693	82,0248	0,008524	-0,040038	370,4813832	370,489907	370,4413448
384	0	156,2831	82,49783	-0,55037397	81,9475	0,000671	-0,003574	367,0629838	367,0636545	367,0594097
384	1,0313	85,67688	71,3064	-0,15289232	71,1535	0,061462	0,106572	253,6869513	253,7484137	253,7935232
384	2,0625	15,07063	28,61895	0,24458934	28,8635	0,122254	0,216718	77,31889726	77,44115123	77,53561504
387	0	11,47866	28,15047	0,1272312	28,2777	0,103223	0,240447	71,47767103	71,58089445	71,71811782
387	1,0313	-157,3164	-45,35979	0,72249687	-44,6373	0,153646	0,365361	-293,7859231	-293,6322767	-293,4205625
387	2,0625	-326,1115	-150,5316	1,31776253	-149,214	0,204069	0,490274	-722,3725132	-722,1684438	-721,8822389
388	0	-281,5407	-154,634	0,30833105	-154,326	0,268487	-0,423667	-674,6543787	-674,3858921	-675,078046
388	1,0313	-120,5112	-48,24624	0,20641744	-48,0398	0,184165	-0,338247	-252,7442301	-252,5600656	-253,0824775
388	2,0625	40,51827	26,48008	0,10450384	26,5846	0,099843	-0,252828	105,8429224	105,9427649	105,5900949
390	0	39,57745	27,20214	0,19684662	27,399	0,122602	-0,217906	106,248657	106,3712587	106,0307506
390	1,0313	100,7564	70,91331	0,08101266	70,9943	0,042439	-0,127342	272,9719985	273,0144372	272,8446567
390	2,0625	161,9354	83,12848	-0,03482131	83,0937	-0,037724	-0,036777	376,7033185	376,6655941	376,6665413
391	0	158,8229	83,14982	0,06711984	83,2169	-0,029402	0,008106	372,9036181	372,874216	372,911724
391	1,0313	119,2386	63,59676	-0,05346159	63,5433	-0,076864	0,10248	282,0968284	282,0199645	282,1993084
391	2,0625	79,6544	12,54769	-0,17404301	12,3736	-0,124326	0,196854	128,2980172	128,1736914	128,4948712
392	0	74,87318	11,93488	-0,10783862	11,827	-0,132407	0,240433	120,9892247	120,8568181	121,2296582
392	1,0313	-68,40852	-55,37312	-0,24515039	-55,6183	-0,177142	0,331702	-200,1676089	-200,3447507	-199,8359072
392	2,0625	-211,6902	-123,2493	-0,38246216	-123,632	-0,221877	0,42297	-522,6826652	-522,0378182	-522,0378182
397	0	-172,0779	-123,3342	-0,38246216	-123,717	-0,221877	-0,399523	-471,1347025	-471,3565796	-471,534226
397	1,0313	-35,92467	-55,34285	-0,24515039	-55,588	-0,177142	-0,317743	-157,8780796	-158,0552215	-158,1958231
397	2,0625	100,2286	11,98171	-0,10783862	11,8739	-0,132407	-0,235963	154,0449154	153,9125089	153,8089521
399	0	99,32488	12,59449	-0,17404301	12,4204	-0,124326	-0,196659	153,9632256	153,8388999	153,7665666
399	1,0313	130,2591	63,62854	-0,05346159	63,5751	-0,076864	-0,108254	296,4869502	296,4100863	296,3786965
399	2,0625	161,1933	83,16659	0,06711984	83,2337	-0,029402	-0,019848	376,0186532	375,9892512	375,9988049
400	0	158,3191	83,14516	-0,03482131	83,1103	-0,037724	0,021632	372,0354634	371,997739	372,0570957
400	1,0313	88,46076	70,91495	0,08101266	70,996	0,042439	0,11365	256,9909182	257,0333568	257,1045685
400	2,0625	18,60246	27,18873	0,19684662	27,3856	0,122602	0,205668	78,95435138	79,07695309	79,16001967
402	0	13,96588	26,46645	0,10450384	26,571	0,099843	0,242356	71,29754972	71,39739223	71,53990567
402	1,0313	-154,4612	-48,27484	0,20641744	-48,0684	0,184165	0,336789	-296,9363837	-296,7522191	-296,5995947
402	2,0625	-322,8882	-154,6776	0,30833105	-154,369	0,268487	0,431222	-728,4933131	-728,2248265	-728,0620911
403	0	-300,5485	-156,937	-0,85404069	-157,791	0,281344	-0,3382	-706,2951225	-706,013778	-706,6333226

403	1,0313	-133,7814	-49,52484	-0,62864668	-50,1535	0,183018	-0,27043	-274,2227636	-274,0397458	-274,4931938
403	2,0625	32,98575	26,22582	-0,40325267	25,8226	0,084691	-0,20266	94,52659926	94,61129049	94,32393904
420	0	32,67913	27,02308	-0,2115519	26,8115	0,116921	-0,167505	96,10591736	96,2228388	95,93841237
420	1,0313	99,00821	71,47316	-0,03869237	71,4345	0,0321	-0,097717	271,5796018	271,6117017	271,4818846
420	2,0625	165,3373	84,42723	0,13416717	84,5614	-0,052722	-0,027929	384,0612646	384,008543	384,0333353
421	0	162,6547	84,44733	0,28355824	84,7309	-0,043242	0,015608	380,9128762	380,8696343	380,9284846
421	1,0313	127,1013	65,17931	0,39235239	65,5717	-0,084945	0,085322	296,3749565	296,2900119	296,4602783
421	2,0625	91,54783	14,41527	0,50114653	14,9164	-0,126647	0,155035	148,8450153	148,7183679	149,0000504
463	0	86,86397	13,75242	0,55328111	14,3057	-0,142089	0,196842	141,5345508	141,3924617	141,7313927
463	1,0313	-52,93894	-53,49769	0,59662167	-52,9011	-0,171589	0,261005	-174,6227593	-174,7943487	-174,3617547
463	2,0625	-192,7419	-121,316	0,63996223	-120,676	-0,20109	0,325167	-491,9164149	-492,1175047	-491,5912478
517	0	-171,6806	-121,4028	0,63996223	-120,763	-0,20109	-0,332593	-464,7103916	-464,9114813	-465,0429848
517	1,0313	-34,54407	-53,46892	0,59662167	-52,8723	-0,171589	-0,265267	-150,6518798	-150,8234692	-150,9171467
517	2,0625	102,5924	13,79814	0,55328111	14,3514	-0,142089	-0,197941	162,0730043	161,9309152	161,8750637
518	0	102,0514	14,46098	0,50114653	14,9621	-0,126647	-0,157826	162,591029	162,4643816	162,4332028
518	1,0313	133,5042	65,21038	0,39235239	65,6027	-0,084945	-0,085355	304,7608603	304,6759157	304,6755057
518	2,0625	164,9569	84,46376	0,28355824	84,7473	-0,043242	-0,012883	383,9386701	383,8954281	383,9257871
527	0	162,2392	84,44357	0,13416717	84,5777	-0,052722	0,030229	380,0684296	380,0137079	380,0966583
527	1,0313	91,77031	71,47485	-0,03869237	71,4362	0,0321	0,10168	262,1737186	262,2058185	262,2753986
527	2,0625	21,30142	27,01012	-0,2115519	26,7986	0,116921	0,173131	81,2889861	81,40590754	81,46211739
530	0	16,43832	26,21258	-0,40325267	25,8093	0,084691	0,20991	72,988464	73,07315523	73,19837372
530	1,0313	-153,2399	-49,55265	-0,62864668	-50,1813	0,183018	0,278094	-299,5744952	-299,3914774	-299,2964016
530	2,0625	-322,9182	-156,9794	-0,85404069	-157,833	0,281344	0,346278	-735,4604505	-735,1791061	-735,1141729
531	0	-304,3501	-155,7156	-2,25759089	-157,973	0,253896	-0,29565	-711,6015274	-711,3476317	-711,8971777
531	1,0313	-135,1658	-48,00745	-1,76982293	-49,7773	0,152587	-0,239212	-275,2700429	-275,1174561	-275,5092545
531	2,0625	34,01858	28,0392	-1,28205497	26,7571	0,051278	-0,182773	97,73844563	97,78972342	97,55567266
534	0	34,16973	28,69897	-0,83848073	27,8605	0,105184	-0,149785	100,1416191	100,2468028	99,99183402
534	1,0313	103,1409	73,46932	-0,26041441	73,2089	0,027614	-0,087679	280,5010085	280,5286226	280,4133299
534	2,0625	172,1121	86,74366	0,3176519	87,0613	-0,049956	-0,025572	397,8683763	397,8184207	397,8428042
536	0	169,74	86,69169	0,52161091	87,2133	-0,038645	0,011473	395,0885939	395,0499488	395,1000669
536	1,0313	135,4429	67,3306	1,17918909	68,5098	-0,075056	0,072817	313,0952997	313,0202435	313,1681163
536	2,0625	101,1457	16,47349	1,83676727	18,3103	-0,111467	0,13416	168,1099839	167,9985167	168,2441442
537	0	96,87669	15,87824	1,75479474	17,633	-0,144854	0,169262	161,2057708	161,0609167	161,3750332
537	1,0313	-42,54209	-51,7561	2,42567564	-49,3304	-0,159263	0,222981	-153,9655671	-154,1248305	-153,7425858
537	2,0625	-181,9609	-119,9586	3,09655653	-116,862	-0,173673	0,2767	-470,2732505	-470,4469234	-469,9965505

538	0	-167,189	-120,0469	3,09655653	-116,95	-0,173673	-0,289474	-451,246468	-451,4201409	-451,5359418
538	1,0313	-29,39959	-51,72851	2,42567564	-49,3028	-0,159263	-0,232141	-136,8251366	-136,9844001	-137,0572775
538	2,0625	108,3898	15,92309	1,75479474	17,6779	-0,144854	-0,174808	176,262567	176,117713	176,087759
539	0	108,3414	16,51838	1,83676727	18,3551	-0,111467	-0,139644	177,554084	177,4426168	177,4144398
539	1,0313	139,8019	67,36151	1,17918909	68,5407	-0,075056	-0,075327	318,8238975	318,7488414	318,748571
539	2,0625	171,2625	86,70862	0,52161091	87,2302	-0,038645	-0,011009	397,1016895	397,0630444	397,0906806
540	0	169,2494	86,7603	0,3176519	87,078	-0,049956	0,026416	394,1801472	394,1301916	394,2065629
540	1,0313	97,43338	73,47199	-0,26041441	73,2116	0,027614	0,090689	273,0865364	273,1141504	273,1772251
540	2,0625	25,61735	28,68766	-0,83848073	27,8492	0,105184	0,154962	89,00090401	89,10608771	89,1558657
610	0	21,44155	28,0273	-1,28205497	26,7452	0,051278	0,187905	81,36450885	81,41578663	81,55241353
610	1,0313	-149,7046	-48,03327	-1,76982293	-49,8031	0,152587	0,246504	-294,2221214	-294,0695347	-293,975617
610	2,0625	-320,8507	-155,7553	-2,25759089	-158,013	0,253896	0,305104	-733,1317476	-732,877852	-732,8266435
677	0	-298,1586	-152,0665	-5,6233797	-157,69	0,01359	-0,301144	-702,9858946	-702,9723045	-703,287039
677	1,0313	-124,4648	-43,73922	-3,75282916	-47,4921	0,039134	-0,229674	-256,7883838	-256,7492497	-257,0180574
677	2,0625	49,22895	32,92653	-1,88227862	31,0442	0,064678	-0,158203	126,0861309	126,1508092	125,9279283
685	0	47,83638	32,87596	-0,56363874	32,3123	0,121964	-0,134194	126,8119437	126,9339082	126,6777494
685	1,0313	115,9768	77,17691	0,96671367	78,1436	0,096461	-0,072799	307,0571495	307,1536105	306,9843507
685	2,0625	184,1173	89,98186	2,49706608	92,4789	0,070958	-0,011403	424,3103337	424,3812912	424,2989304
686	0	181,7504	89,62829	2,60280809	92,2311	0,085226	0,014363	420,7377759	420,8230022	420,7521391
686	1,0313	144,355	69,60944	3,71012054	73,3196	0,019015	0,067274	334,3006007	334,3196162	334,3678745
686	2,0625	106,9595	18,09457	4,817433	22,912	-0,047195	0,120184	184,871404	184,8242085	184,9915883
687	0	104,6729	17,83054	3,85782445	21,6884	-0,078784	0,147537	179,45154	179,3727564	179,599077
687	1,0313	-38,65234	-50,33125	4,31697789	-46,0143	-0,196507	0,193647	-142,276599	-142,4731058	-142,0829519
687	2,0625	-181,9776	-119,0612	4,77613133	-114,285	-0,31423	0,239757	-465,1410835	-465,4553137	-464,9013263
688	0	-160,5695	-119,1536	4,77613133	-114,377	-0,31423	-0,259747	-437,4953215	-437,8095516	-437,7550689
688	1,0313	-21,74163	-50,30481	4,31697789	-45,9878	-0,196507	-0,209064	-120,2397919	-120,4362987	-120,4488557
688	2,0625	117,0862	17,87719	3,85782445	21,735	-0,078784	-0,15838	195,6821099	195,6033264	195,5237298
689	0	116,9726	18,1408	4,817433	22,9582	-0,047195	-0,130877	197,9808242	197,9336288	197,8499475
689	1,0313	148,3979	69,64276	3,71012054	73,3529	0,019015	-0,073594	339,6229652	339,6419807	339,5493709
689	2,0625	179,8231	89,6487	2,60280809	92,2515	0,085226	-0,016312	418,2730846	418,358311	418,2567728
690	0	179,6262	90,00142	2,49706608	92,4985	0,070958	0,009665	418,5109879	418,5819454	418,5206526
690	1,0313	106,312	77,1825	0,96671367	78,1492	0,096461	0,075283	294,5040578	294,6005188	294,5793408
690	2,0625	32,99788	32,86757	-0,56363874	32,3039	0,121964	0,140901	107,505106	107,6270705	107,6460074
691	0	31,87494	32,91726	-1,88227862	31,035	0,064678	0,16445	103,5073858	103,5720641	103,6718359
691	1,0313	-143,8036	-43,76291	-3,75282916	-47,5157	0,039134	0,240564	-281,9761267	-281,9369925	-281,7355629

691	2,0625	-319,4821	-152,1046	-5,6233797	-157,728	0,01359	0,316677	-730,7826352	-730,7690452	-730,4659577
692	0	-200,3216	-122,5744	-23,2022111	-145,777	-0,102372	-0,189017	-551,9712953	-552,0736674	-552,1603124
692	1,0313	-60,88278	-24,29213	-9,51108925	-33,8032	-0,02503	-0,149389	-146,754043	-146,7790726	-146,9034316
692	2,0625	78,55601	42,32867	4,18003263	46,5087	0,052313	-0,10976	195,1402133	195,1925261	195,0304532
693	0	77,23223	41,83243	5,31658292	47,149	0,116199	-0,081956	194,69993	194,8161292	194,617974
693	1,0313	129,1614	81,20818	12,0002394	93,2084	0,124667	-0,047967	354,3266128	354,4512798	354,2786459
693	2,0625	181,0905	89,08793	18,6838959	107,772	0,133135	-0,013978	450,961274	451,0944089	450,9472962
694	0	182,0379	89,05646	18,3001693	107,357	0,15143	0,016671	451,3625879	451,5140176	451,379259
694	1,0313	141,9546	68,67414	14,6259572	83,3001	0,085437	0,039878	351,1411939	351,2266311	351,1810717
694	2,0625	101,8713	16,79582	10,9517451	27,7476	0,019445	0,063084	187,9277784	187,947223	187,9908629
695	0	102,2015	16,77138	9,24049786	26,0119	-0,015393	0,093573	184,8856925	184,8703	184,9792659
695	1,0313	-36,44444	-48,52456	-1,19496571	-49,7195	-0,152134	0,105162	-146,816817	-146,9689508	-146,7116555
695	2,0625	-175,0904	-114,3887	-11,6304293	-126,019	-0,288875	0,11675	-479,6556721	-479,9445471	-479,5389224
696	0	-133,2584	-114,4599	-11,6304293	-126,09	-0,288875	-0,147154	-425,4165777	-425,7054527	-425,5637313
696	1,0313	-7,78436	-48,48279	-1,19496571	-49,6778	-0,152134	-0,128588	-109,4751804	-109,6273142	-109,6037685
696	2,0625	117,6897	16,82749	9,24049786	26,068	-0,015393	-0,110023	205,1325891	205,1171966	205,0225666
697	0	119,1993	16,8508	10,9517451	27,8025	0,019445	-0,079995	210,5641499	210,5835945	210,4841546
697	1,0313	147,5253	68,71347	14,6259572	83,3394	0,085437	-0,050012	358,4617449	358,547182	358,4117327
697	2,0625	175,8513	89,08012	18,3001693	107,38	0,15143	-0,020029	443,3673183	443,518748	443,3472892
698	0	177,4644	89,11087	18,6838959	107,795	0,133135	0,009883	446,2932613	446,4263962	446,3031443
698	1,0313	112,0831	81,21659	12,0002394	93,2168	0,124667	0,050616	332,1416659	332,266333	332,1922823
698	2,0625	46,70177	41,82629	5,31658292	47,1429	0,116199	0,09135	154,998049	155,1142482	155,0893988
699	0	48,41541	42,32197	4,18003263	46,502	0,052313	0,117601	155,9440376	155,9963503	156,061639
699	1,0313	-108,7745	-24,3125	-9,51108925	-33,8236	-0,02503	0,164775	-209,0540178	-209,0790474	-208,8892429
699	2,0625	-265,9644	-122,6085	-23,2022111	-145,811	-0,102372	0,211948	-637,3750691	-637,4774412	-637,1631208
700	0	-228,5095	-119,4316	-73,4287473	-192,86	-0,041376	-0,058406	-682,783007	-682,8243832	-682,8414126
700	1,0313	-81,20139	-21,64219	-23,2535606	-44,8958	-0,05628	-0,068585	-195,3533054	-195,4095858	-195,4218908
700	2,0625	66,10675	44,48569	26,9216261	71,4073	-0,071185	-0,078765	228,7534001	228,6822156	228,674635
701	0	66,06289	43,75716	20,6542159	64,4114	0,008575	-0,034221	214,7045112	214,713086	214,6702901
701	1,0313	121,6915	82,19524	35,9180348	118,113	0,019626	-0,035693	394,425509	394,4451346	394,3898164
701	2,0625	177,3201	89,1373	51,1818536	140,319	0,030676	-0,037164	511,1544853	511,1851616	511,1173212
702	0	176,9733	88,74969	50,5657633	139,315	0,047889	0,010808	508,696203	508,7440916	508,7070109
702	1,0313	142,2303	68,40652	36,6495879	105,056	0,063501	0,007699	395,0116191	395,0751204	395,0193177
702	2,0625	107,4873	16,56735	22,7334125	39,3008	0,079114	0,004589	218,3350137	218,4141276	218,3396029
703	0	107,4792	16,30697	27,3547508	43,6617	0,026562	0,049109	227,0464002	227,0729619	227,0955092

745	0	60 10105	45 60110	4 855816	50 1770	0 065004	0 065004	404 7400000	0 065004
703	1,0313	-20,06555	-47,51671	-20,9636251	-68,4803	0,062205	0,040337	-163,0458911	-163,0458911
703	2,0625	-147,6103	-111,9086	-69,282001	-181,191	0,097848	0,031565	-554,2745279	-554,2745279
704	0	-132,56	-111,9811	-69,282001	-181,263	0,097848	-0,067766	-534,8542159	-534,8542159
704	1,0313	-11,1563	-47,47421	-20,9636251	-68,4378	0,062205	-0,06784	-151,3788642	-151,3788642
704	2,0625	110,2474	16,36586	27,3547508	43,7206	0,026562	-0,067913	230,7628597	230,7628597
705	0	113,9135	16,62476	22,7334125	39,3582	0,079114	-0,024773	226,8039604	226,8039604
705	1,0313	142,5088	68,44833	36,6495879	105,098	0,063501	-0,019425	395,4572217	395,4572217
705	2,0625	171,104	88,77589	50,5657633	139,342	0,047889	-0,014078	501,1184614	501,1184614
706	0	174,2827	89,16255	51,1818536	140,344	0,030676	0,031596	507,2563155	507,2563155
706	1,0313	113,481	82,20515	35,9180348	118,123	0,019626	0,038801	383,7716912	383,7716912
706	2,0625	52,67934	43,75174	20,6542159	64,406	0,008575	0,046007	197,2950453	197,2950453
707	0	55,82935	44,4798	26,9216261	71,4014	-0,071185	0,087232	215,3810131	215,3810131
707	1,0313	-94,37056	-21,66277	-23,2535606	-44,9163	-0,05628	0,087661	-212,5143832	-212,5143832
707	2,0625	-244,5705	-119,4668	-73,4287473	-192,896	-0,041376	0,08809	-703,7741517	-703,7741517
708	0	-253,4988	-129,8422	-24,2262618	-154,069	0,072245	-0,029955	-637,6854918	-637,6854918
708	1,0313	-94,95661	-26,27587	-9,6852229	-35,9611	-0,096538	-0,065163	-195,3657804	-195,3657804
708	2,0625	63,58562	45,629	4,855816	50,4848	-0,265321	-0,100371	183,630935	183,630935
709	0	62,72262	44,03866	5,82472915	49,8634	-0,16635	-0,040703	181,2661871	181,2661871
709	1,0313	122,983	84,50966	12,57437	97,084	-0,163466	-0,050658	354,0459372	354,0459372
709	2,0625	183,2434	93,48464	19,3240107	112,809	-0,160583	-0,060613	463,8336656	463,8336656
710	0	184,9978	93,50651	18,9875889	112,494	-0,154266	0,008318	465,4853808	465,4853808
710	1,0313	146,5765	71,28972	14,9597079	86,2494	-0,003541	0,004308	363,0482731	363,0482731
710	2,0625	108,1551	17,57691	10,9318268	28,5087	0,147183	0,000297	197,6191439	197,6191439
711	0	112,5048	18,72832	9,51191284	28,2402	0,058773	0,058873	202,7366488	202,7366488
711	1,0313	-32,96478	-52,80623	-2,19778487	-55,004	0,386686	0,048469	-152,8622426	-152,8622426
711	2,0625	-178,4343	-124,9089	-13,9074826	-138,816	0,714598	0,038066	-509,5974797	-509,5974797
712	0	-168,7135	-124,9781	-13,9074826	-138,886	0,714598	-0,065843	-496,3842135	-496,3842135
712	1,0313	-28,49544	-52,76306	-2,19778487	-54,9608	0,386686	-0,067718	-146,9657558	-146,9657558
712	2,0625	111,7226	18,78522	9,51191284	28,2971	0,058773	-0,069594	201,8336722	201,8336722
713	0	112,4457	17,63314	10,9318268	28,565	0,147183	-0,013621	203,3093113	203,3093113
713	1,0313	146,8975	71,32959	14,9597079	86,2893	-0,003541	-0,010329	363,5453367	363,5453367
713	2,0625	181,3493	93,53002	18,9875889	112,518	-0,154266	-0,007038	460,7893405	460,7893405
714	0	184,1977	93,50794	19,3240107	112,832	-0,160583	0,058357	465,1208712	465,1208712
714	1,0313	120,1827	84,5175	12,57437	97,0919	-0,163466	0,054616	350,421229	350,421229
714	2,0625	56,1677	44,03105	5,82472915	49,8558	-0,16635	0,050875	172,7295652	172,7295652

726	2,0625	89,71423	14,84636	1,22529562	16,0717	0,362592	0,714494	148,77181	149,1344017	149,4863043
727	0	94,68282	15,38529	1,39239409	16,7777	0,297526	0,774649	156,6430305	156,9405565	157,4176792
727	1,0313	-54,40417	-54,72689	1,79991561	-52,927	0,542839	1,125444	-176,5793792	-176,0365397	-175,4539356
727	2,0625	-203,4912	-125,4073	2,20743712	-123,2	0,788153	1,476239	-510,9381346	-510,1499815	-509,4618959
728	0	-183,9944	-125,4911	2,20743712	-123,284	0,788153	-1,332177	-485,7599687	-484,9718157	-487,0921457
728	1,0313	-42,85069	-54,69614	1,79991561	-52,8962	0,542839	-1,028749	-161,4983316	-160,9554921	-162,5270808
728	2,0625	98,293	15,43199	1,39239409	16,8244	0,297526	-0,725321	161,4296777	161,7272036	160,7043564
729	0	99,58319	14,89339	1,22529562	16,1187	0,362592	-0,670872	161,6955209	162,0581126	161,0246492
729	1,0313	131,2255	66,3577	0,65517319	67,0129	0,169647	-0,362128	304,6189282	304,7885754	304,2568006
729	2,0625	162,8678	86,32601	0,08505076	86,4111	-0,023297	-0,053383	384,5503139	384,5270167	384,4969305
730	0	165,7492	86,33465	-0,16219135	86,1725	-0,021792	0,054653	387,8188588	387,7970663	387,8735117
730	1,0313	98,02705	73,80026	-0,33575614	73,4645	-0,151357	0,393327	274,3641723	274,212815	274,7574995
730	2,0625	30,30492	29,76985	-0,50932093	29,2605	-0,280922	0,732001	97,91746417	97,63654212	98,64946565
731	0	34,44652	30,08794	-0,80052451	29,2874	-0,34543	0,771364	103,3553075	103,0098779	104,1266713
731	1,0313	-137,4288	-46,96383	-1,00577871	-47,9696	-0,427416	1,148064	-274,5966161	-275,0240316	-273,4485518
731	2,0625	-309,304	-155,6771	-1,2110329	-156,888	-0,509401	1,524765	-715,8715357	-716,3809371	-714,3467709
732	0	-257,5639	-155,8665	1,92140377	-153,945	-0,456046	-4,426151	-642,7232057	-643,1792512	-647,1493562
732	1,0313	-111,0839	-47,05534	0,61080782	-46,4445	-0,432751	-3,485922	-237,2981216	-237,7308725	-240,7840439
732	2,0625	35,3961	30,09431	-0,69978813	29,3945	-0,409456	-2,545694	104,8039664	104,3945102	102,2582724
733	0	44,32539	29,27174	0,05262239	29,3244	-0,307431	-2,45291	116,2717342	115,9643036	113,8188242
733	1,0313	98,66121	72,49881	-0,63144153	71,8674	-0,188764	-1,317183	271,9943068	271,8055424	270,6771236
733	2,0625	152,997	84,22987	-1,31550545	82,9144	-0,070098	-0,181456	364,7248579	364,6547597	364,5434014
734	0	155,5176	84,30865	-1,14606159	83,1626	-0,070628	-0,0064	368,4980848	368,4274565	368,4916845
734	1,0313	114,4021	64,15019	-0,56599598	63,5842	0,137721	1,140661	275,8910856	276,0288069	277,0317467
734	2,0625	73,28654	12,49571	0,01406963	12,5098	0,346071	2,287722	120,2920649	120,6381358	122,5797873
735	0	70,75896	13,57836	-0,41676595	13,1616	0,247683	2,38371	118,3098414	118,557524	120,6935511
735	1,0313	-68,69806	-57,39306	0,62448341	-56,7686	0,560669	3,333217	-202,8446413	-202,2839726	-199,5114247
735	2,0625	-208,1551	-128,9327	1,66573276	-127,267	0,873655	4,282723	-525,1354696	-524,2618149	-520,8527462
736	0	-173,815	-129,0108	1,66573276	-127,345	0,873655	-3,951303	-480,6495672	-479,7759125	-484,6008703
736	1,0313	-45,98756	-57,35966	0,62448341	-56,7352	0,560669	-3,103133	-173,2541895	-172,6935208	-176,3573223
736	2,0625	81,83988	13,62462	-0,41676595	13,2079	0,247683	-2,254963	132,8075604	133,055243	130,5525978
737	0	90,53321	12,54293	0,01406963	12,557	0,346071	-2,115438	142,807166	143,1532369	140,6917278
737	1,0313	121,3426	64,18025	-0,56599598	63,6143	0,137721	-1,092506	284,9738508	285,1115721	283,881345
737	2,0625	152,1519	84,32156	-1,14606159	83,1755	-0,070628	-0,069573	364,1485141	364,0778858	364,0789408
738	0	155,024	84,24348	-1,31550545	82,928	-0,070098	0,130698	367,3871698	367,3170716	367,5178681

738	1,0313	90,46364	72,49714	-0,63144153	71,8657	-0,188764	1,174298	261,3341229	261,1453586	262,5084205
738	2,0625	25,90326	29,25478	0,05262239	29,3074	-0,307431	2,217897	92,28905447	91,9816239	94,50695144
739	0	22,82651	30,07737	-0,69978813	29,3776	-0,409456	2,271419	88,42962269	88,02016646	90,70104163
739	1,0313	-134,6841	-47,08483	0,61080782	-46,474	-0,432751	3,227257	-268,0373053	-268,4700561	-264,8100482
739	2,0625	-292,1946	-155,9085	1,92140377	-153,987	-0,456046	4,183095	-687,8272292	-688,2832747	-683,6441341
740	0	-374,5672	-142,5138	-7,6157158	-150,13	-0,660123	-11,83496	-787,1963482	-787,8564708	-799,0313116
740	1,0313	-139,8394	-42,34805	-3,25075725	-45,5988	-0,442445	-8,08998	-272,9888053	-273,4312505	-281,7978029
740	2,0625	94,88841	26,1562	1,11420131	27,2704	-0,224768	-5,783032	177,8957416	177,6709738	172,1127098
741	0	90,09808	28,71305	2,93097755	31,644	-0,18021	-5,749853	180,4155719	180,235362	174,6657192
741	1,0313	165,5697	69,32562	4,70657205	74,0322	-0,037569	-2,87289	363,3049422	363,2673737	360,4320522
741	2,0625	241,0412	78,44217	6,48216655	84,9243	0,105073	0,004073	483,202291	483,3073638	483,2063637
742	0	243,2428	78,61577	6,5885089	85,2043	0,100827	-0,253466	486,6241444	486,7249717	486,3706788
742	1,0313	164,2957	59,49196	4,06176256	63,5537	0,220199	2,620915	340,6919102	340,9121094	343,3128249
742	2,0625	85,34872	8,872142	1,53501622	10,4072	0,339571	5,495295	131,7676544	132,1072256	137,2629494
743	0	94,42538	6,772475	-0,0987915	6,67368	0,290382	5,398793	136,1003574	136,3907391	141,4991508
743	1,0313	-153,7999	-56,83577	-4,91020387	-61,746	0,339622	8,466634	-323,4317549	-323,0921332	-314,9651213
743	2,0625	-402,0251	-121,0122	-9,72161623	-130,734	0,388862	11,53447	-784,1002127	-783,7113511	-772,5657389
744	0	-339,0541	-121,1085	-9,72161623	-130,83	0,388862	-11,5906	-702,4305773	-702,0417156	-714,0211754
744	1,0313	-109,835	-56,81383	-4,91020387	-61,724	0,339622	-8,45431	-266,2335312	-265,8939096	-274,6878413
744	2,0625	119,3841	6,814045	-0,0987915	6,71525	0,290382	-5,318022	168,629887	168,9202687	163,311865
745	0	114,6396	8,916412	1,53501622	10,4514	0,339571	-5,300525	169,9342998	170,273871	164,6337748
745	1,0313	177,4519	59,52239	4,06176256	63,5841	0,220199	-2,36331	357,8557783	358,0759775	355,492468
745	2,0625	240,2642	78,63235	6,5885089	85,2209	0,100827	0,573904	482,7852352	482,8860624	483,3591397
746	0	242,1428	78,46117	6,48216655	84,9433	0,105073	0,450558	484,6722939	484,7773668	485,1228515
746	1,0313	150,6504	69,32756	4,70657205	74,0341	-0,037569	3,201805	343,9137624	343,8761939	347,115567
746	2,0625	59,15799	28,69794	2,93097755	31,6289	-0,18021	5,953052	140,1632093	139,9829994	146,1162609
747	0	68,03795	26,14384	1,11420131	27,258	-0,224768	5,993362	142,9654243	142,7406565	148,9587858
747	1,0313	-185,1649	-42,38261	-3,25075725	-45,6334	-0,442445	8,535915	-331,9810352	-332,4234803	-323,4451205
747	2,0625	-438,3677	-142,5706	-7,6157158	-150,186	-0,660123	11,07847	-870,2504906	-870,9106131	-859,1720227
748	0	20,61094	-147,4677	1,03832686	-146,429	-0,285603	-18,88611	-266,0646232	-266,350226	-284,9507286
748	1,0313	15,90598	-42,36462	0,80270013	-41,5619	-0,212892	-14,09483	-62,44606248	-62,65895431	-76,54089706
748	2,0625	11,20103	31,07701	0,5670734	31,6441	-0,140181	-9,303564	77,84950227	77,70932133	68,54593847
749	0	11,20103	31,07701	0,5670734	31,6441	-0,140181	-9,303564	77,84950227	77,70932133	68,54593847
749	1,0313	6,496066	73,02264	0,33144655	73,3541	-0,06747	-4,512291	155,1530687	155,0855987	150,6407781
749	2,0625	1,791107	83,47224	0,0958197	83,5681	0,005241	0,278983	169,4645496	169,4697905	169,7435322

750	0	1,791,107	83,472,24	0,0958197	83,5681	0,005241	0,278983	169,464,5496	169,469,7905	169,743,5322
750	1,0312	-2,913,849	62,107,72	-0,13980699	61,9679	0,077952	5,070253	120,147,8218	120,225,7736	125,218,0744
750	2,0625	-7,618,805	8,611,027	-0,37543369	8,23559	0,150663	9,861523	6,566738803	6,717401486	16,428,26137
751	0	-7,618,805	8,611,027	-0,37543369	8,23559	0,150663	9,861523	6,566738803	6,717401486	16,428,26137
751	1,0312	-12,323,76	-61,946,05	-0,61106034	-62,5571	0,223374	14,65279	-141,135,1009	-140,911,7274	-126,482,3092
751	2,0625	-17,028,72	-133,0713	-0,84688699	-133,918	0,296084	19,44406	-289,973,2863	-289,677,2019	-270,529,2254
752	0	39,963,99	-131,8787	-0,84688699	-132,725	0,296084	-22,00689	-213,497,5624	-213,201,478	-235,504,449
752	1,0313	30,169,36	-61,478,54	-0,61106026	-62,0896	0,223374	-16,17328	-84,959,03527	-84,735,66174	-101,132,3181
752	2,0625	20,374,73	8,254,794	-0,37543353	7,87936	0,150663	-10,33968	42,245,86406	42,396,52669	31,906,185
753	0	20,374,73	8,254,794	-0,37543353	7,87936	0,150663	-10,33968	42,245,86406	42,396,52669	31,906,185
753	1,0313	10,580,09	61,214,27	-0,13980668	61,0745	0,077952	-4,506072	135,903,049	135,981,0007	131,396,9767
753	2,0625	0,785,452	82,677,71	0,09582017	82,7735	0,005241	1,327534	166,568,1485	166,573,3893	167,895,6683
754	0	0,785,452	82,677,71	0,09582017	82,7735	0,005241	1,327534	166,568,1485	166,573,3893	167,895,6683
754	1,0312	-9,009,178	72,645,12	0,33144686	72,9766	-0,06747	7,161137	134,241,2058	134,173,7356	141,402,343
754	2,0625	-18,803,81	31,116,53	0,56707356	31,6836	-0,140181	12,99474	38,922,26269	38,782,0817	51,917,00269
755	0	-18,803,81	31,116,53	0,56707356	31,6836	-0,140181	12,99474	38,922,26269	38,782,0817	51,917,00269
755	1,0312	-28,598,44	-41,908,04	0,80270021	-41,1053	-0,212892	18,82834	-119,388,6486	-119,601,5404	-100,560,3068
755	2,0625	-38,393,06	-146,5941	1,03832686	-145,556	-0,285603	24,66194	-341,022,5126	-341,308,1153	-316,360,569
756	0	-383,6066	-237,7383	-106,490487	-344,229	0,040906	-7,363153	-1187,146,272	-1187,105,366	-1194,509,425
756	1,0313	-126,6078	-73,77926	-38,1770327	-111,956	-0,006255	-5,002326	-388,502,6781	-388,508,9329	-393,505,0038
756	2,0625	130,3911	47,6565	30,1364216	77,7929	-0,053416	-2,641498	325,094,2743	325,040,8584	322,452,7763
757	0	122,5969	45,6324	24,1484784	69,7809	0,010042	-3,06647	298,937,7415	298,947,7839	295,871,2712
757	1,0313	197,055	110,5657	44,7011357	155,267	-0,026437	-0,987253	566,705,2179	566,678,7812	565,717,9653
757	2,0625	271,5132	129,6108	65,2537929	194,865	-0,062916	1,091965	742,696,239	742,633,3232	743,788,2042
758	0	276,7724	130,426	65,7361183	196,162	-0,059687	0,739197	752,128,2458	752,068,5585	752,867,4428
758	1,0313	173,4729	96,29011	43,153688	139,444	-0,018581	2,873917	504,402,3562	504,383,7748	507,276,2734
758	2,0625	70,17342	16,26602	20,5712577	36,8373	0,022525	5,008637	164,900,0113	164,922,5359	169,908,6487
759	0	86,67807	19,63547	27,1549694	46,7904	-0,030494	4,86284	206,262,3683	206,231,8747	211,125,2078
759	1,0313	-217,744	-96,24115	-43,8650806	-140,106	0,023439	7,254224	-563,279,5993	-563,256,16	-566,025,375
759	2,0625	-522,166	-212,9452	-114,88513	-327,83	0,077372	9,645609	-1334,476,439	-1334,399,067	-1324,83083
760	0	-432,8227	-213,0994	-114,88513	-327,985	0,077372	-13,47308	-1218,63855	-1218,561178	-1232,111,628
760	1,0313	-151,1038	-96,21984	-43,8650806	-140,085	0,023439	-9,595493	-476,604,7736	-476,581,3342	-486,200,2669
760	2,0625	130,6151	19,68861	27,1549694	46,8436	-0,030494	-5,717909	263,486,8267	263,456,333	257,768,918
761	0	113,8771	16,31803	20,5712577	36,8893	0,022525	-6,171394	221,818,7478	221,841,2724	215,647,3539
761	1,0313	195,3323	96,32593	43,153688	139,48	-0,018581	-2,524371	532,891,2917	532,872,7104	530,366,9209

761	2,0625	276,7876	130,4456	65,7361183	196,182	-0,059687	1,122652	752,1873804	752,1276931	753,3100326
762	0	271,5574	129,6298	65,2537929	194,884	-0,062916	0,4672	742,791706	742,7287903	743,2589063
762	1,0313	174,6375	110,5691	44,7011357	155,27	-0,026437	4,447099	537,5690638	537,5426272	542,0161633
762	2,0625	77,71753	45,62011	24,1484784	69,7686	0,010042	8,426999	240,5699664	240,5800089	248,9969651
763	0	85,95059	47,64354	30,1364216	77,78	-0,053416	8,122327	267,2956842	267,2422683	275,4180111
763	1,0313	-196,4593	-73,80431	-38,1770327	-111,981	-0,006255	13,08498	-479,3660837	-479,3660837	-466,2748533
763	2,0625	-478,8693	-237,7755	-106,490487	-344,266	0,040906	18,04763	-1311,061994	-1311,021087	-1293,014359
764	0	-172,5378	-211,72	-20,8626664	-232,583	0,992575	-2,889855	-689,46457	-688,4719949	-692,3544245
764	1,0313	-58,20053	-64,15168	-10,393846	-74,5455	0,440869	-2,152769	-224,7517419	-224,3108734	-226,904511
764	2,0625	56,13675	40,89336	0,07497429	40,9683	-0,110838	-1,415684	154,9144446	154,8036066	153,4987609
765	0	65,25563	42,28891	4,27522611	46,5641	0,071719	-1,460994	177,9606014	178,0323201	176,4996078
765	1,0313	101,2121	103,4391	9,30648276	112,746	-0,146344	-0,558999	357,0668631	356,920519	356,5078644
765	2,0625	137,1686	118,701	14,3377394	133,039	-0,364407	0,342996	444,3966696	444,0322626	444,7396658
766	0	134,8443	118,9936	14,3453733	133,339	-0,342865	0,341167	441,9756116	441,6327466	442,3167784
766	1,0313	86,1467	89,49697	10,3829252	99,8799	-0,312112	1,177586	311,7505045	311,4383926	312,9280909
766	2,0625	37,4491	14,11208	6,42047706	20,5326	-0,281359	2,014006	89,74894206	89,46758338	91,76294821
767	0	22,99252	12,91304	2,28762266	15,2007	-0,42201	1,899418	60,29159026	59,86958063	62,19100865
767	1,0313	-103,9458	-84,82784	-6,87330732	-91,7011	-0,053161	2,515956	-318,5318534	-318,5850142	-316,015897
767	2,0625	-230,8841	-183,3962	-16,0342373	-199,43	0,315688	3,132494	-699,0101693	-698,6944813	-695,877675
768	0	-144,3221	-183,5208	-16,0342373	-199,556	0,315688	-4,635644	-586,7288983	-586,4132104	-591,3645428
768	1,0313	-37,48711	-84,79142	-6,87330732	-91,6647	-0,053161	-3,421497	-232,0626986	-232,1158595	-235,4841952
768	2,0625	69,34787	12,96692	2,28762266	15,2545	-0,42201	-2,207349	120,6613246	120,239315	118,4539759
769	0	78,37941	14,16515	6,42047706	20,5856	-0,281359	-2,256407	143,064487	142,7831284	140,8080805
769	1,0313	106,8131	89,53139	10,3829252	99,9143	-0,312112	-0,816373	338,6857307	338,3736189	337,8693573
769	2,0625	135,2469	119,0094	14,3453733	133,355	-0,342865	0,62366	442,5305192	442,1876542	443,1541789
770	0	131,898	118,718	14,3377394	133,056	-0,364407	0,724694	437,5787746	437,2143676	438,3034689
770	1,0313	76,11994	103,4427	9,30648276	112,749	-0,146344	1,988316	324,4542119	324,3078677	326,4425281
770	2,0625	20,34192	42,27912	4,27522611	46,5543	0,071719	3,251938	119,5531939	119,6249125	122,8051321
774	0	5,473255	40,88437	0,07497429	40,9593	-0,110838	3,26322	89,03392545	88,92308742	92,27024762
774	1,0313	-126,4695	-64,17424	-10,393846	-74,5681	0,440869	3,819019	-313,5465938	-313,1057253	-309,7275744
774	2,0625	-258,4124	-211,7562	-20,8626664	-232,619	0,992575	4,401717	-801,1737546	-800,1811795	-796,7720381
775	0	-210,2982	-169,105	-12,5184697	-181,623	-0,887121	1,702086	-636,634542	-637,5216631	-634,9324555
775	1,0313	-80,13383	-76,67297	-3,62585025	-80,2988	-0,601661	1,24655	-264,7716163	-265,3732774	-263,5250666
775	2,0625	50,03054	14,78795	5,26676922	20,0547	-0,316201	0,791014	105,1491329	104,8329318	105,9401471
843	0	59,10975	16,66219	8,58169326	25,2439	-0,278061	0,84122	127,3304394	127,0523783	128,171659

843	1,0313	98,72093	88,85558	11,5137414	100,369	-0,114996	0,416039	329,0758577	328,9608612	329,4918968
843	2,0625	138,3321	115,1608	14,4457895	129,607	0,048068	-0,009141	439,0448207	439,0928889	439,0356793
910	0	143,6504	115,2036	14,7181781	129,922	0,017996	-0,014472	446,5889946	446,6069901	446,5745227
910	1,0313	95,44987	99,09333	8,35928617	107,453	0,226206	-0,447054	338,9900715	339,2162771	338,543018
910	2,0625	47,24935	37,09487	2,00039428	39,0953	0,434416	-0,879635	139,6146932	140,0491088	138,735058
918	0	47,89363	35,2561	-1,03292505	34,2232	0,343264	-0,900872	130,7080675	131,0513315	129,8071955
918	1,0313	-86,45001	-67,73184	-13,2972221	-81,0291	0,446885	-1,371398	-274,4431394	-273,9962542	-275,8145375
918	2,0625	-220,7937	-213,2431	-25,5615191	-238,805	0,550506	-1,841924	-764,6409878	-764,0904814	-766,4829121
919	0	-136,5795	-169,1219	-12,5184697	-181,64	-0,887121	-1,714716	-540,834129	-541,7212501	-542,5488445
919	1,0313	-21,59579	-76,67447	-3,62585025	-80,3003	-0,601661	-1,250344	-188,6751556	-189,2768167	-189,9254993
919	2,0625	93,38791	14,80191	5,26676922	20,0687	-0,316201	-0,785972	161,5416413	161,2254402	160,7556696
920	0	93,8298	16,67699	8,58169326	25,2587	-0,278061	-0,739007	172,4961134	172,2180523	171,7571061
920	1,0313	117,6198	88,87147	11,5137414	100,385	-0,114996	-0,338516	353,6761177	353,5611212	353,3376018
920	2,0625	141,4097	115,1777	14,4457895	129,624	0,048068	0,061976	443,0796666	443,1277348	443,1416423
921	0	138,1094	115,2169	14,7181781	129,935	0,017996	0,143796	439,4123112	439,4303067	439,5561072
921	1,0313	74,09061	99,09931	8,35928617	107,459	0,226206	0,491173	311,2349946	311,4612001	311,7261675
921	2,0625	10,07187	37,0935	2,00039428	39,0939	0,434416	0,83855	91,28122275	91,71563833	92,1197726
922	0	2,798226	35,25175	-1,03292505	34,2188	0,343264	0,792544	72,0753452	72,41860921	72,86788926
922	1,0313	-147,4313	-67,74513	-13,2972221	-81,0423	0,446885	1,157523	-353,7454114	-353,2985262	-352,5878889
922	2,0625	-297,6609	-213,2653	-25,5615191	-238,827	0,550506	1,522501	-864,6128095	-864,0623031	-863,0903085
923	0	-320,7534	-228,0043	-94,439755	-322,444	1,107141	-0,859966	-1061,86741	-1060,760269	-1062,727376
923	1,0313	-131,895	-75,32985	-36,2010419	-111,531	0,706326	-0,679527	-394,525274	-393,8189478	-395,2048011
923	2,0625	56,96337	34,82125	22,0376713	56,8589	0,305512	-0,499088	187,7702202	188,0757317	187,2711323
924	0	48,17565	36,12552	15,7832263	51,9087	0,475002	-0,491438	166,445835	166,9208374	165,9543975
924	1,0313	116,9646	101,5256	34,1720789	135,698	0,157993	-0,272416	423,4492434	423,6072362	423,1768275
924	2,0625	185,7535	121,0374	52,5609315	173,598	-0,159017	-0,053394	588,6761965	588,5171798	588,6228022
925	0	179,3662	120,9453	52,0941389	173,039	-0,126637	-0,051528	579,2548454	579,1282085	579,2033171
925	1,0313	134,3337	94,48787	37,060288	131,548	-0,30262	0,180858	437,7301666	437,4275469	437,9110248
925	2,0625	89,30132	22,14222	22,0264371	44,1687	-0,478603	0,413245	204,4290326	203,95043	204,8422772
926	0	86,4065	20,83701	27,2684711	48,1055	-0,590613	0,402308	208,5394121	207,9487987	208,9417204
926	1,0313	-82,23983	-74,7496	-26,9238593	-101,673	-0,683364	0,624448	-310,2586884	-310,9420523	-309,6342409
926	2,0625	-250,8862	-171,1636	-81,1161896	-252,28	-0,776114	0,846587	-830,7116613	-831,4877756	-829,8650745
927	0	-196,3622	-171,2873	-81,1161896	-252,404	-0,776114	-0,700799	-760,0779329	-760,8540472	-760,7787317
927	1,0313	-37,10348	-74,71224	-26,9238593	-101,636	-0,683364	-0,547156	-251,506735	-252,1900989	-252,0538908
927	2,0625	122,1553	20,89176	27,2684711	48,1602	-0,590613	-0,393513	255,1222865	254,531673	254,7287736

928	0	114,776	22,1969	22,0264371	44,2233	-0,478603	-0,386037	237,6554924	237,1768898	237,2694551
928	1,0313	149,2224	94,52291	37,060288	131,583	-0,30262	-0,212196	457,1554825	456,8528627	456,9432866
928	2,0625	183,6687	120,9607	52,0941389	173,055	-0,126637	-0,038354	584,8790173	584,7523804	584,8406628
929	0	179,3713	121,0539	52,5609315	173,615	-0,159017	-0,032536	580,41233	580,2533133	580,3797937
929	1,0313	99,97542	101,5272	34,1720789	135,699	0,157993	0,162549	401,3666774	401,5246702	401,5292263
929	2,0625	20,57958	36,11233	15,7832263	51,8956	0,475002	0,357634	130,5445695	131,0195719	130,9022037
930	0	19,80792	34,80808	22,0376713	56,8458	0,305512	0,337664	139,441795	139,7473065	139,779459
930	1,0313	-178,7438	-75,35679	-36,2010419	-111,558	0,706326	0,540192	-455,4825585	-454,7762322	-454,9423667
930	2,0625	-377,2955	-228,045	-94,439755	-322,485	1,107141	0,74272	-1135,453553	-1134,346412	-1134,710834
931	0	-291,4774	-233,7568	-29,0842682	-262,841	1,352628	-0,404655	-904,6027971	-903,2501687	-905,0074521
931	1,0313	-128,7271	-77,42697	-14,1888201	-91,6158	0,822456	-0,316869	-350,5768236	-349,7543672	-350,8936924
931	2,0625	34,02322	36,37953	0,70662802	37,0862	0,292284	-0,229083	118,4025084	118,6947927	118,1734257
932	0	32,85624	37,71956	2,258023	39,9776	0,500428	-0,233747	122,6682794	123,1687071	122,4345328
932	1,0313	100,6721	105,1479	9,64704794	114,795	0,10515	-0,127873	360,4636079	360,568758	360,3357349
932	2,0625	168,4879	126,688	17,0360729	143,724	-0,290127	-0,021999	506,4824811	506,1923536	506,4604818
933	0	161,5821	126,404	16,8068255	143,211	-0,25	-0,024142	496,4783654	496,2283655	496,4542235
933	1,0313	127,5852	99,50097	12,8801079	112,381	-0,412585	0,089026	390,6229304	390,2103451	390,7119566
933	2,0625	93,58832	26,70972	8,95339027	35,6631	-0,575171	0,202194	192,9910402	192,4158694	193,1932344
934	0	82,8943	25,20776	7,11302074	32,3208	-0,711431	0,196404	172,404155	171,6927245	172,6005592
934	1,0313	-50,4806	-72,39821	-4,30728788	-76,7055	-0,751249	0,304611	-219,0357826	-219,7870311	-218,7311716
934	2,0625	-183,8555	-170,8316	-15,7275965	-186,559	-0,791066	0,412818	-612,1305924	-612,9216589	-611,7177747
935	0	-143,5162	-170,9695	-15,7275965	-186,697	-0,791066	-0,403412	-559,9652892	-560,7563557	-560,3687013
935	1,0313	-15,86682	-72,36349	-4,30728788	-76,6708	-0,751249	-0,305552	-173,9684243	-174,7196728	-174,2739762
935	2,0625	111,7826	25,27143	7,11302074	32,3845	-0,711431	-0,207692	210,0862642	209,3748336	209,8785726
936	0	111,6431	26,77253	8,95339027	35,7259	-0,575171	-0,21932	216,5878572	216,0126865	216,3685375
936	1,0313	138,9232	99,54491	12,8801079	112,425	-0,412585	-0,110385	405,4501727	405,0375873	405,3397874
936	2,0625	166,2033	126,4291	16,8068255	143,236	-0,25	-0,001451	502,5360328	502,2860329	502,534582
937	0	161,5972	126,713	17,0360729	143,749	-0,290127	-0,00988	497,5743928	497,2842653	497,5645124
937	1,0313	87,23269	105,1534	9,64704794	114,8	0,10515	0,105187	343,0034686	343,1086188	343,1086561
937	2,0625	12,86823	37,70567	2,258023	39,9637	0,500428	0,220255	96,65608922	97,15651691	96,87634458
938	0	3,96766	36,36546	0,70662802	37,0721	0,292284	0,21474	79,30213947	79,59442378	79,51687974
938	1,0313	-164,643	-77,46042	-14,1888201	-91,6492	0,822456	0,325813	-397,3344043	-396,5119479	-397,0085911
938	2,0625	-333,2537	-233,8096	-29,0842682	-262,894	1,352628	0,436886	-959,0175896	-957,6649611	-958,5807035
939	0	-294,7935	-225,7024	-2,24667263	-227,949	1,391352	-0,24353	-839,1296752	-837,7383227	-839,373205
939	1,0313	-122,5819	-68,89768	-2,55396323	-71,4516	0,775961	-0,187341	-302,2597423	-301,4837812	-302,4470832

939	2,0625	49,62971	45,38372	-2,86125382	42,5225	0,16057	-0,131152	149,563549	149,7241187	149,4323971
940	0	43,32421	45,21357	-1,46302867	43,7505	0,454796	-0,139859	143,8225617	144,2773581	143,6827028
940	1,0313	112,4605	111,9591	-0,88027265	111,079	0,050195	-0,072617	368,3562559	368,4064506	368,2836384
940	2,0625	181,5968	132,8163	-0,29751663	132,519	-0,354407	-0,005376	501,1134948	500,7590879	501,1081187
941	0	173,9139	131,9889	-0,2537275	131,735	-0,308054	-0,018651	489,5584088	489,2503548	489,5397578
941	1,0313	138,5099	103,8349	1,29614337	105,131	-0,45047	0,0506	390,3250351	389,8745653	390,3756356
941	2,0625	103,1059	29,79276	2,84601423	32,6388	-0,592886	0,119852	199,3152061	198,7223205	199,4350581
942	0	96,17619	28,96873	1,57615052	30,5449	-0,799925	0,104985	186,118811	185,3188857	186,2237958
942	1,0313	-47,07767	-71,17556	3,84968821	-67,3259	-0,741856	0,169574	-195,8527236	-196,5945797	-195,6831497
942	2,0625	-190,3315	-172,1473	6,1232259	-166,024	-0,683787	0,234163	-579,4791303	-580,1629173	-579,2449673
943	0	-157,3339	-172,2839	6,1232259	-166,161	-0,683787	-0,271903	-536,8552894	-537,5390763	-537,1271926
943	1,0313	-18,2992	-71,13981	3,84968821	-67,2901	-0,741856	-0,197327	-158,3692033	-159,1110595	-158,5665305
943	2,0625	120,7355	29,03316	1,57615052	30,6093	-0,799925	-0,122751	218,1747063	217,374781	218,0519551
944	0	117,3688	29,85672	2,84601423	32,7027	-0,592886	-0,140777	217,9849161	217,3920305	217,8441393
944	1,0313	147,8089	103,8812	1,29614337	105,177	-0,45047	-0,061452	402,5062502	402,0557804	402,4447978
944	2,0625	178,249	132,0175	-0,2537275	131,764	-0,308054	0,017872	495,2511291	494,943075	495,2690011
945	0	174,7775	132,8439	-0,29751663	132,546	-0,354407	0,00193	492,3034225	491,9490156	492,3053522
945	1,0313	100,8707	111,968	-0,88027265	111,088	0,050195	0,078699	353,3073096	353,3575044	353,3858985
945	2,0625	26,96391	45,20386	-1,46302867	43,7408	0,454796	0,155248	122,5347415	122,9899538	122,6899897
946	0	23,35085	45,37256	-2,86125382	42,5113	0,16057	0,146473	115,3787276	115,5392973	115,5252008
946	1,0313	-152,8357	-68,92824	-2,55396323	-71,4822	0,775961	0,211265	-341,650868	-340,8749068	-341,4396031
946	2,0625	-329,0223	-225,7524	-2,24667263	-227,999	1,391352	0,276057	-883,7271051	-882,3357526	-883,4510485
947	0	-233,0603	-180,6333	0,12327678	-180,51	0,708047	-0,185415	-663,9983599	-663,2903132	-664,1837752
947	1,0313	-83,65221	-39,94897	-0,39081216	-40,3398	0,436713	-0,132207	-189,4274371	-188,9907242	-189,5596444
947	2,0625	65,7559	58,21199	-0,90490109	57,3071	0,165379	-0,078999	200,0968441	200,2622232	200,0178448
948	0	57,45656	57,29127	-0,68375087	56,6075	0,525825	-0,094451	187,9085725	188,4343975	187,8141216
948	1,0313	115,6498	115,5833	-0,69742892	114,886	0,282288	-0,040873	380,1164484	380,3987362	380,0755751
948	2,0625	173,843	127,9871	-0,71110697	127,276	0,038751	0,012704	480,547869	480,5866198	480,5605734
949	0	164,3984	125,8765	-0,58032924	125,296	0,087086	-0,012347	464,3103278	464,397414	464,2979804
949	1,0313	130,4172	98,91992	0,16119607	99,0811	-0,149082	0,035408	367,7045339	367,5554522	367,7399417
949	2,0625	96,43586	26,07511	0,90272138	26,9778	-0,38525	0,083163	179,3222847	178,9370351	179,4054477
950	0	88,48116	23,93541	0,88846104	24,8239	-0,650434	0,059311	164,6732594	164,0228259	164,7325704
950	1,0313	-41,60444	-67,22233	2,03769526	-65,1846	-0,874819	0,099373	-184,4550335	-185,3298527	-184,3556609
950	2,0625	-171,69	-159,2075	3,18692948	-156,021	-1,099205	0,139434	-535,2381987	-536,3374035	-535,0987644
951	0	-146,3735	-159,334	3,18692948	-156,147	-1,099205	-0,172456	-502,5797173	-503,678922	-502,7521737

951	1,0313	-18,16784	-67,17725	2,03769526	-65,1396	-0,874819	-0,123955	-153,8972936	-154,7721128	-154,0212491
951	2,0625	110,0378	24,00842	0,88846104	24,8969	-0,650434	-0,075455	192,8429536	192,19252	192,767499
952	0	108,8408	26,1467	0,90272138	27,0494	-0,38525	-0,099879	195,5918699	195,2066204	195,4919912
952	1,0313	139,5005	98,97335	0,16119607	99,1345	-0,149082	-0,044375	379,6197637	379,470682	379,5753891
952	2,0625	170,1602	125,9118	-0,58032924	125,331	0,087086	0,01113	471,8712022	471,9582883	471,8823318
953	0	169,9214	128,02	-0,71110697	127,309	0,038751	-0,015331	475,5156431	475,5543939	475,5003117
953	1,0313	107,1844	115,5982	-0,69742892	114,901	0,282288	0,044821	369,1411893	369,4234772	369,1860104
953	2,0625	44,44748	57,28803	-0,68375087	56,6043	0,525825	0,104974	170,9902802	171,5161051	171,0952539
954	0	44,04477	58,20641	-0,90490109	57,3015	0,165379	0,087491	171,8612274	172,0266065	171,9487186
954	1,0313	-110,8417	-39,97246	-0,39081216	-40,3633	0,436713	0,14682	-224,8207579	-224,3840451	-224,6739384
954	2,0625	-265,7282	-180,6747	0,12327678	-180,551	0,708047	0,206148	-706,5493849	-705,8413382	-706,3432369
955	0	-133,6623	-113,7018	1,17364943	-112,528	-0,687796	-0,060261	-398,817388	-399,5051841	-398,8776488
955	1,0313	-25,31351	2,934834	0,49580791	3,43064	-0,14929	-0,024099	-26,04628625	-26,19557648	-26,07038484
955	2,0625	83,03531	77,04817	-0,18203361	76,8661	0,389216	0,012064	261,6781739	262,0673896	261,6902376
956	0	76,01486	79,26583	0,01760129	79,2834	0,781626	-0,006463	257,3861857	258,1678113	257,3797225
956	1,0313	112,1643	123,8824	-0,20625082	123,676	0,875419	0,011098	393,1658502	394,0412692	393,1769485
956	2,0625	148,3137	122,6107	-0,43010293	122,181	0,969212	0,02866	437,1690595	438,1382719	437,1977192
957	0	137,2936	119,6701	-0,32315745	119,347	1,00681	0,001481	417,1755528	418,1823626	417,1770338
957	1,0313	102,7547	88,6182	-0,1278525	88,4903	0,534974	0,010281	310,5618654	311,0968394	310,5721468
957	2,0625	68,21588	11,67809	0,06745246	11,7455	0,063138	0,019082	112,1717227	112,2348609	112,1908044
958	0	55,61785	4,580212	0,04242412	4,62264	-0,254957	-0,002423	81,54848076	81,29352385	81,54605782
958	1,0313	-50,13334	-75,54662	0,61069294	-74,9359	-1,181408	0,006108	-215,0451952	-216,2266037	-215,0390869
958	2,0625	-155,8845	-156,5009	1,17896177	-155,322	-2,10786	0,01464	-513,2937434	-515,4016034	-513,2791039
959	0	-145,1056	-156,5968	1,17896177	-155,418	-2,10786	-0,031898	-499,4728742	-501,5807342	-499,5047724
959	1,0313	-37,38752	-75,47603	0,61069294	-74,8653	-1,181408	-0,019094	-198,3344607	-199,5158692	-198,3535544
959	2,0625	70,33054	4,673616	0,04242412	4,71604	-0,254957	-0,006289	100,8617763	100,6068194	100,8554872
960	0	73,13093	11,76958	0,06745246	11,837	0,063138	-0,028063	118,744275	118,8074132	118,7162118
960	1,0313	109,4789	88,68642	-0,1278525	88,5586	0,534974	-0,015971	319,4397496	319,9747236	319,4237782
960	2,0625	145,8269	119,715	-0,32315745	119,392	1,00681	-0,00388	428,358769	429,3655787	428,3548892
961	0	147,2337	122,6527	-0,43010293	122,223	0,969212	-0,032105	435,8490084	436,8182208	435,8169031
961	1,0313	110,9393	123,9029	-0,20625082	123,697	0,875419	-0,01167	391,614344	392,489763	391,6026741
961	2,0625	74,64494	79,2648	0,01760129	79,2824	0,781626	0,008765	255,6032245	256,38485	255,6119899
962	0	73,39626	77,04444	-0,18203361	76,8624	0,389216	-0,011571	249,13995	249,5291657	249,128379
962	1,0313	-39,44953	2,913608	0,49580791	3,40942	-0,14929	0,02747	-44,46555179	-44,61484202	-44,43808138
962	2,0625	-152,2953	-113,7405	1,17364943	-112,567	-0,687796	0,066512	-423,1176951	-423,8054913	-423,0511833

963	0	-54,58193	-115,0873	-0,33022738	-115,418	-2,224599	0,403767	-301,7915137	-304,0161132	-301,3877466
963	1,0313	31,56446	30,07354	0,2622932	30,3358	-0,711357	0,26314	101,7054575	100,9941004	101,9685974
963	2,0625	117,7108	132,711	0,85481379	133,566	0,801885	0,122513	420,1557871	420,9576723	420,2782998
964	0	119,2605	131,9941	0,81596787	132,81	0,89125	0,173779	420,6587438	421,5499938	420,8325224
964	1,0313	131,7928	173,8942	0,82421314	174,718	1,443673	0,070161	520,7673951	522,2110682	520,8375561
964	2,0625	144,3251	169,906	0,83245841	170,739	1,996096	-0,033457	529,099591	531,0956873	529,0661344
965	0	147,7221	175,055	0,90489225	175,96	1,947888	0,020631	543,9584379	545,906326	543,9790685
965	1,0313	88,52422	111,7891	0,4990984	112,288	1,218543	-0,068997	339,6579417	340,8764851	339,5889444
965	2,0625	29,32633	2,635076	0,09330455	2,72838	0,489199	-0,158625	43,58099031	44,07018881	43,42236498
966	0	31,24432	10,51334	0,23114203	10,7445	0,318259	-0,114385	62,10657682	62,42483574	61,99219158
966	1,0313	-108,0715	-142,308	-0,69715264	-143,005	-1,36388	-0,204898	-426,5032856	-427,8671654	-426,7081835
966	2,0625	-247,3873	-295,9568	-1,62544732	-297,582	-3,046019	-0,295411	-916,7680202	-919,8140388	-917,0634308
967	0	-279,5337	-295,9938	-1,62544732	-297,619	-3,046019	0,306524	-958,6323244	-961,678343	-958,3258005
967	1,0313	-126,1354	-142,1923	-0,69715264	-142,889	-1,36388	0,209923	-449,7549899	-451,1188698	-449,5450673
967	2,0625	27,2629	10,63805	0,23114203	10,8692	0,318259	0,113321	57,18016817	57,49842709	57,29348945
968	0	12,25402	2,762743	0,09330455	2,85605	0,489199	0,159951	21,64232054	22,13151905	21,80227109
968	1,0313	83,80942	111,8806	0,4990984	112,38	1,218543	0,066431	333,7117251	334,9302685	333,7781565
968	2,0625	155,3648	175,1103	0,90489225	176,015	1,947888	-0,027088	554,0046745	555,9525626	553,9775866
969	0	137,0633	169,9671	0,83245841	170,8	1,996096	0,02933	519,7813949	521,7774911	519,810725
969	1,0313	138,6342	173,9182	0,82421314	174,742	1,443673	-0,076755	529,7092844	531,1529575	529,6325291
969	2,0625	140,205	131,9811	0,81596787	132,797	0,89125	-0,182841	447,8607187	448,7519687	447,6778779
970	0	125,3986	132,7042	0,85481379	133,559	0,801885	-0,130442	430,1361477	430,938033	430,0057057
970	1,0313	59,25898	30,02661	0,2622932	30,2889	-0,711357	-0,272175	137,6144722	136,9031151	137,3422968
970	2,0625	-6,880596	-115,1743	-0,33022738	-115,505	-2,224599	-0,413909	-239,953845	-242,1784444	-240,3677537

TABEL MOMEN BALOK LINTANG STRUKTUR BAWAH

FRAME	STA	ML		ML TOT	ME		COMB1	COMB 2		COMB 3
		ML	ML		ME X	ME Y		1,3MD + 2 (MLQ+MLP)	1,3MD + 2 (MLQ+MLP)+1MEY	
		ML merata	ML Koef kejut							
404	0	42,09221	0,203705475	74,8264	0,574632	0,998036	204,3726765	204,9473087	205,3707124	
404	4,125	35,26704	0,225522919	29,66029	0,038248	0,183469	105,1677257	105,2059733	105,3511947	
404	8,25	28,44186	0,247340362	-15,50582	-0,498137	-0,631098	5,962774961	5,464637891	5,331677084	
405	0	28,80926	-15,7177	-15,47036	-0,498137	0,291999	6,511310562	6,013173492	6,803309541	
405	4,125	35,19142	0,225522919	29,67525	0,038248	0,070087	105,0993537	105,1376012	105,1694405	
405	8,25	41,57359	0,203705475	74,82087	0,574632	-0,151825	203,6873968	204,262029	203,5355714	
406	0	-20,01094	0,247340362	28,08428	0,451247	0,570669	30,15432954	30,60557636	30,72499808	
406	4,125	28,38677	0,30324247	20,77225	-0,052059	0,021799	78,44729855	78,39523945	78,46909744	
406	8,25	76,78448	1,772237547	13,46022	-0,555365	-0,527071	126,7402676	126,1849025	126,2131968	
409	0	76,01305	1,772237547	13,49058	-0,555365	0,698483	125,7981321	125,2427671	126,4966155	
409	4,125	28,41623	0,30324247	20,78205	-0,052059	-0,05	78,50521049	78,45315138	78,45521049	
409	8,25	-19,18059	0,30324247	28,07353	0,451247	-0,798483	31,21228888	31,6635357	30,41380543	
410	0	-57,55788	-3,61621914	-2,187021	0,433482	1,048588	-79,19928031	-78,76579858	-78,150692	
410	4,125	17,3475	0,428429986	11,83403	-0,056661	0,016307	46,21981276	46,16315153	46,23611953	
410	8,25	92,25288	4,473079111	25,85508	-0,546804	-1,015975	171,6389058	171,0921016	170,6229311	
413	0	91,06062	4,473079111	25,87983	-0,546804	1,235829	170,1384687	169,5916645	171,374298	
413	4,125	17,39329	0,428429986	11,83841	-0,056661	-0,036425	46,288088	46,23142677	46,2516626	
413	8,25	-56,27404	-3,61621914	-2,203022	0,433482	-1,30868	-77,5622927	-77,12881097	-78,87097282	
415	0	-73,66417	-12,04384	-18,87959	0,390695	2,087449	-133,522603	-133,1319085	-131,4351543	
415	4,125	8,468639	0,610621344	5,68384	-0,036178	0,05182	22,37691063	22,34073279	22,42873021	
415	8,25	90,60145	22,19028	30,24727	-0,46305	-1,98381	178,2764242	177,813374	176,2926147	
417	0	89,35506	22,21	30,26699	-0,46305	2,254248	176,6955568	176,2325066	178,9498051	
417	4,125	8,502067	0,610621344	5,684814	-0,036178	-0,003793	22,42231442	22,38613659	22,4185219	
417	8,25	-72,35092	-12,06161	-18,89736	0,390695	-2,261833	-131,850928	-131,4602335	-134,1127613	
422	0	-55,62146	-14,27581	-22,02616	0,180575	4,036045	-116,360212	-116,1796369	-112,3241667	
422	4,125	0,804617	0,146294983	0,002791	-0,01296	0,571818	1,051584871	1,038624774	1,623403023	
422	8,25	57,23069	13,9888	22,03174	-0,206495	-2,892409	118,4633817	118,2568864	115,5709727	
423	0	57,83225	13,99684	22,03978	-0,206495	2,198433	119,2614903	119,054995	121,4599231	
423	4,125	0,8094	-0,144671	0,001624	-0,01296	0,178552	1,055466839	1,042506742	1,234018744	
423	8,25	-56,21345	-14,28619	-22,03654	0,180575	-1,841329	-117,1505566	-116,9699815	-118,9918856	
424	0	-28,31629	-10,13517	-14,12906	0,059735	1,333308	-65,06928982	-64,99955467	-63,7359822	
424	4,125	-0,524751	-1,000516	-1,030229	-0,007473	0,43182	-2,74263559	-2,750108213	-2,310815654	

424	8,25	27,26678	8,134143	3,934458045	12,0686	-0,08468	-0,469668	59,58401864	59,4933824	59,11435089
425	0	30,97255	8,14303	3,934458045	12,07749	-0,08468	-0,534983	64,41929232	64,33461192	63,88430966
425	4,125	-0,527584	-0,999759	-0,0297133	-1,029472	-0,007473	0,341928	-2,744804226	-2,752276849	-2,402876201
425	8,25	-32,02772	-10,14255	-3,99388465	-14,13643	0,069735	1,218839	-69,90890077	-69,83916561	-68,69006206
426	0	13,59387	-4,406213	0,470982216	-3,93523	-0,118327	19,93928	9,801570408	9,683243508	29,74085228
426	4,125	0,317656	-0,638569	-0,01929648	-0,657866	0,001399	1,015138	-0,902778535	-0,901379208	0,112359396
426	8,25	-12,95856	3,129074	-0,50957519	2,619499	0,121126	-17,90901	-11,60712748	-11,48600192	-29,51613349
427	0	41,98771	3,136332	-0,50957519	2,626757	0,121126	15,74758	59,83753748	59,95866304	75,5851178
427	4,125	0,127978	-0,640061	-0,01929648	-0,659357	0,001399	0,42628	-1,15234282	-1,150943494	-0,726063204
427	8,25	-41,73175	-4,416454	0,470982216	-3,945471	-0,118327	-14,89502	-62,14222312	-62,26055002	-77,03724421
428	0	-7,248023	-4,798245	0,422515962	-4,375729	-0,202475	11,85824	-18,17388724	-18,37636224	-6,315642673
428	4,125	0,784103	0,073331	-0,016078	0,057253	0,01153	0,25858	1,133839987	1,145370335	1,392419622
428	8,25	8,816229	4,944906	-0,45467195	4,490234	0,225536	-11,34109	20,44156722	20,66710291	9,100481916
429	0	83,66149	4,957633	-0,45467195	4,502961	0,225536	11,53361	117,7658549	117,9913906	129,2994684
429	4,125	0,660872	0,07232	-0,016078	0,056242	0,01153	-0,076841	0,97161767	0,983148018	0,894776349
429	8,25	-82,33974	-4,812993	0,422515962	-4,390477	-0,202475	-11,6873	-115,8226195	-116,0250945	-127,5099157
430	0	-27,87835	-4,244741	-0,03730409	-4,282045	-0,273388	4,807166	-44,80593935	-45,07932702	-39,99877289
430	4,125	4,178289	1,43609	0,057474622	1,493564	0,012213	0,069388	8,418904382	8,431117861	8,488292094
430	8,25	36,23492	7,11692	0,152253335	7,269174	0,297815	-4,668391	61,64374811	61,94156274	56,97535708
431	0	87,97513	7,132596	0,152253335	7,284849	0,297815	4,947444	128,9373726	129,2351872	133,8848165
431	4,125	3,957941	1,435764	0,057474622	1,493238	0,012213	-0,093459	8,131799463	8,144012941	8,038340933
431	8,25	-80,05925	-4,261068	-0,03730409	-4,298372	-0,273388	-5,134361	-112,6737737	-112,9471613	-117,8081346
432	0	-39,95731	-1,474838	-1,60956558	-3,084404	-0,276187	1,824146	-58,11331384	-58,38950042	-56,28916753
432	4,125	9,698672	3,749291	0,325743254	4,075034	0,017431	0,016205	20,75834159	20,77577265	20,77454658
432	8,25	59,35466	8,973419	2,26105209	11,23447	0,311049	-1,791736	99,62999701	99,94104571	97,8382607
437	0	92,90633	8,990698	2,26105209	11,25175	0,311049	1,635602	143,2817316	143,5927803	144,9173338
437	4,125	9,36561	3,750093	0,325743254	4,075836	0,017431	-0,070612	20,32696451	20,34439557	20,25635234
437	8,25	-74,17511	-1,490513	-1,60956558	-3,100078	-0,276187	-1,776827	-102,6278025	-102,9039891	-104,4046291
439	0	-38,24536	3,481132	-3,65712045	-0,175988	-0,220114	0,710623	-50,07094613	-50,29106012	-49,3603233
439	4,125	18,303	6,923585	1,145242398	8,068828	0,022574	-0,078053	39,93155711	39,95413129	39,85350445
439	8,25	74,85136	10,36604	5,947605247	16,31364	0,265262	-0,866728	129,9340603	130,1993227	129,0673322
441	0	100,9563	10,38528	5,947605247	16,33288	0,265262	0,182381	163,9089441	164,1742065	164,0913254
441	4,125	17,40253	6,926259	1,145242398	8,071502	0,022574	-0,131315	38,76629519	38,78886937	38,63498064
441	8,25	-66,15123	3,467241	-3,65712045	-0,18988	-0,220114	-0,44501	-86,37635373	-86,59646772	-86,82136409
443	0	-35,23946	2,820683	-6,15793729	-3,337255	-0,120788	0,037509	-52,48581075	-52,60659911	-52,44830138

443	4,125	26,30589	8,630665	2,636516359	11,26718	0,020825	-0,331261	56,73201981	56,7528446	56,40075892
443	8,25	87,85124	14,44065	11,43097	25,87162	0,162438	-0,700031	165,9498504	166,1122883	165,2498192
445	0	115,1792	14,45425	11,43097	25,88522	0,162438	-0,397132	201,5034408	201,6658788	201,1063083
445	4,125	23,33506	8,633642	2,636516359	11,27016	0,020825	-0,371894	52,87589555	52,89672034	52,50400174
445	8,25	68,50911	2,813033	-6,15793729	-3,344904	-0,120788	-0,346655	-95,75164974	-95,8724381	-96,09830488
447	0	-18,58788	4,174877	-7,39867282	-3,223795	-0,03003	-1,145894	-30,61183276	-30,64186292	-31,75772628
447	4,125	33,61907	9,841814	3,787274471	13,62909	0,011602	-0,818367	70,96296722	70,9745688	70,14460009
447	8,25	85,82602	15,50875	14,97322176	30,48197	0,053233	-0,490841	172,5377672	172,5910005	172,0469265
448	0	123,9263	15,52165	14,97322176	30,49488	0,053233	-0,292061	222,0938786	222,1471119	221,8018172
448	4,125	27,14366	9,845669	3,787274471	13,63294	0,011602	-0,847534	62,55264346	62,56424504	61,70510976
448	8,25	-69,63894	4,169685	-7,39867282	-3,228988	-0,03003	-1,403006	-96,98859166	-97,01862182	-98,39159764
452	0	-43,01152	3,014583	-6,4379659	-3,423383	0,015799	-2,488667	-62,76174009	-62,74594142	-65,25040715
452	4,125	27,18005	8,887442	2,704427506	11,59187	0,002109	-1,248078	58,5177996	58,51990889	57,26972202
452	8,25	97,37161	14,7603	11,84682091	26,60712	-0,01158	-0,007488	179,7973393	179,7857592	179,7898512
456	0	114,4558	14,77369	11,84682091	26,62051	-0,01158	0,355474	202,0335885	202,0220084	202,3890624
456	4,125	24,37805	8,890604	2,704427506	11,59503	0,002109	-1,270821	54,88152476	54,88363405	53,61070388
456	8,25	-65,69973	3,007521	-6,43796589	-3,430445	0,015799	-2,897116	-92,270539	-92,25474033	-95,16765466
458	0	-49,74722	4,412478	-4,03194682	0,380531	0,026464	-0,725182	-63,91032136	-63,88385765	-64,63550368
458	4,125	20,4012	7,575603	1,262254084	8,837857	-0,002937	-0,66878	44,19727065	44,19433329	43,52849095
458	8,25	90,54961	10,73873	6,556454987	17,29518	-0,032338	-0,612377	152,3048627	152,2725242	151,6924856
461	0	101,0323	10,75883	6,556454987	17,31528	-0,032338	-0,11317	165,9725215	165,9401831	165,8593512
461	4,125	19,61937	7,578878	1,262254084	8,841132	-0,002937	-0,682912	43,18744897	43,1845116	42,50453741
461	8,25	-61,79353	4,39893	-4,03194682	0,366983	0,026464	-1,252653	-79,59762357	-79,57115986	-80,85027638
464	0	-58,79833	-1,062686	-2,09439395	-3,15708	0,028005	0,5534	-82,751996	-82,72399108	-82,19859641
464	4,125	11,83318	4,423608	0,411530056	4,835138	-0,002535	-0,162557	25,05341544	25,05088084	24,89085836
464	8,25	82,4647	9,909903	2,917454058	12,82736	-0,033074	-0,878514	132,8588269	132,8257527	131,9803131
466	0	95,39134	9,929142	2,917454058	12,8466	-0,033074	-0,291451	149,7019328	149,6688587	149,4104817
466	4,125	11,61035	4,424958	0,411530056	4,836488	-0,002535	-0,172199	24,76642399	24,76388938	24,59422486
466	8,25	-72,17065	-1,079227	-2,09439395	-3,173621	0,028005	-0,052947	-100,1690848	-100,1410799	-100,222032
468	0	-58,46742	-5,221439	-0,47237011	-5,693809	0,025854	0,610116	-87,39526042	-87,3694061	-86,7851446
468	4,125	5,630892	1,913216	0,089654411	2,002871	-0,001469	-0,029006	11,3259014	11,32443262	11,29689566
468	8,25	69,7292	9,047872	0,651678927	9,699551	-0,028792	-0,668127	110,0470632	110,0182713	109,3789359
469	0	92,56751	9,065518	0,651678927	9,717197	-0,028792	0,064803	139,772151	139,7433592	139,8369544
469	4,125	5,519953	1,913105	0,089654411	2,002759	-0,001469	-0,034905	11,18145727	11,1799885	11,1465523
469	8,25	-81,5276	-5,239308	-0,47237011	-5,711678	0,025854	-0,134613	-117,4092365	-117,3833822	-117,5438498

473	0	-46,22696	-7,290376	0,514194535	-6,776181	0,024085	0,502307	-73,64741653	-73,62333114	-73,14510949
473	4,125	2,11153	0,343783	-0,0005068	0,343276	-0,000784	-0,005996	3,431540693	3,430756324	3,425544981
473	8,25	50,45003	7,977941	-0,51520813	7,462733	-0,025654	-0,514298	80,51049792	80,48484379	79,99619945
476	0	94,12445	7,993359	-0,51520813	7,478381	-0,025654	0,443349	137,3185525	137,2928984	137,7619011
476	4,125	1,893973	0,342659	-0,0005068	0,342152	-0,000784	-0,010625	3,146469678	3,145685308	3,135844402
476	8,25	-90,33651	-7,308272	0,514194535	-6,794077	0,024085	-0,464599	-131,0256132	-131,0015278	-131,4902123
477	0	-21,39803	-8,165216	0,816308047	-7,348908	0,021929	0,432589	-42,5152553	-42,49332667	-42,08266611
477	4,125	0,281612	-0,608264	-0,01806117	-0,626325	-0,000467	-0,016791	-0,886553858	-0,887020574	-0,903344973
477	8,25	21,96126	6,948688	-0,85243039	6,096258	-0,022862	-0,466171	40,74214758	40,71928552	40,27597616
478	0	101,993	6,961894	-0,85243039	6,109463	-0,022862	0,747537	144,8098082	144,7869462	145,557345
478	4,125	-0,285027	-0,610153	-0,01806117	-0,628214	-0,000467	-0,022192	-1,626964113	-1,627430828	-1,649156525
478	8,25	-102,563	-8,1822	0,816308047	-7,365892	0,021929	-0,791922	-148,0637364	-148,0418078	-148,8556581
479	0	15,85897	-8,239458	0,363752848	-7,875705	0,016656	0,500148	4,865249388	4,881905234	5,365396906
479	4,125	-0,678157	-1,190921	-0,03470759	-1,225628	-0,000359	0,001841	-3,332859964	-3,33321886	-3,331018886
479	8,25	-17,21528	5,857617	-0,43316803	5,424449	-0,017374	-0,496465	-11,53096932	-11,54834295	-12,02743468
480	0	112,9472	5,86797	-0,43316803	5,434802	-0,017374	0,832746	157,7009703	157,6835966	158,5337164
480	4,125	-1,755936	-1,193336	-0,03470759	-1,228043	-0,000359	-0,004707	-4,738803109	-4,739162004	-4,743510251
480	8,25	-116,4591	-8,254641	0,363752848	-7,890888	0,016656	-0,84216	-167,1785765	-167,1619206	-168,0207369
481	0	51,75574	-6,875519	-0,99355723	-7,869076	0,011323	1,524907	51,54431129	51,55563421	53,06921868
481	4,125	-1,129619	-1,344617	-0,16228653	-1,506904	0,000416	0,299925	-4,482312811	-4,481897008	-4,182388143
481	8,25	-54,01498	4,186285	0,668984163	4,855269	-0,010491	-0,925058	-60,50893691	-60,51942822	-61,43399497
482	0	106,385	4,19307	0,668984163	4,862055	-0,010491	0,062769	148,024586	148,0140946	148,087355
482	4,125	-2,287721	-1,346929	-0,16228653	-1,509215	0,000416	0,295942	-5,992467421	-5,992051618	-5,696525516
482	8,25	-110,9604	-6,886928	-0,99355723	-7,880485	0,011323	0,529115	-160,0095208	-159,9981979	-159,480406
483	0	55,51072	-7,447197	-1,07236192	-8,519559	0,109361	0,637257	55,12481725	55,23417802	55,76207429
483	4,125	-1,08523	-1,345396	-0,16209168	-1,507488	-0,000281	0,294571	-4,425774736	-4,426056144	-4,131204127
483	8,25	-57,68118	4,756404	0,748178563	5,504583	-0,109924	-0,048116	-63,97636672	-64,0862903	-64,02448254
484	0	111,5755	4,761241	0,748178563	5,509419	-0,109924	-0,984376	156,067005	155,9570814	155,0826295
484	4,125	-2,325595	-1,347673	-0,16209168	-1,509765	-0,000281	0,298422	-6,042803803	-6,04308521	-5,744381653
484	8,25	-116,2267	-7,456587	-1,07236192	-8,528949	0,109361	1,58122	-168,1526126	-168,0432519	-166,5713928
485	0	21,14225	-9,04626	0,246329408	-8,799993	0,170371	-0,722762	9,885064253	10,05543526	9,162301913
485	4,125	-0,57678	-1,165702	-0,03122678	-1,196928	-0,004532	-0,007118	-3,1436702	-3,148202106	-3,150788006
485	8,25	-22,29581	6,714857	-0,30878297	6,406074	-0,179435	0,708527	-16,17240465	-16,35183948	-15,46387792
486	0	120,522	6,72185	-0,30878297	6,413067	-0,179435	-0,629047	169,5046721	169,3252373	168,8756251
486	4,125	-1,788615	-1,168057	-0,03122678	-1,199283	-0,004532	0,000357	-4,72376663	-4,728298536	-4,723410084

486	8,25	-124,0992	-9,057963	0,246329408	-8,811633	0,170371	0,62976	-178,9522054	-178,7818344	-178,3224452
487	0	-17,01082	-9,18206	0,666279207	-8,515781	0,214882	-0,72509	-39,14562828	-38,93074634	-39,87071862
487	4,125	0,388603	-0,578536	-0,01382764	-0,592364	-0,005532	-0,023266	-0,679544502	-0,685076649	-0,702810594
487	8,25	17,78803	8,024988	-0,69393448	7,331053	-0,225946	0,678558	37,78653928	37,56059304	38,46509743
488	0	109,4878	8,034673	-0,69393448	7,340739	-0,225946	-0,580915	157,0156396	156,7896933	156,4347248
488	4,125	-0,303109	-0,580368	-0,01382764	-0,594196	-0,005532	-0,016743	-1,582432994	-1,587965142	-1,599176043
488	8,25	-110,094	-9,195409	0,666279207	-8,52913	0,214882	0,547429	-160,1805056	-159,9656236	-159,6330769
489	0	-43,37096	-8,404265	0,346028307	-8,058237	0,233573	-0,527898	-72,4987172	-72,26514439	-73,02661568
489	4,125	2,243642	0,38395	0,005415217	0,389365	-0,007456	-0,005425	3,695465714	3,688009241	3,690040271
489	8,25	47,85824	9,172165	-0,33519787	8,836967	-0,248486	0,517048	79,88964862	79,64116287	80,40669622
490	0	100,7363	9,184635	-0,33519787	8,849437	-0,248486	-0,502269	148,6560677	148,407582	148,1537989
490	4,125	1,903635	0,38288	0,005415217	0,388295	-0,007456	0,000448	3,251314921	3,243858448	3,251762884
490	8,25	-96,92903	-8,418876	0,346028307	-8,072847	0,233573	0,503165	-142,1534379	-141,9198651	-141,6502731
491	0	-56,46273	-6,289055	-0,6402117	-6,929266	0,22667	-0,40688	-87,26007841	-87,03340866	-87,6669586
491	4,125	5,868858	1,97273	0,099243968	2,071974	-0,01068	-0,003128	11,77346447	11,76278446	11,7703369
491	8,25	68,20044	10,23452	0,838699636	11,07322	-0,24803	0,400625	110,8070073	110,5589776	111,2076324
492	0	98,61768	10,24929	0,838699636	11,08799	-0,24803	-0,405761	150,3789686	150,1309388	149,9732078
492	4,125	5,579659	1,972678	0,099243968	2,071922	-0,01068	0,004431	11,39740179	11,38672178	11,40183316
492	8,25	-87,45837	-6,303934	-0,6402117	-6,944145	0,22667	0,414624	-127,584165	-127,3574952	-127,1695414
493	0	-55,71978	-1,910163	-2,23214563	-4,142308	0,195785	-0,346217	-80,72033264	-80,5245479	-81,06654993
493	4,125	12,40454	4,513552	0,429538054	4,94309	-0,013697	-0,006392	26,01208022	25,99838304	26,0056879
493	8,25	80,52886	10,93727	3,091221741	14,02849	-0,223179	0,333433	132,7444931	132,521314	133,0779257
494	0	101,8625	10,95369	3,091221741	14,04491	-0,223179	-0,344714	160,5111135	160,2879343	160,1663996
494	4,125	11,74238	4,514991	0,429538054	4,944529	-0,013697	0,006022	25,15414982	25,14045264	25,16017206
494	8,25	-78,37778	-1,923705	-2,23214563	-4,15585	0,195785	0,356758	-110,2028138	-110,0070291	-109,8460555
495	0	-40,94935	4,036078	-4,07685018	-0,040772	0,143434	-0,313366	-53,31569424	-53,17226064	-53,62906006
495	4,125	21,93625	7,721187	1,301185817	9,022372	-0,011921	-0,010337	46,5618687	46,54994756	46,5515314
495	8,25	84,82184	11,4063	6,679221812	18,08552	-0,167276	0,292691	146,4394316	146,2721558	146,7321229
496	0	109,6106	11,42358	6,679221812	18,1028	-0,167276	-0,312393	178,6994139	178,532138	178,3870204
496	4,125	19,86992	7,724642	1,301185817	9,025828	-0,011921	0,008258	43,88255173	43,87063059	43,89080976
496	8,25	-69,87078	4,025703	-4,07685018	-0,051147	0,143434	0,328909	-90,93431042	-90,79087681	-90,60540092
497	0	-17,66916	3,664056	-6,24739954	-2,583343	0,065197	-0,250088	-28,13659296	-28,0713957	-28,38668115
497	4,125	31,71363	9,188166	2,790072362	11,97824	0,000396	-0,015863	65,18419256	65,18458832	65,1683293
497	8,25	81,09642	14,71228	11,82754427	26,53982	-0,064406	0,218362	158,5049781	158,4405724	158,7233398
498	0	124,4446	14,72333	11,82754427	26,55087	-0,064406	-0,249106	214,879714	214,8153083	214,6306079

498	4,125	25,48042	9,191773	2,790072362	11,98185	0,00396	0,012374	57,08824228	57,08863805	57,10061634
498	8,25	-73,48374	3,660217	-6,24739954	-2,587183	0,065197	0,273854	-100,7032295	-100,6380322	-100,4293752
499		0	-37,08358	4,586173	-7,29896633	-2,712793	-0,060968	-53,63424139	-53,69520932	-53,76442826
499	4,125	30,2446	9,954564	3,824309258	13,77887	0,020646	-0,016756	66,87573098	66,89637734	66,85897473
499	8,25	97,57279	15,32296	14,94758485	30,27054	0,102261	0,096674	187,3857033	187,487964	187,4823777
500		0	117,3923	15,33418	14,94758485	30,28176	0,102261	213,1734529	213,2757136	213,0396501
500	4,125	27,11483	9,958639	3,824309258	13,78295	0,020646	0,013212	62,81517721	62,83582356	62,82838931
500	8,25	-63,16259	4,583102	-7,29896633	-2,715864	-0,060968	0,160227	-87,54309852	-87,60406646	-87,38287153
501		0	-44,30291	3,285725	-6,05714363	-2,771418	-0,25504	-63,1366197	-63,39166	-63,26613671
501	4,125	24,70813	8,63065	2,642301501	11,27295	0,039991	-0,018411	54,66647198	54,7064631	54,64806052
501	8,25	93,71917	13,97557	11,34174663	25,31732	0,335023	0,092694	172,4696637	172,8045862	172,5622577
502		0	107,269	13,98897	11,34174663	25,33072	0,335023	190,11110804	190,446103	189,9924426
502	4,125	23,54632	8,633733	2,642301501	11,27603	0,039991	0,017287	53,16227977	53,20227089	53,17956721
502	8,25	-60,17632	3,278491	-6,05714363	-2,778653	-0,25504	0,153213	-83,7865209	-84,0415612	-83,63330817
503		0	-43,01484	4,190914	-3,50472711	0,686187	-0,46975	-54,54691537	-55,01666512	-55,03706816
503	4,125	17,57543	6,873367	1,136549005	8,009916	0,044897	-0,02208	38,86789479	38,91279132	38,84581472
503	8,25	78,1657	9,55582	5,777825121	15,33365	0,559543	0,445993	132,282705	132,8422478	132,7286976
504		0	92,83995	9,576491	5,777825121	15,35432	0,559543	151,4005618	151,9601047	150,9694592
504	4,125	17,42798	6,876195	1,136549005	8,012744	0,044897	0,025384	38,68186176	38,72675829	38,70724618
504	8,25	-57,98399	4,175899	-3,50472711	0,671172	-0,46975	0,481871	-74,03683832	-74,50658806	-73,55496687
505		0	-44,29264	-0,559191	-1,41199407	-1,971185	-0,600195	-61,52280471	-62,12300001	-63,278314
505	4,125	9,30946	3,684638	0,314075365	3,998714	0,037056	-0,039093	20,09972489	20,13678089	20,06063152
505	8,25	62,91156	7,928468	2,040144796	9,968613	0,674307	1,677323	101,7222545	102,3965618	103,399577
506		0	83,71564	7,94873	2,040144796	9,988875	0,674307	128,8080806	129,4823878	127,2294501
506	4,125	9,336111	3,685642	0,314075365	3,999717	0,037056	0,043761	20,13637841	20,1734344	20,18013932
506	8,25	-65,04342	-0,577446	-1,41199407	-1,98944	-0,600195	1,666152	-88,53532374	-89,13551904	-86,86917151
507		0	-32,55317	-3,28023	0,177570445	-3,10266	-0,617769	-48,52443621	-49,14220503	-53,62014205
507	4,125	3,952629	1,385168	0,048267763	1,433436	0,025966	-0,087657	8,005288366	8,031254245	7,917631383
507	8,25	40,45842	6,050566	-0,08103492	5,969531	0,669701	4,920392	64,53501295	65,20471352	69,45540481
508		0	78,25301	6,070243	-0,08103492	5,989208	0,669701	113,7073255	114,3770261	109,0507287
508	4,125	3,950253	1,385232	0,048267763	1,4335	0,025966	0,074748	8,00232959	8,028295468	8,077077651
508	8,25	-70,3525	-3,299778	0,177570445	-3,122208	-0,617769	4,806093	-97,70266637	-98,32043518	-92,89657344
509		0	-11,15527	0,61783225	-3,25059	-0,503131	-11,82222	-21,00302879	-21,50615972	-32,82524486
509	4,125	0,653939	0,040607	-0,02199871	0,018608	0,020206	-0,079461	0,887338039	0,90754391	0,807877454
509	8,25	12,46315	3,949636	-0,66182968	3,287807	0,543543	11,66329	22,77770487	23,32124754	34,44099977

510	0	75,426	3,972221	-0,66182968	3,310391	0,543543	-11,58865	104,6745814	105,2181241	93,08593074
510	4,125	0,658505	0,041794	-0,02199871	0,019795	0,020206	0,261455	0,895647144	0,915853015	1,157102109
510	8,25	-74,10899	-3,888633	0,61783225	-3,270801	-0,503131	12,11156	-102,8832871	-103,386418	-90,77172652
511	0	14,06271	-3,922907	0,580182711	-3,342724	-0,284252	-15,46193	11,59607202	11,31181967	-3,86586286
511	4,125	0,269513	-0,663252	-0,0219598	0,685212	0,005226	0,422288	-1,020055886	-1,014830146	-0,597768016
511	8,25	-13,52368	2,596403	-0,62410232	1,972301	0,294704	16,30651	-13,63618379	-13,34147996	2,670326828
512	0	40,09538	2,65486	-0,62410232	2,030757	0,294704	-18,55698	56,18551064	56,48021447	37,62853012
512	4,125	0,118938	-0,646661	-0,0219598	-0,668621	0,005226	1,01843	-1,18262262	-1,17739688	-0,164192325
512	8,25	-39,85751	-3,948182	0,580182712	-3,367999	-0,284252	20,59384	-58,55075588	-58,83500823	-37,95691477
513	0	9,185367	-10,72022	-4,15608228	-14,8763	0,34639	-1,658285	-17,81163218	-17,46524264	-19,4699171
513	4,125	-0,406247	-1,026866	-0,03087784	-1,057744	-0,009108	0,275097	-2,643608867	-2,652716966	-2,368511688
513	8,25	-9,997861	8,66649	4,094326603	12,76082	-0,364606	2,208479	12,52441445	12,15980871	14,73289373
514	0	71,89218	8,664122	4,094326603	12,75845	-0,364606	-3,188148	118,9767348	118,612129	115,7885868
514	4,125	-0,650245	-1,028636	-0,03087784	-1,059514	-0,009108	0,305522	-2,96434643	-2,973454529	-2,658824477
514	8,25	-73,19267	-10,72139	-4,15608228	-14,87748	0,34639	3,799192	-124,9054276	-124,5590381	-121,1062357
515	0	-15,38251	-14,82729	-7,99625152	-22,82354	0,652248	-1,757091	-65,64433384	-64,99208594	-67,40142435
515	4,125	1,016044	-0,151912	0,149734642	-0,002177	-0,022003	-0,020433	1,316502885	1,294500029	1,296070208
515	8,25	17,4146	14,52346	8,295720808	22,81918	-0,696254	1,716225	68,27733961	67,581086	69,99356476
516	0	103,7265	14,52606	8,295720808	22,82178	-0,696254	-1,64159	180,488012	179,7917584	178,8464218
516	4,125	0,694558	-0,152619	0,149734642	-0,002884	-0,022003	0,017604	0,897157192	0,875154336	0,914761219
516	8,25	-102,3374	-14,83129	-7,99625152	-22,82755	0,652248	1,676798	-178,6936976	-178,0414497	-177,0168993
519	0	40,97086	-16,10536	-10,4234044	-26,52876	0,879501	-0,982985	-106,3196428	-105,4401418	-107,3026273
519	4,125	3,636995	1,603977	0,418304584	2,022281	-0,036352	-0,037835	8,772656863	8,736305041	8,734822012
519	8,25	48,24485	19,31331	11,2600136	30,57333	-0,952205	0,907315	123,8649565	122,9127519	124,7722713
520	0	117,0266	19,32076	11,2600136	30,58078	-0,952205	-0,814487	213,2961081	212,3439035	212,4816211
520	4,125	3,391687	1,603387	0,418304584	2,021691	-0,036352	-0,012642	8,452575769	8,416223948	8,439934119
520	8,25	-110,2432	-16,11399	-10,4234044	-26,53739	0,879501	0,789204	-196,3909566	-195,5114556	-195,6017528
521	0	-50,14544	-12,16752	-7,10867147	-19,27619	0,986523	-0,4731	-103,7414501	-102,7549271	-104,2145504
521	4,125	8,779841	5,027656	0,618940656	5,646597	-0,061799	-0,014616	22,70698692	22,64518762	22,6923709
521	8,25	67,70512	22,22283	8,346552783	30,56938	-1,110122	0,443868	149,155424	148,0453023	149,5992922
522	0	119,7371	22,23703	8,346552783	30,58358	-1,110122	-0,455592	216,8254387	215,7153171	216,3698463
522	4,125	8,450599	5,028839	0,618940656	5,64778	-0,061799	0,003498	22,28133728	22,21953798	22,28483565
522	8,25	-102,8359	-12,17935	-7,10867147	-19,28802	0,986523	0,462589	-172,2627642	-171,2762411	-171,800175
523	0	-38,16178	1,747991	-3,81455095	-2,06656	0,930845	-0,269848	-53,74343519	-52,81259033	-54,01328324
523	4,125	17,82305	11,2492	0,433408865	11,68261	-0,090897	-0,01023	46,5351787	46,44428199	46,52494864

523	8,25	73,80788	20,7504	4,681368678	25,43177	-1,112638	0,249388	146,8137926	145,7011543	147,0631805
524	0	115,4054	20,77118	4,681368678	25,45255	-1,112638	-0,285376	200,9321803	199,819542	200,6468039
524	4,125	17,229	11,25446	0,433408865	11,68787	-0,090897	0,007581	45,77343195	45,68253524	45,78101282
524	8,25	-80,94745	1,737732	-3,81455095	-2,076819	0,930845	0,300538	-109,3853164	-108,4544715	-109,0847782
525	0	-3,66561	29,63265	-1,29278406	28,33987	0,799226	-0,175285	51,9144473	52,7136732	51,73916255
525	4,125	28,71186	20,04524	0,286716555	20,33196	-0,078078	-0,009541	77,98933756	77,91125997	77,9797964
525	8,25	61,08934	10,45783	1,866217168	12,32404	-0,955381	0,156202	104,0642278	103,1088467	104,2204303
526	0	95,07374	10,49207	1,866217168	12,35829	-0,955381	-0,1863	148,3124379	147,3570568	148,1261374
526	4,125	28,10727	20,05917	0,286716555	20,34589	-0,078078	0,005793	77,23121709	77,15313951	77,23701052
526	8,25	-38,85921	29,62627	-1,29278406	28,33348	0,799226	0,197887	6,14999629	6,949222193	6,347883622
528	0	48,27126	74,70579	0,143594999	74,84938	0,69756	-0,02284	212,4514063	213,1489663	212,4285661
528	4,125	34,39014	28,90293	0,197105269	29,10003	0,015607	0,00074	102,9072405	102,9228479	102,9079806
528	8,25	20,50901	-16,89994	0,250615539	-16,64932	-0,666345	0,02432	-6,636925192	-7,303270461	-6,612604985
529	0	38,3599	-16,83419	0,250615539	-16,58357	-0,666345	-0,039353	16,70072849	16,03438322	16,66137525
529	4,125	35,44509	28,92987	0,197105269	29,12697	0,015607	-0,004705	104,3325627	104,3481701	104,3278582
529	8,25	32,53028	74,69392	0,143594999	74,83751	0,69756	0,029944	191,9643969	192,6619569	191,9943411
541	0	-72,48319	-15,63827	-10,132547	-25,77082	0,294717	3,825889	-145,7697934	-145,4750763	-141,9439045
541	4,125	3,424675	1,622617	0,412789054	2,035406	-0,021052	0,279024	8,522889497	8,501837984	8,801913102
541	8,25	79,33254	18,88351	10,95812514	29,84163	-0,33682	-3,267842	162,8155724	162,4787523	159,5477307
542	0	78,48893	18,89755	10,95812514	29,85567	-0,33682	3,176924	161,7469503	161,4101302	164,9238741
542	4,125	3,444533	1,621822	0,412789054	2,034611	-0,021052	0,085567	8,547114428	8,526062916	8,632681245
542	8,25	-71,59986	-15,6539	-10,132547	-25,78645	0,294717	-3,00579	-144,6527215	-144,3580044	-147,6585116

TABEL MOMEN BALOK LENGKUNG TEPI ARAH X

FRAME	STA	MD	ML		ML TOT	ME		COMB1 1,3MD + 2 (MQ+MP)	COMB 2 1,3MD + 2 (MQ+MP)+1MEX	COMB 3 1,3MD + 2 (MQ+MP)+1MEY
			ML merata	ML.Koef kejut		ME X	ME Y			
13	0	-565,2518	-658,2966	-113,374339	-771,6709	9,932677	-0,873864	-2278,169134	-2268,236457	-2279,042998
13	2,586036	-100,6621	-137,0098	-22,2232845	-159,233	5,499124	-0,48558	-449,3267556	-443,8276316	-449,812336
13	5,172072	363,9276	384,2771	68,92776989	453,2048	1,065571	-0,097297	1379,515623	1380,581194	1379,418326
14	0	-314,0648	-391,5076	-78,9871135	-470,4947	0,422672	0,268177	-1349,273639	-1348,850967	-1349,005462
14	2,567192	-0,434163	17,92465	5,807961219	23,73261	0,794779	0,112192	46,90081076	47,69558927	47,01300289
14	5,134383	313,1965	427,3569	90,60303597	517,9599	1,166885	-0,043793	1443,075261	1444,242145	1443,031468
15	0	-163,6876	-370,9677	-86,5448352	-457,5125	1,355452	0,342642	-1127,818999	-1126,463547	-1127,476357
15	2,55129	-75,04869	22,07027	16,04537747	38,11565	0,603442	0,079184	-21,3319995	-20,72855751	-21,25281552
15	5,10258	13,59024	415,1083	118,6355901	533,7438	-0,148568	-0,184274	1085,155	1085,006432	1084,970726
19	0	395,6699	240,4215	7,12875591	247,5503	-18,30356	1,364407	1009,471413	991,1678487	1010,83582
19	2,506689	496,2987	264,7648	3,54442071	268,3092	-12,09684	0,275568	1181,806698	1169,709854	1182,082266
19	5,013378	596,9275	289,1081	-0,03991449	289,0681	-5,890123	-0,813271	1354,141983	1348,25186	1353,328711
20	0	758,6426	389,7709	2,995226675	392,7661	-19,06084	-0,961481	1771,767658	1752,706817	1770,806177
20	2,502183	395,2074	191,8034	1,395554752	193,199	-9,554815	-0,453443	900,1675375	890,6127223	899,7140942
20	5,004366	31,77214	-6,164062	-0,20411717	-6,36818	-0,04879	0,054594	28,56741712	28,51862757	28,62201111
164	0	-194,5786	-52,86007	7,985862674	-44,87421	-8,285382	0,6766	-342,7006326	-350,9860143	-342,0240325
164	2,513691	238,8016	141,3972	4,007778196	145,405	-6,546036	0,415315	601,2520088	594,7059724	601,6673239
164	5,027383	672,1818	335,6545	0,029693718	335,6842	-4,806691	0,15403	1545,20465	1540,397959	1545,35868
167	0	-83,47809	-83,753	41,43013975	-42,32286	-14,68346	2,999738	-193,167235	-207,8506957	-190,1674972
167	2,705585	-59,38267	-24,40927	7,575193492	-16,83408	-7,283543	0,034921	-110,8656221	-118,1491654	-110,8307012
167	5,41117	-35,28725	34,93446	-26,2797528	8,654707	0,116374	-2,929896	-28,56400924	-28,44763502	-31,49390513
187	0	-304,5871	-149,5342	29,02267603	-120,5116	7,851345	1,294696	-636,9863385	-629,1349931	-635,6916424
187	2,651523	-79,6047	-23,63884	-7,39137236	-31,03021	1,730663	-0,671549	-165,5465335	-163,8158704	-166,2180829
187	5,303045	145,3777	102,2566	-43,8054208	58,45115	-4,390019	-2,637795	305,8932715	301,5032523	303,2554766
213	0	-191,846	-59,84603	48,89389881	-10,95213	-2,535151	10,53724	-271,3040727	-273,8392239	-260,7668291
213	2,672821	-131,6229	-21,34029	2,971842679	-18,36845	-3,006798	0,859684	-207,8466706	-210,8534685	-206,9869865
213	5,345641	-71,3998	17,16545	-42,9502135	-25,78477	-3,478445	-8,817875	-144,3892685	-147,8677132	-153,207144
214	0	-495,8361	-184,2165	4,556957799	-179,6596	5,816873	-0,994594	-1003,906059	-998,0891858	-1004,900653
214	2,623968	-97,61621	-41,58066	-12,7759366	-54,3566	0,419835	-1,16048	-235,614273	-235,1944379	-236,7747526
214	5,247936	300,6037	101,0552	-30,108831	70,94637	-4,977203	-1,326365	532,677513	527,70031	531,3511481
215	0	-461,5282	-208,8115	-4,80277971	-213,6142	5,857804	0,738486	-1027,215111	-1021,357307	-1026,476626
215	2,585908	-79,63126	-37,74854	-13,7082605	-51,4568	0,481138	-0,561797	-206,434249	-205,9531113	-206,9960458
215	5,171816	302,2657	133,3144	-22,6137413	110,7006	-4,895529	-1,862079	614,3466133	609,4510844	612,4845339
216	0	-564,291	-240,8554	-30,3617514	-271,2171	7,01437	0,333259	-1276,012554	-1268,998184	-1275,679295

216	2,555252	-83,08255	-38,9609	-15,4233999	-54,3843	0,849309	-0,934486	-216,7759193	-215,9266102	-217,7104054
216	5,110504	398,1259	162,9336	-0,48504846	162,4485	-5,315752	-2,202231	842,4607154	837,1449637	840,2584845
217	0	-559,6312	-243,7581	-56,4059197	-300,1641	7,440946	-1,066983	-1327,848752	-1320,407806	-1328,915734
217	2,531798	-39,32236	-25,14322	-13,2568514	-38,40007	0,815069	-1,406281	-127,9192104	-127,1041412	-129,3254912
217	5,063596	480,9865	193,4717	29,89221699	223,3639	-5,810808	-1,745579	1072,010331	1066,199523	1070,264752
218	0	-412,9968	-192,1595	-77,5790188	-269,7385	6,399658	-4,050893	-1076,372865	-1069,973207	-1080,423758
218	2,515189	25,75197	-4,085353	-7,60910452	-11,69446	0,647495	-2,292098	10,08864356	10,73613888	7,796545949
218	5,030378	464,5007	183,9888	62,36080972	246,3496	-5,104667	-0,533302	1096,550152	1091,445485	1096,01685
219	0	103,5081	21,16797	-6,63212105	14,53585	-0,291716	-5,175692	163,6321981	163,3404816	158,4565059
219	2,504407	307,7214	115,5159	53,74751797	169,6635	-2,473177	-0,40819	739,3647197	736,8915422	738,9565296
219	5,008813	511,9347	210,6639	114,127157	324,7911	-4,654639	4,359312	1315,097241	1310,442603	1319,456553
221	0	429,176	166,2839	104,6643424	270,9483	-4,336462	-2,036506	1099,825342	1095,48888	1097,788836
221	2,500135	347,976	135,9773	57,89354024	193,8708	-2,284352	4,140581	840,1104499	837,8260983	844,2510313
221	5,00027	266,7759	105,6707	11,12273805	116,7934	-0,232241	10,31767	580,3955581	580,1633167	590,713227
224	0	481,84	199,574	6,871040582	206,445	-5,196581	4,043846	1039,282042	1034,085461	1043,325887
224	2,52383	-43,88122	-17,52444	-11,5627725	-29,08721	2,395398	-1,018866	-115,2200132	-112,8246152	-116,2388789
224	5,047659	-569,6025	-234,6228	-29,9965855	-264,6194	9,987377	-6,081577	-1269,722068	-1259,734691	-1275,803645
227	0	263,7379	133,5056	-37,0416233	96,46397	-3,950196	-2,77227	535,7872666	531,8370701	533,0149962
227	2,607363	-60,70065	-17,91423	-10,5103235	-28,42455	1,024727	-0,758237	-135,7599475	-134,7352204	-136,5181842
227	5,214725	-385,1392	-169,3341	16,02097623	-153,3131	5,999651	1,255797	-807,3071616	-801,3075108	-806,0513645
230	0	-469,671	-198,4867	4,46320114	-194,0235	7,587964	0,422973	-998,6192931	-991,0313289	-998,1963201
230	2,572163	-59,27053	-20,30955	-10,8047758	-31,11433	1,595876	-1,000171	-139,2803395	-137,6844633	-140,2805105
230	5,144327	351,13	157,8676	-26,0727527	131,7948	-4,396212	-2,423315	720,0586141	715,6624024	717,6352992
231	0	-541,8293	-224,7522	-10,6819829	-235,4342	8,847181	-1,703613	-1175,246441	-1166,39926	-1176,950054
231	2,544352	-59,42002	-22,30505	-11,3321206	-33,63717	2,05066	-1,252687	-144,520369	-142,4697093	-145,7730565
231	5,088705	422,9893	180,1421	-11,9822582	168,1598	-4,745861	-0,801762	886,205703	881,4598419	885,4039412
235	0	532,8908	216,4967	34,26533411	250,7621	-5,608428	12,90158	1194,282222	1188,673794	1207,183804
235	2,509705	20,5615	6,958574	-7,80279127	-0,844217	2,146045	1,566252	25,0415184	27,18756293	26,60777043
235	5,01941	-491,7678	-202,5796	-49,8709166	-252,4505	9,900517	-9,769078	-1144,199185	-1134,298668	-1153,968263
236	0	-240,1847	-99,46556	-59,8708857	-159,3364	7,482528	1,873629	-630,9130007	-623,4304725	-629,0393717
236	2,501881	125,1428	47,23258	2,274740356	49,50732	1,368984	5,0551	261,7003067	263,0692902	266,755407
236	5,003762	490,4703	193,9307	64,42036644	258,3511	-4,744561	8,236572	1154,313614	1149,569053	1162,550186
323	0	-303,6103	-249,7198	21,91728598	-227,8026	63,85086	0,158051	-850,2985353	-786,4476703	-850,1404845
323	2,705585	-126,975	-75,14077	1,61072729	-73,53005	16,73265	0,145194	-312,1275269	-295,3948735	-311,9823331
323	5,41117	49,66041	99,43831	-18,6958314	80,74247	-30,38556	0,132337	226,0434815	195,6579233	226,1758184
324	0	-341,1565	-178,8527	25,56077866	-153,292	21,87259	-0,490296	-750,0874552	-728,214869	-750,5777515
324	2,651523	-60,49361	-9,364856	-5,71452805	-15,07938	-5,00319	-0,005844	-108,8004551	-113,8036449	-108,806299
324	5,303045	220,1693	160,123	-36,9898348	123,1332	-31,87897	0,478609	532,4865451	500,6075792	532,9651536

325	0	-432,0757	-206,3466	11,65365175	-194,693	23,67242	-0,256577	-951,0844033	-927,411988	-951,3409804
325	2,607363	-44,70876	-5,928408	-9,09992808	-15,02834	-4,650794	0,013766	-88,17806588	-92,82886007	-88,16429984
325	5,214725	342,6582	194,4898	-29,8535079	164,6363	-32,974	0,284109	774,7282716	741,7542678	775,0123807
326	0	-502,2781	-224,955	1,338803071	-223,6162	20,248	-0,286527	-1100,194017	-1079,946019	-1100,480544
326	2,572163	-39,65014	-5,775545	-9,09327857	-14,86882	-5,297006	-0,036209	-81,28283441	-86,57984047	-81,31904357
326	5,144327	422,9778	213,4039	-19,5253502	193,8786	-30,84201	0,214109	937,6283483	906,7863377	937,8424573
342	0	-516,6284	-188,8134	4,189768656	-184,6237	6,38875	-2,256464	-1040,864282	-1034,475532	-1043,120746
342	2,623968	-133,757	-66,14449	-15,648545	-81,79303	11,86297	-0,622713	-337,4702234	-325,6072514	-338,0929364
342	5,247936	249,1143	56,52446	-35,4868586	21,0376	17,33719	1,011038	365,9238351	383,2610292	366,9348732
343	0	-470,5401	-205,4793	-4,25874547	-209,7381	2,866203	-0,512612	-1031,178347	-1028,312144	-1031,690959
343	2,585908	-111,9524	-59,96054	-16,3056977	-76,26623	10,86371	0,094022	-298,0705774	-287,2068626	-297,9765558
343	5,171816	246,6353	85,55828	-28,3526489	57,20563	18,86123	0,700655	435,0371919	453,8984187	435,7378472
344	0	-609,6156	-263,2898	-32,846669	-296,1365	16,27597	-0,301501	-1384,77322	-1368,497249	-1385,074721
344	2,555252	-126,991	-69,45198	-18,991502	-88,44349	15,12759	0,049284	-341,9752871	-326,8476972	-341,9260034
344	5,110504	355,6335	124,3859	-5,13633507	119,2495	13,97921	0,400069	700,8226454	714,8018544	701,222714
345	0	-647,3174	-297,9921	-62,6703455	-360,6624	32,11664	-0,138761	-1562,837531	-1530,720893	-1562,976292
345	2,531798	-94,71562	-64,48262	-17,8673782	-82,35	19,3023	0,067411	-287,8303051	-268,5280037	-287,7628943
345	5,063596	457,8862	169,0269	26,93558905	195,9624	6,487965	0,273582	987,1769205	993,6648851	987,450503
346	0	-552,3511	-288,1537	-88,7825702	-376,9363	51,2518	0,079993	-1471,929051	-1420,677249	-1471,849058
346	2,515189	-47,72171	-57,84282	-13,9163764	-71,7592	25,98946	0,117185	-205,5566138	-179,5671506	-205,4394284
346	5,030378	456,9077	172,4681	60,94981744	233,4179	0,727124	0,154378	1060,815823	1061,542947	1060,970201
347	0	-6,218841	-62,01066	-16,399219	-78,40987	39,09396	0,212698	-164,9042419	-125,8102771	-164,6915436
347	2,504407	280,8194	91,052	50,79861438	141,8506	9,391041	0,126302	648,766383	658,1574242	648,8926852
347	5,008813	567,8575	244,1147	117,9964478	362,1111	-20,31188	0,039906	1462,437008	1442,125126	1462,476914
348	0	386,2272	118,3873	99,00770241	217,395	18,46698	0,220728	936,8854618	955,3524459	937,1061896
348	2,500135	360,5507	144,941	58,91195363	203,8529	-6,545554	0,062331	876,42173	869,8761757	876,4840611
348	5,00027	334,8741	171,4946	18,81620485	190,3108	-31,55809	-0,096065	815,9579981	784,3999055	815,8619326
349	0	480,7282	194,0519	64,40720228	258,4591	-5,02209	0,152122	1141,864829	1136,842739	1142,016951
349	2,501979	173,0221	86,14092	6,869120346	93,01004	-16,96271	-0,070492	410,9488342	393,9861253	410,8783421
349	5,003959	-134,6839	-21,77006	-50,6689616	-72,43902	-28,90333	-0,293106	-319,9671611	-348,8704888	-320,2602672
350	0	559,3383	236,8171	36,72995829	273,547	-14,4172	0,172238	1274,233829	1259,816632	1274,406068
350	2,509487	59,74057	36,02238	-4,37448513	31,6479	-11,56884	-0,070481	140,958533	129,3896967	140,8880519
350	5,018974	-439,8572	-164,7723	-45,4789285	-210,2512	-8,720475	-0,3132	-992,3167635	-1001,037239	-992,6299637
351	0	528,1757	236,8883	11,24743024	248,1357	-22,95591	0,1846	1182,899957	1159,944046	1183,084557
351	2,52383	-13,34009	5,041354	-8,91016826	-3,858815	-8,346038	-0,070049	-25,07974224	-33,4257804	-25,14979086
351	5,047659	-554,8559	-226,8056	-29,0677668	-255,8734	6,263834	-0,324697	-1233,059441	-1226,795607	-1233,384139
352	0	484,7056	228,2925	-6,30973614	221,9828	-27,65359	0,203528	1074,082821	1046,429232	1074,286349
352	2,544352	-35,70584	-4,900805	-9,28211483	-14,18292	-6,207383	-0,057235	-74,78343213	-80,99081464	-74,84066717

352	5,088705	-556,1173	-238,0941	-12,2544935	-250,3486	15,23882	-0,317998	-1223,649685	-1208,410861	-1223,967683
354	0	-166,6764	-54,55353	-51,4916384	-106,0452	31,17223	-6,427065	-428,7697133	-397,5974804	-435,196778
354	2,672821	-5,879088	66,10601	13,20386108	79,30987	-43,84586	0,255503	150,9769312	107,1310706	151,2324346
354	5,345641	154,9183	186,7656	77,89936056	264,6649	-118,864	6,938071	730,7235758	611,8596215	737,6616472
365	0	28,8523	-6,488624	-0,2413694	-6,729994	0,092692	-0,001521	24,04800619	24,14069808	24,04648527
365	2,502183	514,9451	268,0633	10,30512401	278,3684	-45,04575	-0,02616	1226,165431	1181,119677	1226,139271
365	5,004366	1001,038	542,6152	20,85161742	563,4668	-90,1842	-0,050799	2428,282856	2338,098655	2428,232058
366	0	750,1441	397,6157	12,60073994	410,2165	-56,03743	-0,038043	1795,620271	1739,582839	1795,582227
366	2,506689	676,3722	381,3454	17,17444387	398,5199	-66,49765	-0,031283	1676,323591	1609,825941	1676,292309
366	5,013378	602,6002	365,0752	21,7481478	386,8233	-76,95787	-0,024522	1557,026912	1480,069043	1557,00239
367	0	833,184	455,4549	14,02035471	469,4752	-60,56504	-0,052493	2022,089561	1961,524518	2022,037068
367	2,513691	354,9105	217,5134	12,91553938	230,4289	-42,15894	-0,009696	922,2414596	880,0825238	922,2317636
367	5,027383	-123,3629	-20,42813	11,81072404	-8,617407	-23,75283	0,033101	-177,6066413	-201,3594702	-177,5735406
368	0	857,046	477,1568	14,83641608	491,9932	-58,40314	-0,069266	2098,146255	2039,743117	2098,076989
368	2,523556	148,7722	107,215	10,56645842	117,7814	-23,46729	0,002492	428,9667124	405,4994241	428,969204
368	5,047112	-559,5016	-262,7269	6,296500753	-256,4304	11,46856	0,07425	-1240,212831	-1228,744269	-1240,138581
369	0	844,2423	504,9021	39,2650001	544,1671	-59,31153	-0,092891	2185,849249	2126,53772	2185,756358
369	2,537563	4,992677	60,98051	17,15319952	78,13371	-14,02035	0,014773	162,7579045	148,7375531	162,7726777
369	5,075126	-834,257	-382,9411	-4,95860107	-387,8997	31,27083	0,122437	-1860,33344	-1829,062613	-1860,211003
370	0	157,1228	537,2076	132,9645841	670,1722	-57,66472	-0,008959	1544,603952	1486,939236	1544,594992
370	2,55129	-53,22353	41,12377	18,26756158	59,39133	-8,23674	0,053561	49,59207774	41,35533803	49,64563884
370	5,10258	-263,5699	-454,96	-96,429461	-551,3895	41,19124	0,116082	-1445,419796	-1404,22856	-1445,303715
371	0	429,453	536,8452	103,4344376	640,2796	-50,24931	0,220829	1838,848119	1788,598814	1839,068949
371	2,567192	23,76669	39,6465	8,329376508	47,97587	-9,163658	0,061851	126,8484349	117,6847769	126,9102854
371	5,134383	-381,9197	-457,5522	-86,7756846	-544,3278	31,92199	-0,097128	-1585,15125	-1553,22926	-1585,248378
372	0	502,0207	510,3079	83,62420805	593,9322	-57,37863	-0,077393	1840,491242	1783,112613	1840,413849
372	2,586036	-259,0898	-248,0508	-35,1815464	-283,2324	57,08527	-0,09363	-903,2814297	-846,1961624	-903,3750593
372	5,172072	-1020,2	-1006,41	-153,987301	-1160,397	171,5492	-0,109866	-3647,054102	-3475,504937	-3647,163968
532	0	-758,9503	-317,3327	2,751509111	-314,5812	0,265701	0,400352	-1615,797735	-1615,532033	-1615,397382
532	2,537563	-34,36552	31,73879	13,73581704	45,47461	-0,387163	0,094985	46,27403567	45,88687261	46,36902069
532	5,075126	690,2192	380,8103	24,72012497	405,5304	-1,040028	-0,210382	1708,345806	1707,305779	1708,135424
533	0	704,0329	357,9768	0,881561923	358,8584	-2,580035	-0,027888	1632,959574	1630,379479	1632,931626
533	2,523556	82,73273	62,1588	5,295070525	67,45387	-2,40379	0,190167	242,4603033	240,0565128	242,6504701
533	5,047112	-538,5674	-233,6592	9,708579126	-223,9506	-2,227546	0,408221	-1148,038908	-1150,266454	-1147,630686

324	2,651523	-212,6464	-1,378177	-0,789012142	-2,167189	0,053388	98,60916	-280,7747097	-280,7213214	-182,165549
324	5,303045	-34,1878	2,015677	0,660191592	2,675869	-0,13644	34,06827	-39,09240533	-39,22884522	-5,024140079
325	0	-140,0796	3,523118	0,73905132	4,262169	0,063399	29,74272	-173,5792031	-173,5158043	-143,8364816
325	2,607363	-37,18151	1,697056	0,503312893	2,200369	-0,03849	11,59355	-43,93522807	-43,97371819	-32,34168056
325	5,214725	65,71662	-0,129006	0,267574467	0,138569	-0,140379	-6,555626	85,70874697	85,56836795	79,15312051
326	0	-27,67142	7,320472	0,536195138	7,856667	0,270172	-5,320254	-20,25951561	-19,98934369	-25,57977006
326	2,572163	34,40261	1,313353	0,309357656	1,62271	0,010318	-3,778206	47,96881364	47,97913128	44,19060732
326	5,144327	96,47664	4,693767	0,082520173	-4,611247	-0,249537	-2,236158	116,1971429	115,94796063	113,9609847
342	0	348,102	7,300593	0,188256037	7,488843	-0,310339	-182,8151	467,5102227	467,1998837	284,6951389
342	2,623968	232,6585	3,824225	0,58793364	0,928651	-1,071806	-112,6666	310,8735038	309,8016975	198,2069472
342	5,247936	117,215	0,347858	0,58793364	0,928651	-1,833274	-42,51803	154,2367349	152,4035113	111,7187554
343	0	147,1768	-7,037471	0,288162344	-6,749309	2,755172	-4,022659	177,831226	180,5863981	173,8085666
343	2,585908	70,67071	0,695638	-0,347276288	0,348362	0,35887	1,618888	92,56865256	92,92752296	94,18754072
343	5,171816	-5,835374	8,428747	-0,98271492	7,446032	-2,037431	7,260436	7,306079058	5,268647847	14,56651479
344	0	34,86756	-12,03029	-3,057459103	-15,08775	3,088314	5,470324	15,15232806	18,2406418	20,62265216
344	2,555252	13,7298	5,426273	-0,993177166	4,433096	0,283505	2,619546	26,71492967	26,99843422	29,33447547
344	5,110504	-7,407964	22,88284	1,071104771	23,95394	-2,521305	-0,231233	38,27753128	35,75622663	38,04629878
345	0	-5,132923	-12,94933	-5,014937555	-17,96427	3,930203	0,181483	-42,60134435	-38,67114107	-42,41986168
345	2,531798	-11,59975	13,40259	0,356886912	13,75948	0,199394	-0,10142	12,43927525	12,63866958	12,33785521
345	5,063596	-18,06658	39,75451	5,728711378	45,48322	-3,531415	-0,384323	67,47989486	63,94848022	67,09557211
346	0	-30,06749	-2,202015	-4,486688743	-6,688704	4,054162	-0,135178	-52,46515071	-48,41098904	-52,60032837
346	2,515189	-78,96335	9,532377	1,158143184	10,69052	1,096788	-0,12612	-81,27133075	-80,17454295	-81,39745123
346	5,030378	-127,8592	21,26677	6,802975112	28,06974	-1,860586	-0,117063	-110,0775108	-111,9380969	-110,1945741
347	0	-102,3288	10,1334	1,639309103	11,77271	1,319142	-0,040732	-109,4820426	-108,1629006	-109,5227745
347	2,504407	-178,3702	13,64423	9,002647443	22,64687	-0,063915	-0,047075	-186,5875712	-186,6514864	-186,6346458
347	5,008813	-254,4117	17,15505	16,36598578	33,52104	-1,446972	-0,053417	-263,6930997	-265,1400721	-263,746517
348	0	-235,8615	12,46152	15,31529117	27,77681	1,64321	-0,019894	-251,0664786	-249,4232683	-251,0863724
348	2,500135	-422,6793	12,50854	8,618401588	21,12694	0,255321	-0,022545	-507,2292157	-506,9738945	-507,2517611
348	5,00027	-609,497	12,55557	1,921512008	14,47708	-1,132568	-0,025197	-763,3919527	-764,5245206	-763,4171498
349	0	-586,1292	16,33249	5,990896815	22,32339	1,564984	-0,019117	-717,3211389	-715,7561554	-717,3402555
349	2,501979	-430,3799	11,06488	1,381168804	12,44605	-0,47812	-0,013087	-534,6018135	-535,0799333	-534,6149005
349	5,003959	-274,6307	5,797265	-3,22859208	2,568706	-2,521223	-0,007057	-351,8824882	-354,4037113	-351,8895454
350	0	-209,3912	32,80307	5,060716703	37,86378	2,330015	-0,008876	-196,4810354	-194,1510208	-196,4899118
350	2,509487	-187,6221	13,02545	0,562519689	13,58797	0,144645	-0,035727	-216,7327253	-216,5880801	-216,7684518
350	5,018974	-155,8529	-6,752165	-3,935677325	-10,68784	-2,040724	-0,062577	-236,9844151	-239,0251393	-237,0469918
351	0	-140,6286	25,25217	1,359385079	26,61155	1,066753	-0,08931	-129,5941302	-128,5273772	-129,6834403
351	2,52383	-118,125	6,770488	-0,447877912	6,32261	-0,005896	-0,080441	-140,9173263	-140,9232226	-140,9977671

351	5,047659	-95,62143	-11,71119	-2,255140903	-13,96633	-1,078545	-0,071571	-152,2405224	-153,3190679	-152,3120938
352	0	-113,167	12,82007	0,009606792	12,82968	0,490201	-0,088172	-121,4577305	-120,9675291	-121,5459028
352	2,544352	-74,95924	1,204435	-0,456893462	0,747542	-0,026246	0,863863	-95,95192289	-95,97816912	-95,08805997
352	5,088705	-36,75148	-10,4112	-0,923392715	-11,33459	-0,542694	1,815898	-70,44611531	-70,98880911	-68,63021713
354	0	-337,707	-2,511972	0,446059381	-2,065912	-0,702433	185,8793	-443,1509471	-443,8533796	-257,2711421
354	2,672821	-527,7417	8,43964	0,380033302	8,819673	-0,199144	-113,3051	-668,6239592	-668,6239592	-781,72988
354	5,345641	-717,7763	19,39125	0,314007223	19,70526	0,304145	-412,4899	-893,3945388	-893,3945388	-1306,188518
365	0	-129,6953	1,869605	-0,38315683	1,486448	64,51445	0,067595	-165,6310485	-101,1165983	-165,5634538
365	2,502183	27,45002	16,06382	-0,114478049	15,94934	22,37897	0,019129	67,5837107	89,96267944	67,60283926
365	5,004366	184,5954	30,25803	0,154200732	30,41223	-19,75651	-0,029338	300,7984599	281,0419572	300,7691323
366	0	15,23195	51,3464	-0,328715458	51,01768	32,31818	0,045384	121,8369081	154,1550885	121,8822925
366	2,506689	60,97734	34,3783	-0,33796446	34,04034	5,88467	-0,03673	147,3512129	153,2358827	147,314483
366	5,013378	106,7227	17,4102	-0,347213462	17,06299	-20,54884	-0,118844	172,8655177	152,3166769	172,7466735
367	0	16,27654	73,23378	-0,21020664	73,02357	12,63896	-0,074299	167,2066418	179,8456042	167,1323425
367	2,513691	50,37741	32,1519	-1,038770381	31,11313	-0,184931	-0,10103	127,7168821	127,5319515	127,6158519
367	5,027383	84,47828	-8,929987	-1,867334123	-10,79732	-13,00882	-0,127761	88,2271224	75,21829878	88,09936122
368	0	24,30107	57,17691	-1,770863037	55,40604	6,430599	-0,058624	142,4034756	148,8340754	142,3448522
368	2,523556	57,47994	15,98042	-0,905363386	15,07505	-0,417316	0,884599	104,8740274	104,456711	105,7586259
368	5,047112	90,65881	-25,21608	-0,039863734	-25,25594	-7,265232	1,827821	67,34457825	60,07934663	69,17239972
369	0	10,17736	27,05469	0,768041822	27,82273	4,275598	2,406251	68,87602395	73,15162214	71,28227475
369	2,537563	93,05836	1,891833	4,218191477	6,110025	0,030704	3,706241	133,1959216	133,2266258	136,9021628
369	5,075126	175,9394	-23,27102	7,668341132	-15,60268	-4,21419	5,006232	197,5158193	193,3016294	202,5220508
370	0	70,55898	9,746568	12,15995097	21,90654	3,247756	6,194284	135,5397574	138,7875134	141,7340413
370	2,55129	200,0506	-1,718897	3,017727072	1,29883	0,288516	-13,80516	262,6634998	262,9520157	248,8583361
370	5,10258	329,5423	-13,18438	-6,124496822	-19,30888	-2,670724	-33,80461	389,7872423	387,1165181	355,9826309
371	0	225,8793	5,571471	-1,448947165	4,122524	2,539717	-40,30823	301,8880991	304,4278161	261,5798655
371	2,567192	431,1451	4,668969	-1,133292952	3,535676	0,053914	-103,5083	567,6139505	567,6139505	464,0517302
371	5,134383	636,411	3,766467	-0,817638738	2,948828	-2,43189	-166,7084	833,2319746	830,8000849	666,5235949
372	0	580,6265	10,58048	0,062831085	10,64331	1,640383	-193,1339	776,1010647	777,7414474	582,9671245
372	2,586036	839,4381	-10,12097	-1,75354275	-11,87451	0,674665	112,0671	1067,520531	1068,195196	1179,587672
372	5,172072	1098,25	-30,82242	-3,569916585	-34,39233	-0,291052	417,2682	1358,939997	1358,648945	1776,208219
532	0	-18,3288	-20,44108	7,96668522	-12,47439	-5,22683	4,933781	-48,77623375	-54,00306381	-43,84245271
532	2,537563	10,74911	1,395214	4,150605765	5,545819	0,360484	3,765904	25,06548211	25,42596578	28,83138646
532	5,075126	39,82702	23,23151	0,334526311	23,56603	5,947797	2,598028	98,90719797	104,8549954	101,5052256
533	0	-90,1832	-53,04675	2,260667686	-50,78608	-8,74752	-5,905772	-218,8103153	-227,5578355	-224,7160873
533	2,523556	-30,27899	-15,66215	0,976019614	-14,68614	-0,235901	-4,277201	-68,7349533	-68,97085438	-73,01215412
533	5,047112	29,62522	21,72244	-0,308628457	21,41381	8,275718	-2,64863	81,34040868	89,6161267	78,69177906

TABEL MOMEN BALOK LENGKUNG TENGAH ARAH X

FRAME	STA	MD	ML		ML TOT	ME		COMB1		COMB 2		COMB 3	
			ML merata	ML Koef sejut		ME X	ME Y	1,3MD + 2 (MQ+MP)	1,3MD + 2 (MQ+MP)+1MEX	1,3MD + 2 (MQ+MP)+1MEY	1,3MD + 2 (MQ+MP)+1MEY		
545	0	-865,8396	-719,0412	-154,4571985	-873,4984	11,86018	-3,968794	-2872,588198	-2860,728023			-2876,556992	
545	2,58604	-157,4529	-148,6667	-29,24026329	-177,907	8,128486	-0,229841	-560,5027673	-552,3742816			-560,732608	
545	5,17207	550,9338	421,7077	95,97667192	517,6844	4,396796	3,509113	1751,582664	1755,97946			1755,091776	
546	0	-469,914	-427,2056	-106,7450678	-533,9507	-5,841086	0,762383	-1678,789629	-1684,630715			-1678,027246	
546	2,56719	11,19157	17,40506	8,288168596	25,69323	0,878043	0,335674	65,93550409	66,81354688			66,27117782	
546	5,13438	492,2971	462,0158	123,321405	585,3372	7,597172	-0,091035	1810,660637	1818,257809			1810,569602	
547	0	-314,0462	-412,8625	-122,6388947	-535,5014	-5,20315	0,269106	-1479,26295	-1484,4661			-1478,993844	
547	2,55129	-64,83453	19,43483	23,37810001	42,81293	0,958304	-0,109152	1,340970715	2,299274749			1,231819157	
547	5,10258	184,3772	451,7322	169,3950947	621,1273	7,119758	-0,487409	1481,944891	1489,064649			1481,457482	
548	0	476,7487	266,7066	3,777049011	270,4836	-29,09196	0,107277	1160,740555	1131,648591			1160,847832	
548	2,50669	636,1289	329,6219	0,482442301	330,1044	-15,28334	0,647556	1487,176238	1471,892894			1487,823793	
548	5,01338	795,509	392,5372	-2,812164409	389,7251	-1,474723	1,187834	1813,61192	1812,137197			1814,799754	
549	0	1011,698	515,9048	-0,403576869	515,5012	-24,96861	1,580316	2346,209594	2321,240988			2347,789911	
549	2,50218	516,9313	250,8863	-0,333051605	250,5532	-12,39926	0,770461	1173,117042	1160,717779			1173,887503	
549	5,00437	22,16471	-14,13229	-0,262526341	-14,39482	0,170079	-0,039394	0,024490364	0,194569435			-0,014903715	
563	0	-271,2248	-100,733	9,183860001	-91,54915	-18,13324	-0,228521	-535,6905302	-553,8237675			-535,9190514	
563	2,51369	292,3357	160,7201	1,72958204	162,4497	-8,644367	0,0736	704,9358196	696,2914522			705,0094201	
563	5,02738	855,8962	422,1733	-5,724695921	416,4486	0,844502	0,375722	1945,562169	1946,406672			1945,937892	
564	0	-396,1876	-95,61181	37,05192613	-58,55988	-13,64821	-10,16174	-632,1636489	-645,8118568			-642,3253847	
564	2,70559	-111,9795	-26,51609	8,031691995	-18,4844	-7,42129	-0,788941	-182,5421215	-189,963411			-183,3310623	
564	5,41117	172,2286	42,57963	-20,98854214	21,59109	-1,194371	8,583854	267,079406	265,8850348			275,6632601	
565	0	-436,8069	-159,0649	38,70759676	-120,3573	9,403627	-2,173557	-808,5635088	-799,1598814			-810,7370656	
565	2,65152	-53,07201	-24,004	-6,99066186	-30,99467	1,691569	1,786126	-130,9829457	-129,2913765			-129,1968202	
565	5,30305	330,6629	111,0569	-52,68892048	58,36795	-6,020489	5,745808	546,5976174	540,5771285			552,3434253	
566	0	-299,4727	-74,22193	57,17695247	-17,04498	-6,159383	-19,42105	-423,4044837	-429,5638665			-442,825534	
566	2,67282	-161,2226	-24,69229	3,551793452	-21,14049	-5,394271	-0,804054	-251,8703124	-257,2645836			-252,6743659	
566	5,34564	-22,97241	24,83736	-50,07336557	-25,23601	-4,62916	17,81294	-80,33614098	-84,96530071			-62,52319772	
567	0	-741,431	-200,2878	5,533923045	-194,7539	10,41054	1,043262	-1353,36804	-1342,957497			-1352,324778	
567	2,62397	-97,16547	-44,33857	-14,76930422	-59,10788	0,998359	2,519223	-244,5308624	-243,5325032			-242,0116398	
567	5,24794	547,1001	111,6106	-35,07253148	76,5381	-8,413825	3,995184	864,3063151	855,8924901			868,3014987	
568	0	-569,1801	-233,0017	-0,887561006	-233,8892	10,71175	-0,232125	-1207,712689	-1197,000939			-1207,944814	
568	2,58591	-75,74085	-40,88371	-16,70387899	-57,58759	0,924134	1,017123	-213,6382818	-212,7141476			-212,6211588	
568	5,17182	417,6985	151,2343	-32,52019696	118,7141	-8,863482	2,266371	780,4361258	771,5726433			782,7024964	

569	0	-709,5088	-270,695	-33,84802001	-304,5431	12,25816	-0,236789	-1531,447603	-1519,189444	-1531,684392
569	2,55525	-96,9955	-42,12959	-20,11830929	-62,2479	1,531142	1,31673	-250,5899588	-249,0588168	-249,273229
569	5,1105	515,5178	186,4359	-6,388598574	180,0473	-9,195875	2,870248	1030,267685	1021,071811	1033,137934
570	0	-711,5513	-277,1514	-70,97451706	-348,1259	12,44876	1,940394	-1621,268464	-1608,819703	-1619,328069
570	2,5318	-52,03996	-26,91364	-18,72347604	-45,63712	1,646839	2,019413	-158,9261945	-157,2792954	-156,9067816
570	5,0636	607,4713	223,3241	33,52756499	256,8517	-9,154962	2,098432	1303,416075	1294,261112	1305,514506
571	0	-539,1587	-218,7731	-108,2190409	-326,9922	10,67152	7,29063	-1354,890722	-1344,219206	-1347,600092
571	2,51519	14,47035	-3,64297	-12,61745241	-16,26042	1,816135	3,127203	-13,70938851	-11,89325393	-10,58218535
571	5,03038	568,0994	211,4872	82,98413611	294,4713	-7,039246	-1,036224	1327,471944	1320,432698	1326,435721
572	0	100,85	26,69812	-14,7900895	11,90803	1,176499	7,400667	154,9210965	156,0975958	162,3217639
572	2,50441	356,3299	129,3232	73,04239534	202,3656	-2,643758	-1,226808	867,9599349	865,3161772	866,7331268
572	5,00881	611,8097	231,9482	160,8748882	392,8231	-6,464015	-9,854284	1580,998773	1574,534759	1571,14449
573	0	509,749	185,5583	149,5883002	335,1466	-4,120657	-0,530941	1332,966951	1328,846294	1332,43601
573	2,50014	399,2885	149,2487	77,53806908	226,7868	-2,781267	-7,285105	972,6486107	969,8673441	965,363506
573	5,00027	288,8279	112,9392	5,487837921	118,427	-1,441877	-14,03927	612,3302706	610,888394	598,2910021
574	0	581,046	221,1936	0,550964087	221,7445	-6,694696	-10,00637	1198,848833	1192,154137	1188,842462
574	2,52383	-55,37779	-20,8747	-15,68100286	-36,5557	2,437733	1,206407	-145,1025365	-142,664804	-143,8961299
574	5,04766	-691,8016	-262,943	-31,9129698	-294,8559	11,57016	12,41918	-1489,053906	-1477,483745	-1476,634722
575	0	399,7536	142,7763	-45,36026214	97,41604	-5,668018	5,402225	714,5117101	708,843692	719,9139356
575	2,60736	-45,26839	-18,84571	-12,29953642	-31,14525	0,979556	1,544378	-121,1394079	-120,159852	-119,5950298
575	5,21473	-490,2903	-180,4677	20,76118931	-159,7065	7,62713	-2,313469	-966,790526	-949,163396	-959,1039952
576	0	-567,8197	-213,0758	8,726133504	-204,3497	9,264671	-0,631482	-1146,86496	-1137,600288	-1147,496442
576	2,57216	-56,33419	-22,21275	-12,82645043	-35,0392	1,588881	1,966778	-143,3128582	-141,723977	-141,3460806
576	5,14433	455,1513	168,6503	-34,37903437	134,2713	-6,086909	4,565037	860,2392433	854,1523342	864,8042802
577	0	-649,456	-245,7346	-7,867495188	-253,6021	10,54505	4,463883	-1351,497028	-1340,951982	-1347,033145
577	2,54435	-65,90522	-25,22578	-14,11976063	-39,34554	2,088904	2,231298	-164,3678562	-162,2789526	-162,1365582
577	5,0887	517,6455	195,2831	-20,37202606	174,9111	-6,367239	-0,001287	1022,761315	1016,394076	1022,760029
578	0	641,5267	244,015	36,60487605	280,6199	-6,850271	-19,03218	1395,22454	1388,374269	1376,192359
578	2,50971	12,77211	5,199168	-12,88336571	-7,684198	2,083094	-2,324387	1,235349314	3,318443674	-1,089037815
578	5,01941	-615,9825	-233,6167	-62,37160747	-295,9883	11,01646	14,38341	-1392,753842	-1381,737382	-1378,370434
579	0	-328,7262	-121,724	-87,41863029	-209,1426	7,477704	-0,752434	-845,6293072	-838,1516032	-846,3817413
579	2,50188	126,4222	48,55443	-1,630547429	46,92388	1,03547	-6,684407	258,1966563	259,2321259	251,5122495
579	5,00376	581,5707	218,8328	84,15753543	302,9904	-5,406765	-12,61638	1362,02262	1356,615855	1349,40624
614	0	-577,5323	-267,4796	16,7294102	-250,7502	69,28052	-2,495554	-1252,292328	-1183,011811	-1254,787882
614	2,70559	-167,4066	-78,84735	1,835151259	-77,0122	17,82743	-0,212395	-371,653014	-353,8255875	-371,8654086
614	5,41117	242,7191	109,7849	-13,05910769	96,72576	-33,62566	2,070765	508,9863	475,3606364	511,0570647
615	0	-464,5137	-186,0696	35,56344794	-150,5061	22,10519	1,359291	-904,8800551	-882,7748678	-903,5207643

615	2,65152	-37,34461	-9,066912	-5,22351752	-14,29043	-5,555551	0,348182	-77,12885663	-82,68440789	-76,78067428
615	5,30305	389,8244	167,9358	-46,01048296	121,9253	-33,21629	-0,662926	750,6223418	717,406052	749,9594157
616	0	-527,288	-216,2129	16,58625528	-199,6266	24,51388	0,792116	-1084,727628	-1060,211748	-1083,935512
616	2,60736	-32,61032	-6,720546	-10,87087578	-17,59142	-4,866367	-0,062503	-77,57626516	-82,4432318	-77,63876837
616	5,21473	462,0673	202,7718	-38,32801085	164,4438	-34,24381	-0,917122	929,5750973	895,3252847	928,6579749
617	0	-593,3098	-237,702	5,863884536	-231,8381	20,81005	0,439258	-1234,978966	-1214,168914	-1234,539709
617	2,57216	-40,9834	-7,482941	-11,0931652	-18,57611	-5,500328	-0,050224	-90,43063002	-95,93095788	-90,48085389
617	5,14433	511,343	222,7361	-28,05021494	194,6859	-31,81071	-0,539706	1054,117706	1022,306998	1053,578001
618	0	-749,1239	-203,4858	4,815605599	-198,6702	14,99229	2,981555	-1371,201384	-1356,209094	-1368,21983
618	2,62397	-124,3242	-69,62799	-17,80781499	-87,43581	13,51476	1,697947	-336,4931062	-322,9783427	-334,7951591
618	5,24794	500,4754	64,22979	-40,43123557	23,79855	12,03724	0,41434	698,2151718	710,2524091	698,6295114
619	0	-569,9635	-230,8382	-0,868421065	-231,7067	12,16101	1,568545	-1204,365896	-1192,204883	-1202,797351
619	2,58591	-99,74283	-63,42908	-19,39905459	-82,82814	11,96137	-0,028544	-295,3219488	-283,3605834	-295,3504925
619	5,17182	370,4778	103,9801	-37,92968811	66,0504	11,76172	-1,625633	613,7219982	625,4837159	612,0963655
620	0	-737,406	-294,2975	-36,92453033	-331,2221	26,17034	0,557888	-1621,071951	-1594,901616	-1620,514064
620	2,55525	-129,6935	-72,87749	-23,78687424	-96,66437	16,52888	-0,221203	-361,9302446	-345,4013655	-362,1514475
620	5,1105	478,0191	148,5426	-10,64921815	137,8933	6,887423	-1,000293	897,2114621	904,0988851	896,2111686
621	0	-773,9203	-335,2616	-78,01682596	-413,2784	42,09287	-0,010327	-1832,653326	-1790,560459	-1832,663652
621	2,5318	-94,21904	-66,48037	-23,43809038	-89,91846	20,85174	-0,21388	-302,3216805	-281,4699367	-302,5355604
621	5,0636	585,4823	202,3009	31,1406452	233,4415	-0,389379	-0,417433	1228,009965	1227,620586	1227,592531
622	0	-645,7138	-319,213	-120,2561483	-439,4691	60,0478	-0,271034	-1718,366159	-1658,31836	-1718,637192
622	2,51519	-44,22852	-58,2162	-19,11683836	-77,33304	28,22311	-0,243727	-212,1631574	-183,9400437	-212,406884
622	5,03038	557,2567	202,7806	82,02247155	284,803	-3,601571	-0,216419	1294,039844	1290,438273	1293,823424
623	0	7,946433	-58,98551	-24,9702638	-83,95577	42,37529	-0,339197	-157,5811849	-115,205892	-157,9203823
623	2,50441	328,5369	104,5605	70,12773602	174,6883	9,065327	-0,209934	776,4744586	785,539786	776,2645249
623	5,00881	649,1273	268,1066	165,2257358	433,3323	-24,24464	-0,08067	1710,530102	1686,285464	1710,449432
624	0	452,1344	134,8496	143,6162146	278,4658	20,06268	-0,296661	1144,706262	1164,768947	1144,409602
624	2,50014	408,9301	158,1153	78,62561362	236,7409	-7,180276	-0,133892	1005,090967	997,9106913	1004,957075
624	5,00027	365,7258	181,3811	13,63501265	195,0161	-34,42324	0,028876	865,4756722	831,0524352	865,5045481
625	0	580,6042	216,2282	83,94958752	300,1778	-4,359848	-0,227455	1355,141077	1350,781229	1354,913622
625	2,50198	170,8615	88,32698	3,138530562	91,46551	-17,92994	0,000219	405,0510017	387,1210623	405,0512208
625	5,00396	-238,8811	-39,57427	-77,6725264	-117,2468	-31,50003	0,227893	-545,0390738	-576,5391046	-544,8111808
626	0	665,8703	260,5488	38,76678801	299,3156	-13,81157	-0,277698	1464,262696	1450,451129	1463,984998
626	2,50949	44,5778	34,47457	-9,407129213	25,06744	-11,92002	0,01322	108,0860173	96,16599758	108,0992377
626	5,01897	-576,7147	-191,5997	-57,58104644	-249,1807	-10,02847	0,304138	-1248,090661	-1258,119134	-1247,786523
627	0	618,4886	255,827	4,61115119	260,4381	-23,22413	-0,326984	1324,911388	1301,687257	1324,584404
627	2,52383	-31,53699	1,961843	-13,00126517	-11,03942	-8,593677	0,025309	-63,07693671	-71,67061353	-63,05162774

627	5,04766	-681,5626	-251,9033	-30,61364545	-282,517	6,036777	0,377602	-1451,065261	-1445,028484	-1450,68766
628	0	566,0228	241,4157	-14,9734188	226,4422	-28,31271	-0,386081	1188,714113	1160,401406	1188,328032
628	2,54435	-47,534	-7,603773	-12,04765737	-19,65143	-6,394249	0,00837	-101,0970593	-107,4913086	-101,0886898
628	5,0887	-661,0908	-256,6232	-9,12189595	-265,7451	15,52421	0,40282	-1390,908232	-1375,384023	-1390,505412
629	0	-101,807	-50,28444	-58,98299672	-109,2674	30,9732	14,24956	-350,8839696	-319,9107652	-336,6344088
629	2,67282	-65,94599	64,17967	14,17101366	78,35068	-49,04662	-0,739517	70,9715629	21,92494561	70,23204639
629	5,34564	-30,08498	178,6438	87,32501803	265,9688	-129,0664	-15,72859	492,8270954	363,7606564	477,0985016
630	0	21,7856	-14,51818	-0,307264485	-14,82544	0,346652	0,005361	-1,329603981	-0,982951846	-1,324242816
630	2,50218	592,7558	322,1227	8,159940756	330,2827	-47,20147	-0,057253	1431,147877	1383,946411	1431,090624
630	5,00437	1163,726	658,7637	16,62714632	675,3908	-34,74959	-0,119867	2863,625359	2768,875773	2863,505492
631	0	905,8507	495,1986	9,513125967	504,7117	-52,4266	-0,046217	2187,029339	2134,602743	2186,983121
631	2,50669	755,4434	441,6724	13,82755568	455,4999	-39,90233	-0,101767	1893,076295	1823,173965	1892,974527
631	5,01338	605,0361	388,1462	18,1419854	406,2882	-37,37806	-0,157317	1599,123251	1511,745187	1598,965934
632	0	981,8519	539,9717	8,334163303	548,3059	-56,84634	-0,009693	2373,019235	2316,172891	2373,009542
632	2,51369	372,6281	236,119	10,69886366	246,8178	-45,30459	-0,08803	978,0522179	932,7476242	977,9641878
632	5,02738	-236,5956	-67,73379	13,06356402	-54,67023	-33,76284	-0,166367	-416,9147989	-450,677643	-417,0811664
633	0	988,1215	543,8107	4,17546797	547,9862	-54,53669	0,03538	2380,530275	2325,993587	2380,565655
633	2,52356	145,155	108,7784	10,58275877	119,3612	-25,52705	-0,080566	427,4238988	401,8968491	427,343333
633	5,04711	-697,8115	-326,2538	16,99004957	-309,2638	3,482589	-0,196511	-1525,682478	-1522,199889	-1525,878989
634	0	953,9649	553,7462	39,92179723	593,668	-55,21402	-0,090699	2427,490366	2372,276346	2427,399667
634	2,53756	4,499447	58,65527	23,01969535	81,67497	-15,22038	-0,116832	169,1992218	153,9788434	169,0823902
634	5,07513	-944,966	-436,4357	6,117593472	-430,3181	24,77326	-0,142964	-2089,091923	-2064,318659	-2089,234886
635	0	317,0941	577,5332	184,2582372	761,7914	-53,08137	-0,587832	1935,8052	1882,72383	1935,217369
635	2,55129	-43,46327	39,26464	25,75418964	65,01882	-8,859394	-0,094571	73,53539636	64,67600204	73,44082533
635	5,10258	-404,0207	-499,0039	-132,7495579	-631,7538	35,36258	0,39869	-1788,734408	-1753,371826	-1788,335718
636	0	609,3996	572,8955	136,4253027	709,3214	-45,60889	-0,200876	2210,862397	2165,253504	2210,661521
636	2,56719	36,04591	40,17514	11,04144893	51,21658	-10,62834	0,378545	149,2928557	138,6645132	149,6714005
636	5,13438	-537,3078	-492,5453	-114,3430048	-606,8883	24,35221	0,957966	-1912,276685	-1887,924477	-1911,31872
637	0	691,446	552,5445	111,6275738	664,1721	-60,07624	3,565654	2227,22407	2167,147828	2230,789724
637	2,58604	-277,5096	-260,3794	-42,6126806	-302,992	63,25472	-0,02787	-966,7466042	-903,4918824	-966,7744745
637	5,17207	-1246,465	-1073,303	-196,853035	-1270,156	186,5857	-3,621395	-4160,717279	-3974,131592	-4164,338673
771	0	-873,9511	-368,6488	14,08890392	-354,5599	-7,288743	-0,179117	-1845,256277	-1852,54502	-1845,435394
771	2,53756	-27,94414	28,40267	19,40554254	47,80821	-0,361784	-0,11956	59,28904465	58,92726036	59,16948451
771	5,07513	818,0628	425,4542	24,72218116	450,1763	6,565175	-0,060003	1963,834366	1970,399541	1963,774363
772	0	858,5761	421,9043	-10,2969637	411,6053	4,458649	0,037926	1939,359514	1943,818164	1939,39744
772	2,52356	96,1829	62,93042	5,119905339	68,05033	-3,148552	-0,063426	261,1384359	257,9898836	261,0750103
772	5,04711	-666,2103	-296,0434	20,53877638	-275,5047	-10,75575	-0,164777	-1417,082643	-1427,838396	-1417,24742

569	0	-95,30121	-0,001851	1,59364E-11	-0,001851	4,198027	-0,607971	-123,8952802	-123,8952802	-123,8952802
560	2,55525	20,55525	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000

TABEL MOMEN BALOK LINGKUNG TENGAH ARAH Y

FRAME	STA	MD	ML		ML TOT	ME		COMB1		COMB 2		COMB 3	
			ML merata	ML Koef kejut		ME X	ME Y	1,3MD + 2 (MQ+WP)	1,3MD + 2 (MQ+MP)+1MEX	1,3MD + 2 (MQ+MP)+1MEX	1,3MD + 2 (MQ+MP)+1MEY		
545	0	-2,155129	-0,003105	-1,3326E-11	-0,003105	1,443015	-1,445824	-2,80787771	-2,80787771	-2,80787771	-2,80787771	-2,80787771	-2,80787771
545	2,58604	-4,009117	-0,006548	-6,6726E-12	-0,006548	1,443015	-1,445824	-5,224948656	-5,224948656	-5,224948656	-5,224948656	-5,224948656	-5,224948656
545	5,17207	-5,863105	-0,009991	-1,9301E-14	-0,009991	1,443015	-1,445824	-7,642019602	-7,642019602	-7,642019602	-7,642019602	-7,642019602	-7,642019602
546	0	-0,902775	-0,021542	-2,6973E-12	-0,021542	-2,617307	0,166216	-1,21669083	-1,21669083	-1,21669083	-1,21669083	-1,21669083	-1,21669083
546	2,56719	-0,059161	-0,002059	1,12064E-12	-0,002059	-2,617307	0,166216	-0,081027386	-0,081027386	-0,081027386	-0,081027386	-0,081027386	-0,081027386
546	5,13438	0,784452	0,017424	4,93856E-12	0,017424	-2,617307	0,166216	1,054636059	1,054636059	1,054636059	1,054636059	1,054636059	1,054636059
547	0	2,347832	0,003606	2,37418E-12	0,003606	-2,415035	0,148261	3,059394575	3,059394575	3,059394575	3,059394575	3,059394575	3,059394575
547	2,55129	2,626627	0,013564	3,98398E-12	0,010564	-2,415035	0,148261	3,435743581	3,435743581	3,435743581	3,435743581	3,435743581	3,435743581
547	5,10258	2,905422	0,017522	5,59378E-12	0,017522	-2,415035	0,148261	3,812092586	3,812092586	3,812092586	3,812092586	3,812092586	3,812092586
548	0	3,942395	0,007651	4,50646E-12	0,007651	-5,508709	-0,215535	5,14041484	5,14041484	5,14041484	5,14041484	5,14041484	5,14041484
548	2,50669	1,169059	0,007225	1,42746E-12	0,007225	-5,508709	-0,215535	1,534227178	1,534227178	1,534227178	1,534227178	1,534227178	1,534227178
548	5,01338	-1,604278	0,0068	-1,6515E-12	0,0068	-5,508709	-0,215535	-2,071960484	-2,071960484	-2,071960484	-2,071960484	-2,071960484	-2,071960484
549	0	3,392527	0,005863	4,39869E-12	0,005863	-5,02335	0,323659	4,422010452	4,422010452	4,422010452	4,422010452	4,422010452	4,422010452
549	2,50218	-0,534946	0,006374	-4,0369E-13	0,006374	-5,02335	0,323659	-0,682682609	-0,682682609	-0,682682609	-0,682682609	-0,682682609	-0,682682609
549	5,00437	-4,462419	0,006885	-5,2061E-12	0,006885	-5,02335	0,323659	-5,78737567	-5,78737567	-5,78737567	-5,78737567	-5,78737567	-5,78737567
563	0	4,447357	0,003871	5,07822E-12	0,003871	-3,774875	-0,12019	5,789305711	5,789305711	5,789305711	5,789305711	5,789305711	5,789305711
563	2,51369	2,106638	0,008731	2,29444E-12	0,008731	-3,774875	-0,12019	2,756091255	2,756091255	2,756091255	2,756091255	2,756091255	2,756091255
563	5,02738	-0,234081	0,013591	-4,8933E-13	0,013591	-3,774875	-0,12019	-0,277123202	-0,277123202	-0,277123202	-0,277123202	-0,277123202	-0,277123202
564	0	821,5982	0,002571	-1,861E-11	0,002571	-2,301505	-3,46424	1068,082823	1068,082823	1068,082823	1068,082823	1068,082823	1068,082823
564	2,70559	547,5678	0,003796	-1,3833E-11	0,003796	-2,301505	-3,46424	711,8456922	711,8456922	711,8456922	711,8456922	711,8456922	711,8456922
564	5,41117	273,5373	0,005022	-9,0555E-12	0,005022	-2,301505	-3,46424	355,6085617	355,6085617	355,6085617	355,6085617	355,6085617	355,6085617
565	0	347,063	0,00304	-2,0747E-11	0,00304	2,908539	-1,493362	451,1879377	451,1879377	451,1879377	451,1879377	451,1879377	451,1879377
565	2,65152	177,4944	0,003606	-8,4387E-12	0,003606	2,908539	-1,493362	230,7499478	230,7499478	230,7499478	230,7499478	230,7499478	230,7499478
565	5,30305	7,925857	0,004172	3,86915E-12	0,004172	2,908539	-1,493362	10,31195798	10,31195798	10,31195798	10,31195798	10,31195798	10,31195798
566	0	-834,4431	0,000801	1,67032E-12	0,000801	-0,286256	-6,9653	-1084,774458	-1084,774458	-1084,774458	-1084,774458	-1084,774458	-1084,774458
566	2,67282	-611,4996	-0,00413	1,20189E-11	-0,00413	-0,286256	-6,9653	-794,9577377	-794,9577377	-794,9577377	-794,9577377	-794,9577377	-794,9577377
566	5,34564	-388,5561	-0,009061	2,23675E-11	-0,009061	-0,286256	-6,9653	-505,1410178	-505,1410178	-505,1410178	-505,1410178	-505,1410178	-505,1410178
567	0	-448,4461	-0,005698	1,3577E-11	-0,005698	3,587004	-0,562492	-582,9912746	-582,9912746	-582,9912746	-582,9912746	-582,9912746	-582,9912746
567	2,62397	-247,1942	-0,005071	1,10579E-11	-0,005071	3,587004	-0,562492	-321,3626341	-321,3626341	-321,3626341	-321,3626341	-321,3626341	-321,3626341
567	5,24794	-45,94239	-0,004444	8,53877E-12	-0,004444	3,587004	-0,562492	-59,73399363	-59,73399363	-59,73399363	-59,73399363	-59,73399363	-59,73399363
568	0	-189,5841	0,000139	1,61405E-11	0,000139	3,784982	-0,483098	-246,4590007	-246,4590007	-246,4590007	-246,4590007	-246,4590007	-246,4590007
568	2,58591	-47,40551	-0,00354	2,72179E-12	-0,00354	3,784982	-0,483098	-61,63424269	-61,63424269	-61,63424269	-61,63424269	-61,63424269	-61,63424269
568	5,17182	94,77304	-0,007218	-1,0697E-11	-0,007218	3,784982	-0,483098	123,1905153	123,1905153	123,1905153	123,1905153	123,1905153	123,1905153

569	0	-95,30121	-0,001851	1,59364E-11	-0,001851	4,198027	-0,607971	-123,8952802	-123,8952802
569	2,55525	32,66032	-0,003969	-7,4732E-12	-0,003969	4,198027	-0,607971	42,45048301	42,45048301
569	5,1105	160,6219	-0,006087	-3,0883E-11	-0,006087	4,198027	-0,607971	208,7962462	208,7962462
570	0	-27,00551	0,00092	1,28662E-11	0,00092	4,266479	-0,03121	-35,10532378	-35,10532378
570	2,5318	108,565	-0,00576	-1,7974E-11	-0,00576	4,266479	-0,03121	141,1229346	141,1229346
570	5,0636	244,1354	-0,012439	-4,8813E-11	-0,012439	4,266479	-0,03121	317,3511931	317,3511931
571	0	75,45983	-0,004118	4,39715E-12	-0,004118	3,520761	1,655314	98,08953936	98,08953936
571	2,51519	223,3975	-0,005402	-2,1178E-11	-0,005402	3,520761	1,655314	290,4059411	290,4059411
571	5,03038	371,3352	-0,006686	-4,6753E-11	-0,006686	3,520761	1,655314	482,7223428	482,7223428
572	0	291,7249	-0,005655	-1,7839E-11	-0,005655	1,525414	3,444918	379,2310823	379,2310823
572	2,50441	442,8886	-0,006477	-3,4821E-11	-0,006477	1,525414	3,444918	575,7422412	575,7422412
572	5,00881	594,0523	-0,007298	-5,1803E-11	-0,007298	1,525414	3,444918	772,2534001	772,2534001
573	0	575,1017	-0,007768	-2,8362E-11	-0,007768	-0,535727	2,701519	747,6167332	747,6167332
573	2,50014	446,9744	-0,005776	-4,0831E-11	-0,005776	-0,535727	2,701519	581,0551321	581,0551321
573	5,00027	318,847	-0,003784	-5,3299E-11	-0,003784	-0,535727	2,701519	414,493531	414,493531
574	0	165,2818	-0,009479	-9,073E-11	-0,009479	-3,618451	-4,442763	214,8473228	214,8473228
574	2,52383	75,45724	-0,004624	-4,9893E-11	-0,004624	-3,618451	-4,442763	98,08515799	98,08515799
574	5,04766	-14,36728	0,000231	-9,0564E-12	0,000231	-3,618451	-4,442763	-18,67700687	-18,67700687
575	0	79,97236	-0,005372	-2,6597E-11	-0,005372	-2,549539	1,479597	103,953322	103,953322
575	2,60736	-38,72822	-0,002958	-2,6137E-12	-0,002958	-2,549539	1,479597	-50,35259802	-50,35259802
575	5,21473	-157,4288	-0,000543	2,13698E-11	-0,000543	-2,549539	1,479597	-204,658518	-204,658518
576	0	77,05529	0,000214	-1,5828E-11	0,000214	2,984177	-1,010145	100,1722983	100,1722983
576	2,57216	-16,27731	0,003377	1,9291E-11	0,003377	2,984177	-1,010145	-21,15375304	-21,15375304
576	5,14433	-109,6099	0,006541	5,44097E-11	0,006541	2,984177	-1,010145	-142,4798043	-142,4798043
577	0	41,57	-5,67E-05	-4,7898E-12	-5,67E-05	3,323495	0,877467	54,04089154	54,04089154
577	2,54435	-44,31242	0,003887	3,68647E-11	0,003887	3,323495	0,877467	-57,59837783	-57,59837783
577	5,0887	-130,1949	0,007831	7,85191E-11	0,007831	3,323495	0,877467	-169,2376472	-169,2376472
578	0	232,8282	-0,012503	-7,898E-11	-0,012503	-3,559528	-6,657274	302,6516574	302,6516574
578	2,50971	130,7546	-0,006332	-5,2488E-11	-0,006332	-3,559528	-6,657274	169,9683686	169,9683686
578	5,01941	28,68108	-0,000161	-2,5999E-11	-0,000161	-3,559528	-6,657274	37,28507987	37,28507987
579	0	-118,4275	0,003895	4,39609E-11	0,003895	2,574956	2,371005	-153,9479657	-153,9479657
579	2,50188	-238,6471	0,004962	4,5475E-11	0,004962	2,574956	2,371005	-310,2313007	-310,2313007
579	5,00376	-358,8667	0,006029	4,69821E-11	0,006029	2,574956	2,371005	-466,5146357	-466,5146357
614	0	-913,4876	0,007038	-2,4805E-11	0,007038	19,01736	-0,843869	-1187,51979	-1187,51979
614	2,70559	-612,3414	0,00141	-1,4771E-11	0,00141	19,01736	-0,843869	-796,0410091	-796,0410091
614	5,41117	-311,1952	-0,004217	-4,7381E-12	-0,004217	19,01736	-0,843869	-404,5622284	-404,5622284
615	0	-395,7893	0,000448	-8,7577E-12	0,000448	10,43202	0,381331	-514,5252276	-514,5252276

615	2,65152	-202,2881	-0,003713	-1,0522E-12	-0,003713	10,43202	0,381331	-262,9819532	-262,9819532
615	5,30305	-8,786872	-0,007873	6,65325E-12	-0,007873	10,43202	0,381331	-11,43867875	-11,43867875
616	0	-176,9214	-0,001051	8,23671E-13	-0,001051	11,26918	0,327772	-229,9999777	-229,9999777
616	2,60736	-38,45905	-0,005794	5,85716E-12	-0,005794	11,26918	0,327772	-50,00834799	-50,00834799
616	5,21473	100,0033	-0,010536	1,08907E-11	-0,010536	11,26918	0,327772	129,9832817	129,9832817
617	0	-76,1508	-0,002967	6,04486E-12	-0,002967	10,22889	0,1903	-99,00197086	-99,00197086
617	2,57216	33,37964	-0,006979	8,22596E-12	-0,006979	10,22889	0,1903	43,37957759	43,37957759
617	5,14433	142,9101	-0,010991	1,04071E-11	-0,010991	10,22889	0,1903	185,761126	185,761126
618	0	394,2781	-0,092695	5,42732E-12	-0,092695	0,563038	0,489186	512,376176	512,376176
618	2,62397	223,1851	-0,028829	4,09478E-12	-0,028829	0,563038	0,489186	290,0830255	290,0830255
618	5,24794	52,09215	0,035037	2,76224E-12	0,035037	0,563038	0,489186	67,78987498	67,78987498
619	0	180,0472	0,026019	3,58363E-12	0,026019	0,077203	0,617612	234,113374	234,113374
619	2,58591	60,47039	0,017325	1,28873E-12	0,017325	0,077203	0,617612	78,64615179	78,64615179
619	5,17182	-59,10641	0,038631	-1,0062E-12	0,008631	0,077203	0,617612	-76,8210704	-76,8210704
620	0	115,2067	-0,002727	3,04438E-12	-0,002727	3,773192	0,304898	149,7632572	149,7632572
620	2,55525	4,315567	0,004899	-1,8704E-13	0,004899	3,773192	0,304898	5,620035434	5,620035434
620	5,1105	-106,5756	0,012525	-3,4185E-12	0,012525	3,773192	0,304898	-138,5231863	-138,5231863
621	0	75,87943	-0,003479	2,73494E-12	-0,003479	8,389739	0,080399	98,6363014	98,6363014
621	2,5318	-44,05411	0,007088	-1,2962E-12	0,007088	8,389739	0,080399	-57,25616451	-57,25616451
621	5,0636	-163,9876	0,017656	-5,3274E-12	0,017656	8,389739	0,080399	-213,1486304	-213,1486304
622	0	15,59584	0,000889	2,07095E-12	0,000889	12,653	-0,010857	20,27637058	20,27637058
622	2,51519	-99,82051	0,005556	-1,2601E-12	0,005556	12,653	-0,010857	-129,75555	-129,75555
622	5,03038	-215,2369	0,010223	-4,5912E-12	0,010223	12,653	-0,010857	-279,7874705	-279,7874705
623	0	-110,2517	0,004247	-2,7853E-14	0,004247	13,30054	-0,051614	-143,3187108	-143,3187108
623	2,50441	-238,0554	0,007235	-2,3759E-12	0,007235	13,30054	-0,051614	-309,4575743	-309,4575743
623	5,00881	-365,8591	0,010222	-4,7239E-12	0,010222	13,30054	-0,051614	-475,5964379	-475,5964379
624	0	-295,6771	0,005981	-1,5262E-13	0,005981	10,8966	-0,065104	-384,3683016	-384,3683016
624	2,50014	-442,8592	0,006616	-2,4318E-12	0,006616	10,8966	-0,065104	-575,7037342	-575,7037342
624	5,00027	-590,0413	0,00725	-4,711E-12	0,00725	10,8966	-0,065104	-767,0391667	-767,0391667
625	0	-579,0232	0,005489	-4,39E-13	0,005489	5,423743	-0,090998	-752,7191982	-752,7191982
625	2,50198	-441,8977	0,006392	-3,5864E-12	0,006392	5,423743	-0,090998	-574,4542875	-574,4542875
625	5,00396	-304,7723	0,007295	-6,7338E-12	0,007295	5,423743	-0,090998	-396,1893767	-396,1893767
626	0	-373,9682	0,010656	-4,7046E-13	0,010656	-0,753758	-0,115927	-486,1373406	-486,1373406
626	2,50949	-244,5872	0,007312	-4,1449E-12	0,007312	-0,753758	-0,115927	-317,9487239	-317,9487239
626	5,01897	-115,2062	0,003969	-7,8193E-12	0,003969	-0,753758	-0,115927	-149,7601073	-149,7601073
627	0	-239,6223	0,009795	-3,5957E-12	0,009795	-5,796926	-0,139587	-311,4893508	-311,4893508
627	2,52383	-134,1392	0,006688	-5,9458E-12	0,006688	-5,796926	-0,139587	-174,3675677	-174,3675677

627	5,04766	-28,65611	0,003581	-8,2959E-12	0,003581	-5,796926	-0,139587	-37,24578459	-37,24578459
628	0	-178,084	0,010379	-7,3422E-12	0,010379	-8,614553	-0,15503	-231,4884638	-231,4884638
628	2,54435	-77,69015	0,006982	-7,7264E-12	0,006982	-8,614553	-0,15503	-100,983232	-100,983232
628	5,0887	22,70371	0,003585	-8,1105E-12	0,003585	-8,614553	-0,15503	29,52199984	29,52199984
629	0	-345,1496	0,054997	-8,7241E-12	0,054997	29,93834	5,607962	-448,5844988	-448,5844988
629	2,67282	-540,9374	-0,011652	-7,3929E-12	-0,011652	29,93834	5,607962	-703,2418632	-703,2418632
629	5,34564	-736,7251	-0,0783	-6,0617E-12	-0,0783	29,93834	5,607962	-957,8992276	-957,8992276
630	0	-241,2313	0,004482	1,58667E-12	0,004482	19,00265	0,025024	-313,5916892	-313,5916892
630	2,50218	-50,32585	0,009512	4,13718E-13	0,009512	19,00265	0,025024	-65,40458632	-65,40458632
630	5,00437	140,5796	0,014542	-7,5924E-13	0,014542	19,00265	0,025024	182,7825166	182,7825166
631	0	-237,188	0,022984	1,17992E-12	0,022984	6,971641	0,022161	-308,2983793	-308,2983793
631	2,50669	-31,41235	0,015358	1,19844E-13	0,015358	6,971641	0,022161	-40,80533544	-40,80533544
631	5,01338	174,3633	0,007731	-9,4023E-13	0,007731	6,971641	0,022161	226,6877084	226,6877084
632	0	-172,6633	0,020076	7,68418E-13	0,020076	-4,591554	0,031164	-224,4221038	-224,4221038
632	2,51369	2,013348	0,011411	-2,2811E-13	0,011411	-4,591554	0,031164	2,640173533	2,640173533
632	5,02738	176,69	0,002745	-1,2246E-12	0,002745	-4,591554	0,031164	229,7024508	229,7024508
633	0	-145,2418	0,015667	-1,9915E-13	0,015667	-11,49554	0,045945	-188,7830164	-188,7830164
633	2,52356	28,18973	0,010432	-7,07E-13	0,010432	-11,49554	0,045945	36,66750912	36,66750912
633	5,04711	201,6213	0,005196	-1,2149E-12	0,005196	-11,49554	0,045945	262,1180346	262,1180346
634	0	-98,90139	0,020776	-1,1631E-12	0,020776	-15,76065	0,010298	-128,5302504	-128,5302504
634	2,53756	83,0251	0,013063	-1,0371E-12	0,013063	-15,76065	0,010298	107,9587569	107,9587569
634	5,07513	264,9516	0,00535	-9,1105E-13	0,00535	-15,76065	0,010298	344,4477642	344,4477642
635	0	-8,480741	0,025259	-1,7511E-12	0,025259	-17,33318	-0,193338	-10,97444568	-10,97444568
635	2,55129	197,1537	0,006138	-7,2224E-13	0,006138	-17,33318	-0,193338	256,3120988	256,3120988
635	5,10258	402,7882	-0,012983	3,06639E-13	-0,012983	-17,33318	-0,193338	523,5986432	523,5986432
636	0	178,221	0,00663	-1,1245E-12	0,00663	-13,626	-0,225702	231,7006065	231,7006065
636	2,56719	423,5269	-0,001784	7,99073E-13	-0,001784	-13,626	-0,225702	550,5813832	550,5813832
636	5,13438	668,8327	-0,010199	2,72262E-12	-0,010199	-13,626	-0,225702	869,4621599	869,4621599
637	0	546,9595	0,003074	1,45345E-12	0,003074	-47,69112	1,389588	711,0534975	711,0534975
637	2,58604	847,7704	-0,0242	4,42341E-12	-0,0242	-47,69112	1,389588	1102,053097	1102,053097
637	5,17207	1148,581	-0,051474	7,39336E-12	-0,051474	-47,69112	1,389588	1493,052696	1493,052696
771	0	4,028175	0,005677	4,60323E-12	0,005677	-2,729768	-0,02347	5,247980403	5,247980403
771	2,53756	3,375505	0,009215	4,34424E-12	0,009215	-2,729768	-0,02347	4,406585992	4,406585992
771	5,07513	2,722834	0,012753	4,08525E-12	0,012753	-2,729768	-0,02347	3,565191582	3,565191582
772	0	-1,434229	-0,01238	-1,8015E-12	-0,01238	3,014477	0,040162	-1,889256561	-1,889256561
772	2,52356	-2,999254	-0,007791	-3,4975E-12	-0,007791	3,014477	0,040162	-3,91461252	-3,91461252
772	5,04711	-4,564278	-0,003203	-5,193E-12	-0,003203	3,014477	0,040162	-5,939968479	-5,939968479

TABEL MOMEN KOLOM TEPI ARAH X

FRAME	STA	MD	ML		ML TOT	ME		COMB1 1,3MD + 2 (MQ+MP)	COMB 2 1,3MD + 2 (MQ+MP)+1MEX		COMB 3 1,3MD + 2 (MQ+MP)+1MEY
			ML merata	ML_Koef kejut		ME X	ME Y				
1	0	-12,32855	-7,430324	-0,864050919	-8,294375	3,43786	2,317717	-32,61586146	-29,17800097		-30,2981443
1	5,5	54,91055	41,10308	4,831326889	45,93441	-19,44532	-0,054645	163,2525326	143,8072085		163,1978879
1	11	122,1496	89,63649	10,5267047	100,1632	-42,32851	-2,427007	359,1209267	316,792418		356,69392
2	0	351,9071	134,3226	-55,71288746	78,60971	24,95277	-4,138213	614,6987167	639,6514828		610,5605037
2	2,811	-73,35192	-50,59479	-9,179562112	-59,77435	15,03838	-0,334843	-214,9062054	-199,8678292		-215,2410485
2	5,622	-498,611	-235,5122	37,35376324	-198,1584	5,123986	3,468527	-1044,511127	-1039,387141		-1041,042601
12	0	-186,5724	-159,3829	-62,54338357	-221,9263	-13,87263	-3,343033	-686,3967154	-700,2693421		-689,7397485
12	3,683	-9,902498	-135,5795	-29,72483368	-165,3044	10,06463	-2,425317	-343,4819618	-333,4173366		-345,907279
12	7,366	166,7674	-111,7762	3,093716205	-108,6824	34,00188	-1,507601	-0,567208145	33,43466885		-2,074809433
41	0	484,5538	241,1783	-36,3615964	204,8167	-10,58501	-6,352913	1039,553364	1028,968354		1033,200452
41	2,811	29,577	19,84363	5,582226028	25,42586	-0,683702	0,708107	89,30180958	88,6181076		90,00991654
41	5,622	-425,3998	-201,4911	47,52604846	-153,965	9,217606	7,769127	-860,9497453	-851,732139		-853,1806185
128	0	-167,1265	-102,6896	-3,126135935	-105,8157	13,25789	0,152549	-428,8959849	-415,6380912		-428,7434362
128	0,17956	-21,67135	-15,62273	-0,699430725	-16,32216	1,515236	-0,032119	-60,81707129	-59,30183499		-60,84919072
128	0,35913	123,7838	71,44415	1,727274486	73,17142	-10,22742	-0,216788	307,2618423	297,0344213		307,0450548
137	0	275,369	95,18608	-7,283528479	87,90256	13,48678	-1,194682	533,7847946	547,2715704		532,5901124
137	0,43763	20,34911	4,607113	-1,011953254	3,59516	1,32062	-0,155774	33,64416329	34,97622491		33,48838913
137	0,87525	-234,6708	-85,97186	5,259621972	-80,71224	-10,82265	0,883134	-466,4964681	-477,3191206		-465,6133341
151	0	773,6482	732,9062	115,7997006	848,7059	-0,510704	-0,593815	2703,15445	2702,643746		2702,560635
151	1,70381	23,46576	24,51722	4,37838697	28,89561	0,031956	-0,038112	88,29670881	88,32866445		88,25859696
151	3,40763	-726,7167	-683,8718	-107,0429267	-790,9147	0,574615	0,517591	-2526,561032	-2525,986417		-2526,043441
153	0	478,3091	798,7079	177,291316	975,9993	-0,273976	-0,401475	2573,800416	2573,52644		2573,398941
153	2,28788	6,520122	17,06084	3,889231957	20,95008	0,207465	-0,02492	50,37631125	50,5837764		50,35139076
153	4,57575	-465,2689	-764,5863	-169,5128521	-934,0991	0,688907	0,351634	-2473,047794	-2472,358887		-2472,69616
155	0	679,7809	776,1518	148,1358677	924,2876	0,560093	-0,373528	2732,290506	2732,850599		2731,916978
155	2,94644	9,378212	31,94165	8,191219797	40,13287	-0,999118	0,270337	92,45741019	91,4582926		92,72774749
155	5,89288	-661,0245	-712,2685	-131,7534282	-844,0219	-2,558328	0,914203	-2547,375686	-2549,934014		-2546,461483
274	0	76,5308	41,17801	8,601587048	49,7796	-0,31915	5,304075	199,0492332	198,7300834		204,3533081
274	0,45128	-3,371271	-1,61434	-0,439982325	-2,054323	0,015605	-0,330945	-8,491298285	-8,475693259		-8,822243012
274	0,90256	-83,27334	-44,40669	-9,481551697	-53,88824	0,35036	-5,965964	-216,0318297	-215,6814699		-221,9977941
275	0	224,5641	88,64336	53,88093923	142,5243	-4,493425	-1,979524	576,9819674	572,4885426		575,0024433
275	0,50025	4,08185	1,851	1,012544246	2,863545	-0,176377	-0,144656	11,03349372	10,85711637		10,88883796
275	1,0005	-216,4004	-84,94136	-51,85585074	-136,7972	4,14067	1,690213	-554,9149799	-550,7743099		-553,2247673
278	0	774,1314	316,3808	94,59702171	410,9778	-13,08392	10,75008	1828,326433	1815,242516		1839,076518
278	0,67222	43,06111	18,45246	5,961173571	24,41363	-1,0903	1,131486	104,8067041	103,7164039		105,9381899

281	0	-883,6291	-362,7178	-51,48206768	10,903321	-8,4871121	-1618,713025	-1607,809708	-1627,200138
281	0,96769	45,41364	19,89983	2,782499259	22,68233	-1,122426	-1977,117495	-1964,270218	-1988,173351
281	1,93538	974,4564	402,5174	57,0470662	459,5645	-15,09213	104,4024041	103,2799781	105,5836331
283	0	-930,7277	-386,4098	-18,11763524	-404,5275	12,91343	2185,922303	2170,830174	2199,340617
283	1,38866	31,17961	14,30799	0,037613073	14,3456	-0,906768	-2019,001017	-2006,087585	-2023,492614
283	2,77731	993,087	415,0258	18,19286138	433,2187	-14,72697	69,22469223	68,31792384	69,45569325
285	0	-864,2637	-367,4134	12,28955519	-355,1238	11,8834	2157,450401	2142,723432	2162,404
285	1,93663	14,49492	7,68839	-1,504527992	6,183862	-0,676268	-1833,79047	-1821,907069	-1833,123775
285	3,87325	893,2535	382,7902	-15,29861117	337,4915	-13,23594	31,21111835	30,53484992	31,07548305
287	0	-733,1564	-327,9832	37,13078625	-290,8524	10,69033	1896,212707	1882,976769	1895,274741
287	2,61659	0,319431	2,059944	-2,17260314	-0,112659	-0,420298	-1534,808012	-1524,117683	-1531,884034
287	5,23319	733,7952	332,103	-41,47599253	290,6271	-11,53093	0,189942871	-0,230355352	-0,008354
294	0	-547,3431	-273,6453	55,41424789	-218,2311	9,040467	1535,187898	1523,656972	1531,867326
294	3,43206	-7,974995	-0,986754	-2,220064588	-3,206818	-0,671701	-1148,008271	-1138,967805	-1144,359349
294	6,86413	531,3932	271,6718	-59,85437706	211,8175	-10,38387	-16,7811307	-17,45283183	-16,92957262
296	0	-326,098	-204,2202	51,98316321	-152,237	11,2111	1114,44601	1104,062141	1110,500204
296	4,39053	-27,53258	-9,841019	-1,667153304	-11,50817	1,740331	-728,4013794	-717,1902842	-724,5512207
296	8,78106	271,0328	184,5381	-55,31746982	129,2207	-7,730433	-58,80870234	-57,068371	-58,98234638
301	0	894,5761	378,004	53,14144537	431,1455	-11,09797	610,7839748	603,0535422	606,586528
301	1,05088	-32,22026	-14,54114	-1,532338896	-16,07348	0,817336	2025,239828	2014,141859	2024,267304
301	2,10175	-959,0166	-407,0863	-56,20612317	-463,2924	12,73264	-74,03330372	-73,21596799	-73,86033915
303	0	807,3135	346,7986	96,15787135	442,9565	-10,37385	-2173,306436	-2160,573795	-2171,987982
303	0,72584	-44,16069	-19,64088	-5,883582413	-25,52446	0,919101	1935,42056	1925,046708	1937,32447
303	1,45169	-895,6349	-386,0804	-107,9250362	-494,0054	12,21206	-108,4578104	-107,5387089	-108,5140988
307	0	-362,9898	-163,2564	-69,60013703	-232,8566	4,850336	-2152,336181	-2140,124125	-2154,352667
307	0,52481	-8,220028	-3,858926	-1,478411635	-5,337338	0,177632	-937,5998732	-932,7496371	-941,7874427
307	1,04963	346,5497	155,5386	66,64331376	222,1819	-4,495073	-21,36071155	-21,18307989	-21,49002769
309	0	-763,0809	-310,0639	25,26123094	-284,8027	10,77578	894,8784501	890,3833774	898,8073873
309	2,09044	-2,909172	-0,975743	1,769524903	0,793782	0,582883	-1561,610506	-1550,834724	-1559,482226
309	4,18088	757,2626	308,1124	-21,72218113	286,3902	-9,610017	-2,19435934	-1,611476565	-2,21749428
311	0	-867,3832	-374,4657	-7,887166208	-382,3529	11,86462	1557,221788	1547,611771	1555,047237
311	1,50441	-10,39921	-5,667978	1,571265032	-4,096713	0,581932	-1892,303913	-1880,439289	-1889,995423
311	3,00881	846,5848	363,1298	11,02969627	374,1595	-10,70076	-21,71239654	-21,13046468	-21,49283907
321	0	899,1074	411,3815	-7,358506694	404,023	5,631016	1848,87912	1838,17836	1847,009745
321	0,77469	54,84197	23,09299	-0,942206642	22,15078	0,521231	1976,88565	1982,516666	1976,186397
321	1,54938	-789,4235	-365,1956	5,47409341	-359,7215	-4,588554	115,5961187	116,1173496	115,5458245
385	0	412,6119	272,3784	-43,95094816	228,4274	-43,63127	-1745,693413	-1750,281967	-1745,094748
385	4,39053	10,23141	-3,017403	0,156528185	-2,860875	4,331471	993,2503884	949,6191139	993,8581244
							11,91055357	11,91055357	7,565743356

385	8,78106	-392,1491	-278,4132	44,26400453	-234,1492	52,29422	-0,634415	-978,0922225	-925,7980068	-978,7266377
386	0	-652,8297	-366,5822	48,66673586	-317,9154	55,56962	-0,735536	-1484,509549	-1428,939932	-1485,245085
386	3,43206	6,027071	-0,446972	2,05161424	1,604642	1,34642	-0,039141	11,04447774	12,39089726	11,00533688
386	6,86413	664,8839	365,6882	44,56350738	321,1247	-52,87678	0,657254	1506,598504	1453,721727	1507,255759
389	0	834,012	407,6061	-27,73793723	379,8681	-48,67873	0,548704	1843,951814	1795,27308	1844,500518
389	2,61659	-5,562436	-5,988222	1,710695522	-4,277527	2,27732	-0,012353	-15,78622055	-13,50890076	-15,79857308
389	5,23319	-845,1368	-419,5825	31,15932827	-388,4232	53,23337	-0,573409	-1875,524255	-1822,290882	-1876,097664
393	0	940,6439	428,9105	-5,036608008	423,8739	-41,23425	0,490926	2070,584831	2029,350585	2071,075757
393	1,93663	-19,34677	-11,38935	1,069315901	-10,32003	2,425796	-0,022196	-45,79085691	-43,36506115	-45,8130528
393	3,87325	-979,3374	-451,6892	7,175239809	-444,514	33,91664	-0,535318	-2162,166545	-2116,080707	-2162,701863
398	0	-1040,17	-455,373	-22,93934833	-478,3123	2,343768	-0,529404	-2308,846106	-2274,92947	-2309,375509
398	1,38866	-34,96931	-17,34553	-0,393230803	-17,73876	-29,2291	0,467848	-80,93761558	-78,59384802	-80,96839333
398	2,77731	970,2317	420,6819	22,15288672	442,8348	-29,2291	0,467848	2146,970875	2117,741774	2147,438723
401	0	876,5092	360,5052	51,2597436	411,7649	-11,28802	0,424368	1962,991784	1951,703767	1963,416152
401	0,96769	-46,34588	-20,7625	-2,886836892	-23,64934	1,46951	-0,03584	-107,5483164	-106,0788067	-107,5841565
401	1,93538	-969,201	-402,0302	-57,03341739	-459,0636	14,22704	-0,496048	-2178,088417	-2163,861381	-2178,584465
411	0	142,9639	22,4965	44,52933514	67,02583	25,39158	0,226081	319,9047164	345,2963008	320,1307978
411	0,50025	-2,293716	-0,205519	-0,81809468	-1,023614	-0,59651	-0,007821	-5,029058341	-5,625568411	-5,036878965
411	1,0005	-147,5513	-22,90754	-46,1655245	-69,07306	-26,5846	-0,241723	-329,9628331	-356,5474377	-330,2045558
412	0	181,406	125,7782	19,01443421	144,7926	-38,84679	-0,180331	525,4130979	486,5663045	525,2327668
412	0,45128	5,684261	3,70793	0,684436652	4,392367	-1,010336	-0,004274	16,17427191	15,16393596	16,16999815
412	0,90256	-170,0375	-118,3623	-17,6455609	-136,0079	36,82612	0,171784	-493,0645541	-456,2384325	-492,8927705
414	0	464,3576	234,9416	77,9642387	312,9059	-38,4447	-0,068085	1229,476549	1191,031848	1229,408465
414	0,52481	10,49254	5,272266	1,642549166	6,914816	-0,836729	0,001343	27,46993254	26,6320315	27,47127536
414	1,04963	-443,3725	-224,3971	-74,67914037	-299,0762	36,77124	0,07077	-1174,536684	-1137,765442	-1174,465914
416	0	-695,6537	-259,004	-87,85977902	-346,8637	-14,50526	-0,461034	-1598,07729	-1612,582552	-1598,538324
416	0,67472	-38,26585	-15,35899	-5,59327008	-20,95226	-0,40597	-0,036911	-91,65013691	-92,05610736	-91,68704826
416	1,34944	619,122	228,286	76,67323886	304,9592	13,69332	0,387211	1414,777017	1428,470337	1415,164228
436	0	-980,4283	-498,0382	-2,760533578	-500,7988	34,67908	0,103117	-2276,154356	-2241,475274	-2276,051239
436	0,77469	-66,49069	-33,45044	-0,252177106	-33,70262	4,154832	0,007083	-153,8431336	-149,6883011	-153,8360504
436	1,54938	847,4469	431,1374	2,256179366	433,3935	-26,36942	-0,088951	1968,468089	1942,098672	1968,379138
438	0	-230,0607	-90,26345	7,92509514	-82,33836	-16,46035	0,026323	-463,7556407	-480,2159886	-463,7293174
438	0,43763	-22,31011	-8,738571	0,54981868	-8,188753	0,39154	0,002296	-45,38065424	-44,98911441	-45,37835777
438	0,87525	185,4405	72,78631	-6,825457779	65,96085	17,24343	-0,02173	372,9943322	390,2377598	372,9726019
440	0	253,8306	146,9573	8,346010707	155,3033	-34,31822	-0,016555	640,586297	606,2680729	640,5697422
440	0,17956	27,42219	17,21493	0,90346683	18,1184	-2,427686	-0,001622	71,88564492	69,45795931	71,88402269
440	0,35913	-198,9862	-112,5274	-6,539077046	-119,0665	29,46285	0,01331	-496,8150072	-467,3521542	-496,8016968
442	0	-693,2191	-992,1769	-200,0131374	-1192,19	91,58904	-0,092776	-3285,564925	-3193,97588	-3285,657701
442	2,28788	-13,28786	-22,82726	-4,555023431	-27,38228	2,406834	-0,018336	-72,03879053	-69,6319561	-72,05712639

442	4, b/b/b	666,6434	946,5224	190,9030906	1137,425	-86,77538	0,056104	3141,487344	3054,711968	3141,543448
444	0	-991,2727	-920,5782	-137,8398171	-1058,418	89,0647	0,138766	-3405,49049	-3316,425791	-3405,351724
444	1,70381	-39,65823	-37,04164	-5,832105599	-42,87374	5,714061	0,014249	-137,3031867	-131,5891259	-137,2889381
444	3,40763	911,9563	846,4949	126,1756059	972,6705	-77,63658	-0,110269	3130,884116	3053,247539	3130,773848
446	0	-1403,652	-768,1303	-32,70384183	-800,8342	70,87216	0,170443	-3426,416125	-3355,543961	-3426,245682
446	1,19375	-72,55794	-39,27663	-2,615696834	-41,89232	5,505348	0,013862	-178,109965	-172,6046167	-178,0961034
446	2,3875	1258,536	689,5771	27,47244816	717,0495	-59,86147	-0,14272	3070,196195	3010,334728	3070,053475
453	0	764,8062	831,5969	145,7848635	977,3818	-53,94062	-0,284268	2949,011561	2895,070939	2948,727292
453	2,94644	-59,85714	-68,32574	-12,42452815	-80,75027	17,77715	-0,150966	-239,3148137	-221,537668	-239,4657802
453	5,89288	-884,5205	-968,2484	-170,6339198	-1138,882	89,49491	-0,017665	-3427,641188	-3338,146275	-3427,658853
457	0	776,2176	735,4942	69,46920299	804,9634	-321,6576	-1,246365	2619,009756	2297,352119	2617,763391
457	3,683	368,6288	385,4755	58,89280514	444,3683	-126,1353	1,026849	1367,953997	1241,818699	1368,980845
457	7,366	-38,96009	35,45677	48,3164073	83,77318	69,38704	3,300063	116,8982369	186,2852792	120,1982994
462	0	-711,6903	-258,8967	27,78747002	-231,1092	-16,18418	-1,067806	-1387,415901	-1403,600083	-1388,483707
462	2,09044	4,808931	1,640558	-1,701561783	-0,061004	-0,798345	0,207038	6,129602841	5,331257378	6,336640432
462	4,18088	721,3082	262,1778	-31,19059359	230,9872	14,58749	1,481882	1399,675106	1414,262598	1401,156988
465	0	1004,304	422,7678	57,81816458	480,586	-18,0991	0,509338	2266,7675	2248,668399	2267,276837
465	1,05088	31,91237	13,32415	1,377822315	14,70198	-0,138775	0,033636	70,89002721	70,75125203	70,92366304
465	2,10175	-940,4796	-396,1195	-55,06251995	-451,182	17,82155	-0,442066	-2124,987445	-2107,165895	-2125,429511
467	0	857,5201	349,1313	4,628952271	353,7603	2,66719	0,964248	1822,296779	1824,963968	1823,261026
467	1,50441	6,158451	1,889748	-2,024744148	-0,134996	1,291876	0,034556	7,735994786	9,027870432	7,770550725
467	3,00881	-845,2032	-345,3519	-8,678440567	-354,0303	-0,083439	-0,895136	-1806,824789	-1806,908227	-1807,719925
472	0	1011,575	457,632	116,1740712	573,8061	-44,77328	0,17277	2462,660097	2417,886815	2462,832867
472	0,72584	48,99008	22,18899	6,172674157	28,36166	-2,04201	0,022416	120,4104246	118,3684144	120,4328403
472	1,45169	-913,5951	-413,2541	-103,8287228	-517,0828	40,68926	-0,127939	-2221,839248	-2181,149987	-2221,967187
535	0	1229,696	615,0378	14,75195677	629,7898	1,0903	-0,621163	2858,184232	2859,274532	2857,56307
535	1,19375	57,09697	26,87145	1,177843517	28,0493	0,16616	-0,04532	130,3246575	130,4908178	130,2793377
535	2,3875	-1115,502	-561,2949	-12,39626974	-573,6912	-0,757979	0,530523	-2597,534917	-2598,292896	-2597,004394

TABEL MOMEN KOLOM TEPI ARAH Y

FRAME	STA	MD		ML		ML TOT	ME		COMB1 1,3MD + 2 (MQ+MP)	COMB 2 1,3MD + 2 (MQ+MP)+1IMEX		COMB 3 1,3MD + 2 (MQ+MP)+1MEY
		ML merata	ML Koef kejut				ME X	ME Y				
1	0	-52,46692	-186,3618	-78,9972815	-265,3591	6,139451	31,13674		-598,9251634	-592,7857121		-567,7884199
1	5,5	-532,3145	-50,49348	-21,4635561	-71,95704	1,669253	-46,1218		-835,9229214	-834,2536688		-882,0447182
1	11	-1012,162	85,37483	36,07016924	121,445	-2,800946	-123,3803		-1072,920679	-1075,721626		-1196,301016
2	0	22,15596	-16,85733	0,242867944	-16,61446	-1,404459	62,48673		-4,426179615	-5,830639112		58,060553
2	2,811	25,12017	64,6727	1,749962418	66,42266	0,000953	13,55305		165,5015549	165,502508		179,0546026
2	5,622	28,08439	146,2027	3,257056891	149,4598	1,406366	-35,38064		335,4292895	336,8356551		300,0486522
12	0	-396,3559	-243,7897	-99,7918162	-343,5815	-0,133993	33,36893		-1202,425642	-1202,559635		-1169,056714
12	3,683	-191,1895	-74,79025	-30,5455362	-105,3358	0,645569	-111,2324		-459,2179594	-458,5723907		-570,4503204
12	7,366	13,97683	94,20918	38,70074385	132,9099	1,42513	-255,8337		283,9897231	285,4148535		28,1560729
41	0	-22,21453	-146,034	-3,38228547	-149,4163	-0,624046	34,89477		-327,7114784	-328,3355244		-292,8167058
41	2,811	-15,62891	-64,38513	-1,75414378	-66,13928	0,009502	-13,5799		-152,5961337	-152,5866318		-166,1760302
41	5,622	-9,043289	17,26375	-0,1260021	17,13774	0,64305	-62,05457		22,51921105	23,16226076		-39,5353546
128	0	92,37026	83,01429	-0,32646119	82,68782	2,092493	5,752789		285,4569877	287,5494807		291,2097768
128	0,1796	114,8099	102,2417	-0,15938604	102,0824	1,293348	0,365481		353,4175304	354,7108786		353,7830112
128	0,3591	137,2495	121,4692	0,007689099	121,4769	0,494203	-5,021827		421,3780731	421,8722764		416,3562456
137	0	30,46111	35,32383	-1,6868645	33,63697	1,299397	-9,270333		106,8733736	108,1727705		97,60304081
137	0,4376	134,9441	110,086	-0,61930413	109,4667	-0,274328	-3,290486		394,3607048	394,086377		391,0702184
137	0,8753	239,4271	184,8482	0,448256234	185,2964	-1,848053	2,68936		681,848036	679,9999835		684,5373961
151	0	-88,84967	-27,46778	-8,41737132	-35,88515	3,2838	-0,588869		-187,2748784	-183,9910785		-187,8637474
151	1,7038	129,6554	102,9816	39,38254544	142,3641	0,733699	-0,002894		453,2803121	454,0140109		453,2774179
151	3,4076	348,1605	233,4309	87,1824622	320,6134	-1,816402	0,583081		1093,835503	1092,0191		1094,418583
153	0	-65,14393	-20,69814	-7,55016649	-28,24831	2,244248	-6,534765		-141,1837224	-138,9394745		-147,7184879
153	2,2879	99,94184	98,52003	10,7893247	109,3094	0,572913	-0,788924		348,5431067	349,1160196		347,754183
153	4,5758	265,0276	217,7382	29,12881589	246,867	-1,098422	4,956918		838,2699358	837,1715137		843,2268538
155	0	-39,85342	-25,79207	-5,80673325	-31,5988	1,282932	-0,829392		-115,0070555	-113,7241234		-115,836447
155	2,9464	88,57312	88,53703	8,833262175	97,37029	0,221634	1,939838		309,8856356	310,1072693		311,8254735
155	5,8929	216,9997	202,8661	23,4732576	226,3394	-0,839665	4,709067		734,7783266	733,9386619		739,4873939
274	0	-131,6272	-111,8977	-54,1220768	-166,0198	-0,391064	3,516348		-503,1549272	-503,5459909		-499,6385795
274	0,4513	-125,2207	-69,29957	-35,0335216	-104,3331	-0,123608	-1,522748		-371,4531303	-371,576738		-372,9758786
274	0,9026	-118,8142	-26,70146	-15,9449664	-42,64643	0,143848	-6,561844		-239,7513334	-239,6074851		-246,3131776
275	0	-44,88203	12,1791	-1,24550754	10,93359	-0,104542	-79,07698		-36,47946648	-36,58400872		-115,5564431
275	0,5002	93,02456	60,77316	11,83118037	72,60434	0,005033	-15,86741		266,1406028	266,1456356		250,273192
275	1,0005	230,9312	109,3672	24,90786829	134,2751	0,114608	47,34215		568,7606722	568,8752799		616,1028271
278	0	-40,71836	26,3884	-9,33913054	17,04927	-0,094933	-103,3426		-18,8353392	-18,93027269		-122,1779833

278	0,6722	141,4949	94,82141	0,876691494	95,69811	-0,137806	-28,75091	375,3395794	375,2017729	346,5886708
278	1,3444	323,7082	163,2544	11,09251353	174,3469	-0,180679	45,84083	769,514498	769,3338185	815,353249
281	0	-316,2366	-157,8583	-3,85617666	-161,7144	0,191014	12,98966	-734,5365071	-734,3454928	-721,5468439
281	0,9677	-112,7611	-77,46142	1,479429212	-75,98199	0,043697	-9,551112	-298,5534773	-298,5097802	-308,1045896
281	1,9354	90,71436	2,935408	6,815035082	9,750443	-0,10362	-32,09189	137,4295524	137,3259324	105,3376648
283	0	-312,6574	-159,4479	-1,36549472	-160,8134	0,153776	10,82024	-728,0813417	-727,9275659	-717,2611031
283	1,3887	-106,811	-74,67027	0,533986303	-74,13628	0,018	-7,86416	-287,1268693	-287,1088697	-294,9910288
283	2,7773	99,03534	10,10736	2,433467322	12,54083	-0,117777	-26,54856	153,8276032	153,7098265	127,2790454
285	0	-292,2697	-156,1093	0,293170787	-155,8162	0,114967	2,556305	-691,5829434	-691,4679765	-689,0266381
285	1,9366	-102,8428	-73,05029	0,158385148	-72,89191	0,008721	-2,160371	-279,4795171	-279,4707963	-281,639888
285	3,8733	86,584	10,00875	0,023599508	10,03235	-0,097525	-6,877047	132,62339091	132,5263839	125,746862
287	0	-259,5046	-151,1424	1,239653778	-149,9028	0,072484	-0,653773	-637,1615782	-637,0890945	-637,8153511
287	2,6166	-99,17251	-70,64045	0,166391696	-70,47405	-0,000895	-0,641406	-269,872376	-269,8732714	-270,5137824
287	5,2332	61,15959	9,861552	-0,90687039	8,954681	-0,074274	-0,62904	97,41682621	97,34255178	96,78778625
294	0	-210,6806	-144,4475	0,02247626	-144,425	-0,055587	-4,105084	-562,7347307	-562,7903173	-566,8398142
294	3,4321	-102,405	-66,08704	-0,63695588	-66,724	-0,035684	0,563611	-266,5745308	-266,6102149	-266,0109194
294	6,8641	5,87051	12,27339	-1,29638802	10,977	-0,015782	5,232306	29,58566909	29,56988751	34,81797545
296	0	-143,4808	-135,4073	-19,7568549	-155,1642	0,318402	-5,070565	-496,8534899	-496,535088	-501,9240546
296	4,3905	-140,8176	-56,78399	-7,82235113	-64,60634	0,120045	4,933206	-312,2755287	-312,1554832	-307,3423229
296	8,7811	-138,1543	21,83937	4,112152625	25,95152	-0,078311	14,93698	-127,6975675	-127,7758785	-112,7605913
301	0	-301,9939	-160,1263	-3,24628858	-163,3726	-1,059342	1,279883	-719,3372871	-720,3966295	-718,0574036
301	1,0509	-105,6728	-77,98031	1,464867861	-76,51544	0,397507	-0,817407	-290,4054657	-290,0079582	-291,2228729
301	2,1018	90,64836	4,165721	6,176024305	10,34175	1,854357	-2,914698	138,5263556	140,380713	135,6116579
303	0	-327,7593	-169,4455	-12,0276446	-181,4731	-0,607721	3,107658	-789,0332954	-789,6410168	-785,9256376
303	0,7258	-138,7565	-96,31755	-1,41336103	-97,73092	0,241185	-3,89262	-375,8453233	-375,6041379	-379,7379433
303	1,4517	50,24619	-23,18962	9,200922497	-13,9887	1,090092	-10,8929	37,34264885	38,43274095	26,44975091
307	0	-51,97023	9,056842	-2,0235247	7,033318	-0,312604	16,01418	-53,49466392	-53,80726768	-37,4804839
307	0,5248	90,05771	59,94221	11,63590808	71,57811	0,049214	3,860451	260,2312478	260,2804622	264,0916988
307	1,0496	232,0856	110,8276	25,29534086	136,1229	0,411033	-8,293278	573,9571595	574,3681921	565,6638815
309	0	-25,73626	-9,952704	-0,26712041	-10,21982	-1,444929	-29,42467	-53,89678541	-55,3417142	-83,32145991
309	2,0904	156,2808	68,73095	3,550978063	72,28193	-0,324353	7,298919	347,7288995	347,4045468	340,42998
309	4,1809	338,2979	147,4146	7,36907654	154,7837	0,796223	14,82684	749,3545844	750,1508078	764,18142
311	0	-74,64234	-9,492589	-1,7138544	-11,20644	-2,210702	-6,25023	-119,4479227	-121,658625	-125,6981525
311	1,5044	98,46348	74,56551	-1,14187775	73,42364	-0,51188	-1,704537	274,8498009	274,3379206	273,1452639
311	3,0088	271,5693	158,6236	-0,56990111	158,0537	1,186942	2,841156	669,1475245	670,3344662	671,9886804
321	0	-65,71436	-18,25202	-4,32957019	-22,58159	3,364487	-0,338345	-130,5918331	-127,2273457	-130,9301783
321	0,7747	124,652	107,7531	-0,44748343	107,3056	0,417715	-0,136719	376,6588687	377,0765836	376,5221501
321	1,5494	315,0184	233,7582	3,434603333	237,1928	-2,529058	0,064908	883,9095706	881,3805129	883,9744786

385	0	-140,9666	-137,6808	-20,0361031	-157,7169	1,543134	-4,43169	-498,6903749	-497,1472411	-503,1220653
385	4,3905	-140,5879	-57,43398	-7,89832736	-65,3323	0,425067	4,974908	-313,4288666	-313,0037997	-308,4539585
385	8,7811	-140,2092	22,81283	4,239448407	27,05228	-0,693	14,38151	-128,1673583	-128,8603583	-113,7858517
386	0	-5,259206	-13,03891	1,181348349	-11,85756	0,665219	-4,560064	-30,55209777	-29,8868784	-35,11216226
386	3,4321	99,89333	65,68259	0,588096421	66,27069	0,237192	-0,642767	262,6398954	262,6398954	261,7599368
386	6,8641	205,0459	144,4041	-0,00515551	144,3989	-0,190836	3,274531	555,3575052	555,1666692	558,6320358
389	0	-256,6085	-152,0085	1,106698706	-150,9018	0,823477	-0,455895	-635,3947076	-634,5712302	-635,8506028
389	2,6166	-96,17954	-70,4298	0,193406187	-70,2364	-0,113549	-0,300299	-265,5061952	-265,6197439	-265,8064941
389	5,2332	64,24945	11,1489	-0,71988633	10,42902	-1,050575	-0,144703	104,3823173	103,3317425	104,2376146
393	0	-291,9659	-157,4025	0,101737807	-157,3007	1,095512	0,083629	-694,1571933	-693,0616808	-694,0735639
393	1,9366	-99,28762	-72,93244	0,17707322	-72,75536	-0,05548	-0,145722	-274,5846366	-274,6401168	-274,7303586
393	3,8733	93,3907	11,5376	0,252408633	11,79	-1,206473	-0,375073	144,9879202	143,7814473	144,6128467
398	0	-109,6949	-11,7677	-2,70819791	-14,47597	1,195151	0,017861	-171,555368	-170,3602166	-171,5375073
398	1,3887	102,1676	74,50609	-0,56649336	73,9396	0,041624	0,034402	280,6971005	280,7387242	280,7315024
398	2,7773	314,0302	160,78	1,57521119	162,3552	-1,111904	0,050943	732,9495689	731,8376649	733,0005122
401	0	-318,7312	-158,9868	-4,0662525	-163,053	0,892814	-0,058333	-740,4565578	-739,5637435	-740,5148911
401	0,9677	-105,7999	-77,15114	1,54864151	-75,6025	-0,030693	-0,008261	-288,7449063	-288,7755997	-288,7531675
401	1,9354	107,1313	4,684475	7,163535519	11,84801	-0,954201	0,041811	162,9667453	162,012544	163,0085561
411	0	-125,0322	-107,026	-24,4387391	-131,4647	-0,653274	0,048708	-425,4713295	-426,124604	-425,4226214
411	0,5002	-111,0683	-59,19165	-11,5035675	-70,69521	-0,321795	0,012579	-285,7792219	-286,1010165	-285,7666427
411	1,0005	-97,1044	-11,3573	1,431604239	-9,925697	0,009685	-0,02355	-146,0871143	-146,0774289	-146,110664
412	0	-17,59897	26,46153	15,85152731	42,31305	-0,319071	0,010675	61,74745112	61,42838049	61,75812596
412	0,4513	104,9542	69,1311	34,97001921	104,1011	0,073555	-0,031708	344,6426997	344,7162551	344,6109919
412	0,9026	227,5074	111,8007	54,08851111	165,8892	0,466181	-0,074091	627,5379484	628,0041298	627,4638579
414	0	-37,99579	9,253392	-2,05131655	7,202075	-0,785165	-0,002495	-34,99037871	-35,77554322	-34,9928736
414	0,5248	93,54202	60,7566	11,70698443	72,46358	-0,360213	-0,029637	266,5317914	266,1715789	266,502154
414	1,0496	225,0798	112,2598	25,46528541	137,7251	0,064739	-0,05678	568,0539615	568,1187009	567,9971817
416	0	-67,362	24,00346	-9,79827057	14,20519	0,446386	0,012468	-59,16020919	-58,71382366	-59,14774161
416	0,6747	131,7083	92,82612	0,560816197	93,38694	0,380352	0,004754	357,9946827	358,3750351	357,9994371
416	1,3494	330,7786	161,6488	10,91990297	172,5687	0,314319	-0,002959	775,1495747	775,4638939	775,1466158
436	0	-84,25862	-15,38471	-4,24119772	-19,62591	4,404602	0,245045	-148,7880292	-144,3834271	-148,5429838
436	0,7747	109,7803	109,0825	-0,29705669	108,7854	-0,147842	0,053581	360,2851967	360,1373548	360,3387775
436	1,5494	303,8191	233,5497	3,647084333	237,1968	-4,700286	-0,137884	869,3584226	864,6581366	869,2205388
438	0	15,33115	34,83105	-1,83490374	32,99615	2,884454	0,037373	85,9227878	88,80724163	85,96016083
438	0,4376	119,0843	107,7909	-0,86408609	106,9268	0,750728	-0,001345	368,6632273	369,413955	368,6618826
438	0,8753	222,8375	180,7507	0,106731557	180,8575	-1,382998	-0,040062	651,4036668	650,0206685	651,3636044
440	0	74,79745	76,98182	-1,04170637	75,94011	4,697865	0,001864	249,1169068	253,814772	249,1187711
440	0,1796	98,76525	95,47709	-0,93175495	94,54533	4,262843	-0,003046	317,4854884	321,7483314	317,4824427

440	0,3591	122,7331	113,9724	-0,82180353	113,1506	3,827821	-0,007956	385,8540701	389,6818908	385,8461143
442	0	-41,75668	-20,231	-7,9634356	-27,92735	3,959964	-6,554674	-110,1383791	-106,1784155	-116,6930532
442	2,2879	90,31896	98,08599	10,72957206	108,8156	0,861274	-0,769093	335,045771	335,9070455	334,2766783
442	4,5758	222,3946	216,403	29,15548768	245,5585	-2,237415	5,016489	780,2299211	777,9925065	785,2464099
444	0	-93,13152	-26,73092	-8,60514465	-35,33606	5,561881	-0,677829	-191,7431003	-186,181219	-192,4209294
444	1,7038	114,8071	103,5183	39,43074208	142,9491	0,617821	-0,010399	435,1474018	435,7652233	435,1370027
444	3,4076	322,7458	233,7676	87,46662881	321,2342	-4,326238	0,657031	1062,037904	1057,711666	1062,694935
446	0	-116,6081	-31,80272	-3,38611543	-35,18884	6,052943	0,647559	-221,9682314	-215,9152885	-221,3206722
446	1,1938	96,31488	105,7072	13,60365667	119,3108	0,40742	0,157974	363,8310392	364,2384588	363,9890133
446	2,3875	309,2379	243,2171	30,59342876	273,8105	-5,238104	-0,331611	949,6303098	944,3922061	949,2986988
453	0	-169,5857	-206,693	-24,0218117	-230,7148	3,582904	4,732068	-681,8910076	-678,3081034	-686,6230756
453	2,9464	-98,55563	-90,15992	-9,02153076	-99,18145	0,51636	-1,941682	-326,485224	-325,9688638	-328,4269059
453	5,8929	-27,52552	26,37311	5,978750147	32,35186	-2,550184	0,848704	28,9205596	26,37037576	29,76926387
457	0	234,0883	-94,74838	-38,7398509	-133,4882	-1,36156	255,8095	37,33829658	35,97673638	293,1477491
457	3,683	296,3274	74,60425	30,5297411	105,134	-0,620735	111,2151	595,4935875	594,8728525	706,7086469
457	7,366	358,5665	243,9569	99,79933315	343,7562	0,12009	-33,37933	1153,648878	1153,768969	1120,269545
462	0	-341,5318	-144,9575	-6,98667757	-151,9442	-2,836226	-14,14812	-747,879657	-750,7158831	-762,0277733
462	2,0904	-159,0894	-68,10181	-3,47325545	-71,57507	0,021553	7,426556	-349,9447456	-349,9447456	-342,5397432
462	4,1809	23,35309	8,753855	0,04016667	8,794021	2,879333	29,00123	47,94705888	50,82639189	76,94828688
465	0	-79,031	-2,576353	-5,91675529	-8,493109	-3,566148	-0,380382	-119,7265165	-123,2926644	-120,106899
465	1,0509	111,8077	78,42853	-1,41832733	77,0102	-0,612173	-0,249796	299,3704262	298,7582529	299,1206298
465	2,1018	302,6464	159,4334	3,080100623	162,5135	2,341801	-0,11921	718,4673689	720,8091702	718,3481587
467	0	-67,3106	-7,97391	-1,43281858	-9,406729	-4,021828	-6,874154	-106,3172423	-110,3390708	-113,191396
467	1,5044	103,5555	75,1608	-1,07729362	74,0835	-0,795377	-2,096347	282,789219	281,9938425	280,6928721
467	3,0088	274,4217	158,2955	-0,72176866	157,5737	2,431075	2,68146	671,8956802	674,3267557	674,5771402
472	0	-31,60529	24,5959	-9,03653739	15,55937	-2,422799	-0,136726	-9,968146369	-12,39094586	-10,10487247
472	0,7258	149,1355	97,97642	1,58037576	99,5568	-1,006306	-0,060186	392,9897384	391,9834326	392,9295526
472	1,4517	329,8763	171,3569	12,19728891	183,5542	0,410188	0,016355	795,9476232	796,357811	795,9639777
535	0	-100,0734	-33,6431	-3,29602171	-36,93912	4,028996	1,238985	-203,9736167	-199,9446204	-202,7346316
535	1,1938	112,1168	104,6013	13,49072358	118,092	0,779164	0,326251	381,9359333	382,7150977	382,2621847
535	2,3875	324,307	242,8457	30,27746888	273,1232	-2,470667	-0,586482	967,8454833	965,3748158	967,259001

MOMEN RENCANA KOLOM TEPI ARAH X

	Kolom	128 dan 440	137 dan 438	321 dan 436	535 dan 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457
Bawah	Mux	640,58	547,27	2276,15	2859,27	2703,15	2573,8	2732,29	416,89
Atas	Mux	496,81	477,31	1968,46	2598,29	2526,56	2473,04	2549,93	2619
	Mu x Pakai	496,81	477,31	1968,46	2598,29	2526,56	2473,04	2549,93	416,89

	Kolom	41 dan 2	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411
Bawah	Mux	1039,53	1561,61	1892,39	2267,27	2462,83	1229,47	525,41	575
Atas	Mux	860,94	1557,22	1822,29	2125,42	2221,96	1174,53	493,06	553,22
	Mu x Pakai	860,94	1557,22	1822,29	2125,42	2221,96	1174,53	493,06	553,22

	Kolom	278 dan 416	281 dan 401	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
Bawah	Mux	1839,07	1988,17	2309,37	2071,07	1844,55	1485,24	995,85	32,61
Atas	Mux	1627,2	2199,34	2147,43	2162,7	1876,09	1507,25	978,72	359,12
	Mu x Pakai	1627,2	1988,17	2147,43	2071,07	1844,55	1485,24	978,72	359,12

MOMEN RENCANA KOLOM TEPI ARAH Y

	Kolom	128 dan 440	137 dan 438	321 dan 436	535 dan 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457
Bawah	Muy	287,54	97,6	130,93	203,97	194,74	147,71	115,83	1202,55
Atas	Muy	421,87	684,53	883,97	967,84	1062,03	843,22	739,48	285,41
	Mu y Pakai	287,54	97,6	130,93	203,97	194,74	147,71	115,83	1202,55

	Kolom	41 dan 2	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411
Bawah	Muy	5,83	83,32	113,19	123,29	12,39	53,8	61,42	115,55
Atas	Muy	336,83	764,18	674,57	720,8	796,35	574,36	628	616,1
	Mu y Pakai	5,83	83,32	113,19	123,29	12,39	53,8	61,42	115,55

	Kolom	278 dan 416	281 dan 401	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
Bawah	Muy	59,14	740,51	171,53	694,15	637,81	566,83	503,12	567,78
Atas	Muy	775,14	163	733	144,98	97,41	34,81	113,78	1196,3
	Mu y Pakai	59,14	163	171,53	144,98	97,41	34,81	113,78	567,78

TABEL MOMEN KOLOM TENGAH ARAH X

FRAME	STA	MD	ML		ML TOT	ME		COMB1 1,3MD + 2 (MQ+MP)	COMB 2 1,3MD + 2 (MQ+MP)+1MEX		COMB 3 1,3MD + 2 (MQ+MP)+1MEY
			ML merata	ML Koef kejut		ME X	ME Y				
4	0	645,3292	153,0746	-63,73564152	89,33892	15,64235	11,20323	1017,60575	1033,248099		1028,808981
4	2,811	-65,22685	-52,21791	-10,15021652	-62,36812	16,92504	0,710934	-209,5311484	-192,6061089		-208,820214
4	5,622	-775,7829	-257,5104	43,43520849	-214,0752	18,20773	-9,781362	-1436,668047	-1418,460317		-1446,449409
43	0	779,0878	266,3785	-42,80593027	223,5726	-18,06086	14,49683	1459,959209	1441,898353		1474,456039
43	2,811	31,45468	20,7357	6,381801965	27,11751	-1,432865	-1,082272	95,12609121	93,6932262		94,0438196
43	5,622	-716,1784	-224,9071	55,5695342	-169,3375	15,19513	-16,66137	-1269,707026	-1254,5119		-1286,3684
543	0	-10,4498	-9,084312	-1,119678055	-10,20399	4,595542	-3,98938	-33,99272105	-29,39717911		-37,98210088
543	5,5	45,20391	42,65039	5,052785192	47,70318	-20,60381	-0,545955	154,1714318	133,5676176		153,625477
543	11	100,8576	94,38509	11,22524844	105,6103	-45,80317	2,89747	342,3355846	296,5324144		345,233055
544	0	-198,3835	-178,6674	-82,89131764	-261,5588	-27,97468	7,54946	-781,0160832	-808,990765		-773,4666228
544	3,683	-54,09265	-144,7206	-38,16159565	-182,8822	17,07566	2,169142	-436,0848126	-419,009149		-433,9156708
544	7,366	90,19823	-110,7737	6,568126349	-104,2056	62,12601	-3,211177	-91,15354203	-29,02753309		-94,36471882
551	0	-205,7339	-119,3156	-2,226598001	-121,5422	23,31953	-0,401161	-510,5383938	-487,2188621		-510,9395545
551	0,1796	-24,28483	-16,60517	-0,656323294	-17,26149	2,544541	-0,066278	-66,09327071	-63,54872993		-66,15954914
551	0,3591	157,1642	86,10523	0,913951413	87,01918	-18,23045	0,268604	378,3518524	360,1214023		378,6204562
555	0	381,2318	155,56	-9,132812358	146,4271	29,95666	0,237055	788,4555738	818,4122345		788,6926293
555	0,4376	28,78109	10,00029	-1,202632729	8,797659	2,754415	0,001135	55,01073497	57,76514992		55,01186968
555	0,8753	-323,6696	-135,5594	6,727546901	-128,8318	-24,44783	-0,234786	-678,4341039	-702,8819346		-678,6688899
560	0	1056,305	819,451	155,4749516	974,9259	14,60137	-0,289913	3323,048537	3337,649908		3322,758624
560	1,7038	30,36896	25,19753	5,670795578	30,86833	0,556265	-0,022452	101,2163012	101,7725662		101,193849
560	3,4076	-995,5672	-769,0559	-144,1333605	-913,1893	-13,48884	0,245009	-3120,615935	-3134,104775		-3120,370926
561	0	803,766	874,1121	245,67341	1119,786	12,97114	-0,33006	3284,466815	3297,437955		3284,136755
561	2,2879	11,39622	16,4268	4,625070314	21,05187	0,64864	0,009128	56,91883471	57,56747511		56,92796311
561	4,5758	-780,9736	-841,2585	-236,4232694	-1077,682	-11,67386	0,348317	-3170,629146	-3182,303005		-3170,280829
562	0	1017,644	848,1796	202,2797711	1050,459	10,40349	2,762838	3423,856223	3434,259717		3426,619061
562	2,9464	21,90441	32,64131	11,36662618	44,00793	-1,591933	0,096917	116,4916018	114,8996687		116,5885186
562	5,8929	-973,8354	-782,897	-179,5465187	-962,4435	-13,58736	-2,569004	-3190,87302	-3204,46038		-3193,442024
585	0	93,97171	43,06722	10,19009908	53,25732	-2,159552	-8,175421	228,6778567	226,5183044		220,5024353
585	0,4513	-3,82052	-1,634742	-0,529507309	-2,164249	0,05972	0,144107	-9,295174209	-9,235454452		-9,151067257
585	0,9026	-101,6127	-46,3367	-11,2491137	-57,58582	2,278992	8,463635	-247,2682051	-244,9892133		-238,8045698
586	0	290,3034	105,1274	77,50307584	182,6305	-4,002678	1,219743	742,6553633	738,6526849		743,8751059
586	0,5002	5,659692	2,236934	1,244401052	3,481336	-0,177437	-0,007082	14,32027111	14,14283375		14,31318862
586	1,0005	-278,984	-100,6536	-75,01427373	-175,6678	3,647804	-1,233908	-714,0148211	-710,3670174		-715,2487287

587	0	967,5643	364,9026	123,1019026	488,0045	-14,34205	-17,72401	2233,842712	2219,50066	2216,118703
587	0,6722	51,33949	20,27488	7,315887782	27,59077	-1,186914	-0,916281	121,9228807	120,7359666	121,0066001
587	1,3444	-864,8853	-324,3529	-108,470127	-432,823	11,96822	15,89145	-1989,996951	-1978,028726	-1974,105502
588	0	-1088,559	-411,5675	-56,88714478	-468,4546	15,12698	21,52715	-2352,03373	-2336,908396	-2330,508223
588	0,9677	53,0762	21,25782	2,712604424	23,97042	-1,297058	-1,036704	116,9398992	115,6428412	115,9031949
588	1,9354	1194,711	454,0831	62,31235363	516,3955	-17,72109	-23,60056	2585,915171	2568,194079	2562,314613
589	0	-1137,182	-428,5087	-12,3446519	-440,8534	15,77624	11,13949	-2360,042831	-2344,266594	-2348,903342
589	1,3887	35,31522	14,59801	-0,580388195	14,01762	-1,086851	-0,314276	73,94503092	72,85817986	73,63075532
589	2,7773	1207,812	457,7047	11,18387551	468,8886	-17,94994	-11,76804	2507,932893	2489,982954	2496,164853
590	0	-1071,29	-399,5625	22,45481604	-377,1077	14,97611	-0,095701	-2146,892002	-2131,915888	-2146,987703
590	1,9366	16,09088	7,240991	-2,120520165	5,12047	-0,835375	0,220991	31,15908895	30,32371376	31,3800795
590	3,8733	1103,471	414,0445	-26,69585637	387,3487	-16,64686	0,537682	2209,21018	2192,563316	2209,747862
591	0	-964,5691	-353,0131	48,81255489	-304,2005	13,84177	-5,53995	-1862,340825	-1848,499053	-1867,880775
591	2,6166	0,978995	1,308868	-2,665752315	-1,356884	-0,552694	0,372206	-1,441075005	-1,993768899	-1,068868758
591	5,2332	966,527	355,6308	-54,14405952	301,4868	-14,94716	6,284363	1859,458675	1844,511515	1865,743038
596	0	-836,2973	-295,0806	67,96979143	-227,1109	12,11448	-7,527676	-1541,408265	-1529,293788	-1548,935941
596	3,4321	-8,416978	1,859137	-2,712179099	-4,571316	-0,772372	0,318015	-20,08470376	-20,85707577	-19,7666892
596	6,8641	819,4634	291,3624	-73,39414963	217,9682	-13,65922	8,163705	1501,238858	1487,579637	1509,402563
597	0	-652,8631	-222,7161	57,94641278	-164,7697	13,9399	-9,48978	-1178,261406	-1164,321505	-1187,751187
597	4,3905	-23,09643	-10,6052	-0,859822042	-11,46502	1,666413	0,60667	-52,95539448	-51,28898159	-52,34872442
597	8,7811	606,6702	201,5057	-59,66605687	141,8397	-10,60708	10,70312	1072,350617	1061,743541	1083,053738
601	0	1146,528	431,794	61,439073	493,2331	-19,32349	0,773369	2476,952729	2457,629243	2477,726098
601	1,0509	-38,85542	-15,5024	-1,288170863	-16,79057	1,184632	-0,261448	-84,09319654	-82,90856503	-84,35464439
601	2,1018	-1224,239	-462,7988	-64,01541473	-526,8142	21,69275	-1,296264	-2645,139122	-2623,446373	-2646,435386
602	0	1037,374	398,8779	126,5699255	525,4478	-17,20495	-4,490371	2399,481266	2382,27632	2394,990894
602	0,7258	-52,99359	-21,16092	-7,134539757	-28,29546	1,309176	0,062086	-125,4825814	-124,1734055	-125,420495
602	1,4517	-1143,361	-441,1997	-140,8390051	-582,0387	19,8233	4,614544	-2650,446429	-2630,623131	-2645,831884
605	0	-463,9363	-183,9186	-96,5598131	-280,4785	8,140974	7,52725	-1164,074168	-1155,933194	-1156,546918
605	0,5248	-10,33489	4,271714	-1,787864356	-6,059578	0,25408	0,108656	-25,55451844	-25,30043796	-25,44586216
605	1,0496	443,2666	175,3752	92,98408439	268,3593	-7,632813	-7,309938	1112,965131	1105,332318	1105,655193
606	0	-1113,945	-344,2182	34,27461115	-309,9436	19,24403	-4,354168	-2068,015767	-2048,771742	-2072,369935
606	2,0904	-10,56979	0,02601	2,047066005	2,073076	0,822439	-0,213463	-9,594580235	-8,772141373	-9,808043654
606	4,1809	1092,806	344,2702	-30,18047914	314,0897	-17,59915	3,927241	2048,826607	2031,227459	2052,753848
607	0	-1125,082	-421,3379	-1,049510846	-422,3874	21,21219	-2,729463	-2307,381488	-2286,169298	-2310,110951
607	1,5044	-12,18428	-5,675832	2,420073175	-3,255759	0,825586	-0,306834	-22,35108679	-21,52550106	-22,65792072
607	3,0088	1100,714	409,9862	5,889657195	415,8759	-19,56102	2,115795	2262,679314	2243,118296	2264,79511
613	0	1128,769	521,5481	-18,97441181	502,5737	22,74055	0,255979	2472,547349	2495,287897	2472,803327

613	0,7747	65,43539	28,58255	-1,736753974	26,84579	1,656684	0,01432	138,7575994	140,4142833	138,7719199
613	1,5494	-997,8985	-464,383	15,50090387	-448,8821	-19,42718	-0,227338	-2195,03215	-2214,45933	-2195,259488
641	0	722,7517	290,2343	-50,0384046	240,1959	-46,10868	0,545242	1419,968943	1373,860267	1420,514185
641	4,3905	9,019812	-2,688234	-0,715318956	-3,403553	4,775016	-0,071334	4,918648743	9,693664695	4,847314941
641	8,7811	-704,7121	-295,6107	48,60776668	-247,003	55,65871	-0,68791	-1410,131646	-1354,472938	-1410,819556
642	0	-915,5178	-383,9242	62,55024357	-321,3739	57,6957	1,455743	-1832,920995	-1775,225296	-1831,465252
642	3,4321	7,050786	0,539826	2,557196303	3,097022	1,414064	0,032643	15,36006507	16,7741286	15,39270833
642	6,8641	929,6194	385,0038	-57,43585096	327,568	-54,86757	-1,390457	1863,641125	1808,773554	1862,250668
643	0	1044,246	429,9254	-39,82844721	390,097	-50,23579	-1,274835	2137,71369	2087,477899	2136,438855
643	2,6166	-4,992103	-5,136781	2,214706792	-2,922074	2,400666	0,043545	-12,3338825	-9,933216615	-12,29033759
643	5,2332	-1054,23	-440,199	44,25786079	-395,9411	55,03712	1,361925	-2162,381455	-2107,344332	-2161,01953
644	0	1131,57	457,4097	-15,71193749	441,6978	-42,24367	-0,868125	2354,436413	2312,192744	2353,568288
644	1,9366	-19,81564	-10,78393	1,703817626	-9,080109	2,540622	0,040411	-43,92055428	-41,37993247	-43,88014283
644	3,8733	-1171,201	-478,9776	19,11957274	-459,858	47,32491	0,948948	-2442,277522	-2394,952609	-2441,328573
648	0	-1245,858	-492,7697	-15,27759124	-508,0473	34,35106	0,76604	-2635,710522	-2601,359462	-2634,944483
648	1,3887	-38,31902	-17,40868	0,250460469	-17,15822	2,443815	0,041363	-84,13116152	-81,68734645	-84,089799
648	2,7773	1169,22	457,9524	15,77851218	473,7309	-29,46343	-0,683314	2467,448199	2437,984769	2466,764885
649	0	1084,669	403,0541	55,99680148	459,0509	-10,18401	-0,542322	2328,171271	2317,987256	2327,628949
649	0,9677	-54,0729	-21,81701	-2,790621438	-24,60763	1,51422	0,042648	-119,5100401	-117,9958197	-119,4673924
649	1,9354	-1192,815	-446,6881	-61,57804436	-508,2661	13,21246	0,627617	-2567,191351	-2553,978896	-2566,563734
652	0	205,1202	33,05893	67,07454622	100,1335	28,72043	-0,229208	466,9232745	495,6437018	466,6940663
652	0,5002	-3,812065	-0,543718	-1,045487255	-1,589206	-0,622879	0,007096	-8,134095348	-8,756974329	-8,126998912
652	1,0005	-212,7444	-34,14637	-69,16552073	-103,3119	-29,96619	0,243401	-483,1914652	-513,1576505	-482,9480642
653	0	196,1996	133,1564	21,55814359	154,7146	-44,17147	0,21501	564,4885944	520,3171255	564,7036042
653	0,4513	6,067612	3,741934	0,77939328	4,521327	-1,077121	0,004426	16,93055043	15,85342982	16,93497619
653	0,9026	-184,0643	-125,6726	-19,99935703	-145,6719	42,01723	-0,206158	-530,6274936	-488,6102658	-530,8336518
654	0	545,8464	260,8422	105,7623309	366,6045	-45,82114	0,142307	1442,809374	1396,988232	1442,951681
654	0,5248	11,87797	5,70946	1,960155656	7,669616	-0,963471	0,000224	30,78059681	29,81712547	30,78082127
654	1,0496	-522,0905	-249,4233	-101,8420195	-351,2653	43,8942	-0,141858	-1381,248181	-1337,353981	-1381,390038
655	0	-902,0661	-299,2897	-115,5175961	-414,8073	-17,6502	0,49697	-2002,300416	-2019,950618	-2001,803446
655	0,6747	-48,08167	-16,98707	-6,935669377	-23,92274	-0,407722	0,038013	-110,3516463	-110,7593685	-110,3136338
655	1,3494	805,9028	265,3155	101,6462574	366,9618	16,83476	-0,420945	1781,597123	1798,431881	1781,176179
661	0	-1223,887	-610,6381	8,357779132	-602,2803	20,7163	-0,203247	-2795,614148	-2774,897849	-2795,817395
661	0,7747	-76,94453	-39,0248	0,464654013	-38,56015	3,704325	-0,010539	-177,1481855	-173,4438607	-177,1587248
661	1,5494	1069,998	532,5885	-7,428471106	525,16	-13,30765	0,182169	2441,317777	2428,010128	2441,499946
662	0	-379,1772	-152,057	9,413217987	-142,6438	-30,39668	-0,144329	-778,2179485	-808,6146257	-778,3622773
662	0,4376	-34,27643	-14,67638	0,606574435	-14,06981	-0,104031	-0,009713	-72,69898305	-72,80301442	-72,70869597

662	0,8753	310,6243	122,7042	-8,200069118	114,5042	30,18861	0,124903	632,8199824	663,0085969	632,9448854
663	0	247,249	159,6526	6,923753583	166,5764	-41,98008	-0,06605	654,5763679	612,5962878	654,5103174
663	0,1796	24,56607	17,34899	0,70708227	18,05607	-2,548364	-0,005854	68,04803692	65,49967286	68,04218272
663	0,3591	-198,1168	-124,9546	-5,509589042	-130,4642	36,88335	0,054342	-518,480294	-481,5969421	-518,425952
664	0	-1010,68	-1071,157	-268,8772829	-1340,034	80,67447	0,575622	-3993,952248	-3913,277778	-3993,376626
664	2,2879	-17,48917	-21,9792	-5,299042349	-27,27824	2,184074	-0,001311	-77,2924035	-75,10832934	-77,29371458
664	4,5758	975,7012	1027,199	258,2791982	1285,478	-76,30632	-0,578244	3839,367441	3763,061119	3838,789197
665	0	-1259,976	-1013,111	-178,3073801	-1191,418	77,59632	0,430129	-4020,805272	-3943,208952	-4020,375143
665	1,7038	-43,91105	-37,6596	-7,173743577	-44,83335	5,699467	0,027141	-146,7510605	-141,0515933	-146,7239198
665	3,4076	1172,154	937,7917	163,9598929	1101,752	-66,19739	-0,375848	3727,303151	3661,105765	3726,927303
666	0	-1650,116	-878,9981	-23,4610627	-902,4591	58,51246	-0,112417	-3950,069646	-3891,557183	-3950,182064
666	1,1938	-77,43565	-42,11072	-2,957648771	-45,06837	5,282985	-0,000402	-190,8030748	-185,52009	-190,8034768
666	2,3875	1495,245	794,7766	17,54576515	812,3224	-47,94649	0,111613	3568,463497	3520,517004	3568,57511
670	0	1101,985	905,7612	193,9448601	1099,706	-44,20061	2,426955	3631,992575	3587,791967	3634,419531
670	2,9464	-61,62195	-69,27669	-15,77888203	-85,05558	19,91963	-0,092437	-250,2196849	-230,300057	-250,3121223
670	5,8929	-1225,229	-1044,315	-225,5026241	-1269,817	84,03986	-2,61183	-4132,431945	-4048,392081	-4135,043775
673	0	593,8801	741,1919	69,3846802	810,5765	-377,9575	1,392256	2393,197174	2015,239635	2394,58943
673	3,683	326,6817	397,7528	68,50781762	466,2606	-142,366	-2,031007	1357,207496	1214,841475	1355,17649
673	7,366	59,48332	54,3138	67,63095505	121,9448	93,2255	-5,45427	321,2178188	414,443315	315,7635493
676	0	-1045,727	-293,8419	35,68348629	-258,1584	-2,049117	0,874925	-1875,76176	-1877,810877	-1874,886834
676	2,0904	11,2831	0,439403	-1,977182627	-1,53778	-1,202947	-0,097872	11,59247223	10,3895253	11,49460046
676	4,1809	1068,293	294,7207	-39,63785154	255,0828	-0,356777	-1,070669	1898,946704	1898,589927	1897,876035
678	0	1249,187	483,0259	66,7992995	549,8252	-35,2821	-0,930983	2723,593589	2688,311488	2722,662606
678	1,0509	37,74541	14,30185	1,163035548	15,46489	-0,788161	-0,067744	79,99880076	79,21064021	79,93105719
678	2,1018	-1173,696	-454,4222	-64,4732284	-518,8954	33,70578	0,795496	-2563,595988	-2529,890208	-2562,800492
679	0	1105,894	397,7122	-1,275022139	396,4372	-14,57249	-2,107703	2230,53636	2215,963875	2228,428658
679	1,5044	8,325524	1,850295	-2,859247118	-1,008952	0,866342	-0,081458	8,805277576	9,671619266	8,723819867
679	3,0088	-1089,243	-394,0116	-4,443472098	-398,4551	16,30517	1,944787	-2212,925805	-2196,620636	-2210,981018
682	0	1227,932	520,6126	150,4849695	671,0976	-60,41829	-0,104761	2938,506821	2878,088532	2938,40206
682	0,7258	55,73494	23,7376	7,451118124	31,18872	-2,684888	-0,019599	134,832859	132,147971	134,8132604
682	1,4517	-1116,462	-473,1374	-135,5827333	-608,7202	55,04851	0,065564	-2668,841103	-2613,79259	-2668,775539
773	0	1482,544	720,3612	4,702582934	725,0638	17,51537	0,109893	3377,435402	3394,950768	3377,545294
773	1,1938	63,89287	29,68045	1,455861952	31,13631	0,980709	0,000258	145,3333429	146,314052	145,3336006
773	2,3875	-1354,759	-661,0003	-1,790859029	-662,7912	-15,55395	-0,109377	-3086,768716	-3102,322664	-3086,878093

TABEL MOMEN KOLOM TENGAH ARAH Y

FRAME	STA	MD	ML		ML TOT	ME		COMB1	COMB 2	COMB 3
			ML merata	ML Koef kejut		ME X	ME Y			
4	0	48,89875	0,1526956	-2,91863E-12	0,152696	3,08E-12	-2,6E-10	1,3MD + 2 (MQ+MP)	1,3MD + 2 (MQ+MP)+1MEX	1,3MD + 2 (MQ+MP)+1MEY
4	2,811	2,51238	-0,441351	9,29008E-13	-0,44135	-1,2E-12	-2,8E-11	63,8737707	63,8737707	63,8737707
4	5,622	-43,874	-1,035399	4,77664E-12	-1,0354	-5,5E-12	2,01E-10	2,383391141	2,383391141	2,383391141
43	0	48,29093	-0,082084	2,44035E-11	-0,08208	-1,7E-12	5,5E-10	-59,10698842	-59,10698842	-59,10698842
43	2,811	5,801396	-0,043481	4,34559E-12	-0,04348	-3,7E-13	-8,8E-11	62,61404055	62,61404055	62,61404055
43	5,622	-36,6881	-0,004878	-1,57123E-11	-0,00488	9,15E-13	-7,2E-10	7,454853047	7,454853047	7,454853047
543	0	388,1707	-0,089056	7,47712E-12	-0,08906	-5,1E-14	-6,5E-11	-47,70433446	-47,70433446	-47,70433446
543	5,5	-381,858	-0,052197	-4,86622E-12	-0,0522	1,13E-12	6,7E-11	504,443774	504,443774	504,443774
543	11	-1151,89	-0,015338	-1,72096E-11	-0,01534	2,31E-12	1,99E-10	-496,5199087	-496,5199087	-496,5199087
544	0	34,63655	-0,104472	3,24185E-12	-0,10447	-5,2E-15	2,09E-10	-1497,483591	-1497,483591	-1497,483591
544	3,683	-59,4283	-0,053942	1,06998E-11	-0,05394	-8,2E-13	-4,2E-10	44,81857022	44,81857022	44,81857022
544	7,366	-153,493	-0,003413	1,81577E-11	-0,00341	-1,6E-12	-1,1E-09	-77,36468622	-77,36468622	-77,36468622
551	0	-0,11332	-0,011584	-2,51889E-13	-0,01158	8,32E-14	1,6E-13	-199,5479427	-199,5479427	-199,5479427
551	0,17956	-0,13487	-0,003112	-2,65346E-13	-0,00311	8,69E-14	4,42E-14	-0,170481729	-0,170481729	-0,170481729
551	0,35913	-0,15643	0,0053595	-2,78804E-13	0,00536	9,05E-14	-7,2E-14	-0,18156008	-0,18156008	-0,18156008
555	0	0,136751	0,0414748	1,9627E-14	0,041475	1,43E-13	9,56E-14	-0,192638431	-0,192638431	-0,192638431
555	0,43763	0,267368	0,0760864	1,47896E-13	0,076086	2,7E-13	-4,4E-13	0,260725371	0,260725371	0,260725371
555	0,87525	0,397985	0,110698	2,76164E-13	0,110698	3,97E-13	-9,8E-13	0,499751225	0,499751225	0,499751225
560	0	-0,83879	0,0159203	-1,78411E-12	0,01592	4,93E-16	6,66E-12	0,738777079	0,738777079	0,738777079
560	1,70381	0,022952	0,0732323	5,39915E-13	0,073232	-2,8E-14	-2,4E-12	-1,058581549	-1,058581549	-1,058581549
560	3,40763	0,884691	0,1305443	2,86394E-12	0,130544	-5,6E-14	-1,1E-11	0,176302788	0,176302788	0,176302788
561	0	-0,06385	0,0020713	-2,90956E-12	0,002071	8,81E-14	2,47E-11	1,411187125	1,411187125	1,411187125
561	2,28788	0,034258	0,0487131	6,23132E-13	0,048713	-3E-14	-8E-13	-0,078860689	-0,078860689	-0,078860689
561	4,57575	0,132364	0,095355	4,15582E-12	0,095355	-1,5E-13	-2,6E-11	0,141961041	0,141961041	0,141961041
562	0	8,183996	0,0209156	-4,91369E-12	0,020916	2,76E-13	1,09E-10	0,362782771	0,362782771	0,362782771
562	2,94644	3,669156	-0,029934	1,3669E-13	-0,02993	2,63E-14	2,89E-11	10,68102537	10,68102537	10,68102537
562	5,89288	-0,84568	-0,080783	5,18707E-12	-0,08078	-2,2E-13	-5,1E-11	4,710036288	4,710036288	4,710036288
585	0	43,59872	-0,067372	-1,70739E-11	-0,06737	-1,3E-12	2,08E-12	-1,260952796	-1,260952796	-1,260952796
585	0,45128	3,65995	-0,044789	-9,7389E-12	-0,04479	-7,6E-13	-3,3E-12	56,54359444	56,54359444	56,54359444
585	0,90256	-36,2788	-0,022207	-2,40386E-12	-0,02221	-2E-13	-8,6E-12	4,668356618	4,668356618	4,668356618
586	0	-4,12807	0,0147043	5,05327E-13	0,014704	9,92E-14	1,42E-11	-47,20688121	-47,20688121	-47,20688121
586	0,50025	-5,62239	0,0381364	1,2662E-11	0,038136	1,19E-12	3,17E-12	-5,337079236	-5,337079236	-5,337079236
586	1,0005	-7,11671	0,0615684	2,48187E-11	0,061568	2,28E-12	-7,9E-12	-7,232831648	-7,232831648	-7,232831648
								-9,12858406	-9,12858406	-9,12858406

587	0	-11,443	0,0326866	-9,08752E-13	0,032687	-5,8E-14	2,55E-11	-14,81052731	-14,81052731
587	0,67222	-9,97919	0,0641575	2,04999E-11	0,064158	1,99E-12	1,1E-11	-12,84463069	-12,84463069
587	1,34444	-8,51538	0,0956284	4,19086E-11	0,095628	4,03E-12	-3,6E-12	-10,87873408	-10,87873408
588	0	8,216407	-0,086386	-3,02457E-11	-0,08639	-3,3E-12	7,54E-12	10,50855707	10,50855707
588	0,96769	11,18865	-0,053131	-1,08362E-11	-0,05313	-1,2E-12	-1,4E-11	14,43898899	14,43898899
588	1,93538	14,1609	-0,019875	8,5733E-12	-0,01988	8,65E-13	-3,7E-11	18,36942092	18,36942092
589	0	15,4912	-0,084757	-6,48847E-12	-0,08476	-1E-12	1,36E-12	19,96904554	19,96904554
589	1,38866	14,05489	-0,051089	-2,08641E-12	-0,05109	-3,3E-13	-1,4E-11	18,16917486	18,16917486
589	2,77731	12,61857	-0,01742	2,31565E-12	-0,01742	3,33E-13	-3E-11	16,36930417	16,36930417
590	0	31,91891	-0,082439	1,07718E-11	-0,08244	7,19E-13	-7,9E-12	41,32969973	41,32969973
590	1,93663	16,72286	-0,049123	1,02045E-12	-0,04912	1,17E-14	-1,4E-11	21,64147757	21,64147757
590	3,87325	1,526821	-0,015806	-8,73087E-12	-0,01581	-7E-13	-2E-11	1,953255398	1,953255398
591	0	64,20887	-0,080061	2,11939E-11	-0,08006	1,64E-12	-2,1E-11	83,31140441	83,31140441
591	2,61659	17,71951	-0,046749	1,30476E-12	-0,04675	4,66E-14	-1,3E-11	22,94186774	22,94186774
591	5,23319	-28,7698	-0,013437	-1,85843E-11	-0,01344	-1,5E-12	-5,6E-12	-37,42766894	-37,42766894
596	0	119,1722	-0,077551	2,37967E-11	-0,07755	1,71E-12	-3,8E-11	154,7687177	154,7687177
596	3,43206	11,05429	-0,043676	6,38821E-13	-0,04368	6,49E-15	-1E-11	14,28322457	14,28322457
596	6,86413	-97,0636	-0,009802	-2,25191E-11	-0,0098	-1,7E-12	1,73E-11	-126,2022686	-126,2022686
597	0	192,4109	-0,072787	1,53797E-11	-0,07279	7,82E-13	-5E-11	249,9886414	249,9886414
597	4,39053	-30,6237	-0,038888	-4,74243E-13	-0,03889	6,91E-14	4,05E-13	-39,88862557	-39,88862557
597	8,78106	-253,658	-0,00499	-1,63282E-11	-0,00499	-6,4E-13	5,1E-11	-329,7658926	-329,7658926
601	0	23,54511	-0,066953	1,51131E-11	-0,06695	1,37E-12	1,25E-11	30,47473833	30,47473833
601	1,05088	21,28271	-0,04118	4,79916E-12	-0,04118	3,79E-13	9,63E-14	27,58516273	27,58516273
601	2,10175	19,02031	-0,015406	-5,51479E-12	-0,01541	-6,1E-13	-1,2E-11	24,69558714	24,69558714
602	0	20,80907	-0,092122	4,53701E-12	-0,09212	7,99E-13	-3,9E-12	26,86754278	26,86754278
602	0,72584	19,02082	-0,060859	3,83826E-12	-0,06086	5,02E-13	-5,2E-12	24,60534744	24,60534744
602	1,45169	17,23257	-0,029596	3,13951E-12	-0,0296	2,05E-13	-6,5E-12	22,3431521	22,3431521
605	0	-5,00819	0,0126511	-2,91336E-12	0,012651	-2,3E-13	2,52E-12	-6,485343553	-6,485343553
605	0,52481	-7,72695	0,0369577	1,91888E-12	0,036958	3,5E-14	2,44E-12	-9,97111666	-9,97111666
605	1,04963	-10,4457	0,0612643	6,75111E-12	0,061264	3,04E-13	2,37E-12	-13,45688977	-13,45688977
606	0	56,41413	0,0136043	1,35048E-11	0,013604	1,58E-13	1,94E-10	73,36558046	73,36558046
606	2,09044	-12,3011	0,0392714	-2,88615E-12	0,039271	-4,8E-14	-1,1E-11	-15,91294113	-15,91294113
606	4,18088	-81,0164	0,0649384	-1,92771E-11	0,064938	-2,5E-13	-2,2E-10	-105,1914627	-105,1914627
607	0	-3,3339	0,0153286	1,09631E-11	0,015329	7,47E-13	3,05E-11	-4,303414639	-4,303414639
607	1,50441	-21,6256	0,0453581	-4,57962E-12	0,045358	-8,3E-14	-1,2E-11	-28,02261406	-28,02261406
607	3,00881	-39,9174	0,0753875	-2,01224E-11	0,075388	-9,1E-13	-5,4E-11	-51,74181348	-51,74181348
613	0	-0,25528	0,0276348	-3,65757E-13	0,027635	-6,1E-14	7,37E-13	-0,27659734	-0,27659734

613	0,77469	0,294499	0,0801372	4,06221E-13	0,080137	1,15E-13	-8,1E-13	0,543122826	0,543122826	0,543122826
613	1,54938	0,84428	0,1326397	1,1782E-12	0,13264	2,9E-13	-2,4E-12	1,362842993	1,362842993	1,362842993
641	0	201,5351	-0,074796	3,73588E-12	-0,0748	1,5E-13	-2,4E-11	261,8460399	261,8460399	261,8460399
641	4,39053	-29,2352	-0,03915	-4,94306E-13	-0,03915	1,11E-13	5,3E-12	-38,08411267	-38,08411267	-38,08411267
641	8,78106	-260,006	-0,003504	-4,72449E-12	-0,0035	7,18E-14	3,49E-11	-338,0142652	-338,0142652	-338,0142652
642	0	103,3269	0,0076278	4,35547E-12	0,007628	6,14E-13	-1,2E-11	134,3402415	134,3402415	134,3402415
642	3,43206	-13,2761	0,0439917	-3,18201E-13	0,043992	-6,1E-14	1E-12	-17,17097068	-17,17097068	-17,17097068
642	6,86413	-129,879	0,0803555	-4,99187E-12	0,080356	-7,3E-13	1,44E-11	-168,6821828	-168,6821828	-168,6821828
643	0	73,27284	-0,082943	5,17313E-12	-0,08294	1,04E-12	-7,5E-12	95,08880029	95,08880029	95,08880029
643	2,61659	20,54074	-0,047135	6,87628E-13	-0,04713	8,78E-14	-1,7E-12	26,60869289	26,60869289	26,60869289
643	5,23319	-32,1914	-0,011327	-3,79787E-12	-0,01133	-8,7E-13	4,1E-12	-41,87141452	-41,87141452	-41,87141452
644	0	38,23555	-0,084932	4,19857E-12	-0,08493	1,15E-12	-3,9E-12	49,53634608	49,53634608	49,53634608
644	1,93663	19,86959	-0,049554	7,49788E-13	-0,04955	1,68E-13	-1,5E-12	25,7313543	25,7313543	25,7313543
644	3,87325	1,503627	-0,014176	-2,69899E-12	-0,01418	-8,1E-13	9,33E-13	1,926362521	1,926362521	1,926362521
648	0	-15,0609	0,0162953	1,57756E-12	0,016295	5,94E-13	4,01E-13	-19,54656381	-19,54656381	-19,54656381
648	1,38866	-17,4887	0,0515879	-6,90698E-13	0,051588	-2,7E-13	1,24E-12	-22,63211005	-22,63211005	-22,63211005
648	2,77731	-19,9165	0,0868805	-2,95895E-12	0,086881	-1,1E-12	2,08E-12	-25,71765629	-25,71765629	-25,71765629
649	0	13,04878	-0,088419	1,97488E-12	-0,08842	1,05E-12	-1,8E-12	16,78657359	16,78657359	16,78657359
649	0,96769	15,6722	-0,053767	6,37188E-13	-0,05377	3,57E-13	-8,5E-13	20,26633254	20,26633254	20,26633254
649	1,93538	18,29563	-0,019115	-7,00499E-13	-0,01911	-3,3E-13	6,45E-14	23,74609149	23,74609149	23,74609149
652	0	49,39563	-0,06216	1,11329E-13	-0,06216	1,76E-13	-7,5E-13	64,09000145	64,09000145	64,09000145
652	0,50025	2,361933	-0,038157	1,35014E-13	-0,03816	1,55E-13	-3,4E-13	2,994198398	2,994198398	2,994198398
652	1,0005	-44,6718	-0,014154	1,58698E-13	-0,01415	1,34E-13	7,11E-14	-58,10160466	-58,10160466	-58,10160466
653	0	-6,76314	0,021953	-1,3813E-13	0,021953	-1,2E-14	1,7E-13	-8,74817342	-8,74817342	-8,74817342
653	0,45128	-6,69865	0,0449666	-1,94735E-13	0,044967	6,5E-14	3,78E-13	-8,618309704	-8,618309704	-8,618309704
653	0,90256	-6,63416	0,0679803	-2,51341E-13	0,06798	1,42E-13	5,86E-13	-8,488445988	-8,488445988	-8,488445988
654	0	-5,56529	0,0120298	1,20793E-13	0,01203	2,99E-14	1,88E-13	-7,210812433	-7,210812433	-7,210812433
654	0,52481	-5,06825	0,036819	-2,62264E-15	0,036819	2,91E-13	3,78E-13	-6,515082146	-6,515082146	-6,515082146
654	1,04963	-4,57121	0,0616083	-1,26038E-13	0,061608	5,52E-13	5,68E-13	-5,819351859	-5,819351859	-5,819351859
655	0	-10,4032	0,032158	-5,21996E-14	0,032158	-1,8E-13	4,01E-13	-13,45979359	-13,45979359	-13,45979359
655	0,67472	-14,8366	0,0647963	-4,51323E-13	0,064796	-5E-13	8,59E-13	-19,15794207	-19,15794207	-19,15794207
655	1,34944	-19,27	0,0974345	-8,50446E-13	0,097435	-8,2E-13	1,32E-12	-24,85609056	-24,85609056	-24,85609056
661	0	-18,5773	0,0193052	5,16159E-14	0,019305	2,67E-13	-2,5E-13	-24,11191684	-24,11191684	-24,11191684
661	0,77469	-25,2536	0,0785156	-3,17566E-13	0,078516	-1E-12	4,61E-13	-32,67258573	-32,67258573	-32,67258573
661	1,54938	-31,9298	0,1377261	-6,86748E-13	0,137726	-2,3E-12	1,17E-12	-41,23325462	-41,23325462	-41,23325462
662	0	-24,7137	0,0325981	-7,47193E-14	0,032598	-1,1E-12	6,95E-14	-32,06257965	-32,06257965	-32,06257965
662	0,43763	-23,184	0,0800996	-5,79641E-14	0,0801	-1,7E-12	3,35E-13	-29,97906208	-29,97906208	-29,97906208

662	0,87525	-21,6544	0,1276012	-4,12088E-14	0,127601	-2,2E-12	6E-13	-27,89554451	-27,89554451	-27,89554451
663	0	-12,6866	0,0643223	7,15694E-14	0,064322	-4,9E-13	2,5E-14	-16,3639882	-16,3639882	-16,3639882
663	0,17956	-12,3953	0,0805764	1,13803E-13	0,080576	-3,3E-13	1,02E-13	-15,95269865	-15,95269865	-15,95269865
663	0,35913	-12,1039	0,0968305	1,56036E-13	0,096831	-1,7E-13	1,79E-13	-15,54140909	-15,54140909	-15,54140909
664	0	46,90603	0,0097752	1,22774E-12	0,009775	1,15E-12	-9E-12	60,99739499	60,99739499	60,99739499
664	2,28788	-17,0343	0,0190646	-2,56165E-13	0,019065	-1,9E-13	4,85E-13	-22,10650801	-22,10650801	-22,10650801
664	4,57575	-80,9747	0,0283539	-1,74007E-12	0,028354	-1,5E-12	1E-11	-105,210411	-105,210411	-105,210411
665	0	10,58235	0,0098615	8,093E-13	0,009862	1,16E-12	-2,1E-12	13,77678178	13,77678178	13,77678178
665	1,70381	-23,7866	0,0638339	-3,60104E-13	0,063834	-3,7E-13	1,09E-12	-30,79486151	-30,79486151	-30,79486151
665	3,40763	-58,1555	0,1178063	-1,52951E-12	0,117806	-1,9E-12	4,33E-12	-75,36650481	-75,36650481	-75,36650481
666	0	-9,49634	0,0182378	4,48327E-13	0,018238	8,15E-13	-4,2E-13	-12,30876472	-12,30876472	-12,30876472
666	1,19375	-25,529	0,0771518	-2,3589E-13	0,077152	-7,7E-13	7,25E-13	-33,03337481	-33,03337481	-33,03337481
666	2,3875	-41,5616	0,1360658	-9,20106E-13	0,136066	-2,4E-12	1,87E-12	-53,7579849	-53,7579849	-53,7579849
670	0	94,08562	-0,112978	1,83225E-12	-0,11298	7,63E-13	-1,9E-11	122,0853474	122,0853474	122,0853474
670	2,94644	-3,4507	-0,05166	5,74684E-14	-0,05166	3,5E-13	1,07E-11	-4,589226909	-4,589226909	-4,589226909
670	5,89288	-100,987	0,0096583	-1,71731E-12	0,009658	-6,3E-14	4,05E-11	-131,2638012	-131,2638012	-131,2638012
673	0	416,8814	-0,022354	5,845E-12	-0,02235	-8,9E-12	-4E-10	541,901135	541,901135	541,901135
673	3,683	158,8436	0,0285181	2,91561E-12	0,028518	-4,1E-12	-1,6E-10	206,5537065	206,5537065	206,5537065
673	7,366	-99,1942	0,0793903	-1,3774E-14	0,07939	6,91E-13	7,97E-11	-128,7937219	-128,7937219	-128,7937219
676	0	68,92848	-0,030335	-1,70952E-12	-0,03033	4,01E-13	-9,2E-11	89,54634793	89,54634793	89,54634793
676	2,09044	8,789386	-0,000147	-3,41111E-13	-0,00015	-5,4E-13	-6,2E-12	11,4259077	11,4259077	11,4259077
676	4,18088	-51,3497	0,0300412	1,02729E-12	0,030041	-1,5E-12	7,97E-11	-66,69453253	-66,69453253	-66,69453253
678	0	-18,6584	0,0186787	-8,92451E-13	0,018679	-9,5E-13	-4,8E-13	-24,21855016	-24,21855016	-24,21855016
678	1,05088	-16,8028	0,0521437	1,26986E-13	0,052144	5,71E-13	4,37E-12	-21,73931266	-21,73931266	-21,73931266
678	2,10175	-14,9471	0,0856088	1,14642E-12	0,085609	2,09E-12	9,22E-12	-19,26007516	-19,26007516	-19,26007516
679	0	-6,12692	0,0106182	-1,31159E-12	0,010618	-9,4E-13	-9,6E-12	-7,943764722	-7,943764722	-7,943764722
679	1,50441	-17,7016	0,0433269	3,35351E-13	0,043327	3,14E-13	8,52E-12	-22,92539257	-22,92539257	-22,92539257
679	3,00881	-29,2762	0,0760355	1,98229E-12	0,076036	1,56E-12	2,66E-11	-37,90702042	-37,90702042	-37,90702042
682	0	-11,9052	0,0303486	-1,31178E-13	0,030349	-1,2E-13	4,16E-13	-15,41604675	-15,41604675	-15,41604675
682	0,72584	-13,1188	0,0635593	8,97739E-14	0,063559	8,23E-13	1,69E-12	-16,92727391	-16,92727391	-16,92727391
682	1,45169	-14,3323	0,0967701	3,10726E-13	0,09677	1,76E-12	2,97E-12	-18,43850106	-18,43850106	-18,43850106
773	0	-0,64421	0,0220321	-1,0101E-12	0,022032	-5,8E-14	1,85E-12	-0,793406256	-0,793406256	-0,793406256
773	1,19375	0,192253	0,0768796	4,77099E-13	0,07688	1,04E-14	-1,5E-12	0,40368797	0,40368797	0,40368797
773	2,3875	1,028714	0,1317271	1,96429E-12	0,131727	7,87E-14	-4,9E-12	1,600782195	1,600782195	1,600782195

MOMEN RENCANA KOLOM TENGAH ARAH X

Kolom	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673
Bawah Mux	654,04	818,41	2795,61	3394,95	3337,64	3297,43	3434,25	2393,19
Atas Mux	518,48	702,88	2441,31	3102,32	3134,1	3182,3	3204,46	321,21
Mu x Pakai	518,48	702,88	2441,31	3102,32	3134,1	3182,3	3204,46	321,21

Kolom	43 dan 4	606 dan 678	607 dan 679	601 dan 678	602 dan 682	605 dan 654	585 dan 653	586 dan 652
Bawah Mux	1474,45	2072,36	2286,16	2723,59	2938,5	1442,95	564,7	742,65
Atas Mux	1286,36	2052,75	2243,11	2563,59	2668,84	1381,39	530,83	714,01
Mu x Pakai	1286,36	2052,75	2243,11	2563,59	2668,84	1381,39	530,83	714,01

Kolom	587 dan 655	588 dan 649	589 dan 648	590 dan 644	591 dan 642	596 dan 642	597 dan 641	543
Bawah Mux	2233,84	2352,03	2635,71	2354,43	1867,88	1831,46	1420,51	37,98
Atas Mux	1989,99	2585,91	2467,44	2442,27	1865,74	1862,25	1410,81	345,23
Mu x Pakai	1989,99	2585,91	2467,44	2442,27	1865,74	1862,25	1410,81	345,23

MOMEN RENCANA KOLOM TENGAH ARAH Y

Kolom	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673
Bawah Muy	16,36	32,06	24,11	12,3	13,77	60,99	122,08	541,9
Atas Muy	15,54	27,89	41,23	33,03	75,36	105,21	131,26	128,79
Mu y Pakai	15,54	27,89	41,23	33,03	75,36	105,21	131,26	128,79

Kolom	43 dan 4	606 dan 676	607 dan 679	601 dan 678	602 dan 682	605 dan 654	585 dan 653	586 dan 652
Bawah Muy	62,61	73,36	4,3	30,47	26,86	6,48	56,54	64,09
Atas Muy	47,7	105,19	51,74	24,69	22,34	13,45	47,2	58,1
Mu y Pakai	47,7	73,36	51,74	24,69	22,34	13,45	47,2	58,1

Kolom	587 dan 655	588 dan 649	589 dan 648	590 dan 644	591 dan 642	596 dan 642	597 dan 641	543
Bawah Muy	13,45	16,78	19,54	49,53	95,08	154,76	261,84	504,44
Atas Muy	24,85	23,74	25,71	1092	41,87	126,2	338,01	1497,48
Mu y Pakai	13,45	16,78	19,54	49,53	41,87	126,2	261,84	504,44

LAMPIRAN

OUTPUT SAP :

GAYA GESER BALOK INDUK TEPI

GAYA GESER INDUK TENGAH

GAYA GESER BALOK ANAK

GAYA GESER BALOK LINTANG

GAYA GESER BALOK LENGKUNG TEPI

GAYA GESER BALOK LENGKUNG TENGAH

GAYA GESER KOLOM TEPI

GAYA GESER KOLOM TENGAH

TABEL GAYA GESER BALOK INDUK TEPI

FRAME	STA	VD	VL		VL TOT	VE
			VL merata	VL.Koef kejut		
124	0	40,41009	59,92033	0,362706816	60,28304	-2,73371
124	2,501127	110,9526	59,92033	0,362706816	60,28304	-2,73371
124	5,002253	181,4951	59,92033	0,362706816	60,28304	-2,73371
134	0	-285,956	-103,31	1,044055028	-102,266	0,065875
134	2,501127	-215,413	-103,31	1,044055028	-102,266	0,065875
134	5,002253	-144,871	-103,31	1,044055028	-102,266	0,065875
135	0	-214,377	-65,0216	1,193290768	-63,8283	-0,55757
135	2,501127	-143,835	-65,0216	1,193290768	-63,8283	-0,55757
135	5,002253	-73,2924	-65,0216	1,193290768	-63,8283	-0,55757
136	0	-103,211	-8,70161	0,997601059	-7,70401	-1,85234
136	2,501127	-32,6685	-8,70161	0,997601059	-7,70401	-1,85234
136	5,002253	37,87397	-8,70161	0,997601059	-7,70401	-1,85234
146	0	-240,833	-139,667	-21,5468804	-161,214	-1,73213
146	2,501127	-170,291	-139,667	-21,5468804	-161,214	-1,73213
146	5,002253	-99,748	-139,667	-21,5468804	-161,214	-1,73213
147	0	-188,835	-161,946	-33,6125137	-195,558	0,369976
147	2,501127	-118,293	-161,946	-33,6125137	-195,558	0,369976
147	5,002253	-47,7502	-161,946	-33,6125137	-195,558	0,369976
148	0	-112,892	-144,727	-36,23851951	-180,965	0,231451
148	2,501127	-42,3497	-144,727	-36,23851951	-180,965	0,231451
148	5,002253	28,19278	-144,727	-36,23851951	-180,965	0,231451
149	0	-327,635	-126,791	-4,777911961	-131,568	0,259446
149	2,501127	-257,093	-126,791	-4,777911961	-131,568	0,259446
149	5,002253	-186,55	-126,791	-4,777911961	-131,568	0,259446
247	0	-98,7483	-10,47	-15,49729708	-25,9673	0,732056
247	2,501124	-28,2058	-10,47	-15,49729708	-25,9673	0,732056
247	5,002248	42,33671	-10,47	-15,49729708	-25,9673	0,732056
248	0	-0,18858	32,80813	20,09447131	52,9026	-0,77455
248	2,501124	70,35392	32,80813	20,09447131	52,9026	-0,77455
248	5,002248	140,8964	32,80813	20,09447131	52,9026	-0,77455
272	0	-196,475	-50,4045	-20,83834152	-71,2428	2,025596
272	2,501124	-125,932	-50,4045	-20,83834152	-71,2428	2,025596
272	5,002248	-55,3897	-50,4045	-20,83834152	-71,2428	2,025596
289	0	-229,633	-68,484	5,185188201	-63,2988	2,134266
289	2,501124	-159,09	-68,484	5,185188201	-63,2988	2,134266
289	5,002248	-88,548	-68,484	5,185188201	-63,2988	2,134266
290	0	-251,356	-75,4063	-0,197290385	-75,6036	2,391416
290	2,501124	-180,814	-75,4063	-0,197290385	-75,6036	2,391416
290	5,002248	-110,271	-75,4063	-0,197290385	-75,6036	2,391416
291	0	-260,264	-77,9258	-6,822627888	-84,7484	2,585532
291	2,501124	-189,722	-77,9258	-6,822627888	-84,7484	2,585532
291	5,002248	-119,179	-77,9258	-6,822627888	-84,7484	2,585532
292	0	-247,831	-72,15	-14,48553016	-86,6355	2,550496
292	2,501124	-177,289	-72,15	-14,48553016	-86,6355	2,550496
292	5,002248	-106,746	-72,15	-14,48553016	-86,6355	2,550496
297	0	-133,109	-48,3854	9,792320385	-38,5931	5,816832
297	2,501124	-62,567	-48,3854	9,792320385	-38,5931	5,816832
297	5,002248	7,975536	-48,3854	9,792320385	-38,5931	5,816832
298	0	-157,567	-47,4745	13,1281898	-34,3464	0,997077
298	2,501124	-87,024	-47,4745	13,1281898	-34,3464	0,997077
298	5,002248	-16,4815	-47,4745	13,1281898	-34,3464	0,997077
299	0	-201,18	-60,1749	9,469988861	-50,7049	2,000337

299	2,501124	-130,637	-60,1749	9,469988861	-50,7049	2,000337
299	5,002248	-60,0949	-60,1749	9,469988861	-50,7049	2,000337
304	0	82,47812	65,61485	23,86870385	89,48355	-1,92757
304	2,501124	153,0206	65,61485	23,86870385	89,48355	-1,92757
304	5,002248	223,5631	65,61485	23,86870385	89,48355	-1,92757
305	0	113,9749	77,42229	15,41023153	92,83252	-2,23038
305	2,501124	184,5174	77,42229	15,41023153	92,83252	-2,23038
305	5,002248	255,0599	77,42229	15,41023153	92,83252	-2,23038
313	0	109,2943	75,28962	6,064890516	81,35451	-2,14765
313	2,501124	179,8368	75,28962	6,064890516	81,35451	-2,14765
313	5,002248	250,3793	75,28962	6,064890516	81,35451	-2,14765
314	0	82,57529	67,46942	-2,088593843	65,38083	-1,98309
314	2,501124	153,1178	67,46942	-2,088593843	65,38083	-1,98309
314	5,002248	223,6603	67,46942	-2,088593843	65,38083	-1,98309
318	0	84,37251	51,26576	-6,782153761	44,48361	-1,53
318	2,501124	154,915	51,26576	-6,782153761	44,48361	-1,53
318	5,002248	225,4575	51,26576	-6,782153761	44,48361	-1,53
319	0	-5,812	66,12527	-6,841896278	59,28337	-3,3675
319	2,501124	64,7305	66,12527	-6,841896278	59,28337	-3,3675
319	5,002248	135,273	66,12527	-6,841896278	59,28337	-3,3675
380	0	-133,925	-49,5845	9,648584583	-39,936	6,403562
380	2,501124	-63,3829	-49,5845	9,648584583	-39,936	6,403562
380	5,002248	7,159566	-49,5845	9,648584583	-39,936	6,403562
381	0	-186,852	-70,135	10,45886916	-59,6761	11,76919
381	2,501124	-116,31	-70,135	10,45886916	-59,6761	11,76919
381	5,002248	-45,7672	-70,135	10,45886916	-59,6761	11,76919
382	0	-222,75	-77,0682	7,477098159	-69,5911	10,05941
382	2,501124	-152,208	-77,0682	7,477098159	-69,5911	10,05941
382	5,002248	-81,6652	-77,0682	7,477098159	-69,5911	10,05941
394	0	-248,229	-83,1427	3,455798726	-79,6869	9,130116
394	2,501124	-177,687	-83,1427	3,455798726	-79,6869	9,130116
394	5,002248	-107,144	-83,1427	3,455798726	-79,6869	9,130116
395	0	-264,203	-85,8864	-1,432369044	-87,3188	7,391694
395	2,501124	-193,661	-85,8864	-1,432369044	-87,3188	7,391694
395	5,002248	-123,118	-85,8864	-1,432369044	-87,3188	7,391694
396	0	-265,071	-82,5427	-7,363442067	-89,9062	4,777319
396	2,501124	-194,528	-82,5427	-7,363442067	-89,9062	4,777319
396	5,002248	-123,986	-82,5427	-7,363442067	-89,9062	4,777319
407	0	-78,8041	9,728188	-13,126129	-3,39794	-8,86981
407	2,501124	-8,26156	9,728188	-13,126129	-3,39794	-8,86981
407	5,002248	62,28094	9,728188	-13,126129	-3,39794	-8,86981
408	0	29,16437	53,64959	22,53063374	76,18023	-10,6107
408	2,501124	99,70687	53,64959	22,53063374	76,18023	-10,6107
408	5,002248	170,2494	53,64959	22,53063374	76,18023	-10,6107
418	0	-242,765	-68,7373	-14,10385884	-82,8411	0,703546
418	2,501124	-172,222	-68,7373	-14,10385884	-82,8411	0,703546
418	5,002248	-101,68	-68,7373	-14,10385884	-82,8411	0,703546
419	0	-176,537	-36,6711	-19,21037609	-55,8814	-4,38976
419	2,501124	-105,994	-36,6711	-19,21037609	-55,8814	-4,38976
419	5,002248	-35,4517	-36,6711	-19,21037609	-55,8814	-4,38976
433	0	-226,378	-77,4231	-0,254212762	-77,6773	5,20384
433	2,501127	-155,836	-77,4231	-0,254212762	-77,6773	5,20384
433	5,002253	-85,2933	-77,4231	-0,254212762	-77,6773	5,20384
434	0	-92,6374	-4,48745	1,499214429	-2,98824	-3,92036
434	2,501127	-22,0949	-4,48745	1,499214429	-2,98824	-3,92036

434	5,002253	48,44757	-4,48745	1,499214429	-2,98824	-3,92036
435	0	79,46051	84,73788	3,257312975	87,99519	-14,2372
435	2,501127	150,003	84,73788	3,257312975	87,99519	-14,2372
435	5,002253	220,5455	84,73788	3,257312975	87,99519	-14,2372
449	0	-152,419	-179,037	-40,277303	-219,315	16,51266
449	2,501127	-81,876	-179,037	-40,277303	-219,315	16,51266
449	5,002253	-11,3335	-179,037	-40,277303	-219,315	16,51266
450	0	-365,788	-158,788	-8,538475703	-167,327	15,38193
450	2,501127	-295,245	-158,788	-8,538475703	-167,327	15,38193
450	5,002253	-224,703	-158,788	-8,538475703	-167,327	15,38193
451	0	-313,11	-126,917	-1,727342206	-128,644	11,19188
451	2,501127	-242,568	-126,917	-1,727342206	-128,644	11,19188
451	5,002253	-172,025	-126,917	-1,727342206	-128,644	11,19188
454	0	-220,46	-136,295	-21,16344789	-157,459	-3,18079
454	2,501127	-149,917	-136,295	-21,16344789	-157,459	-3,18079
454	5,002253	-79,3745	-136,295	-21,16344789	-157,459	-3,18079
455	0	-238,926	-205,821	-38,76112446	-244,582	21,03489
455	2,501127	-168,383	-205,821	-38,76112446	-244,582	21,03489
455	5,002253	-97,8409	-205,821	-38,76112446	-244,582	21,03489
459	0	62,3262	32,48349	-9,040875767	23,44262	7,798792
459	2,501124	132,8687	32,48349	-9,040875767	23,44262	7,798792
459	5,002248	203,4112	32,48349	-9,040875767	23,44262	7,798792
460	0	35,68452	92,76318	-3,805191662	88,95799	-15,1614
460	2,501124	106,227	92,76318	-3,805191662	88,95799	-15,1614
460	5,002248	176,7695	92,76318	-3,805191662	88,95799	-15,1614
470	0	111,1051	73,3754	5,790721327	79,16612	-0,80749
470	2,501124	181,6476	73,3754	5,790721327	79,16612	-0,80749
470	5,002248	252,1901	73,3754	5,790721327	79,16612	-0,80749
471	0	77,64613	60,63325	-2,945577665	57,68767	1,746558
471	2,501124	148,1886	60,63325	-2,945577665	57,68767	1,746558
471	5,002248	218,7311	60,63325	-2,945577665	57,68767	1,746558
474	0	106,4421	81,07233	25,66182731	106,7342	-9,07888
474	2,501124	176,9846	81,07233	25,66182731	106,7342	-9,07888
474	5,002248	247,5271	81,07233	25,66182731	106,7342	-9,07888
475	0	126,547	83,63393	16,10637485	99,7403	-4,86957
475	2,501124	197,0895	83,63393	16,10637485	99,7403	-4,86957
475	5,002248	267,632	83,63393	16,10637485	99,7403	-4,86957

TABEL GAYA GESER BALOK INDUK TENGAH

FRAME	STA	VD	VL		VL TOT	VE
			VL merata	VL.Koef kejut		
550	0	77,525	80,38932	-0,182141701	80,20718	-3,52115
550	2,501127	150,9125	80,38932	-0,182141701	80,20718	-3,52115
550	5,002253	224,3	80,38932	-0,182141701	80,20718	-3,52115
552	0	-336,48	-124,572	4,520200039	-120,051	-2,64669
552	2,501127	-263,093	-124,572	4,520200039	-120,051	-2,64669
552	5,002253	-189,705	-124,572	4,520200039	-120,051	-2,64669
553	0	-259,839	-86,9601	2,324737878	-84,6353	-3,119
553	2,501127	-186,451	-86,9601	2,324737878	-84,6353	-3,119
553	5,002253	-113,064	-86,9601	2,324737878	-84,6353	-3,119
554	0	-124,92	-20,9475	0,874656949	-20,0729	-4,17595
554	2,501127	-51,5323	-20,9475	0,874656949	-20,0729	-4,17595
554	5,002253	21,85515	-20,9475	0,874656949	-20,0729	-4,17595
556	0	-309,467	-153,16	-29,67781304	-182,838	-4,43635
556	2,501127	-236,079	-153,16	-29,67781304	-182,838	-4,43635
556	5,002253	-162,692	-153,16	-29,67781304	-182,838	-4,43635
557	0	-257,198	-174,5	-45,35480677	-219,855	-1,67833
557	2,501127	-183,811	-174,5	-45,35480677	-219,855	-1,67833
557	5,002253	-110,423	-174,5	-45,35480677	-219,855	-1,67833
558	0	-173,499	-158,061	-50,98013423	-209,041	-2,37136
558	2,501127	-100,111	-158,061	-50,98013423	-209,041	-2,37136
558	5,002253	-26,7233	-158,061	-50,98013423	-209,041	-2,37136
559	0	-373,588	-143,275	-3,118242991	-146,394	-2,47423
559	2,501127	-300,201	-143,275	-3,118242991	-146,394	-2,47423
559	5,002253	-226,813	-143,275	-3,118242991	-146,394	-2,47423
580	0	-111,578	-12,6095	-23,68854298	-36,2981	0,475215
580	2,501124	-38,1909	-12,6095	-23,68854298	-36,2981	0,475215
580	5,002248	35,19662	-12,6095	-23,68854298	-36,2981	0,475215
581	0	14,38991	35,42679	28,95080385	64,3776	-1,36527
581	2,501124	87,77741	35,42679	28,95080385	64,3776	-1,36527
581	5,002248	161,1649	35,42679	28,95080385	64,3776	-1,36527
584	0	-230,133	-58,3033	-28,54780112	-86,8511	2,106454
584	2,501124	-156,746	-58,3033	-28,54780112	-86,8511	2,106454
584	5,002248	-83,3585	-58,3033	-28,54780112	-86,8511	2,106454
592	0	-269,922	-72,821	7,346722942	-65,4742	2,7089
592	2,501124	-196,534	-72,821	7,346722942	-65,4742	2,7089
592	5,002248	-123,147	-72,821	7,346722942	-65,4742	2,7089
593	0	-290,479	-81,535	1,703047207	-79,832	2,942021
593	2,501124	-217,092	-81,535	1,703047207	-79,832	2,942021
593	5,002248	-143,704	-81,535	1,703047207	-79,832	2,942021
594	0	-301,514	-86,2824	-6,132787585	-92,4152	3,07818
594	2,501124	-228,127	-86,2824	-6,132787585	-92,4152	3,07818
594	5,002248	-154,739	-86,2824	-6,132787585	-92,4152	3,07818
595	0	-289,563	-81,7247	-17,00725874	-98,732	2,908674
595	2,501124	-216,176	-81,7247	-17,00725874	-98,732	2,908674
595	5,002248	-142,788	-81,7247	-17,00725874	-98,732	2,908674
598	0	-221,858	-52,7874	8,860408639	-43,927	6,530635
598	2,501124	-148,471	-52,7874	8,860408639	-43,927	6,530635
598	5,002248	-75,0834	-52,7874	8,860408639	-43,927	6,530635
599	0	-223,489	-50,7616	15,7479075	-35,0137	1,555838
599	2,501124	-150,102	-50,7616	15,7479075	-35,0137	1,555838
599	5,002248	-76,714	-50,7616	15,7479075	-35,0137	1,555838
600	0	-249,098	-63,6724	11,76839752	-51,904	2,581032

659	5,002253	26,64831	-16,2734	1,410885979	-14,8625	-6,26896
660	0	102,5251	103,7671	2,613777634	106,3809	-15,026
660	2,501127	175,9126	103,7671	2,613777634	106,3809	-15,026
660	5,002253	249,3001	103,7671	2,613777634	106,3809	-15,026
667	0	-210,056	-193,054	-55,08722977	-248,142	14,11033
667	2,501127	-136,668	-193,054	-55,08722977	-248,142	14,11033
667	5,002253	-63,2807	-193,054	-55,08722977	-248,142	14,11033
668	0	-408,056	-176,103	-6,984041174	-183,088	13,10724
668	2,501127	-334,668	-176,103	-6,984041174	-183,088	13,10724
668	5,002253	-261,281	-176,103	-6,984041174	-183,088	13,10724
669	0	-361,829	-148,649	1,679533687	-146,97	8,828648
669	2,501127	-288,442	-148,649	1,679533687	-146,97	8,828648
669	5,002253	-215,054	-148,649	1,679533687	-146,97	8,828648
671	0	-305,867	-150,381	-29,29514522	-179,676	-6,24824
671	2,501127	-232,479	-150,381	-29,29514522	-179,676	-6,24824
671	5,002253	-159,092	-150,381	-29,29514522	-179,676	-6,24824
672	0	-303,34	-218,315	-50,52419963	-268,839	19,25037
672	2,501127	-229,952	-218,315	-50,52419963	-268,839	19,25037
672	5,002253	-156,565	-218,315	-50,52419963	-268,839	19,25037
674	0	154,8017	36,41037	-9,919007478	26,49136	5,895406
674	2,501124	228,1892	36,41037	-9,919007478	26,49136	5,895406
674	5,002248	301,5767	36,41037	-9,919007478	26,49136	5,895406
675	0	65,41248	99,47658	-4,708003795	94,76858	-19,1497
675	2,501124	138,8	99,47658	-4,708003795	94,76858	-19,1497
675	5,002248	212,1875	99,47658	-4,708003795	94,76858	-19,1497
680	0	152,9211	83,04618	5,732184824	88,77836	-3,91472
680	2,501124	226,3086	83,04618	5,732184824	88,77836	-3,91472
680	5,002248	299,6961	83,04618	5,732184824	88,77836	-3,91472
681	0	117,8452	68,4349	-4,892886042	63,54201	-1,44577
681	2,501124	191,2327	68,4349	-4,892886042	63,54201	-1,44577
681	5,002248	264,6202	68,4349	-4,892886042	63,54201	-1,44577
683	0	136,8314	91,31303	34,36938986	125,6824	-11,318
683	2,501124	210,2189	91,31303	34,36938986	125,6824	-11,318
683	5,002248	283,6064	91,31303	34,36938986	125,6824	-11,318
684	0	167,0417	95,42493	19,58110192	115,006	-7,80044
684	2,501124	240,4292	95,42493	19,58110192	115,006	-7,80044
684	5,002248	313,8167	95,42493	19,58110192	115,006	-7,80044

TABEL GAYA GESER BALOK ANAK-1

FRAME	STA	VD	VL		VL TOT	VE
			VL merata	VL Koef kejut		
1432	0	-29,3296	7,582583	0,251359698	7,833942	-0,20559
1432	2,501127	21,97785	7,582583	0,251359698	7,833942	-0,20559
1432	5,002253	73,28535	7,582583	0,251359698	7,833942	-0,20559
1433	0	-60,5706	-2,2231	-0,170989025	-2,39409	0,025992
1433	2,501127	-9,26314	-2,2231	-0,170989025	-2,39409	0,025992
1433	5,002253	42,04436	-2,2231	-0,170989025	-2,39409	0,025992
1434	0	-64,8808	-3,58397	-0,095858985	-3,67983	0,052318
1434	2,501127	-13,5733	-3,58397	-0,095858985	-3,67983	0,052318
1434	5,002253	37,73423	-3,58397	-0,095858985	-3,67983	0,052318
1435	0	-59,0832	-1,6302	0,380502852	-1,2497	0,050072
1435	2,501127	-7,7757	-1,6302	0,380502852	-1,2497	0,050072
1435	5,002253	43,5318	-1,6302	0,380502852	-1,2497	0,050072
1436	0	-84,4002	-4,41686	3,212207214	-1,20465	-0,02773
1436	2,501127	-33,0927	-4,41686	3,212207214	-1,20465	-0,02773
1436	5,002253	18,21481	-4,41686	3,212207214	-1,20465	-0,02773
1437	0	-55,7274	-2,44254	-7,038906974	-9,48144	0,011309
1437	2,501127	-4,41988	-2,44254	-7,038906974	-9,48144	0,011309
1437	5,002253	46,88762	-2,44254	-7,038906974	-9,48144	0,011309
1438	0	-44,1441	-1,15003	-20,59931475	-21,7493	-0,00012
1438	2,501127	7,163417	-1,15003	-20,59931475	-21,7493	-0,00012
1438	5,002253	58,47092	-1,15003	-20,59931475	-21,7493	-0,00012
1439	0	-63,9334	-1,27714	15,73102685	14,45389	0,007615
1439	2,501127	-12,6259	-1,27714	15,73102685	14,45389	0,007615
1439	5,002253	38,68157	-1,27714	15,73102685	14,45389	0,007615
1440	0	-56,1222	-0,90026	-23,48648136	-24,3867	0,017662
1440	2,501124	-4,81486	-0,90026	-23,48648136	-24,3867	0,017662
1440	5,002248	46,49284	-0,90026	-23,48648136	-24,3867	0,017662
1441	0	-42,7618	1,781715	25,61002302	27,39174	-0,02588
1441	2,501124	8,545706	1,781715	25,61002302	27,39174	-0,02588
1441	5,002248	59,85321	1,781715	25,61002302	27,39174	-0,02588
1442	0	-62,18	-2,06882	-9,767888353	-11,8367	0,031136
1442	2,501124	-10,8725	-2,06882	-9,767888353	-11,8367	0,031136
1442	5,002248	40,43498	-2,06882	-9,767888353	-11,8367	0,031136
1443	0	-53,7233	-0,42249	0,713654168	0,291163	0,003658
1443	2,501124	-2,41581	-0,42249	0,713654168	0,291163	0,003658
1443	5,002248	48,89169	-0,42249	0,713654168	0,291163	0,003658
1444	0	-54,3767	-0,5755	0,440217635	-0,13529	0,005462
1444	2,501124	-3,06919	-0,5755	0,440217635	-0,13529	0,005462
1444	5,002248	48,23831	-0,5755	0,440217635	-0,13529	0,005462
1445	0	-55,9924	-0,9005	-0,377827665	-1,27833	0,010193
1445	2,501124	-4,68493	-0,9005	-0,377827665	-1,27833	0,010193
1445	5,002248	46,62257	-0,9005	-0,377827665	-1,27833	0,010193
1446	0	-58,112	-1,33832	-1,835441303	-3,17376	0,017278
1446	2,501124	-6,80449	-1,33832	-1,835441303	-3,17376	0,017278
1446	5,002248	44,50301	-1,33832	-1,835441303	-3,17376	0,017278
1447	0	-64,0021	-2,09948	13,49103042	11,39155	0,075889
1447	2,501124	-12,6946	-2,09948	13,49103042	11,39155	0,075889
1447	5,002248	38,61286	-2,09948	13,49103042	11,39155	0,075889
1448	0	-55,193	-0,74861	1,327430284	0,578819	0,010232
1448	2,501124	-3,88548	-0,74861	1,327430284	0,578819	0,010232
1448	5,002248	47,42202	-0,74861	1,327430284	0,578819	0,010232
1449	0	-53,8632	-0,41952	0,752787321	0,333268	0,005129

1449	2,501124	-2,55568	-0,41952	0,752787321	0,333268	0,005129
1449	5,002248	48,75182	-0,41952	0,752787321	0,333268	0,005129
1450	0	-39,4266	2,338321	10,24082341	12,57914	-0,03336
1450	2,501124	11,88094	2,338321	10,24082341	12,57914	-0,03336
1450	5,002248	63,18844	2,338321	10,24082341	12,57914	-0,03336
1451	0	-45,8585	1,037705	1,095083381	2,132789	-0,01243
1451	2,501124	5,449017	1,037705	1,095083381	2,132789	-0,01243
1451	5,002248	56,75652	1,037705	1,095083381	2,132789	-0,01243
1452	0	-46,8374	0,747381	0,156473924	0,903854	-0,00959
1452	2,501124	4,470122	0,747381	0,156473924	0,903854	-0,00959
1452	5,002248	55,77762	0,747381	0,156473924	0,903854	-0,00959
1453	0	-35,4772	0,083083	0,054101158	0,137184	-0,00165
1453	2,501124	15,83026	0,083083	0,054101158	0,137184	-0,00165
1453	5,002248	67,13776	0,083083	0,054101158	0,137184	-0,00165
1454	0	-95,0703	1,978912	-2,379586298	-0,40067	-0,01029
1454	2,501124	-43,7628	1,978912	-2,379586298	-0,40067	-0,01029
1454	5,002248	7,544677	1,978912	-2,379586298	-0,40067	-0,01029
1455	0	7,544677	1,978912	-2,379586298	-0,40067	-0,01029
1455	2,501124	58,85218	1,978912	-2,379586298	-0,40067	-0,01029
1455	5,002248	110,1597	1,978912	-2,379586298	-0,40067	-0,01029
1456	0	-63,7085	-1,98814	13,64259629	11,65445	0,052228
1456	2,501124	-12,401	-1,98814	13,64259629	11,65445	0,052228
1456	5,002248	38,90646	-1,98814	13,64259629	11,65445	0,052228
1457	0	-56,2315	-1,25269	0,647027865	-0,60567	0,11996
1457	2,501124	-4,92404	-1,25269	0,647027865	-0,60567	0,11996
1457	5,002248	46,38346	-1,25269	0,647027865	-0,60567	0,11996
1458	0	-54,1969	-0,57105	0,546659452	-0,02439	0,037708
1458	2,501124	-2,88935	-0,57105	0,546659452	-0,02439	0,037708
1458	5,002248	48,41815	-0,57105	0,546659452	-0,02439	0,037708
1459	0	-54,0231	-0,55819	0,529391161	-0,02879	0,032946
1459	2,501124	-2,71556	-0,55819	0,529391161	-0,02879	0,032946
1459	5,002248	48,59194	-0,55819	0,529391161	-0,02879	0,032946
1460	0	-54,6979	-0,72359	0,240197295	-0,4834	0,037696
1460	2,501124	-3,39045	-0,72359	0,240197295	-0,4834	0,037696
1460	5,002248	47,91705	-0,72359	0,240197295	-0,4834	0,037696
1461	0	-56,2753	-1,05511	-0,582921861	-1,63803	0,044747
1461	2,501124	-4,96783	-1,05511	-0,582921861	-1,63803	0,044747
1461	5,002248	46,33967	-1,05511	-0,582921861	-1,63803	0,044747
1462	0	-54,7657	-0,09862	-22,40183678	-22,5005	-0,15567
1462	2,501124	-3,45817	-0,09862	-22,40183678	-22,5005	-0,15567
1462	5,002248	47,84933	-0,09862	-22,40183678	-22,5005	-0,15567
1463	0	-40,7282	2,584732	26,68257432	29,26731	-0,20162
1463	2,501124	10,57934	2,584732	26,68257432	29,26731	-0,20162
1463	5,002248	61,88684	2,584732	26,68257432	29,26731	-0,20162
1464	0	-58,7116	-1,51162	-2,085072648	-3,59669	0,049134
1464	2,501124	-7,40408	-1,51162	-2,085072648	-3,59669	0,049134
1464	5,002248	43,90342	-1,51162	-2,085072648	-3,59669	0,049134
1465	0	-61,209	-1,75144	-9,324621259	-11,0761	-0,03521
1465	2,501124	-9,90154	-1,75144	-9,324621259	-11,0761	-0,03521
1465	5,002248	41,40596	-1,75144	-9,324621259	-11,0761	-0,03521
1466	0	-66,786	-4,40464	-1,199581743	-5,60422	0,231671
1466	2,501127	-15,4785	-4,40464	-1,199581743	-5,60422	0,231671
1466	5,002253	35,82898	-4,40464	-1,199581743	-5,60422	0,231671
1467	0	-58,9716	-1,60882	0,36471274	-1,24411	0,054435
1467	2,501127	-7,66408	-1,60882	0,36471274	-1,24411	0,054435

1467	5,002253	43,64342	-1,60882	0,36471274	-1,24411	0,054435
1468	0	-25,1617	9,602397	2,987585289	12,58998	-0,66288
1468	2,501127	26,14576	9,602397	2,987585289	12,58998	-0,66288
1468	5,002253	77,45326	9,602397	2,987585289	12,58998	-0,66288
1469	0	-45,0872	-1,47526	-21,09075089	-22,566	0,077291
1469	2,501127	6,220286	-1,47526	-21,09075089	-22,566	0,077291
1469	5,002253	57,52779	-1,47526	-21,09075089	-22,566	0,077291
1470	0	-65,0477	-1,75153	15,09976591	13,34824	0,110238
1470	2,501127	-13,7402	-1,75153	15,09976591	13,34824	0,110238
1470	5,002253	37,56728	-1,75153	15,09976591	13,34824	0,110238
1471	0	-61,9632	-2,82203	-0,982118668	-3,80415	0,156026
1471	2,501127	-10,6557	-2,82203	-0,982118668	-3,80415	0,156026
1471	5,002253	40,6518	-2,82203	-0,982118668	-3,80415	0,156026
1472	0	-83,761	-4,22366	3,452656222	-0,77101	-0,05887
1472	2,501127	-32,4535	-4,22366	3,452656222	-0,77101	-0,05887
1472	5,002253	18,85404	-4,22366	3,452656222	-0,77101	-0,05887
1473	0	-57,9416	-3,50625	-8,386778777	-11,893	0,2326
1473	2,501127	-6,6341	-3,50625	-8,386778777	-11,893	0,2326
1473	5,002253	44,6734	-3,50625	-8,386778777	-11,893	0,2326
1474	0	-94,7958	2,039475	-2,2967662	-0,25729	-0,02701
1474	2,501124	-43,4883	2,039475	-2,2967662	-0,25729	-0,02701
1474	5,002248	7,819233	2,039475	-2,2967662	-0,25729	-0,02701
1475	0	7,819233	2,039475	-2,2967662	-0,25729	-0,02701
1475	2,501124	59,12673	2,039475	-2,2967662	-0,25729	-0,02701
1475	5,002248	110,4342	2,039475	-2,2967662	-0,25729	-0,02701
1476	0	-47,2065	0,553638	-0,084616417	0,469022	0,025562
1476	2,501124	4,101028	0,553638	-0,084616417	0,469022	0,025562
1476	5,002248	55,40853	0,553638	-0,084616417	0,469022	0,025562
1477	0	-36,4183	-0,28677	-0,47606509	-0,76284	0,081359
1477	2,501124	14,88923	-0,28677	-0,47606509	-0,76284	0,081359
1477	5,002248	66,19673	-0,28677	-0,47606509	-0,76284	0,081359
1478	0	-38,9876	2,621978	10,61699449	13,23897	-0,09859
1478	2,501124	12,31991	2,621978	10,61699449	13,23897	-0,09859
1478	5,002248	63,62741	2,621978	10,61699449	13,23897	-0,09859
1479	0	-46,2554	0,852689	0,815082667	1,667772	0,029413
1479	2,501124	5,052135	0,852689	0,815082667	1,667772	0,029413
1479	5,002248	56,35964	0,852689	0,815082667	1,667772	0,029413

TABEL GAYA GESER BALOK LINTANG STRUKTUR ATAS

FRAME	STA	VL			VL TOT	VE
		VD	VL merata	VL.Koef kejut		
8	0	-161,635	-119,159	-0,142822775	-119,301	0,010996
8	1,03125	-161,635	-88,1758	-0,142822775	-88,3186	0,010996
8	2,0625	-161,635	-57,6342	-0,142822775	-57,777	0,010996
9	0	-64,475	-57,9401	-0,104831154	-58,045	0,011613
9	1,03125	-64,475	-27,3986	-0,104831154	-27,5034	0,011613
9	2,0625	-64,475	3,143024	-0,104831154	3,038193	0,011613
10	0	34,03758	3,567086	-0,075933814	3,491152	0,001633
10	1,03125	34,03758	34,10867	-0,075933814	34,03274	0,001633
10	2,0625	34,03758	64,65026	-0,075933814	64,57432	0,001633
11	0	135,1252	64,29793	-0,024636547	64,2733	0,003524
11	1,03125	135,1252	65,81306	-0,024636547	65,78842	0,003524
11	2,0625	135,1252	65,81306	-0,024636547	65,78842	0,003524
16	0	-134,075	-65,9243	0,024636547	-65,8997	-0,00352
16	1,03125	-134,075	-65,9243	0,024636547	-65,8997	-0,00352
16	2,0625	-134,075	-64,283	0,024636547	-64,2583	-0,00352
17	0	-31,7626	-64,6353	0,075933814	-64,5593	-0,00163
17	1,03125	-31,7626	-34,0937	0,075933814	-34,0177	-0,00163
17	2,0625	-31,7626	-3,55209	0,075933814	-3,47616	-0,00163
18	0	66,82361	-3,12805	0,104831154	-3,02322	-0,01161
18	1,03125	66,82361	27,41353	0,104831154	27,51836	-0,01161
18	2,0625	66,82361	57,95512	0,104831154	58,05995	-0,01161
21	0	163,053	57,64906	0,142822775	57,79188	-0,011
21	1,03125	163,053	88,19064	0,142822775	88,33346	-0,011
21	2,0625	163,053	119,1735	0,142822775	119,3163	-0,011
22	0	-156,269	-118,239	0,164211027	-118,075	0,005282
22	1,03125	-156,269	-87,2565	0,164211027	-87,0923	0,005282
22	2,0625	-156,269	-56,715	0,164211027	-56,5507	0,005282
23	0	-59,6228	-57,2408	0,171105506	-57,0697	0,007966
23	1,03125	-59,6228	-26,8992	0,171105506	-26,5281	0,007966
23	2,0625	-59,6228	3,842379	0,171105506	4,013484	0,007966
24	0	37,7944	3,871563	0,148310649	4,019874	0,003601
24	1,03125	37,7944	34,41315	0,148310649	34,56146	0,003601
24	2,0625	37,7944	64,95474	0,148310649	65,10305	0,003601
25	0	138,3674	64,43658	0,158441613	64,59502	0,007724
25	1,03125	138,3674	65,9517	0,158441613	66,11015	0,007724
25	2,0625	138,3674	65,9517	0,158441613	66,11015	0,007724
26	0	-133,251	-66,0626	-0,158441613	-66,221	-0,00772
26	1,03125	-133,251	-66,0626	-0,158441613	-66,221	-0,00772
26	2,0625	-133,251	-64,4212	-0,158441613	-64,5796	-0,00772
27	0	-31,3489	-64,9393	-0,148310649	-65,0876	-0,0036
27	1,03125	-31,3489	-34,3977	-0,148310649	-34,5461	-0,0036
27	2,0625	-31,3489	-3,85616	-0,148310649	-4,00447	-0,0036
28	0	66,20116	-3,82696	-0,171105506	-3,99807	-0,00797
28	1,03125	66,20116	26,71462	-0,171105506	26,54352	-0,00797
28	2,0625	66,20116	57,25621	-0,171105506	57,0851	-0,00797
29	0	161,855	56,73028	-0,164211027	56,56607	-0,00528
29	1,03125	161,855	87,27186	-0,164211027	87,10765	-0,00528
29	2,0625	161,855	118,2548	-0,164211027	118,0905	-0,00528
30	0	-148,638	-117,281	0,613558847	-116,667	0,000862
30	1,03125	-148,638	-86,2981	0,613558847	-85,6846	0,000862
30	2,0625	-148,638	-55,7565	0,613558847	-55,143	0,000862
31	0	-52,1393	-56,3666	0,426946098	-55,9397	0,00586

31	1,03125	-52,1393	-25,825	0,426946098	-25,3981	0,00586
31	2,0625	-52,1393	4,716553	0,426946098	5,143499	0,00586
32	0	44,54432	4,467977	0,010517335	4,478494	0,004395
32	1,03125	44,54432	35,00956	0,010517335	35,02008	0,004395
32	2,0625	44,54432	65,55115	0,010517335	65,56167	0,004395
33	0	144,8824	64,94606	-0,129806775	64,81625	0,010637
33	1,03125	144,8824	66,46119	-0,129806775	66,33138	0,010637
33	2,0625	144,8824	66,46119	-0,129806775	66,33138	0,010637
34	0	-131,53	-66,5717	0,129806775	-66,4419	-0,01064
34	1,03125	-131,53	-66,5717	0,129806775	-66,4419	-0,01064
34	2,0625	-131,53	-64,9303	0,129806775	-64,8005	-0,01064
35	0	-29,8761	-65,5354	-0,010517335	-65,5459	-0,00439
35	1,03125	-29,8761	-34,9938	-0,010517335	-35,0043	-0,00439
35	2,0625	-29,8761	-4,45224	-0,010517335	-4,46276	-0,00439
36	0	66,85321	-4,70079	-0,426946098	-5,12774	-0,00586
36	1,03125	66,85321	25,8408	-0,426946098	25,41385	-0,00586
36	2,0625	66,85321	56,38238	-0,426946098	55,95544	-0,00586
37	0	162,2149	55,77221	-0,613558847	55,15865	-0,00086
37	1,03125	162,2149	86,3138	-0,613558847	85,70024	-0,00086
37	2,0625	162,2149	117,2967	-0,613558847	116,6831	-0,00086
38	0	-136,436	-115,651	1,205384586	-114,446	-0,02289
38	1,03125	-136,436	-84,6684	1,205384586	-83,463	-0,02289
38	2,0625	-136,436	-54,1268	1,205384586	-52,9214	-0,02289
39	0	-40,0929	-54,9516	0,591493269	-54,3601	-0,01491
39	1,03125	-40,0929	-24,41	0,591493269	-23,8185	-0,01491
39	2,0625	-40,0929	6,131545	0,591493269	6,723038	-0,01491
46	0	-67,8337	-152,066	0,018983613	-152,047	-1,99466
46	1,03125	-67,8337	-116,541	0,018983613	-116,522	-1,99466
46	2,0625	-67,8337	-72,0433	0,018983613	-72,0243	-1,99466
47	0	-3,21333	-61,177	0,169232564	-61,0078	-0,67001
47	1,03125	-3,21333	-16,6793	0,169232564	-16,5101	-0,67001
47	2,0625	-3,21333	27,81835	0,169232564	27,98758	-0,67001
48	0	61,89422	37,41917	0,170310533	37,58948	0,955456
48	1,03125	61,89422	81,91684	0,170310533	82,08715	0,955456
48	2,0625	61,89422	126,4145	0,170310533	126,5848	0,955456
49	0	136,8933	141,7784	0,284492911	142,0629	2,251831
49	1,03125	136,8933	143,9849	0,284492911	144,2694	2,251831
49	2,0625	136,8933	143,9849	0,284492911	144,2694	2,251831
50	0	-136,008	-144,134	-0,284492911	-144,418	-2,25183
50	1,03125	-136,008	-144,134	-0,284492911	-144,418	-2,25183
50	2,0625	-136,008	-141,743	-0,284492911	-142,028	-2,25183
51	0	-60,928	-126,386	-0,170310533	-126,556	-0,95546
51	1,03125	-60,928	-81,8879	-0,170310533	-82,0582	-0,95546
51	2,0625	-60,928	-37,3902	-0,170310533	-37,5605	-0,95546
52	0	4,260222	-27,7924	-0,169232564	-27,9617	0,670007
52	1,03125	4,260222	16,70524	-0,169232564	16,53601	0,670007
52	2,0625	4,260222	61,20292	-0,169232564	61,03369	0,670007
53	0	69,13037	72,06987	-0,018983613	72,05089	1,99466
53	1,03125	69,13037	116,5675	-0,018983613	116,5486	1,99466
53	2,0625	69,13037	152,0921	-0,018983613	152,0732	1,99466
54	0	-110,381	-84,6005	-0,191863498	-84,7924	-0,13933
54	1,03125	-110,381	-84,6005	-0,191863498	-84,7924	-0,13933
54	2,0625	-110,381	-82,2101	-0,191863498	-82,402	-0,13933
55	0	-36,582	-98,5174	-0,039302843	-98,5567	-0,20438
55	1,03125	-36,582	-54,0197	-0,039302843	-54,059	-0,20438

55	2,0625	-36,582	-9,52205	-0,039302843	-9,56135	-0,20438
56	0	36,73415	-21,4577	-0,009616871	-21,4673	-0,07513
56	1,03125	36,73415	23,04	-0,009616871	23,03039	-0,07513
56	2,0625	36,73415	67,53768	-0,009616871	67,52806	-0,07513
57	0	113,299	56,09348	0,067311701	56,16079	-0,12909
57	1,03125	113,299	100,5912	0,067311701	100,6585	-0,12909
57	2,0625	113,299	136,1157	0,067311701	136,1831	-0,12909
58	0	-110,292	-84,5902	-0,191863498	-84,7821	-0,13933
58	1,03125	-110,292	-84,5902	-0,191863498	-84,7821	-0,13933
58	2,0625	-110,292	-82,1998	-0,191863498	-82,3917	-0,13933
59	0	-36,6505	-98,5196	-0,039302843	-98,5589	-0,20438
59	1,03125	-36,6505	-54,0219	-0,039302843	-54,0612	-0,20438
59	2,0625	-36,6505	-9,52424	-0,039302843	-9,56354	-0,20438
60	0	36,66113	-21,4666	-0,009616871	-21,4762	-0,07513
60	1,03125	36,66113	23,03108	-0,009616871	23,02147	-0,07513
60	2,0625	36,66113	67,52876	-0,009616871	67,51914	-0,07513
61	0	113,3032	56,08443	0,067311701	56,15174	-0,12909
61	1,03125	113,3032	100,5821	0,067311701	100,6494	-0,12909
61	2,0625	113,3032	136,1067	0,067311701	136,174	-0,12909
62	0	-150,341	-156,008	0,195185261	-155,813	0,474622
62	1,03125	-150,341	-120,483	0,195185261	-120,288	0,474622
62	2,0625	-150,341	-75,9856	0,195185261	-75,7904	0,474622
63	0	-59,3641	-79,9816	-0,073676932	-80,0552	0,246437
63	1,03125	-59,3641	-35,4839	-0,073676932	-35,5576	0,246437
63	2,0625	-59,3641	9,013793	-0,073676932	8,940116	0,246437
64	0	32,76507	4,674078	-0,570414575	4,103663	0,014676
64	1,03125	32,76507	49,17175	-0,570414575	48,60134	0,014676
64	2,0625	32,76507	93,66943	-0,570414575	93,09901	0,014676
65	0	128,6021	89,62237	-0,745693157	88,87668	-0,20976
65	1,03125	128,6021	91,82886	-0,745693157	91,08317	-0,20976
65	2,0625	128,6021	91,82886	-0,745693157	91,08317	-0,20976
66	0	-128,933	-91,9845	0,745693157	-91,2388	0,209763
66	1,03125	-128,933	-91,9845	0,745693157	-91,2388	0,209763
66	2,0625	-128,933	-89,5941	0,745693157	-88,8484	0,209763
67	0	-32,9993	-93,6498	0,570414575	-93,0793	-0,01468
67	1,03125	-32,9993	-49,1521	0,570414575	-48,5817	-0,01468
67	2,0625	-32,9993	-4,65441	0,570414575	-4,08399	-0,01468
68	0	59,11064	-8,99907	0,073676932	-8,92539	-0,24644
68	1,03125	59,11064	35,49861	0,073676932	35,57229	-0,24644
68	2,0625	59,11064	79,99628	0,073676932	80,06996	-0,24644
69	0	150,0184	75,9989	-0,195185261	75,80372	-0,47462
69	1,03125	150,0184	120,4966	-0,195185261	120,3014	-0,47462
69	2,0625	150,0184	156,0212	-0,195185261	155,826	-0,47462
70	0	-168,14	-168,499	0,377556902	-168,121	0,431737
70	1,03125	-168,14	-132,974	0,377556902	-132,597	0,431737
70	2,0625	-168,14	-88,4768	0,377556902	-88,0992	0,431737
71	0	-68,6591	-86,9879	-0,499177511	-87,4871	0,241298
71	1,03125	-68,6591	-42,4902	-0,499177511	-42,9894	0,241298
71	2,0625	-68,6591	2,007439	-0,499177511	1,508261	0,241298
72	0	32,37126	4,813791	-1,463235286	3,350555	0,011795
72	1,03125	32,37126	49,31147	-1,463235286	47,84823	0,011795
72	2,0625	32,37126	93,80914	-1,463235286	92,34591	0,011795
73	0	137,1619	95,38848	-2,173799167	93,21468	-0,1746
73	1,03125	137,1619	97,59497	-2,173799167	95,42118	-0,1746
73	2,0625	137,1619	97,59497	-2,173799167	95,42118	-0,1746

74	0	-137,645	-97,7618	2,173799167	-95,588	0,174596
74	1,03125	-137,645	-97,7618	2,173799167	-95,588	0,174596
74	2,0625	-137,645	-95,3714	2,173799167	-93,1976	0,174596
75	0	-32,6957	-93,7901	1,463235286	-92,3268	-0,01179
75	1,03125	-32,6957	-49,2924	1,463235286	-47,8292	-0,01179
75	2,0625	-32,6957	-4,79471	1,463235286	-3,33148	-0,01179
76	0	68,3543	-1,98771	0,499177511	-1,48854	-0,2413
76	1,03125	68,3543	42,50996	0,499177511	43,00914	-0,2413
76	2,0625	68,3543	87,00764	0,499177511	87,50681	-0,2413
77	0	167,7633	88,49656	-0,377556902	88,11901	-0,43174
77	1,03125	167,7633	132,9942	-0,377556902	132,6167	-0,43174
77	2,0625	167,7633	168,5188	-0,377556902	168,1413	-0,43174
78	0	-159,889	-168,083	-14,3669862	-182,45	0,347685
78	1,03125	-159,889	-132,559	-14,3669862	-146,926	0,347685
78	2,0625	-159,889	-88,0609	-14,3669862	-102,428	0,347685
79	0	-67,9916	-87,4803	-7,076702969	-94,557	0,207984
79	1,03125	-67,9916	-42,9826	-7,076702969	-50,0593	0,207984
79	2,0625	-67,9916	1,51503	-7,076702969	-5,56167	0,207984
80	0	30,34795	3,718866	3,863876964	7,582743	0,012987
80	1,03125	30,34795	48,21654	3,863876964	52,08042	0,012987
80	2,0625	30,34795	92,71422	3,863876964	96,57809	0,012987
81	0	127,2082	93,23365	11,14391349	104,3776	-0,12001
81	1,03125	127,2082	95,44015	11,14391349	106,5841	-0,12001
81	2,0625	127,2082	95,44015	11,14391349	106,5841	-0,12001
82	0	-127,728	-95,6052	-11,14391349	-106,749	0,120009
82	1,03125	-127,728	-95,6052	-11,14391349	-106,749	0,120009
82	2,0625	-127,728	-93,2148	-11,14391349	-104,359	0,120009
83	0	-30,6515	-92,6952	-3,863876964	-96,5591	-0,01299
83	1,03125	-30,6515	-48,1976	-3,863876964	-52,0614	-0,01299
83	2,0625	-30,6515	-3,69989	-3,863876964	-7,56377	-0,01299
84	0	67,71972	-1,49491	7,076702969	5,581792	-0,20798
84	1,03125	67,71972	43,00276	7,076702969	50,07947	-0,20798
84	2,0625	67,71972	87,50044	7,076702969	94,57714	-0,20798
85	0	159,4863	88,08167	14,3669862	102,4487	-0,34768
85	1,03125	159,4863	132,5793	14,3669862	146,9463	-0,34768
85	2,0625	159,4863	168,1039	14,3669862	182,4709	-0,34768
86	0	-187,363	-164,708	-56,42588427	-221,133	0,260442
86	1,03125	-187,363	-129,183	-56,42588427	-185,609	0,260442
86	2,0625	-187,363	-84,6853	-56,42588427	-141,111	0,260442
87	0	-71,0716	-85,6355	-17,76510358	-103,401	0,161476
87	1,03125	-71,0716	-41,1378	-17,76510358	-58,9029	0,161476
87	2,0625	-71,0716	3,359861	-17,76510358	-14,4052	0,161476
88	0	39,49746	3,61016	14,66567412	18,27583	0,004992
88	1,03125	39,49746	48,10784	14,66567412	62,77351	0,004992
88	2,0625	39,49746	92,60551	14,66567412	107,2712	0,004992
89	0	159,9151	91,60142	52,65085524	144,2523	-0,08677
89	1,03125	159,9151	93,80791	52,65085524	146,4588	-0,08677
89	2,0625	159,9151	93,80791	52,65085524	146,4588	-0,08677
90	0	-160,371	-93,9754	-52,65085524	-146,626	0,086773
90	1,03125	-160,371	-93,9754	-52,65085524	-146,626	0,086773
90	2,0625	-160,371	-91,585	-52,65085524	-144,236	0,086773
91	0	-39,6618	-92,5855	-14,66567412	-107,251	-0,00499
91	1,03125	-39,6618	-48,0878	-14,66567412	-62,7535	-0,00499
91	2,0625	-39,6618	-3,59011	-14,66567412	-18,2558	-0,00499
92	0	70,91489	-3,33906	17,76510358	14,42604	-0,16148

92	1,03125	70,91489	41,15862	17,76510358	58,92372	-0,16148
92	2,0625	70,91489	85,65629	17,76510358	103,4214	-0,16148
93	0	186,9569	84,70574	56,42588427	141,1316	-0,26044
93	1,03125	186,9569	129,2034	56,42588427	185,6293	-0,26044
93	2,0625	186,9569	164,728	56,42588427	221,1539	-0,26044
94	0	-139,256	-159,364	-12,04679319	-171,411	0,182327
94	1,03125	-139,256	-123,84	-12,04679319	-135,887	0,182327
94	2,0625	-139,256	-79,3421	-12,04679319	-91,3889	0,182327
95	0	-53,9089	-82,5679	-6,142307398	-88,7102	0,11625
95	1,03125	-53,9089	-38,0702	-6,142307398	-44,2125	0,11625
95	2,0625	-53,9089	6,427472	-6,142307398	0,285165	0,11625
96	0	32,05546	3,815755	2,954899174	6,770654	-0,01157
96	1,03125	32,05546	48,31343	2,954899174	51,26833	-0,01157
96	2,0625	32,05546	92,81111	2,954899174	95,766	-0,01157
97	0	121,6552	89,31067	8,91208394	98,22276	-0,06384
97	1,03125	121,6552	91,51717	8,91208394	100,4293	-0,06384
97	2,0625	121,6552	91,51717	8,91208394	100,4293	-0,06384
98	0	-121,64	-91,6626	-8,91208394	-100,575	0,063839
98	1,03125	-121,64	-91,6626	-8,91208394	-100,575	0,063839
98	2,0625	-121,64	-89,2722	-8,91208394	-98,1843	0,063839
99	0	-31,8237	-92,79	-2,954899174	-95,7449	0,011566
99	1,03125	-31,8237	-48,2923	-2,954899174	-51,2472	0,011566
99	2,0625	-31,8237	-3,79463	-2,954899174	-6,74953	0,011566
100	0	54,08901	-6,41585	6,142307398	-0,27354	-0,11625
100	1,03125	54,08901	38,08183	6,142307398	44,22414	-0,11625
100	2,0625	54,08901	82,5795	6,142307398	88,72181	-0,11625
101	0	139,0536	79,3514	12,04679319	91,3982	-0,18233
101	1,03125	139,0536	123,8491	12,04679319	135,8959	-0,18233
101	2,0625	139,0536	159,3737	12,04679319	171,4205	-0,18233
102	0	-116,647	-156,96	-9,810193507	-166,771	0,17759
102	1,03125	-116,647	-121,436	-9,810193507	-131,246	0,17759
102	2,0625	-116,647	-76,9382	-9,810193507	-86,7484	0,17759
103	0	-44,5566	-80,9789	-4,785394302	-85,7643	0,089046
103	1,03125	-44,5566	-36,4812	-4,785394302	-41,2666	0,089046
103	2,0625	-44,5566	8,016439	-4,785394302	3,231045	0,089046
104	0	36,26794	5,931202	3,818595399	9,749798	-0,04124
104	1,03125	36,26794	50,42888	3,818595399	54,24747	-0,04124
104	2,0625	36,26794	94,92655	3,818595399	98,74515	-0,04124
105	0	110,5997	90,85598	8,610048176	99,46603	-0,13091
105	1,03125	110,5997	93,06248	8,610048176	101,6725	-0,13091
105	2,0625	110,5997	93,06248	8,610048176	101,6725	-0,13091
106	0	-111,436	-93,2003	-8,610048176	-101,81	0,130905
106	1,03125	-111,436	-93,2003	-8,610048176	-101,81	0,130905
106	2,0625	-111,436	-90,81	-8,610048176	-99,42	0,130905
107	0	-38,3239	-94,9076	-3,818595399	-98,7262	0,041241
107	1,03125	-38,3239	-50,4099	-3,818595399	-54,2285	0,041241
107	2,0625	-38,3239	-5,91222	-3,818595399	-9,73082	0,041241
108	0	42,52279	-8,01349	4,785394302	-3,2281	-0,08905
108	1,03125	42,52279	36,48418	4,785394302	41,26958	-0,08905
108	2,0625	42,52279	80,98186	4,785394302	85,76725	-0,08905
109	0	115,8955	76,93743	9,810193507	86,74762	-0,17759
109	1,03125	115,8955	121,4351	9,810193507	131,2453	-0,17759
109	2,0625	115,8955	156,9597	9,810193507	166,7699	-0,17759
110	0	-257,21	-175,758	-66,27471712	-242,033	0,078552
110	1,03125	-257,21	-140,233	-66,27471712	-206,508	0,078552



110	2,0625	-257,21	-95,7358	-66,27471712	-162,01	0,078552
111	0	-78,4651	-85,2074	-19,92941717	-105,137	0,033888
111	1,03125	-78,4651	-40,7097	-19,92941717	-60,6392	0,033888
111	2,0625	-78,4651	3,787928	-19,92941717	-16,1415	0,033888
112	0	94,14642	10,88587	21,90270632	32,78858	-0,04437
112	1,03125	94,14642	55,38355	21,90270632	77,28626	-0,04437
112	2,0625	94,14642	99,88122	21,90270632	121,7839	-0,04437
113	0	288,7828	111,197	68,89376277	180,0908	-0,07026
113	1,03125	288,7828	113,4035	68,89376277	182,2973	-0,07026
113	2,0625	288,7828	113,4035	68,89376277	182,2973	-0,07026
114	0	-280,011	-113,55	-68,89376277	-182,444	0,070264
114	1,03125	-280,011	-113,55	-68,89376277	-182,444	0,070264
114	2,0625	-280,011	-111,16	-68,89376277	-180,054	0,070264
115	0	-85,0976	-99,8602	-21,90270632	-121,763	0,044374
115	1,03125	-85,0976	-55,3625	-21,90270632	-77,2652	0,044374
115	2,0625	-85,0976	-10,8648	-21,90270632	-32,7675	0,044374
116	0	87,69806	-3,77647	19,92941717	16,15295	-0,03389
116	1,03125	87,69806	40,72121	19,92941717	60,65063	-0,03389
116	2,0625	87,69806	85,21888	19,92941717	105,1483	-0,03389
117	0	266,4243	95,74542	66,27471712	162,0201	-0,07855
117	1,03125	266,4243	140,2431	66,27471712	206,5178	-0,07855
117	2,0625	266,4243	175,7677	66,27471712	242,0424	-0,07855
118	0	3,611047	-117,186	0,201492925	-116,985	-0,02927
118	1,03125	3,611047	-86,2032	0,201492925	-86,0017	-0,02927
118	2,0625	3,611047	-55,6616	0,201492925	-55,4601	-0,02927
119	0	3,611047	-55,6616	0,201492925	-55,4601	-0,02927
119	1,03125	3,611047	-25,12	0,201492925	-24,9185	-0,02927
119	2,062501	3,611047	5,421564	0,201492925	5,623057	-0,02927
120	0	3,611047	5,421564	0,201492925	5,623057	-0,02927
120	1,03125	3,611047	35,96315	0,201492925	36,16464	-0,02927
120	2,0625	3,611047	66,50473	0,201492925	66,70622	-0,02927
121	0	3,611047	66,50473	0,201492925	66,70622	-0,02927
121	1,03125	3,611047	68,01985	0,201492925	68,22135	-0,02927
121	2,062499	3,611047	68,01985	0,201492925	68,22135	-0,02927
122	0	9,128539	-68,1316	-0,201492925	-68,3331	0,029269
122	1,03125	9,128539	-68,1316	-0,201492925	-68,3331	0,029269
122	2,0625	9,128539	-66,4902	-0,201492925	-66,6917	0,029269
123	0	9,128539	-66,4902	-0,201492925	-66,6917	0,029269
123	1,03125	9,128539	-35,9486	-0,201492925	-36,1501	0,029269
123	2,062501	9,128539	-5,40704	-0,201492925	-5,60854	0,029269
125	0	9,128539	-5,40704	-0,201492925	-5,60854	0,029269
125	1,03125	9,128539	25,13454	-0,201492925	24,93305	0,029269
125	2,0625	9,128539	55,67612	-0,201492925	55,47463	0,029269
126	0	9,128539	55,67612	-0,201492925	55,47463	0,029269
126	1,03125	9,128539	86,2177	-0,201492925	86,0162	0,029269
126	2,062499	9,128539	117,2006	-0,201492925	116,9991	0,029269
127	0	-248,655	-113,898	-4,416472124	-118,315	-0,00793
127	1,03125	-248,655	-83,3567	-4,416472124	-87,7732	-0,00793
127	2,0625	-248,655	-52,3738	-4,416472124	-56,7903	-0,00793
129	0	-91,0642	-55,0026	-1,80343735	-56,806	-0,03223
129	1,03125	-91,0642	-24,461	-1,80343735	-26,2645	-0,03223
129	2,0625	-91,0642	6,080568	-1,80343735	4,27713	-0,03223
130	0	59,1529	3,564641	2,43877449	6,003415	-0,07639
130	1,03125	59,1529	34,10623	2,43877449	36,545	-0,07639
130	2,0625	59,1529	64,64781	2,43877449	67,08659	-0,07639

131	0	221,4586	61,91472	4,751616433	66,66634	-0,09991
131	1,03125	221,4586	61,91472	4,751616433	66,66634	-0,09991
131	2,0625	221,4586	63,55611	4,751616433	68,30772	-0,09991
132	0	-242,853	-63,4326	-4,751616433	-68,1842	0,099913
132	1,03125	-242,853	-61,9175	-4,751616433	-66,6691	0,099913
132	2,0625	-242,853	-61,9175	-4,751616433	-66,6691	0,099913
133	0	-77,9059	-64,6561	-2,43877449	-67,0949	0,076385
133	1,03125	-77,9059	-34,1146	-2,43877449	-36,5533	0,076385
133	2,0625	-77,9059	-3,57298	-2,43877449	-6,01175	0,076385
138	0	72,50078	-6,09223	1,80343735	-4,28879	0,032235
138	1,03125	72,50078	24,44936	1,80343735	26,25279	0,032235
138	2,0625	72,50078	54,99094	1,80343735	56,79438	0,032235
139	0	227,9698	52,36139	4,416472124	56,77786	0,007926
139	1,03125	227,9698	83,34427	4,416472124	87,76074	0,007926
139	2,0625	227,9698	113,8859	4,416472124	118,3023	0,007926
140	0	-140,298	-120,628	1,291737499	-119,336	-0,00625
140	1,03125	-140,298	-89,6452	1,291737499	-88,3535	-0,00625
140	2,0625	-140,298	-59,1037	1,291737499	-57,8119	-0,00625
141	0	-51,3354	-57,2771	0,623114672	-56,654	-0,04289
141	1,03125	-51,3354	-26,7355	0,623114672	-26,1124	-0,04289
141	2,0625	-51,3354	3,806092	0,623114672	4,429207	-0,04289
142	0	40,91805	3,875655	-0,632294709	3,24336	-0,1015
142	1,03125	40,91805	34,41724	-0,632294709	33,78495	-0,1015
142	2,0625	40,91805	64,95883	-0,632294709	64,32653	-0,1015
143	0	135,3434	66,82115	-1,144013194	65,67714	-0,1384
143	1,03125	135,3434	68,33628	-1,144013194	67,19227	-0,1384
143	2,0625	135,3434	68,33628	-1,144013194	67,19227	-0,1384
144	0	-121,139	-68,4412	1,144013194	-67,2972	0,138401
144	1,03125	-121,139	-68,4412	1,144013194	-67,2972	0,138401
144	2,0625	-121,139	-66,7998	1,144013194	-65,6558	0,138401
145	0	-27,2856	-64,9432	0,632294709	-64,3109	0,101495
145	1,03125	-27,2856	-34,4016	0,632294709	-33,7693	0,101495
145	2,0625	-27,2856	-3,86003	0,632294709	-3,22774	0,101495
150	0	64,97675	-3,79387	-0,623114672	-4,41698	0,042887
150	1,03125	64,97675	26,74772	-0,623114672	26,1246	0,042887
150	2,0625	64,97675	57,2893	-0,623114672	56,66619	0,042887
152	0	154,4249	59,11531	-1,291737499	57,82357	0,006245
152	1,03125	154,4249	89,6569	-1,291737499	88,36516	0,006245
152	2,0625	154,4249	120,6398	-1,291737499	119,348	0,006245
154	0	-168,796	-120,822	-0,225881303	-121,048	-0,01857
154	1,03125	-168,796	-90,2803	-0,225881303	-90,5062	-0,01857
154	2,0625	-168,796	-59,2974	-0,225881303	-59,5233	-0,01857
156	0	-67,9324	-57,9892	-0,212719093	-58,2019	-0,04919
156	1,03125	-67,9324	-27,4476	-0,212719093	-27,6603	-0,04919
156	2,0625	-67,9324	3,093972	-0,212719093	2,881253	-0,04919
157	0	28,33522	4,016644	-0,610201862	3,406442	-0,09796
157	1,03125	28,33522	34,55823	-0,610201862	33,94803	-0,09796
157	2,0625	28,33522	65,09982	-0,610201862	64,48961	-0,09796
158	0	134,485	66,87161	-0,473038625	66,39857	-0,12707
158	1,03125	134,485	66,87161	-0,473038625	66,39857	-0,12707
158	2,0625	134,485	68,513	-0,473038625	68,03996	-0,12707
159	0	-145,152	-68,39	0,473038625	-67,917	0,127067
159	1,03125	-145,152	-66,8749	0,473038625	-66,4019	0,127067
159	2,0625	-145,152	-66,8749	0,473038625	-66,4019	0,127067
160	0	-37,9371	-65,1076	0,610201862	-64,4974	0,09796

160	1,03125	-37,9371	-34,566	0,610201862	-33,9558	0,09796
160	2,0625	-37,9371	-4,02444	0,610201862	-3,41423	0,09796
161	0	58,21307	-3,10459	0,212719093	-2,89188	0,04919
161	1,03125	58,21307	27,43699	0,212719093	27,64971	0,04919
161	2,0625	58,21307	57,97858	0,212719093	58,1913	0,04919
162	0	158,0307	59,28601	0,225881303	59,51189	0,018569
162	1,03125	158,0307	90,26889	0,225881303	90,49477	0,018569
162	2,0625	158,0307	120,8105	0,225881303	121,0364	0,018569
163	0	-170,416	-124,725	-2,469460856	-127,195	0,005376
163	1,03125	-170,416	-93,7425	-2,469460856	-96,2119	0,005376
163	2,0625	-170,416	-63,2009	-2,469460856	-65,6703	0,005376
165	0	-64,1777	-58,7617	-1,430298491	-60,192	-0,03395
165	1,03125	-64,1777	-28,2201	-1,430298491	-29,6504	-0,03395
165	2,0625	-64,1777	2,32151	-1,430298491	0,891212	-0,03395
166	0	40,22322	5,088976	-0,804747295	4,284229	-0,08599
166	1,03125	40,22322	35,63056	-0,804747295	34,82582	-0,08599
166	2,0625	40,22322	66,17215	-0,804747295	65,3674	-0,08599
168	0	152,796	69,65428	0,617049505	70,27133	-0,12971
168	1,03125	152,796	71,16941	0,617049505	71,78646	-0,12971
168	2,0625	152,796	71,16941	0,617049505	71,78646	-0,12971
169	0	-143,214	-71,2808	-0,617049505	-71,8979	0,129705
169	1,03125	-143,214	-71,2808	-0,617049505	-71,8979	0,129705
169	2,0625	-143,214	-69,6395	-0,617049505	-70,2565	0,129705
170	0	-32,4042	-66,1584	0,804747295	-65,3536	0,085992
170	1,03125	-32,4042	-35,6168	0,804747295	-34,812	0,085992
170	2,0625	-32,4042	-5,07519	0,804747295	-4,27044	0,085992
171	0	72,20857	-2,30806	1,430298491	-0,87776	0,033953
171	1,03125	72,20857	28,23353	1,430298491	29,66383	0,033953
171	2,0625	72,20857	58,77511	1,430298491	60,20541	0,033953
172	0	180,7924	63,21494	2,469460856	65,6844	-0,00538
172	1,03125	180,7924	93,75653	2,469460856	96,22599	-0,00538
172	2,0625	180,7924	124,7394	2,469460856	127,2089	-0,00538
173	0	-152,722	-114,2	-13,89605261	-128,096	-0,01218
173	1,03125	-152,722	-83,2174	-13,89605261	-97,1134	-0,01218
173	2,0625	-152,722	-52,6758	-13,89605261	-66,5719	-0,01218
174	0	-56,5784	-54,1517	-6,507680232	-60,6593	-0,02112
174	1,03125	-56,5784	-23,6101	-6,507680232	-30,1178	-0,02112
174	2,0625	-56,5784	6,931506	-6,507680232	0,423826	-0,02112
175	0	38,72091	5,57419	3,815624233	9,389814	-0,04418
175	1,03125	38,72091	36,11578	3,815624233	39,9314	-0,04418
175	2,0625	38,72091	66,65736	3,815624233	70,47299	-0,04418
176	0	140,2731	66,28988	11,09383379	77,38371	-0,05338
176	1,03125	140,2731	67,80501	11,09383379	78,89884	-0,05338
176	2,0625	140,2731	67,80501	11,09383379	78,89884	-0,05338
177	0	-133,151	-67,9143	-11,09383379	-79,0081	0,053384
177	1,03125	-133,151	-67,9143	-11,09383379	-79,0081	0,053384
177	2,0625	-133,151	-66,2729	-11,09383379	-77,3667	0,053384
178	0	-31,3207	-66,6413	-3,815624233	-70,4569	0,044184
178	1,03125	-31,3207	-36,0997	-3,815624233	-39,9153	0,044184
178	2,0625	-31,3207	-5,55811	-3,815624233	-9,37374	0,044184
179	0	63,28978	-6,91625	6,507680232	-0,40857	0,021124
179	1,03125	63,28978	23,62534	6,507680232	30,13302	0,021124
179	2,0625	63,28978	54,16692	6,507680232	60,6746	0,021124
180	0	157,8641	52,69052	13,89605261	66,58657	0,01218
180	1,03125	157,8641	83,2321	13,89605261	97,12815	0,01218

180	2,0625	157,8641	114,215	13,89605261	128,111	0,01218
181	0	-131,166	-109,855	-48,59017207	-158,445	-0,03974
181	1,03125	-131,166	-78,872	-48,59017207	-127,462	-0,03974
181	2,0625	-131,166	-48,3304	-48,59017207	-96,9206	-0,03974
182	0	-48,4287	-52,5146	-14,79928089	-67,3139	-0,01204
182	1,03125	-48,4287	-21,973	-14,79928089	-36,7723	-0,01204
182	2,0625	-48,4287	8,568595	-14,79928089	-6,23069	-0,01204
183	0	36,32503	4,324714	13,47504368	17,79976	-5,2E-05
183	1,03125	36,32503	34,8663	13,47504368	48,34134	-5,2E-05
183	2,0625	36,32503	65,40789	13,47504368	78,88293	-5,2E-05
184	0	126,0661	60,31598	46,77762054	107,0936	0,034005
184	1,03125	126,0661	61,83111	46,77762054	108,6087	0,034005
184	2,0625	126,0661	61,83111	46,77762054	108,6087	0,034005
185	0	-114,427	-61,9423	-46,77762054	-108,72	-0,03401
185	1,03125	-114,427	-61,9423	-46,77762054	-108,72	-0,03401
185	2,0625	-114,427	-60,3009	-46,77762054	-107,079	-0,03401
186	0	-26,2	-65,3923	-13,47504368	-78,8674	5,17E-05
186	1,03125	-26,2	-34,8508	-13,47504368	-48,3258	5,17E-05
186	2,0625	-26,2	-4,30917	-13,47504368	-17,7842	5,17E-05
188	0	59,83426	-8,55317	14,79928089	6,246111	0,012041
188	1,03125	59,83426	21,98842	14,79928089	36,7877	0,012041
188	2,0625	59,83426	52,53	14,79928089	67,32928	0,012041
189	0	146,259	48,34527	48,59017207	96,93544	0,039738
189	1,03125	146,259	78,88686	48,59017207	127,477	0,039738
189	2,0625	146,259	109,8697	48,59017207	158,4599	0,039738
190	0	-150,792	-111,693	-13,39013893	-125,083	0,0017
190	1,03125	-150,792	-80,7098	-13,39013893	-94,0999	0,0017
190	2,0625	-150,792	-50,1682	-13,39013893	-63,5583	0,0017
191	0	-58,6554	-53,7671	-6,525431555	-60,2925	0,009831
191	1,03125	-58,6554	-23,2255	-6,525431555	-29,7509	0,009831
191	2,0625	-58,6554	7,316078	-6,525431555	0,790646	0,009831
192	0	34,25935	4,906781	3,609862079	8,516643	0,002196
192	1,03125	34,25935	35,44837	3,609862079	39,05823	0,002196
192	2,0625	34,25935	65,98995	3,609862079	69,59982	0,002196
193	0	129,3838	63,26965	10,22716587	73,49682	0,013483
193	1,03125	129,3838	64,78478	10,22716587	75,01194	0,013483
193	2,0625	129,3838	64,78478	10,22716587	75,01194	0,013483
194	0	-127,861	-64,8937	-10,22716587	-75,1209	-0,01348
194	1,03125	-127,861	-64,8937	-10,22716587	-75,1209	-0,01348
194	2,0625	-127,861	-63,2524	-10,22716587	-73,4795	-0,01348
195	0	-31,1554	-65,9741	-3,609862079	-69,5839	-0,0022
195	1,03125	-31,1554	-35,4325	-3,609862079	-39,0424	-0,0022
195	2,0625	-31,1554	-4,89091	-3,609862079	-8,50078	-0,0022
196	0	60,87259	-7,30119	6,525431555	-0,77575	-0,00983
196	1,03125	60,87259	23,2404	6,525431555	29,76583	-0,00983
196	2,0625	60,87259	53,78199	6,525431555	60,30742	-0,00983
197	0	149,4362	50,18232	13,39013893	63,57246	-0,0017
197	1,03125	149,4362	80,72391	13,39013893	94,11404	-0,0017
197	2,0625	149,4362	111,7068	13,39013893	125,0969	-0,0017
198	0	-168,544	-121,355	-1,896918333	-123,252	0,034857
198	1,03125	-168,544	-90,3721	-1,896918333	-92,269	0,034857
198	2,0625	-168,544	-59,8305	-1,896918333	-61,7274	0,034857
199	0	-68,2106	-58,386	-1,495442652	-59,8814	0,022306
199	1,03125	-68,2106	-27,8444	-1,495442652	-29,3398	0,022306
199	2,0625	-68,2106	2,697197	-1,495442652	1,201755	0,022306

200	0	33,85156	4,620361	-1,009312177	3,611049	-0,00546
200	1,03125	33,85156	35,16195	-1,009312177	34,15263	-0,00546
200	2,0625	33,85156	65,70353	-1,009312177	64,69422	-0,00546
201	0	137,635	66,23268	-0,302963442	65,92972	-0,01571
201	1,03125	137,635	67,74781	-0,302963442	67,44484	-0,01571
201	2,0625	137,635	67,74781	-0,302963442	67,44484	-0,01571
202	0	-137,72	-67,8622	0,302963442	-67,5592	0,015705
202	1,03125	-137,72	-67,8622	0,302963442	-67,5592	0,015705
202	2,0625	-137,72	-66,2208	0,302963442	-65,9178	0,015705
203	0	-33,2178	-65,6902	1,009312177	-64,6809	0,005456
203	1,03125	-33,2178	-35,1486	1,009312177	-34,1393	0,005456
203	2,0625	-33,2178	-4,60699	1,009312177	-3,59768	0,005456
204	0	68,92277	-2,68277	1,495442652	-1,18733	-0,02231
204	1,03125	68,92277	27,85882	1,495442652	29,35426	-0,02231
204	2,0625	68,92277	58,4004	1,495442652	59,89585	-0,02231
205	0	169,0206	59,84545	1,896918333	61,74237	-0,03486
205	1,03125	169,0206	90,38704	1,896918333	92,28396	-0,03486
205	2,0625	169,0206	121,3699	1,896918333	123,2668	-0,03486
206	0	-164,215	-119,386	-0,382684182	-119,769	0,019065
206	1,03125	-164,215	-88,4032	-0,382684182	-88,7859	0,019065
206	2,0625	-164,215	-57,8616	-0,382684182	-58,2443	0,019065
207	0	-67,1248	-58,3217	-0,503345597	-58,8251	0,016903
207	1,03125	-67,1248	-27,7802	-0,503345597	-28,2835	0,016903
207	2,0625	-67,1248	2,761429	-0,503345597	2,258083	0,016903
208	0	32,6061	3,639143	-0,611163845	3,027979	-0,00105
208	1,03125	32,6061	34,18073	-0,611163845	33,56957	-0,00105
208	2,0625	32,6061	64,72232	-0,611163845	64,11115	-0,00105
209	0	134,0247	64,52717	-0,657747677	63,86942	-0,00193
209	1,03125	134,0247	66,0423	-0,657747677	65,38455	-0,00193
209	2,0625	134,0247	66,0423	-0,657747677	65,38455	-0,00193
210	0	-134,695	-66,1538	0,657747677	-65,4961	0,001928
210	1,03125	-134,695	-66,1538	0,657747677	-65,4961	0,001928
210	2,0625	-134,695	-64,5125	0,657747677	-63,8547	0,001928
211	0	-31,9582	-64,7079	0,611163845	-64,0968	0,001051
211	1,03125	-31,9582	-34,1663	0,611163845	-33,5552	0,001051
211	2,0625	-31,9582	-3,62475	0,611163845	-3,01359	0,001051
212	0	67,91271	-2,74708	0,503345597	-2,24373	-0,0169
212	1,03125	67,91271	27,79451	0,503345597	28,29786	-0,0169
212	2,0625	67,91271	58,3361	0,503345597	58,83944	-0,0169
220	0	163,9976	57,87582	0,382684182	58,25851	-0,01907
220	1,03125	163,9976	88,41741	0,382684182	88,80009	-0,01907
220	2,0625	163,9976	119,4003	0,382684182	119,783	-0,01907
222	0	54,5439	4,743406	-0,32778504	4,415621	0,023349
222	1,03125	54,5439	35,28499	-0,32778504	34,95721	0,023349
222	2,0625	54,5439	65,82658	-0,32778504	65,49879	0,023349
223	0	154,3454	64,86356	-0,871539044	63,99202	0,031859
223	1,03125	154,3454	66,37868	-0,871539044	65,50714	0,031859
223	2,0625	154,3454	66,37868	-0,871539044	65,50714	0,031859
225	0	-125,592	-66,4889	0,871539044	-65,6174	-0,03186
225	1,03125	-125,592	-66,4889	0,871539044	-65,6174	-0,03186
225	2,0625	-125,592	-64,8476	0,871539044	-63,976	-0,03186
226	0	-25,6751	-65,8105	0,32778504	-65,4827	-0,02335
226	1,03125	-25,6751	-35,2689	0,32778504	-34,9411	-0,02335
226	2,0625	-25,6751	-4,72734	0,32778504	-4,39956	-0,02335
228	0	68,02779	-6,11558	-0,591493269	-6,70708	0,014907

339	2,0625	-120,939	-53,7492	-11,37734377	-65,1265	0,167694
340	0	-22,1066	-55,2071	-4,673736053	-59,8808	0,089919
340	1,03125	-22,1066	-24,6655	-4,673736053	-29,3392	0,089919
340	2,0625	-22,1066	5,876111	-4,673736053	1,202375	0,089919
341	0	75,15984	6,237968	5,435141659	11,67311	-0,05138
341	1,03125	75,15984	36,77955	5,435141659	42,2147	-0,05138
341	2,0625	75,15984	67,32114	5,435141659	72,75628	-0,05138
353	0	169,5777	66,08872	11,69346755	77,78219	-0,11592
353	1,03125	169,5777	67,60385	11,69346755	79,29732	-0,11592
353	2,0625	169,5777	67,60385	11,69346755	79,29732	-0,11592
355	0	-119,074	-67,7136	-11,69346755	-79,4071	0,115918
355	1,03125	-119,074	-67,7136	-11,69346755	-79,4071	0,115918
355	2,0625	-119,074	-66,0722	-11,69346755	-77,7657	0,115918
356	0	-20,6116	-67,3052	-5,435141659	-72,7404	0,051384
356	1,03125	-20,6116	-36,7636	-5,435141659	-42,1988	0,051384
356	2,0625	-20,6116	-6,22204	-5,435141659	-11,6572	0,051384
357	0	75,50172	-5,86061	4,673736053	-1,18687	-0,08992
357	1,03125	75,50172	24,68098	4,673736053	29,35471	-0,08992
357	2,0625	75,50172	55,22256	4,673736053	59,8963	-0,08992
358	0	166,3923	53,76406	11,37734377	65,1414	-0,16769
358	1,03125	166,3923	84,30565	11,37734377	95,68299	-0,16769
358	2,0625	166,3923	115,2885	11,37734377	126,6659	-0,16769
359	0	-134,52	-115,092	1,265025312	-113,827	-0,06824
359	1,03125	-134,52	-84,1094	1,265025312	-82,8444	-0,06824
359	2,0625	-134,52	-53,5678	1,265025312	-52,3028	-0,06824
360	0	-39,0172	-55,0727	0,571120672	-54,5016	0,015726
360	1,03125	-39,0172	-24,5311	0,571120672	-23,96	0,015726
360	2,0625	-39,0172	6,010489	0,571120672	6,58161	0,015726
361	0	55,36945	4,387417	-0,375715056	4,011702	0,08016
361	1,03125	55,36945	34,929	-0,375715056	34,55329	0,08016
361	2,0625	55,36945	65,47059	-0,375715056	65,09487	0,08016
362	0	154,4143	63,80796	-1,001950784	62,80601	0,167579
362	1,03125	154,4143	65,32309	-1,001950784	64,32114	0,167579
362	2,0625	154,4143	65,32309	-1,001950784	64,32114	0,167579
363	0	-123,127	-65,4342	1,001950784	-64,4322	-0,16758
363	1,03125	-123,127	-65,4342	1,001950784	-64,4322	-0,16758
363	2,0625	-123,127	-63,7928	1,001950784	-62,7909	-0,16758
364	0	-23,9251	-65,4553	0,375715056	-65,0796	-0,08016
364	1,03125	-23,9251	-34,9138	0,375715056	-34,538	-0,08016
364	2,0625	-23,9251	-4,37217	0,375715056	-3,99646	-0,08016
373	0	69,53542	-5,99538	-0,571120672	-6,5665	-0,01573
373	1,03125	69,53542	24,54621	-0,571120672	23,97509	-0,01573
373	2,0625	69,53542	55,0878	-0,571120672	54,51667	-0,01573
374	0	163,5508	53,5827	-1,265025312	52,31768	0,068238
374	1,03125	163,5508	84,12429	-1,265025312	82,85926	0,068238
374	2,0625	163,5508	115,1072	-1,265025312	113,8421	0,068238
375	0	-147,936	-117,522	0,577227312	-116,944	0,048895
375	1,03125	-147,936	-86,5387	0,577227312	-85,9615	0,048895
375	2,0625	-147,936	-55,9971	0,577227312	-55,4199	0,048895
376	0	-51,3877	-56,6498	0,385436757	-56,2644	0,058949
376	1,03125	-51,3877	-26,1082	0,385436757	-25,7228	0,058949
376	2,0625	-51,3877	4,433344	0,385436757	4,818781	0,058949
377	0	45,33359	4,192287	-0,029975564	4,162312	0,056228
377	1,03125	45,33359	34,73387	-0,029975564	34,7039	0,056228
377	2,0625	45,33359	65,27546	-0,029975564	65,24548	0,056228

378	0	145,5725	64,6303	-0,174630477	64,45567	0,066018
378	1,03125	145,5725	66,14543	-0,174630477	65,9708	0,066018
378	2,0625	145,5725	66,14543	-0,174630477	65,9708	0,066018
379	0	-129,92	-66,2569	0,174630477	-66,0822	-0,06602
379	1,03125	-129,92	-66,2569	0,174630477	-66,0822	-0,06602
379	2,0625	-129,92	-64,6155	0,174630477	-64,4409	-0,06602
383	0	-28,2412	-65,2606	0,029975564	-65,2307	-0,05623
383	1,03125	-28,2412	-34,719	0,029975564	-34,6891	-0,05623
383	2,0625	-28,2412	-4,17746	0,029975564	-4,14749	-0,05623
384	0	68,46667	-4,41849	-0,385436757	-4,80393	-0,05895
384	1,03125	68,46667	26,12309	-0,385436757	25,73766	-0,05895
384	2,0625	68,46667	56,66468	-0,385436757	56,27924	-0,05895
387	0	163,6801	56,01189	-0,577227312	55,43466	-0,0489
387	1,03125	163,6801	86,55347	-0,577227312	85,97625	-0,0489
387	2,0625	163,6801	117,5364	-0,577227312	116,9591	-0,0489
388	0	-156,15	-118,716	0,098825316	-118,617	0,081767
388	1,03125	-156,15	-87,7327	0,098825316	-87,6338	0,081767
388	2,0625	-156,15	-57,1911	0,098825316	-57,0923	0,081767
390	0	-59,3251	-57,6574	0,112323844	-57,5451	0,077734
390	1,03125	-59,3251	-27,1158	0,112323844	-27,0035	0,077734
390	2,0625	-59,3251	3,425787	0,112323844	3,538111	0,077734
391	0	38,38471	3,689751	0,116927446	3,806678	0,046024
391	1,03125	38,38471	34,23134	0,116927446	34,34826	0,046024
391	2,0625	38,38471	64,77292	0,116927446	64,88985	0,046024
392	0	138,9398	64,30419	0,133150807	64,43734	0,04338
392	1,03125	138,9398	65,81932	0,133150807	65,95247	0,04338
392	2,0625	138,9398	65,81932	0,133150807	65,95247	0,04338
397	0	-132,027	-65,931	-0,133150807	-66,0642	-0,04338
397	1,03125	-132,027	-65,931	-0,133150807	-66,0642	-0,04338
397	2,0625	-132,027	-64,2896	-0,133150807	-64,4228	-0,04338
399	0	-29,9968	-64,7584	-0,116927446	-64,8753	-0,04602
399	1,03125	-29,9968	-34,2168	-0,116927446	-34,3337	-0,04602
399	2,0625	-29,9968	-3,67519	-0,116927446	-3,79212	-0,04602
400	0	67,74138	-3,41119	-0,112323844	-3,52352	-0,07773
400	1,03125	67,74138	27,13039	-0,112323844	27,01807	-0,07773
400	2,0625	67,74138	57,67198	-0,112323844	57,55966	-0,07773
402	0	163,3232	57,20561	-0,098825316	57,10678	-0,08177
402	1,03125	163,3232	87,74719	-0,098825316	87,64837	-0,08177
402	2,0625	163,3232	118,7301	-0,098825316	118,6313	-0,08177
403	0	-161,714	-119,709	-0,218563891	-119,927	0,095347
403	1,03125	-161,714	-88,726	-0,218563891	-88,9445	0,095347
403	2,0625	-161,714	-58,1844	-0,218563891	-58,403	0,095347
420	0	-64,3191	-58,3739	-0,167621367	-58,5415	0,082251
420	1,03125	-64,3191	-27,8323	-0,167621367	-27,9999	0,082251
420	2,0625	-64,3191	2,709269	-0,167621367	2,541648	0,082251
421	0	34,47605	3,413352	-0,105497352	3,307855	0,040439
421	1,03125	34,47605	33,95494	-0,105497352	33,84944	0,040439
421	2,0625	34,47605	64,49652	-0,105497352	64,39103	0,040439
463	0	135,5665	64,24805	-0,042027212	64,20602	0,028606
463	1,03125	135,5665	65,76318	-0,042027212	65,72115	0,028606
463	2,0625	135,5665	65,76318	-0,042027212	65,72115	0,028606
517	0	-132,981	-65,8753	0,042027212	-65,8332	-0,02861
517	1,03125	-132,981	-65,8753	0,042027212	-65,8332	-0,02861
517	2,0625	-132,981	-64,2339	0,042027212	-64,1918	-0,02861
518	0	-30,4997	-64,4823	0,105497352	-64,3768	-0,04044

518	1,03125	-30,4997	-33,9407	0,105497352	-33,8352	-0,04044
518	2,0625	-30,4997	-3,39916	0,105497352	-3,29366	-0,04044
527	0	68,33347	-2,69507	0,167621367	-2,52745	-0,08225
527	1,03125	68,33347	27,84652	0,167621367	28,01414	-0,08225
527	2,0625	68,33347	58,38811	0,167621367	58,55573	-0,08225
530	0	164,5365	58,19852	0,218563891	58,41708	-0,09535
530	1,03125	164,5365	88,7401	0,218563891	88,95867	-0,09535
530	2,0625	164,5365	119,723	0,218563891	119,9416	-0,09535
531	0	-164,058	-119,996	-0,472987113	-120,469	0,098239
531	1,03125	-164,058	-89,013	-0,472987113	-89,486	0,098239
531	2,0625	-164,058	-58,4714	-0,472987113	-58,9444	0,098239
534	0	-66,8812	-58,6845	-0,560549156	-59,245	0,075219
534	1,03125	-66,8812	-28,1429	-0,560549156	-28,7034	0,075219
534	2,0625	-66,8812	2,398706	-0,560549156	1,838157	0,075219
536	0	33,25782	3,5036	-0,637651565	2,865949	0,035308
536	1,03125	33,25782	34,04519	-0,637651565	33,40753	0,035308
536	2,0625	33,25782	64,58677	-0,637651565	63,94912	0,035308
537	0	135,194	64,62064	-0,650551171	63,97009	0,013973
537	1,03125	135,194	66,13577	-0,650551171	65,48522	0,013973
537	2,0625	135,194	66,13577	-0,650551171	65,48522	0,013973
538	0	-133,614	-66,2482	0,650551171	-65,5976	-0,01397
538	1,03125	-133,614	-66,2482	0,650551171	-65,5976	-0,01397
538	2,0625	-133,614	-64,6068	0,650551171	-63,9562	-0,01397
539	0	-30,5072	-64,5732	0,637651565	-63,9356	-0,03531
539	1,03125	-30,5072	-34,0316	0,637651565	-33,394	-0,03531
539	2,0625	-30,5072	-3,49005	0,637651565	-2,8524	-0,03531
540	0	69,63979	-2,38515	0,560549156	-1,8246	-0,07522
540	1,03125	69,63979	28,15644	0,560549156	28,71699	-0,07522
540	2,0625	69,63979	58,69802	0,560549156	59,25857	-0,07522
610	0	165,9599	58,48492	0,472987113	58,95791	-0,09824
610	1,03125	165,9599	89,0265	0,472987113	89,49949	-0,09824
610	2,0625	165,9599	120,0094	0,472987113	120,4824	-0,09824
677	0	-168,43	-120,596	-1,813867193	-122,41	-0,02477
677	1,03125	-168,43	-89,6133	-1,813867193	-91,4272	-0,02477
677	2,0625	-168,43	-59,0718	-1,813867193	-60,8856	-0,02477
685	0	-66,0756	-58,2293	-1,483978093	-59,7133	0,024731
685	1,03125	-66,0756	-27,6877	-1,483978093	-29,1717	0,024731
685	2,0625	-66,0756	2,853879	-1,483978093	1,369901	0,024731
686	0	36,26226	4,141432	-1,07375753	3,067674	0,064205
686	1,03125	36,26226	34,68302	-1,07375753	33,60926	0,064205
686	2,0625	36,26226	65,2246	-1,07375753	64,15085	0,064205
687	0	138,9821	65,13212	-0,445239698	64,68688	0,114156
687	1,03125	138,9821	66,64724	-0,445239698	66,20201	0,114156
687	2,0625	138,9821	66,64724	-0,445239698	66,20201	0,114156
688	0	-134,621	-66,7625	0,445239698	-66,3172	-0,11416
688	1,03125	-134,621	-66,7625	0,445239698	-66,3172	-0,11416
688	2,0625	-134,621	-65,1211	0,445239698	-64,6759	-0,11416
689	0	-30,473	-65,2121	1,07375753	-64,1383	-0,0642
689	1,03125	-30,473	-34,6705	1,07375753	-33,5967	-0,0642
689	2,0625	-30,473	-4,12891	1,07375753	-3,05515	-0,0642
690	0	71,0925	-2,84032	1,483978093	-1,35634	-0,02473
690	1,03125	71,0925	27,70126	1,483978093	29,18524	-0,02473
690	2,0625	71,0925	58,24285	1,483978093	59,72683	-0,02473
691	0	170,3549	59,08574	1,813867193	60,89961	0,02477
691	1,03125	170,3549	89,62733	1,813867193	91,44119	0,02477

691	2,0625	170,3549	120,6102	1,813867193	122,4241	0,02477
692	0	-135,213	-110,856	-13,2762394	-124,132	-0,075
692	1,03125	-135,213	-79,8728	-13,2762394	-93,149	-0,075
692	2,0625	-135,213	-49,3312	-13,2762394	-62,6074	-0,075
693	0	-50,3555	-53,4533	-6,481121457	-59,9345	-0,00821
693	1,03125	-50,3555	-22,9118	-6,481121457	-29,3929	-0,00821
693	2,0625	-50,3555	7,629832	-6,481121457	1,148711	-0,00821
694	0	38,86869	4,493876	3,562872335	8,056749	0,063993
694	1,03125	38,86869	35,03546	3,562872335	38,59833	0,063993
694	2,0625	38,86869	65,57705	3,562872335	69,13992	0,063993
695	0	134,4445	62,3531	10,1192374	72,47234	0,132598
695	1,03125	134,4445	63,86823	10,1192374	73,98746	0,132598
695	2,0625	134,4445	63,86823	10,1192374	73,98746	0,132598
696	0	-121,672	-63,9778	-10,1192374	-74,097	-0,1326
696	1,03125	-121,672	-63,9778	-10,1192374	-74,097	-0,1326
696	2,0625	-121,672	-62,3364	-10,1192374	-72,4556	-0,1326
697	0	-27,4677	-65,5619	-3,562872335	-69,1247	-0,06399
697	1,03125	-27,4677	-35,0203	-3,562872335	-38,5831	-0,06399
697	2,0625	-27,4677	-4,47869	-3,562872335	-8,04156	-0,06399
698	0	63,40006	-7,61573	6,481121457	-1,13461	0,008211
698	1,03125	63,40006	22,92586	6,481121457	29,40698	0,008211
698	2,0625	63,40006	53,46744	6,481121457	59,94857	0,008211
699	0	152,4266	49,34445	13,2762394	62,62069	0,074999
699	1,03125	152,4266	79,88604	13,2762394	93,16228	0,074999
699	2,0625	152,4266	110,8689	13,2762394	124,1452	0,074999
700	0	-142,844	-110,378	-48,65472653	-159,032	0,014453
700	1,03125	-142,844	-79,3948	-48,65472653	-128,05	0,014453
700	2,0625	-142,844	-48,8532	-48,65472653	-97,5079	0,014453
701	0	-53,9429	-52,5441	-14,80127888	-67,3454	-0,01072
701	1,03125	-53,9429	-22,0025	-14,80127888	-36,8038	-0,01072
701	2,0625	-53,9429	8,539092	-14,80127888	-6,26219	-0,01072
702	0	33,69018	4,455912	13,4944731	17,95039	-0,01514
702	1,03125	33,69018	34,9975	13,4944731	48,49197	-0,01514
702	2,0625	33,69018	65,53908	13,4944731	79,03356	-0,01514
703	0	123,6798	60,92546	46,85418268	107,7796	-0,03456
703	1,03125	123,6798	62,44059	46,85418268	109,2948	-0,03456
703	2,0625	123,6798	62,44059	46,85418268	109,2948	-0,03456
704	0	-117,725	-62,5521	-46,85418268	-109,406	0,034563
704	1,03125	-117,725	-62,5521	-46,85418268	-109,406	0,034563
704	2,0625	-117,725	-60,9108	-46,85418268	-107,765	0,034563
705	0	-27,7287	-65,5239	-13,4944731	-79,0184	0,01514
705	1,03125	-27,7287	-34,9824	-13,4944731	-48,4768	0,01514
705	2,0625	-27,7287	-4,44078	-13,4944731	-17,9353	0,01514
706	0	58,95921	-8,52422	14,80127888	6,277055	0,010716
706	1,03125	58,95921	22,01736	14,80127888	36,81864	0,010716
706	2,0625	58,95921	52,55895	14,80127888	67,36023	0,010716
707	0	145,6484	48,86745	48,65472653	97,52218	-0,01445
707	1,03125	145,6484	79,40904	48,65472653	128,0638	-0,01445
707	2,0625	145,6484	110,3919	48,65472653	159,0466	-0,01445
708	0	-153,738	-115,98	-14,10040137	-130,08	0,163668
708	1,03125	-153,738	-84,9967	-14,10040137	-99,0971	0,163668
708	2,0625	-153,738	-54,4551	-14,10040137	-68,5555	0,163668
709	0	-58,4343	-54,5154	-6,545106228	-61,0605	-0,0028
709	1,03125	-58,4343	-23,9738	-6,545106228	-30,5189	-0,0028
709	2,0625	-58,4343	6,567775	-6,545106228	0,022669	-0,0028

710	0	37,25707	6,272767	3,905824058	10,17859	-0,14616
710	1,03125	37,25707	36,81435	3,905824058	40,72018	-0,14616
710	2,0625	37,25707	67,35594	3,905824058	71,26176	-0,14616
711	0	141,0614	68,40266	11,35485839	79,75752	-0,31798
711	1,03125	141,0614	69,91779	11,35485839	81,27265	-0,31798
711	2,0625	141,0614	69,91779	11,35485839	81,27265	-0,31798
712	0	-135,969	-70,0268	-11,35485839	-81,3816	0,317976
712	1,03125	-135,969	-70,0268	-11,35485839	-81,3816	0,317976
712	2,0625	-135,969	-68,3854	-11,35485839	-79,7402	0,317976
713	0	-33,4078	-67,3401	-3,905824058	-71,2459	0,146157
713	1,03125	-33,4078	-36,7985	-3,905824058	-40,7043	0,146157
713	2,0625	-33,4078	-6,2569	-3,905824058	-10,1627	0,146157
714	0	62,07514	-6,55279	6,545106228	-0,00769	0,002796
714	1,03125	62,07514	23,98879	6,545106228	30,5339	0,002796
714	2,0625	62,07514	54,53038	6,545106228	61,07549	0,002796
715	0	158,2295	54,46981	14,10040137	68,57021	-0,16367
715	1,03125	158,2295	85,0114	14,10040137	99,1118	-0,16367
715	2,0625	158,2295	115,9943	14,10040137	130,0947	-0,16367
716	0	-173,788	-126,307	-2,636060023	-128,943	0,135134
716	1,03125	-173,788	-95,3239	-2,636060023	-97,96	0,135134
716	2,0625	-173,788	-64,7824	-2,636060023	-67,4184	0,135134
717	0	-65,5225	-59,0478	-1,444922366	-60,4927	-0,04786
717	1,03125	-65,5225	-28,5062	-1,444922366	-29,9511	-0,04786
717	2,0625	-65,5225	2,035403	-1,444922366	0,590481	-0,04786
718	0	39,92653	5,763928	-0,709031118	5,054897	-0,20568
718	1,03125	39,92653	36,30551	-0,709031118	35,59648	-0,20568
718	2,0625	39,92653	66,8471	-0,709031118	66,13807	-0,20568
719	0	153,8419	71,67106	0,867102751	72,53816	-0,39886
719	1,03125	153,8419	73,18619	0,867102751	74,05329	-0,39886
719	2,0625	153,8419	73,18619	0,867102751	74,05329	-0,39886
720	0	-146,826	-73,3006	-0,867102751	-74,1677	0,398862
720	1,03125	-146,826	-73,3006	-0,867102751	-74,1677	0,398862
720	2,0625	-146,826	-71,6592	-0,867102751	-72,5263	0,398862
721	0	-34,7647	-66,8335	0,709031118	-66,1245	0,205677
721	1,03125	-34,7647	-36,2919	0,709031118	-35,5829	0,205677
721	2,0625	-34,7647	-5,75036	0,709031118	-5,04133	0,205677
722	0	70,66253	-2,02046	1,444922366	-0,57554	0,047864
722	1,03125	70,66253	28,52113	1,444922366	29,96605	0,047864
722	2,0625	70,66253	59,06271	1,444922366	60,50763	0,047864
723	0	180,2207	64,79847	2,636060023	67,43453	-0,13513
723	1,03125	180,2207	95,34006	2,636060023	97,97612	-0,13513
723	2,0625	180,2207	126,3229	2,636060023	128,959	-0,13513
724	0	-159,355	-120,955	-0,199034371	-121,155	-0,0795
724	1,03125	-159,355	-89,9726	-0,199034371	-90,1716	-0,0795
724	2,0625	-159,355	-59,431	-0,199034371	-59,63	-0,0795
725	0	-59,3584	-57,9522	-0,16830525	-58,1205	-0,12564
725	1,03125	-59,3584	-27,4106	-0,16830525	-27,5789	-0,12564
725	2,0625	-59,3584	3,130965	-0,16830525	2,96266	-0,12564
726	0	36,99764	4,107357	-0,552845994	3,554511	-0,1871
726	1,03125	36,99764	34,64894	-0,552845994	34,0961	-0,1871
726	2,0625	36,99764	65,19053	-0,552845994	64,63768	-0,1871
727	0	144,5692	67,0234	-0,39517238	66,62823	-0,23788
727	1,03125	144,5692	68,53853	-0,39517238	68,14336	-0,23788
727	2,0625	144,5692	68,53853	-0,39517238	68,14336	-0,23788
728	0	-136,867	-68,6496	0,39517238	-68,2545	0,23788

728	1,03125	-136,867	-68,6496	0,39517238	-68,2545	0,23788
728	2,0625	-136,867	-67,0083	0,39517238	-66,6131	0,23788
729	0	-30,6835	-65,1756	0,552845994	-64,6227	0,187098
729	1,03125	-30,6835	-34,634	0,552845994	-34,0812	0,187098
729	2,0625	-30,6835	-4,09241	0,552845994	-3,53957	0,187098
730	0	65,66995	-3,11623	0,16830525	-2,94792	0,125639
730	1,03125	65,66995	27,42536	0,16830525	27,59366	0,125639
730	2,0625	65,66995	57,96694	0,16830525	58,13525	0,125639
731	0	166,6669	59,44608	0,199034371	59,64511	0,079501
731	1,03125	166,6669	89,98766	0,199034371	90,1867	0,079501
731	2,0625	166,6669	120,9705	0,199034371	121,1696	0,079501
732	0	-142,041	-121,065	1,270880925	-119,795	-0,02259
732	1,03125	-142,041	-90,0826	1,270880925	-88,8117	-0,02259
732	2,0625	-142,041	-59,541	1,270880925	-58,2701	-0,02259
733	0	-52,6893	-57,188	0,663334711	-56,5246	-0,11507
733	1,03125	-52,6893	-26,6464	0,663334711	-25,983	-0,11507
733	2,0625	-52,6893	3,895221	0,663334711	4,558556	-0,11507
734	0	39,86962	4,276808	-0,562487866	3,71432	-0,20204
734	1,03125	39,86962	34,81839	-0,562487866	34,25591	-0,20204
734	2,0625	39,86962	65,35998	-0,562487866	64,79749	-0,20204
735	0	135,2311	67,8566	-1,009696345	66,84691	-0,3035
735	1,03125	135,2311	69,37173	-1,009696345	68,36203	-0,3035
735	2,0625	135,2311	69,37173	-1,009696345	68,36203	-0,3035
736	0	-123,954	-69,4799	1,009696345	-68,4702	0,303502
736	1,03125	-123,954	-69,4799	1,009696345	-68,4702	0,303502
736	2,0625	-123,954	-67,8385	1,009696345	-66,8288	0,303502
737	0	-29,8757	-65,3433	0,562487866	-64,7809	0,202036
737	1,03125	-29,8757	-34,8018	0,562487866	-34,2393	0,202036
737	2,0625	-29,8757	-4,26017	0,562487866	-3,69769	0,202036
738	0	62,60401	-3,8804	-0,663334711	-4,54374	0,11507
738	1,03125	62,60401	26,66118	-0,663334711	25,99785	0,11507
738	2,0625	62,60401	57,20277	-0,663334711	56,53943	0,11507
739	0	152,7375	59,55315	-1,270880925	58,28227	0,022589
739	1,03125	152,7375	90,09474	-1,270880925	88,82385	0,022589
739	2,0625	152,7375	121,0776	-1,270880925	119,8067	0,022589
740	0	-227,615	-112,682	-4,232687085	-116,915	-0,21108
740	1,03125	-227,615	-81,6992	-4,232687085	-85,9318	-0,21108
740	2,0625	-227,615	-51,1576	-4,232687085	-55,3903	-0,21108
741	0	-73,1846	-54,6527	-1,721788605	-56,3745	-0,13832
741	1,03125	-73,1846	-24,1111	-1,721788605	-25,8329	-0,13832
741	2,0625	-73,1846	6,430498	-1,721788605	4,708709	-0,13832
742	0	76,55469	3,273505	2,450178269	5,723683	-0,11575
742	1,03125	76,55469	33,81509	2,450178269	36,26527	-0,11575
742	2,0625	76,55469	64,35668	2,450178269	66,80686	-0,11575
743	0	240,7033	60,71655	4,665611987	65,38216	-0,04775
743	1,03125	240,7033	62,23168	4,665611987	66,89729	-0,04775
743	2,0625	240,7033	62,23168	4,665611987	66,89729	-0,04775
744	0	-222,273	-62,3464	-4,665611987	-67,012	0,047748
744	1,03125	-222,273	-62,3464	-4,665611987	-67,012	0,047748
744	2,0625	-222,273	-60,705	-4,665611987	-65,3706	0,047748
745	0	-60,9089	-64,3433	-2,450178269	-66,7934	0,115755
745	1,03125	-60,9089	-33,8017	-2,450178269	-36,2518	0,115755
745	2,0625	-60,9089	-3,26008	-2,450178269	-5,71026	0,115755
746	0	88,71991	-6,41396	1,721788605	-4,69217	0,138319
746	1,03125	88,71991	24,12763	1,721788605	25,84941	0,138319

746	2,0625	88,71991	54,66921	1,721788605	56,391	0,138319
747	0	245,53	51,1791	4,232687085	55,41178	0,211081
747	1,03125	245,53	81,72068	4,232687085	85,95337	0,211081
747	2,0625	245,53	112,7036	4,232687085	116,9363	0,211081
748	0	4,562382	-117,47	0,228486527	-117,241	-0,07051
748	1,03125	4,562382	-86,4869	0,228486527	-86,2584	-0,07051
748	2,0625	4,562382	-55,9453	0,228486527	-55,7168	-0,07051
749	0	4,562382	-55,9453	0,228486527	-55,7168	-0,07051
749	1,031251	4,562382	-25,4037	0,228486527	-25,1752	-0,07051
749	2,062501	4,562382	5,137869	0,228486527	5,366356	-0,07051
750	0	4,562382	5,137869	0,228486527	5,366356	-0,07051
750	1,03125	4,562382	36,29635	0,228486527	36,52484	-0,07051
750	2,0625	4,562382	67,45483	0,228486527	67,68332	-0,07051
751	0	4,562382	67,45483	0,228486527	67,68332	-0,07051
751	1,03125	4,562382	68,96996	0,228486527	69,19844	-0,07051
751	2,062499	4,562382	68,96996	0,228486527	69,19844	-0,07051
752	0	9,497825	-68,2668	-0,228486527	-68,4953	0,070508
752	1,03125	9,497825	-68,2668	-0,228486527	-68,4953	0,070508
752	2,0625	9,497825	-66,6254	-0,228486527	-66,8539	0,070508
753	0	9,497825	-66,6254	-0,228486527	-66,8539	0,070508
753	1,031251	9,497825	-36,0838	-0,228486527	-36,3123	0,070508
753	2,062501	9,497825	-5,54222	-0,228486527	-5,7707	0,070508
754	0	9,497825	-5,54222	-0,228486527	-5,7707	0,070508
754	1,03125	9,497825	24,99936	-0,228486527	24,77088	0,070508
754	2,0625	9,497825	55,54094	-0,228486527	55,31246	0,070508
755	0	9,497825	55,54094	-0,228486527	55,31246	0,070508
755	1,03125	9,497825	86,08252	-0,228486527	85,85403	0,070508
755	2,062499	9,497825	117,0654	-0,228486527	116,8369	0,070508
756	0	-249,211	-175,529	-66,24334958	-241,773	0,045732
756	1,03125	-249,211	-140,005	-66,24334958	-206,248	0,045732
756	2,0625	-249,211	-95,507	-66,24334958	-161,75	0,045732
757	0	-72,2018	-85,2145	-19,92984944	-105,144	0,035374
757	1,03125	-72,2018	-40,7168	-19,92984944	-60,6466	0,035374
757	2,0625	-72,2018	3,780894	-19,92984944	-16,149	0,035374
758	0	100,1692	10,8526	21,89811419	32,75071	-0,03986
758	1,03125	100,1692	55,35027	21,89811419	77,24839	-0,03986
758	2,0625	100,1692	99,84795	21,89811419	121,7461	-0,03986
759	0	295,1971	110,9611	68,86792718	179,829	-0,0523
759	1,03125	295,1971	113,1676	68,86792718	182,0355	-0,0523
759	2,0625	295,1971	113,1676	68,86792718	182,0355	-0,0523
760	0	-273,182	-113,338	-68,86792718	-182,206	0,052299
760	1,03125	-273,182	-113,338	-68,86792718	-182,206	0,052299
760	2,0625	-273,182	-110,947	-68,86792718	-179,815	0,052299
761	0	-78,987	-99,8323	-21,89811419	-121,73	0,03986
761	1,03125	-78,987	-55,3346	-21,89811419	-77,2327	0,03986
761	2,0625	-78,987	-10,8369	-21,89811419	-32,735	0,03986
762	0	93,98296	-3,76572	19,92984944	16,16413	-0,03537
762	1,03125	93,98296	40,73195	19,92984944	60,6618	-0,03537
762	2,0625	93,98296	85,22963	19,92984944	105,1595	-0,03537
763	0	273,8521	95,51877	66,24334958	161,7621	-0,04573
763	1,03125	273,8521	140,0164	66,24334958	206,2598	-0,04573
763	2,0625	273,8521	175,541	66,24334958	241,7844	-0,04573
764	0	-110,873	-159,635	-10,15158335	-169,787	0,534988
764	1,03125	-110,873	-124,111	-10,15158335	-134,262	0,534988
764	2,0625	-110,873	-79,613	-10,15158335	-89,7646	0,534988

765	0	-34,8669	-81,546	-4,87879432	-86,4248	0,211455
765	1,03125	-34,8669	-37,0483	-4,87879432	-41,9271	0,211455
765	2,0625	-34,8669	7,449387	-4,87879432	2,570592	0,211455
766	0	47,22192	6,353989	3,842373949	10,19636	-0,02982
766	1,03125	47,22192	50,85166	3,842373949	54,69404	-0,02982
766	2,0625	47,22192	95,34934	3,842373949	99,19171	-0,02982
767	0	123,0917	93,3749	8,88332604	102,2582	-0,35767
767	1,03125	123,0917	95,58139	8,88332604	104,4647	-0,35767
767	2,0625	123,0917	95,58139	8,88332604	104,4647	-0,35767
768	0	-103,598	-95,7376	-8,88332604	-104,621	0,357672
768	1,03125	-103,598	-95,7376	-8,88332604	-104,621	0,357672
768	2,0625	-103,598	-93,3473	-8,88332604	-102,231	0,357672
769	0	-27,5721	-95,3313	-3,842373949	-99,1736	0,029821
769	1,03125	-27,5721	-50,8336	-3,842373949	-54,676	0,029821
769	2,0625	-27,5721	-6,3359	-3,842373949	-10,1783	0,029821
770	0	54,08778	-7,43642	4,87879432	-2,55762	-0,21145
770	1,03125	54,08778	37,06126	4,87879432	41,94005	-0,21145
770	2,0625	54,08778	81,55894	4,87879432	86,43773	-0,21145
774	0	127,9445	79,62618	10,15158335	89,77777	-0,53499
774	1,03125	127,9445	124,1239	10,15158335	134,2754	-0,53499
774	2,0625	127,9445	159,6485	10,15158335	169,8	-0,53499
775	0	-126,22	-89,631	-8,623146156	-98,2542	-0,27681
775	1,03125	-126,22	-89,631	-8,623146156	-98,2542	-0,27681
775	2,0625	-126,22	-87,2407	-8,623146156	-95,8638	-0,27681
843	0	-38,4108	-92,2546	-2,843198169	-95,0978	-0,15812
843	1,03125	-38,4108	-47,7569	-2,843198169	-50,6001	-0,15812
843	2,0625	-38,4108	-3,25921	-2,843198169	-6,1024	-0,15812
910	0	46,7399	-6,62679	6,166198201	-0,4606	-0,2019
910	1,03125	46,7399	37,87088	6,166198201	44,03708	-0,2019
910	2,0625	46,7399	82,36856	6,166198201	88,53475	-0,2019
918	0	130,2726	77,61825	11,89265168	89,51091	-0,10048
918	1,03125	130,2726	122,1159	11,89265168	134,0086	-0,10048
918	2,0625	130,2726	157,6405	11,89265168	169,5332	-0,10048
919	0	-111,499	-89,646	-8,623146156	-98,2692	-0,27681
919	1,03125	-111,499	-89,646	-8,623146156	-98,2692	-0,27681
919	2,0625	-111,499	-87,2557	-8,623146156	-95,8788	-0,27681
920	0	-23,069	-92,2556	-2,843198169	-95,0988	-0,15812
920	1,03125	-23,069	-47,7579	-2,843198169	-50,6011	-0,15812
920	2,0625	-23,069	-3,26026	-2,843198169	-6,10346	-0,15812
921	0	62,07878	-6,61967	6,166198201	-0,45347	-0,2019
921	1,03125	62,07878	37,87801	6,166198201	44,04421	-0,2019
921	2,0625	62,07878	82,37568	6,166198201	88,54188	-0,2019
922	0	145,6771	77,62692	11,89265168	89,51957	-0,10048
922	1,03125	145,6771	122,1246	11,89265168	134,0172	-0,10048
922	2,0625	145,6771	157,6492	11,89265168	169,5418	-0,10048
923	0	-183,135	-164,587	-56,47390369	-221,061	0,388669
923	1,03125	-183,135	-129,062	-56,47390369	-185,536	0,388669
923	2,0625	-183,135	-84,5643	-56,47390369	-141,038	0,388669
924	0	-66,7044	-85,6671	-17,83161461	-103,499	0,307403
924	1,03125	-66,7044	-41,1694	-17,83161461	-59,001	0,307403
924	2,0625	-66,7044	3,328279	-17,83161461	-14,5033	0,307403
925	0	43,6678	3,40684	14,57827964	17,98512	0,17065
925	1,03125	43,6678	47,90452	14,57827964	62,48279	0,17065
925	2,0625	43,6678	92,40219	14,57827964	106,9805	0,17065
926	0	163,5358	91,28591	52,55013855	143,836	0,08994

926	1,03125	163,5358	93,49241	52,55013855	146,0425	0,08994
926	2,0625	163,5358	93,49241	52,55013855	146,0425	0,08994
927	0	-154,433	-93,6486	-52,55013855	-146,199	-0,08994
927	1,03125	-154,433	-93,6486	-52,55013855	-146,199	-0,08994
927	2,0625	-154,433	-91,2582	-52,55013855	-143,808	-0,08994
928	0	-33,4025	-92,3832	-14,57827964	-106,961	-0,17065
928	1,03125	-33,4025	-47,8855	-14,57827964	-62,4638	-0,17065
928	2,0625	-33,4025	-3,3878	-14,57827964	-17,9661	-0,17065
929	0	76,9899	-3,31388	17,83161461	14,51774	-0,3074
929	1,03125	76,9899	41,1838	17,83161461	59,01541	-0,3074
929	2,0625	76,9899	85,68147	17,83161461	103,5131	-0,3074
930	0	192,535	84,5777	56,47390369	141,0516	-0,38867
930	1,03125	192,535	129,0754	56,47390369	185,5493	-0,38867
930	2,0625	192,535	164,6	56,47390369	221,0739	-0,38867
931	0	-157,818	-168,131	-14,4440709	-182,575	0,514106
931	1,03125	-157,818	-132,607	-14,4440709	-147,051	0,514106
931	2,0625	-157,818	-88,109	-14,4440709	-102,553	0,514106
932	0	-65,7608	-87,6339	-7,165115094	-94,799	0,383299
932	1,03125	-65,7608	-43,1362	-7,165115094	-50,3013	0,383299
932	2,0625	-65,7608	1,36145	-7,165115094	-5,80367	0,383299
933	0	32,96669	3,838937	3,807726189	7,646663	0,157659
933	1,03125	32,96669	48,33661	3,807726189	52,14434	0,157659
933	2,0625	32,96669	92,83429	3,807726189	96,64201	0,157659
934	0	129,3332	93,24408	11,07423866	104,3183	0,038611
934	1,03125	129,3332	95,45058	11,07423866	106,5248	0,038611
934	2,0625	129,3332	95,45058	11,07423866	106,5248	0,038611
935	0	-123,781	-95,618	-11,07423866	-106,692	-0,03861
935	1,03125	-123,781	-95,618	-11,07423866	-106,692	-0,03861
935	2,0625	-123,781	-93,2276	-11,07423866	-104,302	-0,03861
936	0	-26,4534	-92,816	-3,807726189	-96,6237	-0,15766
936	1,03125	-26,4534	-48,3183	-3,807726189	-52,126	-0,15766
936	2,0625	-26,4534	-3,82064	-3,807726189	-7,62837	-0,15766
937	0	72,111	-1,34262	7,165115094	5,822492	-0,3833
937	1,03125	72,111	43,15505	7,165115094	50,32017	-0,3833
937	2,0625	72,111	87,65273	7,165115094	94,81784	-0,3833
938	0	163,5013	88,12777	14,4440709	102,5718	-0,51411
938	1,03125	163,5013	132,6254	14,4440709	147,0695	-0,51411
938	2,0625	163,5013	168,15	14,4440709	182,5941	-0,51411
939	0	-166,993	-168,592	0,297978759	-168,294	0,596743
939	1,03125	-166,993	-133,067	0,297978759	-132,769	0,596743
939	2,0625	-166,993	-88,5695	0,297978759	-88,2715	0,596743
940	0	-67,0413	-86,9717	-0,565096747	-87,5368	0,392341
940	1,03125	-67,0413	-42,4741	-0,565096747	-43,0392	0,392341
940	2,0625	-67,0413	2,023608	-0,565096747	1,458511	0,392341
941	0	34,33118	5,051952	-1,502905082	3,549047	0,1381
941	1,03125	34,33118	49,54963	-1,502905082	48,04672	0,1381
941	2,0625	34,33118	94,0473	-1,502905082	92,5444	0,1381
942	0	138,9128	95,70549	-2,204642606	93,50084	-0,05631
942	1,03125	138,9128	97,91198	-2,204642606	95,70734	-0,05631
942	2,0625	138,9128	97,91198	-2,204642606	95,70734	-0,05631
943	0	-134,821	-98,0791	2,204642606	-95,8744	0,05631
943	1,03125	-134,821	-98,0791	2,204642606	-95,8744	0,05631
943	2,0625	-134,821	-95,6887	2,204642606	-93,4841	0,05631
944	0	-29,5176	-94,0302	1,502905082	-92,5273	-0,1381
944	1,03125	-29,5176	-49,5325	1,502905082	-48,0296	-0,1381

963	0	-83,5359	-157,301	-0,574565419	-157,875	-1,46739
963	1,03125	-83,5359	-121,776	-0,574565419	-122,351	-1,46739
963	2,0625	-83,5359	-77,2784	-0,574565419	-77,853	-1,46739
964	0	-12,1525	-62,8792	-0,007995413	-62,8872	-0,53568
964	1,03125	-12,1525	-18,3816	-0,007995413	-18,3896	-0,53568
964	2,0625	-12,1525	26,11611	-0,007995413	26,10812	-0,53568
965	0	57,40401	39,09984	0,393497069	39,49334	0,707243
965	1,03125	57,40401	83,59752	0,393497069	83,99102	0,707243
965	2,0625	57,40401	128,0952	0,393497069	128,4887	0,707243
966	0	135,0941	146,7863	0,900164531	147,6864	1,631165
966	1,03125	135,0941	148,9928	0,900164531	149,8929	1,631165
966	2,0625	135,0941	148,9928	0,900164531	149,8929	1,631165
967	0	-148,75	-149,141	-0,900164531	-150,041	-1,63116
967	1,03125	-148,75	-149,141	-0,900164531	-150,041	-1,63116
967	2,0625	-148,75	-146,75	-0,900164531	-147,651	-1,63116
968	0	-69,3871	-128,06	-0,393497069	-128,454	-0,70724
968	1,03125	-69,3871	-83,5625	-0,393497069	-83,956	-0,70724
968	2,0625	-69,3871	-39,0648	-0,393497069	-39,4583	-0,70724
969	0	-1,52325	-26,0802	0,007995413	-26,0722	0,535683
969	1,03125	-1,52325	18,41743	0,007995413	18,42543	0,535683
969	2,0625	-1,52325	62,91511	0,007995413	62,9231	0,535683
970	0	64,13534	77,31731	0,574565419	77,89188	1,467387
970	1,03125	64,13534	121,815	0,574565419	122,3896	1,467387
970	2,0625	64,13534	157,3396	0,574565419	157,9141	1,467387



TABEL GAYA GESER BALOK LINTANG STRUKTUR BAWAH

FRAME	STA	VD	VL		VL TOT	VE
			VL merata	VL.Koef kejut		
404	0	1,654588	10,95465	-0,005289077	10,94936	0,130033
404	4,125	1,654588	10,95465	-0,005289077	10,94936	0,130033
404	8,25	1,654588	10,95465	-0,005289077	10,94936	0,130033
405	0	-1,54719	-10,9497	0,005289077	-10,9444	-0,13003
405	4,125	-1,54719	-10,9497	0,005289077	-10,9444	-0,13003
405	8,25	-1,54719	-10,9497	0,005289077	-10,9444	-0,13003
406	0	-11,7328	2,128733	-0,356120019	1,772613	0,122014
406	4,125	-11,7328	2,128733	-0,356120019	1,772613	0,122014
406	8,25	-11,7328	2,128733	-0,356120019	1,772613	0,122014
409	0	11,53862	-2,12375	0,356120019	-1,76763	-0,12201
409	4,125	11,53862	-2,12375	0,356120019	-1,76763	-0,12201
409	8,25	11,53862	-2,12375	0,356120019	-1,76763	-0,12201
410	0	-18,1589	-2,41852	-0,980521	-3,39904	0,118823
410	4,125	-18,1589	-2,41852	-0,980521	-3,39904	0,118823
410	8,25	-18,1589	-2,41852	-0,980521	-3,39904	0,118823
413	0	17,85875	2,423461	0,980521	3,403982	-0,11882
413	4,125	17,85875	2,423461	0,980521	3,403982	-0,11882
413	8,25	17,85875	2,423461	0,980521	3,403982	-0,11882
415	0	-19,911	-4,14959	-1,805181081	-5,95477	0,103484
415	4,125	-19,911	-4,14959	-1,805181081	-5,95477	0,103484
415	8,25	-19,911	-4,14959	-1,805181081	-5,95477	0,103484
417	0	19,60073	4,154135	1,805181081	5,959316	-0,10348
417	4,125	19,60073	4,154135	1,805181081	5,959316	-0,10348
417	8,25	19,60073	4,154135	1,805181081	5,959316	-0,10348
422	0	-13,679	-3,42601	-1,914337673	-5,34035	0,046918
422	4,125	-13,679	-3,42601	-1,914337673	-5,34035	0,046918
422	8,25	-13,679	-3,42601	-1,914337673	-5,34035	0,046918
423	0	13,82372	3,428246	1,914337673	5,342584	-0,04692
423	4,125	13,82372	3,428246	1,914337673	5,342584	-0,04692
423	8,25	13,82372	3,428246	1,914337673	5,342584	-0,04692
424	0	-6,73734	-2,21446	-0,961011236	-3,17547	0,018717
424	4,125	-6,73734	-2,21446	-0,961011236	-3,17547	0,018717
424	8,25	-6,73734	-2,21446	-0,961011236	-3,17547	0,018717
425	0	7,636396	2,216434	0,961011236	3,177445	-0,01872
425	4,125	7,636396	2,216434	0,961011236	3,177445	-0,01872
425	8,25	7,636396	2,216434	0,961011236	3,177445	-0,01872
426	0	3,218476	-0,91337	0,118855443	-0,79451	-0,02902
426	4,125	3,218476	-0,91337	0,118855443	-0,79451	-0,02902
426	8,25	3,218476	-0,91337	0,118855443	-0,79451	-0,02902
427	0	10,14781	0,915489	-0,118855443	0,796634	0,029025
427	4,125	10,14781	0,915489	-0,118855443	0,796634	0,029025
427	8,25	10,14781	0,915489	-0,118855443	0,796634	0,029025
428	0	-1,94718	-1,18099	0,106325808	-1,07466	-0,05188
428	4,125	-1,94718	-1,18099	0,106325808	-1,07466	-0,05188
428	8,25	-1,94718	-1,18099	0,106325808	-1,07466	-0,05188
429	0	20,12136	1,184318	-0,106325808	1,077993	0,05188
429	4,125	20,12136	1,184318	-0,106325808	1,077993	0,05188
429	8,25	20,12136	1,184318	-0,106325808	1,077993	0,05188
430	0	-7,77131	-1,37717	-0,022976658	-1,40015	-0,06924
430	4,125	-7,77131	-1,37717	-0,022976658	-1,40015	-0,06924
430	8,25	-7,77131	-1,37717	-0,022976658	-1,40015	-0,06924
431	0	20,3678	1,38105	0,022976658	1,404027	0,069237

431	4,125	20,3678	1,38105	0,022976658	1,404027	0,069237
431	8,25	20,3678	1,38105	0,022976658	1,404027	0,069237
432	0	-12,0378	-1,26646	-0,469165778	-1,73562	-0,07118
432	4,125	-12,0378	-1,26646	-0,469165778	-1,73562	-0,07118
432	8,25	-12,0378	-1,26646	-0,469165778	-1,73562	-0,07118
437	0	20,2523	1,27045	0,469165778	1,739616	0,07118
437	4,125	20,2523	1,27045	0,469165778	1,739616	0,07118
437	8,25	20,2523	1,27045	0,469165778	1,739616	0,07118
439	0	-13,7087	-0,83453	-1,164209175	-1,99874	-0,05883
439	4,125	-13,7087	-0,83453	-1,164209175	-1,99874	-0,05883
439	8,25	-13,7087	-0,83453	-1,164209175	-1,99874	-0,05883
441	0	20,25546	0,83855	1,164209175	2,002759	0,058833
441	4,125	20,25546	0,83855	1,164209175	2,002759	0,058833
441	8,25	20,25546	0,83855	1,164209175	2,002759	0,058833
443	0	-14,9201	-1,40848	-2,131988763	-3,54047	-0,03433
443	4,125	-14,9201	-1,40848	-2,131988763	-3,54047	-0,03433
443	8,25	-14,9201	-1,40848	-2,131988763	-3,54047	-0,03433
445	0	22,26525	1,411057	2,131988763	3,543045	0,03433
445	4,125	22,26525	1,411057	2,131988763	3,543045	0,03433
445	8,25	22,26525	1,411057	2,131988763	3,543045	0,03433
447	0	-12,6562	-1,3738	-2,711744797	-4,08555	-0,01009
447	4,125	-12,6562	-1,3738	-2,711744797	-4,08555	-0,01009
447	8,25	-12,6562	-1,3738	-2,711744797	-4,08555	-0,01009
448	0	23,46245	1,375996	2,711744797	4,087741	0,010093
448	4,125	23,46245	1,375996	2,711744797	4,087741	0,010093
448	8,25	23,46245	1,375996	2,711744797	4,087741	0,010093
452	0	-17,0161	-1,42372	-2,216337794	-3,64006	0,003319
452	4,125	-17,0161	-1,42372	-2,216337794	-3,64006	0,003319
452	8,25	-17,0161	-1,42372	-2,216337794	-3,64006	0,003319
456	0	21,83704	1,426202	2,216337794	3,64254	-0,00332
456	4,125	21,83704	1,426202	2,216337794	3,64254	-0,00332
456	8,25	21,83704	1,426202	2,216337794	3,64254	-0,00332
458	0	-17,0057	-0,76682	-1,283442643	-2,05026	0,007128
458	4,125	-17,0057	-0,76682	-1,283442643	-2,05026	0,007128
458	8,25	-17,0057	-0,76682	-1,283442643	-2,05026	0,007128
461	0	19,73646	0,770897	1,283442643	2,054339	-0,00713
461	4,125	19,73646	0,770897	1,283442643	2,054339	-0,00713
461	8,25	19,73646	0,770897	1,283442643	2,054339	-0,00713
464	0	-17,1228	-1,33001	-0,607496728	-1,93751	0,007404
464	4,125	-17,1228	-1,33001	-0,607496728	-1,93751	0,007404
464	8,25	-17,1228	-1,33001	-0,607496728	-1,93751	0,007404
466	0	20,31054	1,334348	0,607496728	1,941845	-0,0074
466	4,125	20,31054	1,334348	0,607496728	1,941845	-0,0074
466	8,25	20,31054	1,334348	0,607496728	1,941845	-0,0074
468	0	-15,539	-1,72961	-0,136248368	-1,86586	0,006624
468	4,125	-15,539	-1,72961	-0,136248368	-1,86586	0,006624
468	8,25	-15,539	-1,72961	-0,136248368	-1,86586	0,006624
469	0	21,10244	1,733918	0,136248368	1,870167	-0,00662
469	4,125	21,10244	1,733918	0,136248368	1,870167	-0,00662
469	8,25	21,10244	1,733918	0,136248368	1,870167	-0,00662
473	0	-11,7184	-1,85071	0,12477608	-1,72593	0,006029
473	4,125	-11,7184	-1,85071	0,12477608	-1,72593	0,006029
473	8,25	-11,7184	-1,85071	0,12477608	-1,72593	0,006029
476	0	22,3589	1,854771	-0,12477608	1,729995	-0,00603
476	4,125	22,3589	1,854771	-0,12477608	1,729995	-0,00603

476	8,25	22,3589	1,854771	-0,12477608	1,729995	-0,00603
477	0	-5,25567	-1,83199	0,202271325	-1,62972	0,005429
477	4,125	-5,25567	-1,83199	0,202271325	-1,62972	0,005429
477	8,25	-5,25567	-1,83199	0,202271325	-1,62972	0,005429
478	0	24,79467	1,835648	-0,202271325	1,633376	-0,00543
478	4,125	24,79467	1,835648	-0,202271325	1,633376	-0,00543
478	8,25	24,79467	1,835648	-0,202271325	1,633376	-0,00543
479	0	4,009	-1,70874	0,09659647	-1,61214	0,004125
479	4,125	4,009	-1,70874	0,09659647	-1,61214	0,004125
479	8,25	4,009	-1,70874	0,09659647	-1,61214	0,004125
480	0	27,80682	1,711832	-0,09659647	1,615235	-0,00412
480	4,125	27,80682	1,711832	-0,09659647	1,615235	-0,00412
480	8,25	27,80682	1,711832	-0,09659647	1,615235	-0,00412
481	0	12,82069	-1,34082	-0,201520168	-1,54234	0,002644
481	4,125	12,82069	-1,34082	-0,201520168	-1,54234	0,002644
481	8,25	12,82069	-1,34082	-0,201520168	-1,54234	0,002644
482	0	26,3449	1,34303	0,201520168	1,54455	-0,00264
482	4,125	26,3449	1,34303	0,201520168	1,54455	-0,00264
482	8,25	26,3449	1,34303	0,201520168	1,54455	-0,00264
483	0	13,72023	-1,47922	-0,220671574	-1,6999	0,02658
483	4,125	13,72023	-1,47922	-0,220671574	-1,6999	0,02658
483	8,25	13,72023	-1,47922	-0,220671574	-1,6999	0,02658
484	0	27,61239	1,480949	0,220671574	1,70162	-0,02658
484	4,125	27,61239	1,480949	0,220671574	1,70162	-0,02658
484	8,25	27,61239	1,480949	0,220671574	1,70162	-0,02658
485	0	5,265219	-1,91044	0,067286349	-1,84315	0,042401
485	4,125	5,265219	-1,91044	0,067286349	-1,84315	0,042401
485	8,25	5,265219	-1,91044	0,067286349	-1,84315	0,042401
486	0	29,65105	1,912705	-0,067286349	1,845418	-0,0424
486	4,125	29,65105	1,912705	-0,067286349	1,845418	-0,0424
486	8,25	29,65105	1,912705	-0,067286349	1,845418	-0,0424
487	0	-4,21804	-2,0857	0,164874387	-1,92083	0,053434
487	4,125	-4,21804	-2,0857	0,164874387	-1,92083	0,053434
487	8,25	-4,21804	-2,0857	0,164874387	-1,92083	0,053434
488	0	26,61598	2,088495	-0,164874387	1,92362	-0,05343
488	4,125	26,61598	2,088495	-0,164874387	1,92362	-0,05343
488	8,25	26,61598	2,088495	-0,164874387	1,92362	-0,05343
489	0	-11,0581	-2,13048	0,08257287	-2,0479	0,058431
489	4,125	-11,0581	-2,13048	0,08257287	-2,0479	0,058431
489	8,25	-11,0581	-2,13048	0,08257287	-2,0479	0,058431
490	0	23,95943	2,133759	-0,08257287	2,051186	-0,05843
490	4,125	23,95943	2,133759	-0,08257287	2,051186	-0,05843
490	8,25	23,95943	2,133759	-0,08257287	2,051186	-0,05843
491	0	-15,1107	-2,00286	-0,17926198	-2,18212	0,057539
491	4,125	-15,1107	-2,00286	-0,17926198	-2,18212	0,057539
491	8,25	-15,1107	-2,00286	-0,17926198	-2,18212	0,057539
492	0	22,55467	2,006451	0,17926198	2,185713	-0,05754
492	4,125	22,55467	2,006451	0,17926198	2,185713	-0,05754
492	8,25	22,55467	2,006451	0,17926198	2,185713	-0,05754
493	0	-16,515	-1,55726	-0,645256651	-2,20252	0,050783
493	4,125	-16,515	-1,55726	-0,645256651	-2,20252	0,050783
493	8,25	-16,515	-1,55726	-0,645256651	-2,20252	0,050783
494	0	21,84731	1,560896	0,645256651	2,206153	-0,05078
494	4,125	21,84731	1,560896	0,645256651	2,206153	-0,05078
494	8,25	21,84731	1,560896	0,645256651	2,206153	-0,05078

495	0	-15,245	-0,89336	-1,303766302	-2,19713	0,037662
495	4,125	-15,245	-0,89336	-1,303766302	-2,19713	0,037662
495	8,25	-15,245	-0,89336	-1,303766302	-2,19713	0,037662
496	0	21,75532	0,896712	1,303766302	2,200479	-0,03766
496	4,125	21,75532	0,896712	1,303766302	2,200479	-0,03766
496	8,25	21,75532	0,896712	1,303766302	2,200479	-0,03766
497	0	-11,9716	-1,33918	-2,19090228	-3,53008	0,015709
497	4,125	-11,9716	-1,33918	-2,19090228	-3,53008	0,015709
497	8,25	-11,9716	-1,33918	-2,19090228	-3,53008	0,015709
498	0	23,99131	1,340984	2,19090228	3,531886	-0,01571
498	4,125	23,99131	1,340984	2,19090228	3,531886	-0,01571
498	8,25	23,99131	1,340984	2,19090228	3,531886	-0,01571
499	0	-16,322	-1,30143	-2,696551658	-3,99798	-0,01979
499	4,125	-16,322	-1,30143	-2,696551658	-3,99798	-0,01979
499	8,25	-16,322	-1,30143	-2,696551658	-3,99798	-0,01979
500	0	21,88544	1,30316	2,696551658	3,999712	0,019785
500	4,125	21,88544	1,30316	2,696551658	3,999712	0,019785
500	8,25	21,88544	1,30316	2,696551658	3,999712	0,019785
501	0	-16,7299	-1,29574	-2,108956396	-3,4047	-0,07152
501	4,125	-16,7299	-1,29574	-2,108956396	-3,4047	-0,07152
501	8,25	-16,7299	-1,29574	-2,108956396	-3,4047	-0,07152
502	0	20,2964	1,29824	2,108956396	3,407197	0,071523
502	4,125	20,2964	1,29824	2,108956396	3,407197	0,071523
502	8,25	20,2964	1,29824	2,108956396	3,407197	0,071523
503	0	-14,6886	-0,65029	-1,125157846	-1,77545	-0,12476
503	4,125	-14,6886	-0,65029	-1,125157846	-1,77545	-0,12476
503	8,25	-14,6886	-0,65029	-1,125157846	-1,77545	-0,12476
504	0	18,28169	0,654617	1,125157846	1,779775	0,124763
504	4,125	18,28169	0,654617	1,125157846	1,779775	0,124763
504	8,25	18,28169	0,654617	1,125157846	1,779775	0,124763
505	0	-12,9944	-1,02881	-0,418441074	-1,44725	-0,15449
505	4,125	-12,9944	-1,02881	-0,418441074	-1,44725	-0,15449
505	8,25	-12,9944	-1,02881	-0,418441074	-1,44725	-0,15449
506	0	18,0314	1,033476	0,418441074	1,451917	0,154485
506	4,125	18,0314	1,033476	0,418441074	1,451917	0,154485
506	8,25	18,0314	1,033476	0,418441074	1,451917	0,154485
507	0	-8,84989	-1,13101	0,031346105	-1,09966	-0,15606
507	4,125	-8,84989	-1,13101	0,031346105	-1,09966	-0,15606
507	8,25	-8,84989	-1,13101	0,031346105	-1,09966	-0,15606
508	0	18,01279	1,13576	-0,031346105	1,104414	0,156057
508	4,125	18,01279	1,13576	-0,031346105	1,104414	0,156057
508	8,25	18,01279	1,13576	-0,031346105	1,104414	0,156057
509	0	-2,86284	-0,94764	0,155110536	-0,79253	-0,12687
509	4,125	-2,86284	-0,94764	0,155110536	-0,79253	-0,12687
509	8,25	-2,86284	-0,94764	0,155110536	-0,79253	-0,12687
510	0	18,12545	0,952831	-0,155110536	0,79772	0,12687
510	4,125	18,12545	0,952831	-0,155110536	0,79772	0,12687
510	8,25	18,12545	0,952831	-0,155110536	0,79772	0,12687
511	0	3,343805	-0,79022	0,145973943	-0,64425	-0,07018
511	4,125	3,343805	-0,79022	0,145973943	-0,64425	-0,07018
511	8,25	3,343805	-0,79022	0,145973943	-0,64425	-0,07018
512	0	9,691259	0,800369	-0,145973943	0,654395	0,070177
512	4,125	9,691259	0,800369	-0,145973943	0,654395	0,070177
512	8,25	9,691259	0,800369	-0,145973943	0,654395	0,070177
513	0	2,32524	-2,3499	-1,000049562	-3,34995	0,086181

513	4,125	2,32524	-2,3499	-1,000049562	-3,34995	0,086181
513	8,25	2,32524	-2,3499	-1,000049562	-3,34995	0,086181
514	0	17,58604	2,34976	1,000049562	3,349809	-0,08618
514	4,125	17,58604	2,34976	1,000049562	3,349809	-0,08618
514	8,25	17,58604	2,34976	1,000049562	3,349809	-0,08618
515	0	-3,97541	-3,55767	-1,974784525	-5,53245	0,163455
515	4,125	-3,97541	-3,55767	-1,974784525	-5,53245	0,163455
515	8,25	-3,97541	-3,55767	-1,974784525	-5,53245	0,163455
516	0	24,97744	3,558467	1,974784525	5,533251	-0,16345
516	4,125	24,97744	3,558467	1,974784525	5,533251	-0,16345
516	8,25	24,97744	3,558467	1,974784525	5,533251	-0,16345
519	0	-10,814	-4,29317	-2,628293096	-6,92147	0,222025
519	4,125	-10,814	-4,29317	-2,628293096	-6,92147	0,222025
519	8,25	-10,814	-4,29317	-2,628293096	-6,92147	0,222025
520	0	27,54785	4,295122	2,628293096	6,923415	-0,22202
520	4,125	27,54785	4,295122	2,628293096	6,923415	-0,22202
520	8,25	27,54785	4,295122	2,628293096	6,923415	-0,22202
521	0	-14,2849	-4,16853	-1,873360516	-6,04189	0,254139
521	4,125	-14,2849	-4,16853	-1,873360516	-6,04189	0,254139
521	8,25	-14,2849	-4,16853	-1,873360516	-6,04189	0,254139
522	0	26,97856	4,171682	1,873360516	6,045042	-0,25414
522	4,125	26,97856	4,171682	1,873360516	6,045042	-0,25414
522	8,25	26,97856	4,171682	1,873360516	6,045042	-0,25414
523	0	-13,5721	-2,30332	-1,02980844	-3,33313	0,247695
523	4,125	-13,5721	-2,30332	-1,02980844	-3,33313	0,247695
523	8,25	-13,5721	-2,30332	-1,02980844	-3,33313	0,247695
524	0	23,80035	2,307085	1,02980844	3,336894	-0,24769
524	4,125	23,80035	2,307085	1,02980844	3,336894	-0,24769
524	8,25	23,80035	2,307085	1,02980844	3,336894	-0,24769
525	0	-7,84908	2,324221	-0,38290924	1,941312	0,21268
525	4,125	-7,84908	2,324221	-0,38290924	1,941312	0,21268
525	8,25	-7,84908	2,324221	-0,38290924	1,941312	0,21268
526	0	16,2343	-2,3193	0,38290924	-1,93639	-0,21268
526	4,125	16,2343	-2,3193	0,38290924	-1,93639	-0,21268
526	8,25	16,2343	-2,3193	0,38290924	-1,93639	-0,21268
528	0	3,365121	11,10372	-0,012972187	11,09075	0,165322
528	4,125	3,365121	11,10372	-0,012972187	11,09075	0,165322
528	8,25	3,365121	11,10372	-0,012972187	11,09075	0,165322
529	0	0,706621	-11,0943	0,012972187	-11,0813	-0,16532
529	4,125	0,706621	-11,0943	0,012972187	-11,0813	-0,16532
529	8,25	0,706621	-11,0943	0,012972187	-11,0813	-0,16532
541	0	-18,4019	-4,18446	-2,556445112	-6,7409	0,07655
541	4,125	-18,4019	-4,18446	-2,556445112	-6,7409	0,07655
541	8,25	-18,4019	-4,18446	-2,556445112	-6,7409	0,07655
542	0	18,19258	4,188054	2,556445112	6,744499	-0,07655
542	4,125	18,19258	4,188054	2,556445112	6,744499	-0,07655
542	8,25	18,19258	4,188054	2,556445112	6,744499	-0,07655

TABEL GAYA GESER BALOK LENGKUNG TEPI

FRAME	STA	VD	VL		VL TOT	VE	COMB1
			VL merata	VL.Koef kejut			1.5(VD+VL+VE)
13	0	-179,6532	-201,5776	-35,2474034	-236,825	1,714420393	-622,1456454
13	2,586036	-179,6532	-201,5776	-35,2474034	-236,825	1,714420393	-622,1456454
13	5,172072	-179,6532	-201,5776	-35,2474034	-236,825	1,714420393	-622,1456454
14	0	-122,1688	-159,4864	-33,0302879	-192,5167	-0,144946763	-472,2456744
14	2,567192	-122,1688	-159,4864	-33,0302879	-192,5167	-0,144946763	-472,2456744
14	5,134383	-122,1688	-159,4864	-33,0302879	-192,5167	-0,144946763	-472,2456744
15	0	-34,74279	-154,0546	-40,2111128	-194,2657	0,294756734	-343,0706226
15	2,55129	-34,74279	-154,0546	-40,2111128	-194,2657	0,294756734	-343,0706226
15	5,10258	-34,74279	-154,0546	-40,2111128	-194,2657	0,294756734	-343,0706226
19	0	-40,1441	-9,711327	1,429908302	-8,281418	-2,476063423	-76,35237671
19	2,506689	-40,1441	-9,711327	1,429908302	-8,281418	-2,476063423	-76,35237671
19	5,013378	-40,1441	-9,711327	1,429908302	-8,281418	-2,476063423	-76,35237671
20	0	145,2473	79,11791	0,639310499	79,75722	-3,799092741	331,8080713
20	2,502183	145,2473	79,11791	0,639310499	79,75722	-3,799092741	331,8080713
20	5,004366	145,2473	79,11791	0,639310499	79,75722	-3,799092741	331,8080713
164	0	-172,4079	-77,27969	1,582566826	-75,69712	-0,69194868	-373,1954263
164	2,513691	-172,4079	-77,27969	1,582566826	-75,69712	-0,69194868	-373,1954263
164	5,027383	-172,4079	-77,27969	1,582566826	-75,69712	-0,69194868	-373,1954263
167	0	-8,905808	-21,93379	12,51298559	-9,420803	-2,735052656	-31,59249523
167	2,705585	-8,905808	-21,93379	12,51298559	-9,420803	-2,735052656	-31,59249523
167	5,41117	-8,905808	-21,93379	12,51298559	-9,420803	-2,735052656	-31,59249523
187	0	-84,85025	-47,48042	13,73325952	-33,74716	2,308365088	-174,4335761
187	2,651523	-84,85025	-47,48042	13,73325952	-33,74716	2,308365088	-174,4335761
187	5,303045	-84,85025	-47,48042	13,73325952	-33,74716	2,308365088	-174,4335761
213	0	-22,53167	-14,40641	17,1811214	2,774715	0,176460312	-29,37073639
213	2,672821	-22,53167	-14,40641	17,1811214	2,774715	0,176460312	-29,37073639
213	5,345641	-22,53167	-14,40641	17,1811214	2,774715	0,176460312	-29,37073639
214	0	-151,7625	-54,35884	6,605603885	-47,75323	2,056822985	-296,1883197
214	2,623968	-151,7625	-54,35884	6,605603885	-47,75323	2,056822985	-296,1883197
214	5,247936	-151,7625	-54,35884	6,605603885	-47,75323	2,056822985	-296,1883197
215	0	-147,6839	-66,15197	3,443850375	-62,70812	2,07921792	-312,4691527
215	2,585908	-147,6839	-66,15197	3,443850375	-62,70812	2,07921792	-312,4691527
215	5,171816	-147,6839	-66,15197	3,443850375	-62,70812	2,07921792	-312,4691527
216	0	-188,3213	-79,01158	-5,84613653	-84,85772	2,412701767	-406,1495116
216	2,555252	-188,3213	-79,01158	-5,84613653	-84,85772	2,412701767	-406,1495116
216	5,110504	-188,3213	-79,01158	-5,84613653	-84,85772	2,412701767	-406,1495116
217	0	-205,5097	-86,34771	-17,0428573	-103,3906	2,617063939	-459,4247264
217	2,531798	-205,5097	-86,34771	-17,0428573	-103,3906	2,617063939	-459,4247264
217	5,063596	-205,5097	-86,34771	-17,0428573	-103,3906	2,617063939	-459,4247264
218	0	-174,4397	-74,77536	-27,8189482	-102,5943	2,286970163	-412,1205006
218	2,515189	-174,4397	-74,77536	-27,8189482	-102,5943	2,286970163	-412,1205006
218	5,030378	-174,4397	-74,77536	-27,8189482	-102,5943	2,286970163	-412,1205006
219	0	-81,5416	-37,8325	-24,1093598	-61,94186	0,871049076	-213,9186176
219	2,504407	-81,5416	-37,8325	-24,1093598	-61,94186	0,871049076	-213,9186176
219	5,008813	-81,5416	-37,8325	-24,1093598	-61,94186	0,871049076	-213,9186176
221	0	32,47826	12,12199	18,70730921	30,8293	-0,820799674	93,73014039

221	2,500135	32,47826	12,12199	18,70730921	30,8293	-0,820799674	93,73014039
221	5,00027	32,47826	12,12199	18,70730921	30,8293	-0,820799674	93,73014039
224	0	208,303	86,01943	7,303905471	93,32334	-3,008118618	447,9273183
224	2,52383	208,303	86,01943	7,303905471	93,32334	-3,008118618	447,9273183
224	5,047659	208,303	86,01943	7,303905471	93,32334	-3,008118618	447,9273183
227	0	124,4317	58,07394	-10,1755309	47,89841	-1,908028996	255,6331297
227	2,607363	124,4317	58,07394	-10,1755309	47,89841	-1,908028996	255,6331297
227	5,214725	124,4317	58,07394	-10,1755309	47,89841	-1,908028996	255,6331297
230	0	-159,5546	-69,27131	5,935850115	-63,33546	2,329590638	-330,8406928
230	2,572163	-159,5546	-69,27131	5,935850115	-63,33546	2,329590638	-330,8406928
230	5,144327	-159,5546	-69,27131	5,935850115	-63,33546	2,329590638	-330,8406928
231	0	-189,6	-79,56726	0,255521858	-79,31173	2,671218372	-399,3608189
231	2,544352	-189,6	-79,56726	0,255521858	-79,31173	2,671218372	-399,3608189
231	5,088705	-189,6	-79,56726	0,255521858	-79,31173	2,671218372	-399,3608189
235	0	204,1392	83,49115	16,76217796	100,2533	-3,089794073	451,9541585
235	2,509705	204,1392	83,49115	16,76217796	100,2533	-3,089794073	451,9541585
235	5,01941	204,1392	83,49115	16,76217796	100,2533	-3,089794073	451,9541585
236	0	-146,0211	-58,63514	-24,8395602	-83,4747	2,443579238	-340,5783807
236	2,501881	-146,0211	-58,63514	-24,8395602	-83,4747	2,443579238	-340,5783807
236	5,003762	-146,0211	-58,63514	-24,8395602	-83,4747	2,443579238	-340,5783807
323	0	-65,28546	-64,52545	7,505422527	-57,02002	17,41516581	-157,3354754
323	2,705585	-65,28546	-64,52545	7,505422527	-57,02002	17,41516581	-157,3354754
323	5,41117	-65,28546	-64,52545	7,505422527	-57,02002	17,41516581	-157,3354754
324	0	-105,8497	-63,92097	11,79522527	-52,12574	10,13597838	-221,7592354
324	2,651523	-105,8497	-63,92097	11,79522527	-52,12574	10,13597838	-221,7592354
324	5,303045	-105,8497	-63,92097	11,79522527	-52,12574	10,13597838	-221,7592354
325	0	-148,5666	-76,86626	7,959606014	-68,90665	10,86278084	-309,9156845
325	2,607363	-148,5666	-76,86626	7,959606014	-68,90665	10,86278084	-309,9156845
325	5,214725	-148,5666	-76,86626	7,959606014	-68,90665	10,86278084	-309,9156845
326	0	-179,8595	-85,21212	4,055761501	-81,15636	9,931330079	-376,6267455
326	2,572163	-179,8595	-85,21212	4,055761501	-81,15636	9,931330079	-376,6267455
326	5,144327	-179,8595	-85,21212	4,055761501	-81,15636	9,931330079	-376,6267455
342	0	-145,9131	-46,7494	7,560424621	-39,18898	-2,086238022	-280,7825028
342	2,623968	-145,9131	-46,7494	7,560424621	-39,18898	-2,086238022	-280,7825028
342	5,247936	-145,9131	-46,7494	7,560424621	-39,18898	-2,086238022	-280,7825028
343	0	-138,6699	-56,27378	4,6586926	-51,61508	-3,092728543	-290,0666247
343	2,585908	-138,6699	-56,27378	4,6586926	-51,61508	-3,092728543	-290,0666247
343	5,171816	-138,6699	-56,27378	4,6586926	-51,61508	-3,092728543	-290,0666247
344	0	-188,8755	-75,8586	-5,42223135	-81,28084	0,449419853	-404,5604146
344	2,555252	-188,8755	-75,8586	-5,42223135	-81,28084	0,449419853	-404,5604146
344	5,110504	-188,8755	-75,8586	-5,42223135	-81,28084	0,449419853	-404,5604146
345	0	-218,2646	-92,2307	-17,6961081	-109,9268	5,061358717	-484,6950521
345	2,531798	-218,2646	-92,2307	-17,6961081	-109,9268	5,061358717	-484,6950521
345	5,063596	-218,2646	-92,2307	-17,6961081	-109,9268	5,061358717	-484,6950521
346	0	-200,6328	-91,56804	-29,7656327	-121,3337	10,04391259	-467,8838135
346	2,515189	-200,6328	-91,56804	-29,7656327	-121,3337	10,04391259	-467,8838135
346	5,030378	-200,6328	-91,56804	-29,7656327	-121,3337	10,04391259	-467,8838135
347	0	-114,6133	-61,11733	-26,8318388	-87,94917	11,86026421	-286,0532486
347	2,504407	-114,6133	-61,11733	-26,8318388	-87,94917	11,86026421	-286,0532486
347	5,008813	-114,6133	-61,11733	-26,8318388	-87,94917	11,86026421	-286,0532486

348	0	10,27006	-10,62088	16,03743223	5,416556	10,00447431	38,53662971
348	2,500135	10,27006	-10,62088	16,03743223	5,416556	10,00447431	38,53662971
348	5,00027	10,27006	-10,62088	16,03743223	5,416556	10,00447431	38,53662971
349	0	122,9851	43,13024	22,99702588	66,12727	4,772469182	290,8271925
349	2,501979	122,9851	43,13024	22,99702588	66,12727	4,772469182	290,8271925
349	5,003959	122,9851	43,13024	22,99702588	66,12727	4,772469182	290,8271925
350	0	199,0836	80,01424	16,37962129	96,39386	-1,13503726	441,513675
350	2,509487	199,0836	80,01424	16,37962129	96,39386	-1,13503726	441,513675
350	5,018974	199,0836	80,01424	16,37962129	96,39386	-1,13503726	441,513675
351	0	214,5612	91,86316	7,986909364	99,85007	-5,788771229	462,9336962
351	2,52383	214,5612	91,86316	7,986909364	99,85007	-5,788771229	462,9336962
351	5,047659	214,5612	91,86316	7,986909364	99,85007	-5,788771229	462,9336962
352	0	204,5359	91,65134	1,168226038	92,81957	-8,428945298	433,3898094
352	2,544352	204,5359	91,65134	1,168226038	92,81957	-8,428945298	433,3898094
352	5,088705	204,5359	91,65134	1,168226038	92,81957	-8,428945298	433,3898094
354	0	-60,16017	-45,14315	-24,2049534	-69,3481	28,06701359	-152,1618931
354	2,672821	-60,16017	-45,14315	-24,2049534	-69,3481	28,06701359	-152,1618931
354	5,345641	-60,16017	-45,14315	-24,2049534	-69,3481	28,06701359	-152,1618931
365	0	-194,2675	-109,7249	-4,21491674	-113,9399	18,03962573	-435,2515687
365	2,502183	-194,2675	-109,7249	-4,21491674	-113,9399	18,03962573	-435,2515687
365	5,004366	-194,2675	-109,7249	-4,21491674	-113,9399	18,03962573	-435,2515687
366	0	29,43003	6,49075	-1,82459978	4,66615	4,172922666	57,40365439
366	2,506689	29,43003	6,49075	-1,82459978	4,66615	4,172922666	57,40365439
366	5,013378	29,43003	6,49075	-1,82459978	4,66615	4,172922666	57,40365439
367	0	190,2674	94,6582	0,439519096	95,09772	-7,322341807	417,0641286
367	2,513691	190,2674	94,6582	0,439519096	95,09772	-7,322341807	417,0641286
367	5,027383	190,2674	94,6582	0,439519096	95,09772	-7,322341807	417,0641286
368	0	280,665	146,5954	1,69203984	148,2875	-13,84389609	622,6628203
368	2,523556	280,665	146,5954	1,69203984	148,2875	-13,84389609	622,6628203
368	5,047112	280,665	146,5954	1,69203984	148,2875	-13,84389609	622,6628203
369	0	330,7306	174,9401	8,713794403	183,6539	-17,84829831	744,8043445
369	2,537563	330,7306	174,9401	8,713794403	183,6539	-17,84829831	744,8043445
369	5,075126	330,7306	174,9401	8,713794403	183,6539	-17,84829831	744,8043445
370	0	82,44704	194,4443	44,95648068	239,4008	-19,37371868	453,7111548
370	2,55129	82,44704	194,4443	44,95648068	239,4008	-19,37371868	453,7111548
370	5,10258	82,44704	194,4443	44,95648068	239,4008	-19,37371868	453,7111548
371	0	158,0273	193,6742	37,04634449	230,7205	-16,00412264	559,1155222
371	2,567192	158,0273	193,6742	37,04634449	230,7205	-16,00412264	559,1155222
371	5,134383	158,0273	193,6742	37,04634449	230,7205	-16,00412264	559,1155222
372	0	294,3155	293,2514	45,94126065	339,1927	-44,26229812	883,868847
372	2,586036	294,3155	293,2514	45,94126065	339,1927	-44,26229812	883,868847
372	5,172072	294,3155	293,2514	45,94126065	339,1927	-44,26229812	883,868847
532	0	-285,5436	-137,5617	-4,32868416	-141,8904	0,257280148	-640,7650355
532	2,537563	-285,5436	-137,5617	-4,32868416	-141,8904	0,257280148	-640,7650355
532	5,075126	-285,5436	-137,5617	-4,32868416	-141,8904	0,257280148	-640,7650355
533	0	246,2002	117,2227	-1,74892422	115,4738	-0,069839704	542,4062268
533	2,523556	246,2002	117,2227	-1,74892422	115,4738	-0,069839704	542,4062268
533	5,047112	246,2002	117,2227	-1,74892422	115,4738	-0,069839704	542,4062268

GAYA GESER BALOK LINGKUNG TENGAH

FRAME	STA	VD	VL		VL TOT	VE	COMB1
			VL merata	VL.Koef kejut			1,5(VD+VL+VE)
545	0	-268,9797743	-220,5594	-48,4204144	-268,98	1,443015	-804,7747998
545	2,586036	-273,9276109	-220,5594	-48,4204144	-268,98	1,443015	-812,1965547
545	5,172072	-273,9276109	-220,5594	-48,4204144	-268,98	1,443015	-812,1965547
546	0	-187,4054081	-173,1895	-44,8089813	-217,999	-2,617307	-612,0318498
546	2,567192	-187,4054081	-173,1895	-44,8089813	-217,999	-2,617307	-612,0318498
546	5,134383	-187,4054081	-173,1895	-44,8089813	-217,999	-2,617307	-612,0318498
547	0	-97,68066033	-169,4427	-57,2326121	-226,675	-2,415035	-490,1564428
547	2,55129	-97,68066033	-169,4427	-57,2326121	-226,675	-2,415035	-490,1564428
547	5,10258	-97,68066033	-169,4427	-57,2326121	-226,675	-2,415035	-490,1564428
548	0	-63,58194994	-25,09898	1,31432615	-23,7847	-5,508709	-139,3129741
548	2,506689	-63,58194994	-25,09898	1,31432615	-23,7847	-5,508709	-139,3129741
548	5,013378	-63,58194994	-25,09898	1,31432615	-23,7847	-5,508709	-139,3129741
549	0	197,7339454	105,9149	-0,02818549	105,8867	-5,02335	447,8960124
549	2,502183	197,7339454	105,9149	-0,02818549	105,8867	-5,02335	447,8960124
549	5,004366	197,7339454	105,9149	-0,02818549	105,8867	-5,02335	447,8960124
563	0	-224,1963726	-104,0116	2,96547071	-101,046	-3,774875	-493,5261188
563	2,513691	-224,1963726	-104,0116	2,96547071	-101,046	-3,774875	-493,5261188
563	5,027383	-224,1963726	-104,0116	2,96547071	-101,046	-3,774875	-493,5261188
564	0	-105,0449787	-25,53818	10,7260478	-14,8121	-2,301505	-183,237926
564	2,705585	-105,0449787	-25,53818	10,7260478	-14,8121	-2,301505	-183,237926
564	5,41117	-105,0449787	-25,53818	10,7260478	-14,8121	-2,301505	-183,237926
565	0	-144,7224558	-50,9371	17,2347232	-33,7024	2,908539	-263,2744418
565	2,651523	-144,7224558	-50,9371	17,2347232	-33,7024	2,908539	-263,2744418
565	5,303045	-144,7224558	-50,9371	17,2347232	-33,7024	2,908539	-263,2744418
566	0	-51,72443999	-18,53085	20,063134	1,532281	-0,286256	-75,71762254
566	2,672821	-51,72443999	-18,53085	20,063134	1,532281	-0,286256	-75,71762254
566	5,345641	-51,72443999	-18,53085	20,063134	1,532281	-0,286256	-75,71762254
567	0	-245,5310076	-59,43258	7,73760422	-51,695	3,587004	-440,4584746
567	2,623968	-245,5310076	-59,43258	7,73760422	-51,695	3,587004	-440,4584746
567	5,247936	-245,5310076	-59,43258	7,73760422	-51,695	3,587004	-440,4584746
568	0	-190,8185719	-74,2942	6,11634947	-68,1778	3,784982	-382,8171589
568	2,585908	-190,8185719	-74,2942	6,11634947	-68,1778	3,784982	-382,8171589
568	5,171816	-190,8185719	-74,2942	6,11634947	-68,1778	3,784982	-382,8171589
569	0	-239,7076105	-89,44928	-5,37313395	-94,8224	4,198027	-495,4980002
569	2,555252	-239,7076105	-89,44928	-5,37313395	-94,8224	4,198027	-495,4980002
569	5,110504	-239,7076105	-89,44928	-5,37313395	-94,8224	4,198027	-495,4980002
570	0	-260,4912981	-98,83797	-20,6379204	-119,476	4,266479	-563,5510658
570	2,531798	-260,4912981	-98,83797	-20,6379204	-119,476	4,266479	-563,5510658
570	5,063596	-260,4912981	-98,83797	-20,6379204	-119,476	4,266479	-563,5510658
571	0	-220,1143012	-85,53241	-38,0097028	-123,542	3,520761	-510,2034745
571	2,515189	-220,1143012	-85,53241	-38,0097028	-123,542	3,520761	-510,2034745
571	5,030378	-220,1143012	-85,53241	-38,0097028	-123,542	3,520761	-510,2034745
572	0	-102,0121232	-40,97779	-35,0711781	-76,049	1,525414	-264,8035122
572	2,504407	-102,0121232	-40,97779	-35,0711781	-76,049	1,525414	-264,8035122
572	5,008813	-102,0121232	-40,97779	-35,0711781	-76,049	1,525414	-264,8035122
573	0	44,18184341	14,52304	28,818534	43,34157	-0,535727	130,4815339
573	2,500135	44,18184341	14,52304	28,818534	43,34157	-0,535727	130,4815339

573	5,00027	44,18184341	14,52304	28,818534	43,34157	-0,535727	130,4815339
574	0	252,1659102	95,91307	6,43148284	102,3446	-3,618481	526,3379754
574	2,52383	252,1659102	95,91307	6,43148284	102,3446	-3,618481	526,3379754
574	5,047659	252,1659102	95,91307	6,43148284	102,3446	-3,618481	526,3379754
575	0	170,6789583	61,98678	-12,6797571	49,30702	-2,549539	326,1546623
575	2,607363	170,6789583	61,98678	-12,6797571	49,30702	-2,549539	326,1546623
575	5,214725	170,6789583	61,98678	-12,6797571	49,30702	-2,549539	326,1546623
576	0	-198,8541917	-74,20332	8,37916565	-65,8242	2,984177	-392,5412514
576	2,572163	-198,8541917	-74,20332	8,37916565	-65,8242	2,984177	-392,5412514
576	5,144327	-198,8541917	-74,20332	8,37916565	-65,8242	2,984177	-392,5412514
577	0	-229,3513923	-86,66601	2,45731114	-84,2087	3,323495	-465,3548879
577	2,544352	-229,3513923	-86,66601	2,45731114	-84,2087	3,323495	-465,3548879
577	5,088705	-229,3513923	-86,66601	2,45731114	-84,2087	3,323495	-465,3548879
578	0	250,5292551	95,15694	19,7187469	114,8757	-3,559528	542,7681273
578	2,509705	250,5292551	95,15694	19,7187469	114,8757	-3,559528	542,7681273
578	5,01941	250,5292551	95,15694	19,7187469	114,8757	-3,559528	542,7681273
579	0	-181,9225051	-68,06014	-34,2894325	-102,35	2,574956	-422,5456893
579	2,501881	-181,9225051	-68,06014	-34,2894325	-102,35	2,574956	-422,5456893
579	5,003762	-181,9225051	-68,06014	-34,2894325	-102,35	2,574956	-422,5456893
614	0	-151,5848478	-69,71957	5,50500498	-64,2146	19,01736	-295,1730718
614	2,705585	-151,5848478	-69,71957	5,50500498	-64,2146	19,01736	-295,1730718
614	5,41117	-151,5848478	-69,71957	5,50500498	-64,2146	19,01736	-295,1730718
615	0	-161,1033061	-66,75511	15,3824693	-51,3726	10,43202	-303,0658837
615	2,651523	-161,1033061	-66,75511	15,3824693	-51,3726	10,43202	-303,0658837
615	5,303045	-161,1033061	-66,75511	15,3824693	-51,3726	10,43202	-303,0658837
616	0	-189,7233793	-80,34645	10,5306159	-69,8158	11,26918	-372,4050458
616	2,607363	-189,7233793	-80,34645	10,5306159	-69,8158	11,26918	-372,4050458
616	5,214725	-189,7233793	-80,34645	10,5306159	-69,8158	11,26918	-372,4050458
617	0	-214,7322474	-89,50404	6,59252409	-82,9115	10,22889	-431,1223108
617	2,572163	-214,7322474	-89,50404	6,59252409	-82,9115	10,22889	-431,1223108
617	5,144327	-214,7322474	-89,50404	6,59252409	-82,9115	10,22889	-431,1223108
618	0	-238,1125161	-51,01349	8,62183497	-42,3917	0,563088	-419,9116256
618	2,623968	-238,1125161	-51,01349	8,62183497	-42,3917	0,563088	-419,9116256
618	5,247936	-238,1125161	-51,01349	8,62183497	-42,3917	0,563088	-419,9116256
619	0	-181,8396672	-64,73902	7,16600606	-57,573	0,077206	-359,0032161
619	2,585908	-181,8396672	-64,73902	7,16600606	-57,573	0,077206	-359,0032161
619	5,171816	-181,8396672	-64,73902	7,16600606	-57,573	0,077206	-359,0032161
620	0	-237,8288133	-86,65293	-5,14143287	-91,7944	3,773192	-488,7749714
620	2,555252	-237,8288133	-86,65293	-5,14143287	-91,7944	3,773192	-488,7749714
620	5,110504	-237,8288133	-86,65293	-5,14143287	-91,7944	3,773192	-488,7749714
621	0	-268,4658697	-106,1622	-21,5573045	-127,72	8,389739	-581,693467
621	2,531798	-268,4658697	-106,1622	-21,5573045	-127,72	8,389739	-581,693467
621	5,063596	-268,4658697	-106,1622	-21,5573045	-127,72	8,389739	-581,693467
622	0	-239,1411685	-103,7683	-40,2114146	-143,98	12,653	-555,7017574
622	2,515189	-239,1411685	-103,7683	-40,2114146	-143,98	12,653	-555,7017574
622	5,030378	-239,1411685	-103,7683	-40,2114146	-143,98	12,653	-555,7017574
623	0	-128,0105356	-65,30331	-37,972269	-103,276	13,30054	-326,9783625
623	2,504407	-128,0105356	-65,30331	-37,972269	-103,276	13,30054	-326,9783625
623	5,008813	-128,0105356	-65,30331	-37,972269	-103,276	13,30054	-326,9783625
624	0	17,28078931	-9,305799	25,9948346	16,68904	10,8966	67,29963062
624	2,500135	17,28078931	-9,305799	25,9948346	16,68904	10,8966	67,29963062

624	5,00027	17,28078931	-9,305799	25,9948346	16,68904	10,8966	67,29963062
625	0	163,7674086	51,12003	32,2988516	83,41888	5,423743	378,9150467
625	2,501979	163,7674086	51,12003	32,2988516	83,41888	5,423743	378,9150467
625	5,003959	163,7674086	51,12003	32,2988516	83,41888	5,423743	378,9150467
626	0	247,5775276	90,08785	19,1967207	109,2846	-0,753758	534,1625114
626	2,509487	247,5775276	90,08785	19,1967207	109,2846	-0,753758	534,1625114
626	5,018974	247,5775276	90,08785	19,1967207	109,2846	-0,753758	534,1625114
627	0	257,5552502	100,5873	6,97843471	107,5657	-5,796926	538,9860595
627	2,52383	257,5552502	100,5873	6,97843471	107,5657	-5,796926	538,9860595
627	5,047659	257,5552502	100,5873	6,97843471	107,5657	-5,796926	538,9860595
628	0	241,1445786	97,87144	-1,14990418	96,72154	-8,614553	493,8773477
628	2,544352	241,1445786	97,87144	-1,14990418	96,72154	-8,614553	493,8773477
628	5,088705	241,1445786	97,87144	-1,14990418	96,72154	-8,614553	493,8773477
629	0	-13,41691574	-42,82521	-27,3695907	-70,1948	29,93834	-80,51005833
629	2,672821	-13,41691574	-42,82521	-27,3695907	-70,1948	29,93834	-80,51005833
629	5,345641	-13,41691574	-42,82521	-27,3695907	-70,1948	29,93834	-80,51005833
630	0	-228,1888086	-134,5389	-3,38392712	-137,923	19,00265	-520,6634474
630	2,502183	-228,1888086	-134,5389	-3,38392712	-137,923	19,00265	-520,6634474
630	5,004366	-228,1888086	-134,5389	-3,38392712	-137,923	19,00265	-520,6634474
631	0	60,00239321	21,35334	-1,72116683	19,63218	6,971641	129,9093151
631	2,506689	60,00239321	21,35334	-1,72116683	19,63218	6,971641	129,9093151
631	5,013378	60,00239321	21,35334	-1,72116683	19,63218	6,971641	129,9093151
632	0	242,3622111	120,8791	-0,94072822	119,9384	-4,591554	536,5635468
632	2,513691	242,3622111	120,8791	-0,94072822	119,9384	-4,591554	536,5635468
632	5,027383	242,3622111	120,8791	-0,94072822	119,9384	-4,591554	536,5635468
633	0	334,039115	172,3886	-2,53899269	169,8496	-11,49554	738,589739
633	2,523556	334,039115	172,3886	-2,53899269	169,8496	-11,49554	738,589739
633	5,047112	334,039115	172,3886	-2,53899269	169,8496	-11,49554	738,589739
634	0	374,1643142	195,1049	6,66076198	201,7657	-15,76065	840,2539827
634	2,537563	374,1643142	195,1049	6,66076198	201,7657	-15,76065	840,2539827
634	5,075126	374,1643142	195,1049	6,66076198	201,7657	-15,76065	840,2539827
635	0	141,3235555	210,979	62,1270195	273,106	-17,33318	595,644547
635	2,55129	141,3235555	210,979	62,1270195	273,106	-17,33318	595,644547
635	5,10258	141,3235555	210,979	62,1270195	273,106	-17,33318	595,644547
636	0	223,3388986	207,511	48,8410986	256,3521	-13,626	699,0974487
636	2,567192	223,3388986	207,511	48,8410986	256,3521	-13,626	699,0974487
636	5,134383	223,3388986	207,511	48,8410986	256,3521	-13,626	699,0974487
637	0	374,6875943	314,3513	59,6435447	373,9949	-47,69112	1051,487003
637	2,586036	374,6875943	314,3513	59,6435447	373,9949	-47,69112	1051,487003
637	5,172072	374,6875943	314,3513	59,6435447	373,9949	-47,69112	1051,487003
771	0	-333,3935087	-156,4696	-2,09517518	-158,565	-2,729768	-742,0321113
771	2,537563	-333,3935087	-156,4696	-2,09517518	-158,565	-2,729768	-742,0321113
771	5,075126	-333,3935087	-156,4696	-2,09517518	-158,565	-2,729768	-742,0321113
772	0	302,1106316	142,2492	-6,10997683	136,1392	3,014477	661,8964968
772	2,523556	302,1106316	142,2492	-6,10997683	136,1392	3,014477	661,8964968
772	5,047112	302,1106316	142,2492	-6,10997683	136,1392	3,014477	661,8964968

TABEL GAYA GESER KOLOM TEPI

FRAME	STA	VD	VL		VL TOT	VE	COMB 1
			VL merata	VL.Koef kejut			1,5(VD+VL+VE)
1	0	-12,22529	-8,824256	-1,03552324	-9,85978	4,160579	-26,88673521
1	5,5	-12,22529	-8,824256	-1,03552324	-9,85978	4,160579	-26,88673521
1	11	-12,22529	-8,824256	-1,03552324	-9,85978	4,160579	-26,88673521
2	0	151,2839	65,78349	-16,5540112	49,22948	3,526998	306,0605798
2	2,811	151,2839	65,78349	-16,5540112	49,22948	3,526998	306,0605798
2	5,622	151,2839	65,78349	-16,5540112	49,22948	3,526998	306,0605798
12	0	-47,96903	-6,463038	-8,91081995	-15,3739	-6,49939	-104,7634152
12	3,683	-47,96903	-6,463038	-8,91081995	-15,3739	-6,49939	-104,7634152
12	7,366	-47,96903	-6,463038	-8,91081995	-15,3739	-6,49939	-104,7634152
41	0	161,8558	78,73878	-14,9213171	63,81746	-3,522344	333,2264338
41	2,811	161,8558	78,73878	-14,9213171	63,81746	-3,522344	333,2264338
41	5,622	161,8558	78,73878	-14,9213171	63,81746	-3,522344	333,2264338
128	0	-810,0533	-484,8834	-13,5145435	-498,398	65,39593	-1864,582944
128	0,179563	-810,0533	-484,8834	-13,5145435	-498,398	65,39593	-1864,582944
128	0,359125	-810,0533	-484,8834	-13,5145435	-498,398	65,39593	-1864,582944
137	0	582,7361	206,9785	-14,3309345	192,6476	27,77427	1204,736886
137	0,437625	582,7361	206,9785	-14,3309345	192,6476	27,77427	1204,736886
137	0,87525	582,7361	206,9785	-14,3309345	192,6476	27,77427	1204,736886
151	0	440,2964	415,767	65,3952906	481,1623	-0,318497	1381,710191
151	1,703813	440,2964	415,767	65,3952906	481,1623	-0,318497	1381,710191
151	3,407625	440,2964	415,767	65,3952906	481,1623	-0,318497	1381,710191
153	0	206,2128	341,6476	75,7917649	417,4394	-0,210432	935,1626084
153	2,287875	206,2128	341,6476	75,7917649	417,4394	-0,210432	935,1626084
153	4,57575	206,2128	341,6476	75,7917649	417,4394	-0,210432	935,1626084
155	0	227,5299	252,5796	47,4962214	300,0759	0,529185	792,2024725
155	2,946438	227,5299	252,5796	47,4962214	300,0759	0,529185	792,2024725
155	5,892875	227,5299	252,5796	47,4962214	300,0759	0,529185	792,2024725
274	0	177,056	94,82413	20,0353313	114,8595	-0,741788	436,7605641
274	0,451281	177,056	94,82413	20,0353313	114,8595	-0,741788	436,7605641
274	0,902563	177,056	94,82413	20,0353313	114,8595	-0,741788	436,7605641
275	0	440,7442	173,498	105,683948	279,1819	-8,62978	1066,944487
275	0,50025	440,7442	173,498	105,683948	279,1819	-8,62978	1066,944487
275	1,0005	440,7442	173,498	105,683948	279,1819	-8,62978	1066,944487
278	0	1087,548	443,2015	131,855662	575,0571	-17,84184	2467,145207
278	0,672219	1087,548	443,2015	131,855662	575,0571	-17,84184	2467,145207
278	1,344438	1087,548	443,2015	131,855662	575,0571	-17,84184	2467,145207
281	0	-960,0649	-395,3937	-56,0765401	-451,47	14,43617	-2095,648459
281	0,967688	-960,0649	-395,3937	-56,0765401	-451,47	14,43617	-2095,648459
281	1,935375	-960,0649	-395,3937	-56,0765401	-451,47	14,43617	-2095,648459
283	0	-692,6893	-288,5652	-13,0739687	-301,639	9,952211	-1476,564366
283	1,388656	-692,6893	-288,5652	-13,0739687	-301,639	9,952211	-1476,564366
283	2,777313	-692,6893	-288,5652	-13,0739687	-301,639	9,952211	-1476,564366
285	0	-453,7578	-193,6884	7,12274353	-186,566	6,485339	-950,7570986
285	1,936625	-453,7578	-193,6884	7,12274353	-186,566	6,485339	-950,7570986
285	3,87325	-453,7578	-193,6884	7,12274353	-186,566	6,485339	-950,7570986
287	0	-280,317	-126,1346	15,0208222	-111,114	4,246218	-580,7769407
287	2,616594	-280,317	-126,1346	15,0208222	-111,114	4,246218	-580,7769407

287	5,233188	-280,317	-126,1346	15,0208222	-111,114	4,246218	-580,7769407
294	0	-157,1557	-79,44453	16,7929088	-62,6516	2,829834	-325,4662121
294	3,432063	-157,1557	-79,44453	16,7929088	-62,6516	2,829834	-325,4662121
294	6,864125	-157,1557	-79,44453	16,7929088	-62,6516	2,829834	-325,4662121
296	0	-68,00211	-44,27235	12,2195501	-32,0528	2,157088	-146,8467392
296	4,390531	-68,00211	-44,27235	12,2195501	-32,0528	2,157088	-146,8467392
296	8,781063	-68,00211	-44,27235	12,2195501	-32,0528	2,157088	-146,8467392
301	0	881,9282	373,5412	52,026915	425,5682	-11,33846	1944,236917
301	1,050875	881,9282	373,5412	52,026915	425,5682	-11,33846	1944,236917
301	2,10175	881,9282	373,5412	52,026915	425,5682	-11,33846	1944,236917
303	0	1173,082	504,8463	140,583223	645,4295	-15,55838	2704,429567
303	0,725844	1173,082	504,8463	140,583223	645,4295	-15,55838	2704,429567
303	1,451688	1173,082	504,8463	140,583223	645,4295	-15,55838	2704,429567
307	0	-675,9933	-303,7228	-129,802025	-433,525	8,903569	-1650,921871
307	0,524813	-675,9933	-303,7228	-129,802025	-433,525	8,903569	-1650,921871
307	1,049625	-675,9933	-303,7228	-129,802025	-433,525	8,903569	-1650,921871
309	0	-363,6424	-147,8581	11,2376983	-136,62	4,875965	-743,0803016
309	2,090438	-363,6424	-147,8581	11,2376983	-136,62	4,875965	-743,0803016
309	4,180875	-363,6424	-147,8581	11,2376983	-136,62	4,875965	-743,0803016
311	0	-569,6493	-245,1451	-6,28715232	-251,432	7,499764	-1220,372612
311	1,504406	-569,6493	-245,1451	-6,28715232	-251,432	7,499764	-1220,372612
311	3,008813	-569,6493	-245,1451	-6,28715232	-251,432	7,499764	-1220,372612
321	0	1089,814	501,2196	-8,28243653	492,9371	6,595931	2384,020878
321	0,774688	1089,814	501,2196	-8,28243653	492,9371	6,595931	2384,020878
321	1,549375	1089,814	501,2196	-8,28243653	492,9371	6,595931	2384,020878
385	0	91,64735	62,72493	-10,0460454	52,67889	-10,92413	200,1031525
385	4,390531	91,64735	62,72493	-10,0460454	52,67889	-10,92413	200,1031525
385	8,781063	91,64735	62,72493	-10,0460454	52,67889	-10,92413	200,1031525
386	0	-191,9711	-106,6808	13,5822473	-93,0986	15,79901	-403,9059764
386	3,432063	-191,9711	-106,6808	13,5822473	-93,0986	15,79901	-403,9059764
386	6,864125	-191,9711	-106,6808	13,5822473	-93,0986	15,79901	-403,9059764
389	0	320,8654	158,0659	-11,2545682	146,8113	-19,47419	672,3038324
389	2,616594	320,8654	158,0659	-11,2545682	146,8113	-19,47419	672,3038324
389	5,233188	320,8654	158,0659	-11,2545682	146,8113	-19,47419	672,3038324
393	0	495,7029	227,3542	-3,15286847	224,2013	-22,5444	1046,039778
393	1,936625	495,7029	227,3542	-3,15286847	224,2013	-22,5444	1046,039778
393	3,87325	495,7029	227,3542	-3,15286847	224,2013	-22,5444	1046,039778
398	0	-723,866	-315,4326	-16,2359241	-331,669	22,73627	-1549,197358
398	1,388656	-723,866	-315,4326	-16,2359241	-331,669	22,73627	-1549,197358
398	2,777313	-723,866	-315,4326	-16,2359241	-331,669	22,73627	-1549,197358
401	0	953,6706	393,9987	55,954614	449,9534	-13,18352	2085,660623
401	0,967688	953,6706	393,9987	55,954614	449,9534	-13,18352	2085,660623
401	1,935375	953,6706	393,9987	55,954614	449,9534	-13,18352	2085,660623
411	0	290,37	45,38135	90,6495349	136,0309	51,95021	717,5266613
411	0,50025	290,37	45,38135	90,6495349	136,0309	51,95021	717,5266613
411	1,0005	290,37	45,38135	90,6495349	136,0309	51,95021	717,5266613
412	0	389,3842	270,4971	40,6176803	311,1148	-83,8423	924,9849588
412	0,451281	389,3842	270,4971	40,6176803	311,1148	-83,8423	924,9849588
412	0,902563	389,3842	270,4971	40,6176803	311,1148	-83,8423	924,9849588
414	0	864,8136	437,6217	145,426585	583,0483	-71,65983	2064,303224
414	0,524812	864,8136	437,6217	145,426585	583,0483	-71,65983	2064,303224

414	1,049625	864,8136	437,6217	145,426585	583,0483	-71,65983	2064,303224
416	0	-974,3139	-361,106	-121,927113	-483,033	-20,89655	-2217,365267
416	0,674719	-974,3139	-361,106	-121,927113	-483,033	-20,89655	-2217,365267
416	1,349438	-974,3139	-361,106	-121,927113	-483,033	-20,89655	-2217,365267
436	0	-1179,75	-599,71	-3,2378946	-602,948	39,40202	-2614,943815
436	0,774688	-1179,75	-599,71	-3,2378946	-602,948	39,40202	-2614,943815
436	1,549375	-1179,75	-599,71	-3,2378946	-602,948	39,40202	-2614,943815
438	0	-474,7229	-186,2894	16,8529596	-169,436	-38,5076	-1024,000307
438	0,437625	-474,7229	-186,2894	16,8529596	-169,436	-38,5076	-1024,000307
438	0,87525	-474,7229	-186,2894	16,8529596	-169,436	-38,5076	-1024,000307
440	0	1260,889	722,5469	41,4482082	763,9951	-177,6013	2770,924263
440	0,179563	1260,889	722,5469	41,4482082	763,9951	-177,6013	2770,924263
440	0,359125	1260,889	722,5469	41,4482082	763,9951	-177,6013	2770,924263
442	0	-297,189	-423,69	-85,4321648	-509,122	38,98037	-1150,996089
442	2,287875	-297,189	-423,69	-85,4321648	-509,122	38,98037	-1150,996089
442	4,57575	-297,189	-423,69	-85,4321648	-509,122	38,98037	-1150,996089
444	0	-558,5207	-518,5644	-77,4778395	-596,042	48,92008	-1658,464254
444	1,703813	-558,5207	-518,5644	-77,4778395	-596,042	48,92008	-1658,464254
444	3,407625	-558,5207	-518,5644	-77,4778395	-596,042	48,92008	-1658,464254
446	0	-1115,053	-610,5581	-25,2047288	-635,763	54,75754	-2544,086999
446	1,19375	-1115,053	-610,5581	-25,2047288	-635,763	54,75754	-2544,086999
446	2,3875	-1115,053	-610,5581	-25,2047288	-635,763	54,75754	-2544,086999
453	0	279,8849	305,4274	53,695146	359,1225	-24,3405	922,0003417
453	2,946438	279,8849	305,4274	53,695146	359,1225	-24,3405	922,0003417
453	5,892875	279,8849	305,4274	53,695146	359,1225	-24,3405	922,0003417
457	0	110,6676	95,03631	2,87168011	97,90799	-53,08779	233,2317311
457	3,683	110,6676	95,03631	2,87168011	97,90799	-53,08779	233,2317311
457	7,366	110,6676	95,03631	2,87168011	97,90799	-53,08779	233,2317311
462	0	-342,7509	-124,6329	14,1066317	-110,526	-7,360104	-690,9558374
462	2,090438	-342,7509	-124,6329	14,1066317	-110,526	-7,360104	-690,9558374
462	4,180875	-342,7509	-124,6329	14,1066317	-110,526	-7,360104	-690,9558374
465	0	925,3164	389,6216	53,7079503	443,3296	-17,09083	2027,332818
465	1,050875	925,3164	389,6216	53,7079503	443,3296	-17,09083	2027,332818
465	2,10175	925,3164	389,6216	53,7079503	443,3296	-17,09083	2027,332818
467	0	565,9121	230,8164	4,42280562	235,2392	0,914191	1203,098195
467	1,504406	565,9121	230,8164	4,42280562	235,2392	0,914191	1203,098195
467	3,008813	565,9121	230,8164	4,42280562	235,2392	0,914191	1203,098195
472	0	1326,16	599,9129	151,549692	751,4626	-58,87117	3028,127727
472	0,725844	1326,16	599,9129	151,549692	751,4626	-58,87117	3028,127727
472	1,451688	1326,16	599,9129	151,549692	751,4626	-58,87117	3028,127727
535	0	982,2818	492,7048	11,3709849	504,0758	0,774148	2230,697642
535	1,19375	982,2818	492,7048	11,3709849	504,0758	0,774148	2230,697642
535	2,3875	982,2818	492,7048	11,3709849	504,0758	0,774148	2230,697642

GAYA GESER RENCANA KOLOM TEPI

Kolom		128 dan 440	137 dan 438	321 dan 436	535 dan 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457
Bawah Atas	Tinggi kolom	0,359	0,875	1,549	2,383	3,378	4,538	5,866	7,365
	MU	640,58	547,27	2276,15	2859,27	2703,15	2573,8	2732,29	416,89
	MU	496,81	477,31	1968,46	2598,29	2526,56	2473,04	2549,93	2619
	VU 1	3168,21727	1170,948571	2740,225952	2290,205623	1548,167555	1112,128691	900,4807364	412,2050238
VD		810,05	582,73	1089,81	1115,05	558,521	297,189	279,88	110,66
VL		498,398	192,64	492,93	635,76	596,042	509,122	359,122	97,9
VE		65,395	27,774	6,595	54,757	48,92	38,98	24,34	53,087
VU2 =1,5(VD+VL+VE)		2060,7645	1204,716	2384,0025	2708,3505	1805,2245	1267,9365	995,013	392,4705
VU pakai		2060,7645	1170,948571	2384,0025	2290,205623	1548,167555	1112,128691	900,4807364	392,4705

Kolom		41 dan 2	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411
Bawah Atas	Tinggi kolom	5,624	4,172	2,999	2,093	1,445	1,049	0,902	1
	MU	1039,53	1561,61	1892,39	2267,27	2462,83	1229,47	525,41	575
	MU	860,94	1557,22	1822,29	2125,42	2221,96	1174,53	493,06	553,22
	Vu 1	337,9214083	747,5623202	1238,639547	2098,752986	3242,069204	2291,706387	1129,124169	1128,22
VD		161,85	363,64	569,64	925,31	1326,16	864,81	389,38	440,74
VL		63,81	136,62	251,43	443,32	751,46	583,04	311,11	279,8
VE		3,522	4,875	7,499	17,09	58,871	71,659	83,842	8,629
VU2 =1,5(VD+VL+VE)		343,773	757,7025	1242,8535	2078,58	3204,7365	2279,2635	1176,498	1093,7535
VU pakai		337,9214083	747,5623202	1238,639547	2078,58	3204,7365	2279,2635	1129,124169	1093,7535

Kolom		278 dan 416	281 dan 401	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
Bawah Atas	Tinggi kolom	1,344	1,935	2,777	3,873	5,245	6,864	8,781	11
	MU	1839,07	1988,17	2309,37	2071,07	1844,55	1485,24	995,85	567,78
	MU	1627,2	2199,34	2147,43	2162,7	1876,09	1507,25	978,72	1196,3
	Vu 1	2579,06994	2164,087855	1604,897371	1093,150013	709,3689228	435,9688228	224,868466	160,3709091
VD		1087,54	953,67	723,86	495,7	320,86	191,97	91,64	12,22
VL		575,05	449,95	331,66	224,2	146,81	93,09	52,67	9,85
VE		17,841	13,183	22,736	22,544	19,474	15,799	10,924	4,16
VU2 =1,5(VD+VL+VE)		2520,6465	2125,2045	1617,384	1113,666	730,716	451,2885	232,851	39,345
VU pakai		2520,6465	2125,2045	1604,897371	1093,150013	709,3689228	435,9688228	224,868466	160,3709091

TABEL GAYA GESER KOLOM TENGAH

FRAME	STA	VD	VL		VL TOT	VE	COMB 1
			VL merata	VL.Koef kejut			1,5(VD+VL+VE)
4	0	252,7769	73,03183	-19,06276237	53,96906669	-0,456311	459,4345571
4	2,811	252,7769	73,03183	-19,06276237	53,96906669	-0,456311	459,4345571
4	5,622	252,7769	73,03183	-19,06276237	53,96906669	-0,456311	459,4345571
43	0	265,9669	87,38626	-17,49830389	69,88795768	-5,915329	494,9093649
43	2,811	265,9669	87,38626	-17,49830389	69,88795768	-5,915329	494,9093649
43	5,622	265,9669	87,38626	-17,49830389	69,88795768	-5,915329	494,9093649
543	0	-10,11886	-9,40631	-1,122266045	-10,52857569	4,581701	-24,09859584
543	5,5	-10,11886	-9,40631	-1,122266045	-10,52857569	4,581701	-24,09859584
543	11	-10,11886	-9,40631	-1,122266045	-10,52857569	4,581701	-24,09859584
544	0	-39,17754	-9,217172	-12,14491501	-21,36208674	-12,23197	-109,1573938
544	3,683	-39,17754	-9,217172	-12,14491501	-21,36208674	-12,23197	-109,1573938
544	7,366	-39,17754	-9,217172	-12,14491501	-21,36208674	-12,23197	-109,1573938
551	0	-1010,506	-572,0036	-8,745003589	-580,7486146	115,6978	-2213,335814
551	0,179563	-1010,506	-572,0036	-8,745003589	-580,7486146	115,6978	-2213,335814
551	0,359125	-1010,506	-572,0036	-8,745003589	-580,7486146	115,6978	-2213,335814
555	0	805,3714	332,6128	-18,12094745	314,4918362	62,1588	1773,033064
555	0,437625	805,3714	332,6128	-18,12094745	314,4918362	62,1588	1773,033064
555	0,87525	805,3714	332,6128	-18,12094745	314,4918362	62,1588	1773,033064
560	0	602,1415	466,1625	87,92291173	554,0853882	8,24334	1746,705299
560	1,703813	602,1415	466,1625	87,92291173	554,0853882	8,24334	1746,705299
560	3,407625	602,1415	466,1625	87,92291173	554,0853882	8,24334	1746,705299
561	0	346,3344	374,8829	105,3590514	480,2419866	5,386002	1247,943558
561	2,287875	346,3344	374,8829	105,3590514	480,2419866	5,386002	1247,943558
561	4,57575	346,3344	374,8829	105,3590514	480,2419866	5,386002	1247,943558
562	0	337,947	276,7879	64,79456797	341,5824757	4,071163	1025,401021
562	2,946438	337,947	276,7879	64,79456797	341,5824757	4,071163	1025,401021
562	5,892875	337,947	276,7879	64,79456797	341,5824757	4,071163	1025,401021
585	0	216,6991	99,05566	23,75371543	122,8093767	-4,917714	501,8860928
585	0,451281	216,6991	99,05566	23,75371543	122,8093767	-4,917714	501,8860928
585	0,902563	216,6991	99,05566	23,75371543	122,8093767	-4,917714	501,8860928
586	0	569,0028	205,6781	152,441129	358,1192609	-7,646659	1379,213163
586	0,50025	569,0028	205,6781	152,441129	358,1192609	-7,646659	1379,213163
586	1,0005	569,0028	205,6781	152,441129	358,1192609	-7,646659	1379,213163
587	0	1362,986	512,6721	172,2445481	684,9165982	-19,56973	3042,499483
587	0,672219	1362,986	512,6721	172,2445481	684,9165982	-19,56973	3042,499483
587	1,344438	1362,986	512,6721	172,2445481	684,9165982	-19,56973	3042,499483
588	0	-1179,756	-447,278	-61,58987194	-508,8678391	16,97246	-2507,476481
588	0,967688	-1179,756	-447,278	-61,58987194	-508,8678391	16,97246	-2507,476481
588	1,935375	-1179,756	-447,278	-61,58987194	-508,8678391	16,97246	-2507,476481
589	0	-844,3392	-319,0903	-8,471688873	-327,5619687	12,14346	-1739,636511
589	1,388656	-844,3392	-319,0903	-8,471688873	-327,5619687	12,14346	-1739,636511
589	2,777313	-844,3392	-319,0903	-8,471688873	-327,5619687	12,14346	-1739,636511
590	0	-561,4822	-210,058	12,68977536	-197,3682004	8,164455	-1126,028979
590	1,936625	-561,4822	-210,058	12,68977536	-197,3682004	8,164455	-1126,028979
590	3,87325	-561,4822	-210,058	12,68977536	-197,3682004	8,164455	-1126,028979

591	0	-369,0095	-135,4134	19,67378666	-115,7396498	5,501223	-718,871945
591	2,616594	-369,0095	-135,4134	19,67378666	-115,7396498	5,501223	-718,871945
591	5,233188	-369,0095	-135,4134	19,67378666	-115,7396498	5,501223	-718,871945
596	0	-241,2195	-85,43595	20,59460471	-64,84134218	3,754841	-453,4589895
596	3,432063	-241,2195	-85,43595	20,59460471	-64,84134218	3,754841	-453,4589895
596	6,864125	-241,2195	-85,43595	20,59460471	-64,84134218	3,754841	-453,4589895
597	0	-143,4375	-48,31099	13,39387684	-34,91711747	2,795445	-263,3386922
597	4,390531	-143,4375	-48,31099	13,39387684	-34,91711747	2,795445	-263,3386922
597	8,781063	-143,4375	-48,31099	13,39387684	-34,91711747	2,795445	-263,3386922
601	0	1127,997	425,6419	59,69049018	485,3323506	-19,51528	2390,720731
601	1,050875	1127,997	425,6419	59,69049018	485,3323506	-19,51528	2390,720731
601	2,10175	1127,997	425,6419	59,69049018	485,3323506	-19,51528	2390,720731
602	0	1502,206	578,6904	184,205575	762,895971	-25,50703	3359,393065
602	0,725844	1502,206	578,6904	184,205575	762,895971	-25,50703	3359,393065
602	1,451688	1502,206	578,6904	184,205575	762,895971	-25,50703	3359,393065
605	0	-864,3115	-342,3069	-180,5824914	-522,8893744	15,02802	-2058,259206
605	0,524813	-864,3115	-342,3069	-180,5824914	-522,8893744	15,02802	-2058,259206
605	1,049625	-864,3115	-342,3069	-180,5824914	-522,8893744	15,02802	-2058,259206
606	0	-527,8203	-164,6757	15,41665089	-149,2590149	8,812312	-1002,400477
606	2,090438	-527,8203	-164,6757	15,41665089	-149,2590149	8,812312	-1002,400477
606	4,180875	-527,8203	-164,6757	15,41665089	-149,2590149	8,812312	-1002,400477
607	0	-739,7588	-276,2964	-2,306281312	-278,6026892	13,55126	-1507,215383
607	1,504406	-739,7588	-276,2964	-2,306281312	-278,6026892	13,55126	-1507,215383
607	3,008813	-739,7588	-276,2964	-2,306281312	-278,6026892	13,55126	-1507,215383
613	0	1372,597	636,3411	-22,25111137	614,0900323	27,21596	3020,854706
613	0,774688	1372,597	636,3411	-22,25111137	614,0900323	27,21596	3020,854706
613	1,549375	1372,597	636,3411	-22,25111137	614,0900323	27,21596	3020,854706
641	0	162,5616	66,71687	-11,23396756	55,48290278	-11,58942	309,6826665
641	4,390531	162,5616	66,71687	-11,23396756	55,48290278	-11,58942	309,6826665
641	8,781063	162,5616	66,71687	-11,23396756	55,48290278	-11,58942	309,6826665
642	0	-268,8088	-112,0213	17,4801733	-94,54109906	16,39878	-520,4266649
642	3,432063	-268,8088	-112,0213	17,4801733	-94,54109906	16,39878	-520,4266649
642	6,864125	-268,8088	-112,0213	17,4801733	-94,54109906	16,39878	-520,4266649
643	0	400,9939	166,2704	-16,06789514	150,2025521	-20,1164	796,6200204
643	2,616594	400,9939	166,2704	-16,06789514	150,2025521	-20,1164	796,6200204
643	5,233188	400,9939	166,2704	-16,06789514	150,2025521	-20,1164	796,6200204
644	0	594,532	241,7575	-8,992838115	232,7646741	-23,12492	1206,257636
644	1,936625	594,532	241,7575	-8,992838115	232,7646741	-23,12492	1206,257636
644	3,87325	594,532	241,7575	-8,992838115	232,7646741	-23,12492	1206,257636
648	0	-869,574	-342,3173	-11,18207023	-353,4993711	22,97707	-1800,144424
648	1,388656	-869,574	-342,3173	-11,18207023	-353,4993711	22,97707	-1800,144424
648	2,777313	-869,574	-342,3173	-11,18207023	-353,4993711	22,97707	-1800,144424
649	0	1176,766	439,0582	60,7504209	499,8085727	-12,08886	2496,7286
649	0,967688	1176,766	439,0582	60,7504209	499,8085727	-12,08886	2496,7286
649	1,935375	1176,766	439,0582	60,7504209	499,8085727	-12,08886	2496,7286
652	0	417,6558	67,17172	136,171981	203,3436984	58,65728	1019,485154
652	0,50025	417,6558	67,17172	136,171981	203,3436984	58,65728	1019,485154
652	1,0005	417,6558	67,17172	136,171981	203,3436984	58,65728	1019,485154
653	0	421,3159	286,7713	46,04390346	332,8151832	-95,49333	987,9565932

653	0,451281	421,3159	286,7713	46,04390346	332,8151832	-95,49333	987,9565932
653	0,902563	421,3159	286,7713	46,04390346	332,8151832	-95,49333	987,9565932
654	0	1017,446	486,1407	197,7890679	683,929766	-85,47371	2423,853315
654	0,524812	1017,446	486,1407	197,7890679	683,929766	-85,47371	2423,853315
654	1,049625	1017,446	486,1407	197,7890679	683,929766	-85,47371	2423,853315
655	0	-1265,689	-418,4004	-160,9291675	-579,3295553	-25,55506	-2805,861134
655	0,674719	-1265,689	-418,4004	-160,9291675	-579,3295553	-25,55506	-2805,861134
655	1,349438	-1265,689	-418,4004	-160,9291675	-579,3295553	-25,55506	-2805,861134
661	0	-1480,523	-737,863	10,18878595	-727,6742308	21,95979	-3279,356522
661	0,774688	-1480,523	-737,863	10,18878595	-727,6742308	21,95979	-3279,356522
661	1,549375	-1480,523	-737,863	10,18878595	-727,6742308	21,95979	-3279,356522
662	0	-788,1195	-313,9231	20,12372134	-293,7994245	-69,22056	-1726,709179
662	0,437625	-788,1195	-313,9231	20,12372134	-293,7994245	-69,22056	-1726,709179
662	0,87525	-788,1195	-313,9231	20,12372134	-293,7994245	-69,22056	-1726,709179
663	0	1240,141	792,5019	34,62121163	827,1231133	-219,5988	2771,498424
663	0,179563	1240,141	792,5019	34,62121163	827,1231133	-219,5988	2771,498424
663	0,359125	1240,141	792,5019	34,62121163	827,1231133	-219,5988	2771,498424
664	0	-434,1104	-458,5819	-115,206574	-573,7884296	34,30712	-1460,387572
664	2,287875	-434,1104	-458,5819	-115,206574	-573,7884296	34,30712	-1460,387572
664	4,57575	-434,1104	-458,5819	-115,206574	-573,7884296	34,30712	-1460,387572
665	0	-713,7316	-572,5109	-100,44159	-672,9525257	42,19763	-2016,729803
665	1,703813	-713,7316	-572,5109	-100,44159	-672,9525257	42,19763	-2016,729803
665	3,407625	-713,7316	-572,5109	-100,44159	-672,9525257	42,19763	-2016,729803
666	0	-1317,429	-701,0575	-17,1756347	-718,2330904	44,59014	-2986,607868
666	1,19375	-1317,429	-701,0575	-17,1756347	-718,2330904	44,59014	-2986,607868
666	2,3875	-1317,429	-701,0575	-17,1756347	-718,2330904	44,59014	-2986,607868
670	0	394,9199	330,921	71,17875133	402,0997165	-21,76195	1162,886514
670	2,946438	394,9199	330,921	71,17875133	402,0997165	-21,76195	1162,886514
670	5,892875	394,9199	330,921	71,17875133	402,0997165	-21,76195	1162,886514
673	0	72,54911	93,24981	0,238083784	93,48788987	-63,96729	153,1045685
673	3,683	72,54911	93,24981	0,238083784	93,48788987	-63,96729	153,1045685
673	7,366	72,54911	93,24981	0,238083784	93,48788987	-63,96729	153,1045685
676	0	-505,6406	-140,775	18,01568759	-122,7592876	-0,404781	-943,2069495
676	2,090438	-505,6406	-140,775	18,01568759	-122,7592876	-0,404781	-943,2069495
676	4,180875	-505,6406	-140,775	18,01568759	-122,7592876	-0,404781	-943,2069495
678	0	1152,793	446,0322	62,45867867	508,4908496	-32,82402	2442,690184
678	1,050875	1152,793	446,0322	62,45867867	508,4908496	-32,82402	2442,690184
678	2,10175	1152,793	446,0322	62,45867867	508,4908496	-32,82402	2442,690184
679	0	729,5691	263,135	1,053056633	264,1880415	-10,26241	1475,242099
679	1,504406	729,5691	263,135	1,053056633	264,1880415	-10,26241	1475,242099
679	3,008813	729,5691	263,135	1,053056633	264,1880415	-10,26241	1475,242099
682	0	1614,944	684,5482	197,0587353	881,6069472	-79,53971	3625,516959
682	0,725844	1614,944	684,5482	197,0587353	881,6069472	-79,53971	3625,516959
682	1,451688	1614,944	684,5482	197,0587353	881,6069472	-79,53971	3625,516959
773	0	1188,399	578,5808	2,719766267	581,3005293	13,85102	2675,326161
773	1,19375	1188,399	578,5808	2,719766267	581,3005293	13,85102	2675,326161
773	2,3875	1188,399	578,5808	2,719766267	581,3005293	13,85102	2675,326161

LAMPIRAN

OUTPUT SAP :

GAYA AXIAL BALOK LENGKUNG TEPI
GAYA AXIAL BALOK LENGKUNG TENGAH
GAYA AXIAL KOLOM TEPI
GAYA AXIAL KOLOM TENGAH

GAYA AXIAL BALOK LENGKUNG TEPI

FRAME	STA	PD	PL		PL TOT	ME		COMB1	COMB 2	COMB 3
			PL merata	PL Koef kejut		PE X	PE Y			
13	0	-3085,103	-2403,884	-272,1917444	-2676,076	22,33319	0,265191	-9362,785371	-9340,452184	-9362,52018
13	2,586036	-3085,103	-2403,884	-272,1917444	-2676,076	22,33319	0,265191	-9362,785371	-9340,452184	-9362,52018
13	5,172072	-3085,103	-2403,884	-272,1917444	-2676,076	22,33319	0,265191	-9362,785371	-9340,452184	-9362,52018
14	0	-2810,248	-2111,235	-219,9143919	-2331,15	22,24224	-0,598497	-8315,622177	-8293,379935	-8316,220674
14	2,567192	-2810,248	-2111,235	-219,9143919	-2331,15	22,24224	-0,598497	-8315,622177	-8293,379935	-8316,220674
14	5,134383	-2810,248	-2111,235	-219,9143919	-2331,15	22,24224	-0,598497	-8315,622177	-8293,379935	-8316,220674
15	0	-2561,195	-1743,825	-141,7894072	-1885,615	22,01153	-0,815073	-7100,783594	-7078,77206	-7101,598667
15	2,55129	-2561,195	-1743,825	-141,7894072	-1885,615	22,01153	-0,815073	-7100,783594	-7078,77206	-7101,598667
15	5,10258	-2561,195	-1743,825	-141,7894072	-1885,615	22,01153	-0,815073	-7100,783594	-7078,77206	-7101,598667
19	0	590,6806	-61,61395	-77,13671682	-138,7507	56,48126	4,836888	490,3834838	546,8647399	485,5465953
19	2,506689	590,6806	-61,61395	-77,13671682	-138,7507	56,48126	4,836888	490,3834838	546,8647399	485,5465953
19	5,013378	590,6806	-61,61395	-77,13671682	-138,7507	56,48126	4,836888	490,3834838	546,8647399	485,5465953
20	0	-212,3433	-542,7682	-90,61015095	-633,3784	121,8743	-3,286117	-1542,803021	-1420,928734	-1546,089138
20	2,502183	-212,3433	-542,7682	-90,61015095	-633,3784	121,8743	-3,286117	-1542,803021	-1420,928734	-1546,089138
20	5,004366	-212,3433	-542,7682	-90,61015095	-633,3784	121,8743	-3,286117	-1542,803021	-1420,928734	-1546,089138
164	0	-8,554791	-277,4067	-62,85744549	-340,2642	28,77985	-2,450406	-691,649597	-662,86975	-694,1000034
164	2,513691	-8,554791	-277,4067	-62,85744549	-340,2642	28,77985	-2,450406	-691,649597	-662,86975	-694,1000034
164	5,027383	-8,554791	-277,4067	-62,85744549	-340,2642	28,77985	-2,450406	-691,649597	-662,86975	-694,1000034
167	0	-5903,91	-2229,787	-204,3327125	-2434,12	-7,134563	-18,38598	-12543,32299	-12550,45755	-12561,70897
167	2,705585	-5903,91	-2229,787	-204,3327125	-2434,12	-7,134563	-18,38598	-12543,32299	-12550,45755	-12561,70897
167	5,41117	-5903,91	-2229,787	-204,3327125	-2434,12	-7,134563	-18,38598	-12543,32299	-12550,45755	-12561,70897
187	0	-5746,395	-2146,181	-213,4317748	-2359,613	-7,35053	-19,89967	-12189,53945	-12196,88998	-12209,43912
187	2,651523	-5746,395	-2146,181	-213,4317748	-2359,613	-7,35053	-19,89967	-12189,53945	-12196,88998	-12209,43912
187	5,303045	-5746,395	-2146,181	-213,4317748	-2359,613	-7,35053	-19,89967	-12189,53945	-12196,88998	-12209,43912
213	0	-5689,737	-2203,588	-271,9644098	-2475,552	-20,52212	-10,97038	-12347,76175	-12368,28387	-12358,73213
213	2,672821	-5689,737	-2203,588	-271,9644098	-2475,552	-20,52212	-10,97038	-12347,76175	-12368,28387	-12358,73213
213	5,345641	-5689,737	-2203,588	-271,9644098	-2475,552	-20,52212	-10,97038	-12347,76175	-12368,28387	-12358,73213
214	0	-5463,813	-2092,595	-286,8877501	-2379,483	-23,27731	-15,29073	-11861,9226	-11885,1999	-11877,21333
214	2,623968	-5463,813	-2092,595	-286,8877501	-2379,483	-23,27731	-15,29073	-11861,9226	-11885,1999	-11877,21333
214	5,247936	-5463,813	-2092,595	-286,8877501	-2379,483	-23,27731	-15,29073	-11861,9226	-11885,1999	-11877,21333
215	0	-5011,042	-1909,637	-295,4541934	-2205,091	-28,11106	-16,03839	-10924,5368	-10952,64786	-10940,57519
215	2,585908	-5011,042	-1909,637	-295,4541934	-2205,091	-28,11106	-16,03839	-10924,5368	-10952,64786	-10940,57519
215	5,171816	-5011,042	-1909,637	-295,4541934	-2205,091	-28,11106	-16,03839	-10924,5368	-10952,64786	-10940,57519

216	0	-4382,444	-1635,728	-287,5824263	-1923,311	-35,52065	-17,36101	-9543,798993	-9579,319638	-9561,160006
216	2,555252	-4382,444	-1635,728	-287,5824263	-1923,311	-35,52065	-17,36101	-9543,798993	-9579,319638	-9561,160006
216	5,110504	-4382,444	-1635,728	-287,5824263	-1923,311	-35,52065	-17,36101	-9543,798993	-9579,319638	-9561,160006
217	0	-3453,77	-1239,538	-233,6709002	-1473,209	-46,81314	-18,47403	-7436,318678	-7483,13182	-7454,792707
217	2,531798	-3453,77	-1239,538	-233,6709002	-1473,209	-46,81314	-18,47403	-7436,318678	-7483,13182	-7454,792707
217	5,063596	-3453,77	-1239,538	-233,6709002	-1473,209	-46,81314	-18,47403	-7436,318678	-7483,13182	-7454,792707
218	0	-2247,37	-717,9052	-90,96598328	-808,8912	-62,37124	-15,80892	-4539,363951	-4601,735195	-4555,17287
218	2,515189	-2247,37	-717,9052	-90,96598328	-808,8912	-62,37124	-15,80892	-4539,363951	-4601,735195	-4555,17287
218	5,030378	-2247,37	-717,9052	-90,96598328	-808,8912	-62,37124	-15,80892	-4539,363951	-4601,735195	-4555,17287
219	0	-1553,507	-404,5506	41,11038204	-363,4402	-71,26951	-8,125661	-2746,439235	-2817,708745	-2754,564896
219	2,504407	-1553,507	-404,5506	41,11038204	-363,4402	-71,26951	-8,125661	-2746,439235	-2817,708745	-2754,564896
219	5,008813	-1553,507	-404,5506	41,11038204	-363,4402	-71,26951	-8,125661	-2746,439235	-2817,708745	-2754,564896
221	0	-1370,563	-306,7052	62,67729632	-244,0279	-71,99095	4,011141	-2269,78806	-2341,779015	-2265,776919
221	2,500135	-1370,563	-306,7052	62,67729632	-244,0279	-71,99095	4,011141	-2269,78806	-2341,779015	-2265,776919
221	5,00027	-1370,563	-306,7052	62,67729632	-244,0279	-71,99095	4,011141	-2269,78806	-2341,779015	-2265,776919
224	0	-3907,446	-1343,907	-234,6241744	-1578,531	-31,04057	-19,13767	-8236,742849	-8267,783423	-8255,880524
224	2,52383	-3907,446	-1343,907	-234,6241744	-1578,531	-31,04057	-19,13767	-8236,742849	-8267,783423	-8255,880524
224	5,047659	-3907,446	-1343,907	-234,6241744	-1578,531	-31,04057	-19,13767	-8236,742849	-8267,783423	-8255,880524
227	0	-5503,213	-2028,268	-229,1118783	-2257,38	-10,40837	-20,87417	-11668,93777	-11679,34614	-11689,81193
227	2,607363	-5503,213	-2028,268	-229,1118783	-2257,38	-10,40837	-20,87417	-11668,93777	-11679,34614	-11689,81193
227	5,214725	-5503,213	-2028,268	-229,1118783	-2257,38	-10,40837	-20,87417	-11668,93777	-11679,34614	-11689,81193
230	0	-5152,527	-1870,82	-242,9444103	-2113,764	-14,61874	-21,967	-10925,81352	-10940,43226	-10947,78052
230	2,572163	-5152,527	-1870,82	-242,9444103	-2113,764	-14,61874	-21,967	-10925,81352	-10940,43226	-10947,78052
230	5,144327	-5152,527	-1870,82	-242,9444103	-2113,764	-14,61874	-21,967	-10925,81352	-10940,43226	-10947,78052
231	0	-4642,176	-1651,783	-248,859522	-1900,642	-21,09804	-22,38687	-9836,11283	-9857,210874	-9858,499704
231	2,544352	-4642,176	-1651,783	-248,859522	-1900,642	-21,09804	-22,38687	-9836,11283	-9857,210874	-9858,499704
231	5,088705	-4642,176	-1651,783	-248,859522	-1900,642	-21,09804	-22,38687	-9836,11283	-9857,210874	-9858,499704
235	0	-2918,817	-934,7603	-177,3965119	-1112,157	-45,47646	-6,967507	-6018,775593	-6064,252048	-6025,7431
235	2,509705	-2918,817	-934,7603	-177,3965119	-1112,157	-45,47646	-6,967507	-6018,775593	-6064,252048	-6025,7431
235	5,01941	-2918,817	-934,7603	-177,3965119	-1112,157	-45,47646	-6,967507	-6018,775593	-6064,252048	-6025,7431
236	0	-1815,197	-483,0705	44,28725856	-527,3578	-63,33737	7,282212	-3414,471133	-3477,8085	-3407,188921
236	2,501881	-1815,197	-483,0705	44,28725856	-527,3578	-63,33737	7,282212	-3414,471133	-3477,8085	-3407,188921
236	5,003762	-1815,197	-483,0705	44,28725856	-527,3578	-63,33737	7,282212	-3414,471133	-3477,8085	-3407,188921
323	0	-5588,546	-2023,601	-180,3159322	-2203,917	-101,988	0,186994	-11672,94409	-11774,9321	-11672,7571
323	2,705585	-5588,546	-2023,601	-180,3159322	-2203,917	-101,988	0,186994	-11672,94409	-11774,9321	-11672,7571
323	5,41117	-5588,546	-2023,601	-180,3159322	-2203,917	-101,988	0,186994	-11672,94409	-11774,9321	-11672,7571
324	0	-5397,669	-1913,11	-186,2477575	-2099,357	-114,9911	-0,419049	-11215,68428	-11330,6754	-11216,10333

324	2,651523	-5397,669	-1913,11	-186,2477575	-2099,357	-114,9911	-0,419049	-11215,68428	-11330,6754	-11216,10333
324	5,303045	-5397,669	-1913,11	-186,2477575	-2099,357	-114,9911	-0,419049	-11215,68428	-11330,6754	-11216,10333
325	0	-5124,978	-1770,572	-199,0215802	-1969,594	-129,8136	-0,222993	-10601,65927	-10731,47287	-10601,88226
325	2,607363	-5124,978	-1770,572	-199,0215802	-1969,594	-129,8136	-0,222993	-10601,65927	-10731,47287	-10601,88226
325	5,214725	-5124,978	-1770,572	-199,0215802	-1969,594	-129,8136	-0,222993	-10601,65927	-10731,47287	-10601,88226
326	0	-4736,658	-1582,177	-209,2016284	-1791,379	-148,8083	0,028762	-9740,413006	-9889,221326	-9740,384244
326	2,572163	-4736,658	-1582,177	-209,2016284	-1791,379	-148,8083	0,028762	-9740,413006	-9889,221326	-9740,384244
326	5,144327	-4736,658	-1582,177	-209,2016284	-1791,379	-148,8083	0,028762	-9740,413006	-9889,221326	-9740,384244
342	0	-5831,641	-2353,437	-317,0016115	-2670,439	95,6521	0,718321	-12922,01116	-12826,35907	-12921,29284
342	2,623968	-5831,641	-2353,437	-317,0016115	-2670,439	95,6521	0,718321	-12922,01116	-12826,35907	-12921,29284
342	5,247936	-5831,641	-2353,437	-317,0016115	-2670,439	95,6521	0,718321	-12922,01116	-12826,35907	-12921,29284
343	0	-5393,353	-2190,446	-328,0681325	-2518,514	101,6285	1,502817	-12048,38798	-11946,75952	-12046,88516
343	2,585908	-5393,353	-2190,446	-328,0681325	-2518,514	101,6285	1,502817	-12048,38798	-11946,75952	-12046,88516
343	5,171816	-5393,353	-2190,446	-328,0681325	-2518,514	101,6285	1,502817	-12048,38798	-11946,75952	-12046,88516
344	0	-4765,479	-1929,703	-321,931133	-2251,635	102,1472	2,144893	-10698,39164	-10596,24439	-10696,24675
344	2,555252	-4765,479	-1929,703	-321,931133	-2251,635	102,1472	2,144893	-10698,39164	-10596,24439	-10696,24675
344	5,110504	-4765,479	-1929,703	-321,931133	-2251,635	102,1472	2,144893	-10698,39164	-10596,24439	-10696,24675
345	0	-3790,731	-1516,055	-266,1817043	-1782,237	84,49041	2,586191	-8492,424764	-8407,934351	-8489,838573
345	2,531798	-3790,731	-1516,055	-266,1817043	-1782,237	84,49041	2,586191	-8492,424764	-8407,934351	-8489,838573
345	5,063596	-3790,731	-1516,055	-266,1817043	-1782,237	84,49041	2,586191	-8492,424764	-8407,934351	-8489,838573
346	0	-2429,251	-897,8002	-112,3472462	-1010,147	24,88273	2,781094	-5178,32103	-5153,438301	-5175,539936
346	2,515189	-2429,251	-897,8002	-112,3472462	-1010,147	24,88273	2,781094	-5178,32103	-5153,438301	-5175,539936
346	5,030378	-2429,251	-897,8002	-112,3472462	-1010,147	24,88273	2,781094	-5178,32103	-5153,438301	-5175,539936
347	0	-1546,193	-448,9828	35,56050317	-413,4223	-47,53863	2,636282	-2836,895851	-2884,434481	-2834,259569
347	2,504407	-1546,193	-448,9828	35,56050317	-413,4223	-47,53863	2,636282	-2836,895851	-2884,434481	-2834,259569
347	5,008813	-1546,193	-448,9828	35,56050317	-413,4223	-47,53863	2,636282	-2836,895851	-2884,434481	-2834,259569
348	0	-1153,562	-174,1341	77,87095445	-96,26319	-132,0246	2,238483	-1692,156415	-1824,180968	-1689,917932
348	2,500135	-1153,562	-174,1341	77,87095445	-96,26319	-132,0246	2,238483	-1692,156415	-1824,180968	-1689,917932
348	5,00027	-1153,562	-174,1341	77,87095445	-96,26319	-132,0246	2,238483	-1692,156415	-1824,180968	-1689,917932
349	0	-1451,001	-221,3088	-13,9424841	-235,2512	-184,5218	1,767953	-2356,803771	-2541,325615	-2355,035818
349	2,501979	-1451,001	-221,3088	-13,9424841	-235,2512	-184,5218	1,767953	-2356,803771	-2541,325615	-2355,035818
349	5,003959	-1451,001	-221,3088	-13,9424841	-235,2512	-184,5218	1,767953	-2356,803771	-2541,325615	-2355,035818
350	0	-2441,348	-589,7969	-136,9646163	-726,7615	-205,865	1,138964	-4627,275108	-4833,140132	-4626,136144
350	2,509487	-2441,348	-589,7969	-136,9646163	-726,7615	-205,865	1,138964	-4627,275108	-4833,140132	-4626,136144
350	5,018974	-2441,348	-589,7969	-136,9646163	-726,7615	-205,865	1,138964	-4627,275108	-4833,140132	-4626,136144
351	0	-3422,912	-996,756	-193,9859561	-1190,742	-193,1254	0,662929	-6831,269071	-7024,394508	-6830,606143
351	2,52383	-3422,912	-996,756	-193,9859561	-1190,742	-193,1254	0,662929	-6831,269071	-7024,394508	-6830,606143

351	5,047659	-3422,912	-996,756	-193,9859561	-1190,742	-193,1254	0,662929	-6831,269071	-7024,394508	-6830,606143
352	0	-4186,957	-1330,541	-211,271078	-1541,812	-170,8537	0,302048	-8526,668779	-8697,522479	-8526,366731
352	2,544352	-4186,957	-1330,541	-211,271078	-1541,812	-170,8537	0,302048	-8526,668779	-8697,522479	-8526,366731
352	5,088705	-4186,957	-1330,541	-211,271078	-1541,812	-170,8537	0,302048	-8526,668779	-8697,522479	-8526,366731
354	0	-6024,787	-2435,412	-298,5523298	-2733,964	83,78016	3,868813	-13300,15115	-13216,37099	-13296,28234
354	2,672821	-6024,787	-2435,412	-298,5523298	-2733,964	83,78016	3,868813	-13300,15115	-13216,37099	-13296,28234
354	5,345641	-6024,787	-2435,412	-298,5523298	-2733,964	83,78016	3,868813	-13300,15115	-13216,37099	-13296,28234
365	0	806,0596	402,8443	16,59804617	419,4423	-287,653	-0,074431	1886,762197	1599,109155	1886,687766
365	2,502183	806,0596	402,8443	16,59804617	419,4423	-287,653	-0,074431	1886,762197	1599,109155	1886,687766
365	5,004366	806,0596	402,8443	16,59804617	419,4423	-287,653	-0,074431	1886,762197	1599,109155	1886,687766
366	0	2081,147	1123,02	58,19030988	1181,21	-466,1098	-0,160628	5067,910685	4601,800873	5067,750057
366	2,506689	2081,147	1123,02	58,19030988	1181,21	-466,1098	-0,160628	5067,910685	4601,800873	5067,750057
366	5,013378	2081,147	1123,02	58,19030988	1181,21	-466,1098	-0,160628	5067,910685	4601,800873	5067,750057
367	0	1611,603	929,3474	75,17678606	1004,524	-505,3841	-0,10744	4104,131928	3598,74786	4104,024489
367	2,513691	1611,603	929,3474	75,17678606	1004,524	-505,3841	-0,10744	4104,131928	3598,74786	4104,024489
367	5,027383	1611,603	929,3474	75,17678606	1004,524	-505,3841	-0,10744	4104,131928	3598,74786	4104,024489
368	0	428,2187	317,2823	72,10191305	389,3842	-466,7555	0,016926	1335,452785	868,6972383	1335,469712
368	2,523556	428,2187	317,2823	72,10191305	389,3842	-466,7555	0,016926	1335,452785	868,6972383	1335,469712
368	5,047112	428,2187	317,2823	72,10191305	389,3842	-466,7555	0,016926	1335,452785	868,6972383	1335,469712
369	0	-700,3541	-310,9814	45,7557504	-265,2257	-412,83	0,146448	-1440,911623	-1853,741665	-1440,765175
369	2,537563	-700,3541	-310,9814	45,7557504	-265,2257	-412,83	0,146448	-1440,911623	-1853,741665	-1440,765175
369	5,075126	-700,3541	-310,9814	45,7557504	-265,2257	-412,83	0,146448	-1440,911623	-1853,741665	-1440,765175
370	0	-1214,362	-850,9276	-40,57049557	-891,4981	-364,5213	0,192208	-3361,666575	-3726,187918	-3361,474367
370	2,55129	-1214,362	-850,9276	-40,57049557	-891,4981	-364,5213	0,192208	-3361,666575	-3726,187918	-3361,474367
370	5,10258	-1214,362	-850,9276	-40,57049557	-891,4981	-364,5213	0,192208	-3361,666575	-3726,187918	-3361,474367
371	0	-1530,88	-1296,693	-127,9149283	-1424,608	-327,1438	0,201434	-4839,359933	-5166,503719	-4839,158499
371	2,567192	-1530,88	-1296,693	-127,9149283	-1424,608	-327,1438	0,201434	-4839,359933	-5166,503719	-4839,158499
371	5,134383	-1530,88	-1296,693	-127,9149283	-1424,608	-327,1438	0,201434	-4839,359933	-5166,503719	-4839,158499
372	0	-1851,647	-1654,228	-187,8067758	-1842,035	-296,4923	0,95955	-6104,210549	-6400,702809	-6103,250999
372	2,586036	-1851,647	-1654,228	-187,8067758	-1842,035	-296,4923	0,95955	-6104,210549	-6400,702809	-6103,250999
372	5,172072	-1851,647	-1654,228	-187,8067758	-1842,035	-296,4923	0,95955	-6104,210549	-6400,702809	-6103,250999
532	0	-2143,232	-1305,051	-67,36070378	-1372,411	21,59484	-1,112542	-5531,024573	-5509,429729	-5532,137115
532	2,537563	-2143,232	-1305,051	-67,36070378	-1372,411	21,59484	-1,112542	-5531,024573	-5509,429729	-5532,137115
532	5,075126	-2143,232	-1305,051	-67,36070378	-1372,411	21,59484	-1,112542	-5531,024573	-5509,429729	-5532,137115
533	0	-1124,364	-792,638	-54,61448981	-847,2525	22,26918	-1,593901	-3156,178351	-3133,909169	-3157,772252
533	2,523556	-1124,364	-792,638	-54,61448981	-847,2525	22,26918	-1,593901	-3156,178351	-3133,909169	-3157,772252
533	5,047112	-1124,364	-792,638	-54,61448981	-847,2525	22,26918	-1,593901	-3156,178351	-3133,909169	-3157,772252

GAYA AXIAL BALOK LENGKUNG TENGAH

FRAME	STA	PD	PL		PL TOT	ME		COMB1		COMB 2		COMB 3	
			PL merata	PL Koef kejut		PE X	PE Y	1,3PD + 2 (PQ+PP)	1,3PD + 2 (PQ+PP)+1PEX	1,3PD + 2 (PQ+PP)+1PEX	1,3PD + 2 (PQ+PP)+1PEY		
545	0	-4165,308	-2762,301	-349,746336	-3112,048	-9,0833	-4,0041	-11638,9962	-11648,07946	-11648,07946	-11643,0003		
545	2,58604	-4165,308	-2762,301	-349,746336	-3112,048	-9,0833	-4,0041	-11638,9962	-11648,07946	-11648,07946	-11643,0003		
545	5,17207	-4165,308	-2762,301	-349,746336	-3112,048	-9,0833	-4,0041	-11638,9962	-11648,07946	-11648,07946	-11643,0003		
546	0	-3759,643	-2440,51	-278,345227	-2718,855	-5,8515	-1,245278	-10325,24712	-10331,09862	-10331,09862	-10326,49239		
546	2,56719	-3759,643	-2440,51	-278,345227	-2718,855	-5,8515	-1,245278	-10325,24712	-10331,09862	-10331,09862	-10326,49239		
546	5,13438	-3759,643	-2440,51	-278,345227	-2718,855	-5,8515	-1,245278	-10325,24712	-10331,09862	-10331,09862	-10326,49239		
547	0	-3359,076	-2037,241	-170,242587	-2207,484	-0,2597	-1,27873	-8781,765282	-8782,025004	-8782,025004	-8783,044012		
547	2,55129	-3359,076	-2037,241	-170,242587	-2207,484	-0,2597	-1,27873	-8781,765282	-8782,025004	-8782,025004	-8783,044012		
547	5,10258	-3359,076	-2037,241	-170,242587	-2207,484	-0,2597	-1,27873	-8781,765282	-8782,025004	-8782,025004	-8783,044012		
548	0	694,1286	48,26847	-104,771517	-56,50304	111,241	-0,481329	789,3611425	900,6017774	900,6017774	788,8798131		
548	2,50669	694,1286	48,26847	-104,771517	-56,50304	111,241	-0,481329	789,3611425	900,6017774	900,6017774	788,8798131		
548	5,01338	694,1286	48,26847	-104,771517	-56,50304	111,241	-0,481329	789,3611425	900,6017774	900,6017774	788,8798131		
549	0	-305,3041	-518,1104	-113,417077	-631,5275	226,993	-3,423748	-1659,950415	-1432,95713	-1432,95713	-1663,374162		
549	2,50218	-305,3041	-518,1104	-113,417077	-631,5275	226,993	-3,423748	-1659,950415	-1432,95713	-1432,95713	-1663,374162		
549	5,00437	-305,3041	-518,1104	-113,417077	-631,5275	226,993	-3,423748	-1659,950415	-1432,95713	-1432,95713	-1663,374162		
563	0	-132,7514	-294,8439	-86,6785938	-381,5225	49,145	-1,089526	-935,6219186	-886,4768844	-886,4768844	-936,7114443		
563	2,51369	-132,7514	-294,8439	-86,6785938	-381,5225	49,145	-1,089526	-935,6219186	-886,4768844	-886,4768844	-936,7114443		
563	5,02738	-132,7514	-294,8439	-86,6785938	-381,5225	49,145	-1,089526	-935,6219186	-886,4768844	-886,4768844	-936,7114443		
564	0	-7329,422	-2448,527	-249,749896	-2698,277	-15,129	38,05826	-14924,80289	-14939,93162	-14939,93162	-14886,74464		
564	2,70559	-7329,422	-2448,527	-249,749896	-2698,277	-15,129	38,05826	-14924,80289	-14939,93162	-14939,93162	-14886,74464		
564	5,41117	-7329,422	-2448,527	-249,749896	-2698,277	-15,129	38,05826	-14924,80289	-14939,93162	-14939,93162	-14886,74464		
565	0	-7039,037	-2355,967	-257,222617	-2613,19	-15,839	42,06734	-14377,12853	-14392,96737	-14392,96737	-14335,06119		
565	2,65152	-7039,037	-2355,967	-257,222617	-2613,19	-15,839	42,06734	-14377,12853	-14392,96737	-14392,96737	-14335,06119		
565	5,30305	-7039,037	-2355,967	-257,222617	-2613,19	-15,839	42,06734	-14377,12853	-14392,96737	-14392,96737	-14335,06119		
566	0	-7189,625	-2427,193	-339,293124	-2766,486	2,82647	17,34684	-14879,48421	-14876,65774	-14876,65774	-14862,13737		
566	2,67282	-7189,625	-2427,193	-339,293124	-2766,486	2,82647	17,34684	-14879,48421	-14876,65774	-14876,65774	-14862,13737		
566	5,34564	-7189,625	-2427,193	-339,293124	-2766,486	2,82647	17,34684	-14879,48421	-14876,65774	-14876,65774	-14862,13737		
567	0	-6838,657	-2303,285	-356,52078	-2659,805	-2,1371	26,37401	-14209,86491	-14212,00199	-14212,00199	-14183,4909		
567	2,62397	-6838,657	-2303,285	-356,52078	-2659,805	-2,1371	26,37401	-14209,86491	-14212,00199	-14212,00199	-14183,4909		
567	5,24794	-6838,657	-2303,285	-356,52078	-2659,805	-2,1371	26,37401	-14209,86491	-14212,00199	-14212,00199	-14183,4909		
568	0	-6166,877	-2100,671	-368,231655	-2468,903	-11,285	28,1253	-12954,74501	-12966,0296	-12966,0296	-12926,61971		
568	2,58591	-6166,877	-2100,671	-368,231655	-2468,903	-11,285	28,1253	-12954,74501	-12966,0296	-12966,0296	-12926,61971		
568	5,17182	-6166,877	-2100,671	-368,231655	-2468,903	-11,285	28,1253	-12954,74501	-12966,0296	-12966,0296	-12926,61971		

569	0	-5338,695	-1793,116	-364,400143	-2'57,516	-25,015	29,56959	-11255,33546	-11280,35016	-11225,76587
569	2,55525	-5338,695	-1793,116	-364,400143	-2157,516	-25,015	29,56959	-11255,33546	-11280,35016	-11225,76587
569	5,1105	-5338,695	-1793,116	-364,400143	-2157,516	-25,015	29,56959	-11255,33546	-11280,35016	-11225,76587
570	0	-4139,268	-1342,979	-302,953393	-1645,932	-44,647	30,58975	-8672,912751	-8717,559577	-8642,322999
570	2,5318	-4139,268	-1342,979	-302,953393	-1645,932	-44,647	30,58975	-8672,912751	-8717,559577	-8642,322999
570	5,0636	-4139,268	-1342,979	-302,953393	-1645,932	-44,647	30,58975	-8672,912751	-8717,559577	-8642,322999
571	0	-2584,046	-745,9314	-116,710957	-862,6423	-70,208	24,41586	-5084,544733	-5154,752566	-5060,128868
571	2,51519	-2584,046	-745,9314	-116,710957	-862,6423	-70,208	24,41586	-5084,544733	-5154,752566	-5060,128868
571	5,03038	-2584,046	-745,9314	-116,710957	-862,6423	-70,208	24,41586	-5084,544733	-5154,752566	-5060,128868
572	0	-1688,927	-392,9475	66,68613111	-326,2614	-85,164	10,36265	-2848,128358	-2933,292687	-2837,76571
572	2,50441	-1688,927	-392,9475	66,68613111	-326,2614	-85,164	10,36265	-2848,128358	-2933,292687	-2837,76571
572	5,00881	-1688,927	-392,9475	66,68613111	-326,2614	-85,164	10,36265	-2848,128358	-2933,292687	-2837,76571
573	0	-1462,569	-290,5488	92,75397194	-197,7949	-89,951	-7,36429	-2296,92967	-2386,880792	-2304,29396
573	2,50014	-1462,569	-290,5488	92,75397194	-197,7949	-89,951	-7,36429	-2296,92967	-2386,880792	-2304,29396
573	5,00027	-1462,569	-290,5488	92,75397194	-197,7949	-89,951	-7,36429	-2296,92967	-2386,880792	-2304,29396
574	0	-4651,177	-1482,423	-296,970388	-1779,394	-45,507	38,31118	-9605,31726	-9650,824404	-9567,006082
574	2,52383	-4651,177	-1482,423	-296,970388	-1779,394	-45,507	38,31118	-9605,31726	-9650,824404	-9567,006082
574	5,04766	-4651,177	-1482,423	-296,970388	-1779,394	-45,507	38,31118	-9605,31726	-9650,824404	-9567,006082
575	0	-6669,979	-2228,312	-276,727055	-2505,039	-19,763	44,07772	-13681,05066	-13700,81364	-13636,97294
575	2,60736	-6669,979	-2228,312	-276,727055	-2505,039	-19,763	44,07772	-13681,05066	-13700,81364	-13636,97294
575	5,21473	-6669,979	-2228,312	-276,727055	-2505,039	-19,763	44,07772	-13681,05066	-13700,81364	-13636,97294
576	0	-6198,324	-2058,924	-295,041633	-2353,965	-25,202	46,10551	-12765,75108	-12790,95343	-12719,64557
576	2,57216	-6198,324	-2058,924	-295,041633	-2353,965	-25,202	46,10551	-12765,75108	-12790,95343	-12719,64557
576	5,14433	-6198,324	-2058,924	-295,041633	-2353,965	-25,202	46,10551	-12765,75108	-12790,95343	-12719,64557
577	0	-5555,886	-1821,823	-306,46695	-2128,29	-33,355	46,32078	-11479,23228	-11512,58761	-11432,9115
577	2,54435	-5555,886	-1821,823	-306,46695	-2128,29	-33,355	46,32078	-11479,23228	-11512,58761	-11432,9115
577	5,0887	-5555,886	-1821,823	-306,46695	-2128,29	-33,355	46,32078	-11479,23228	-11512,58761	-11432,9115
578	0	-3429,066	-1020,751	-234,520691	-1255,271	-62,523	15,68356	-6968,328637	-7030,851678	-6952,645078
578	2,50971	-3429,066	-1020,751	-234,520691	-1255,271	-62,523	15,68356	-6968,328637	-7030,851678	-6952,645078
578	5,01941	-3429,066	-1020,751	-234,520691	-1255,271	-62,523	15,68356	-6968,328637	-7030,851678	-6952,645078
579	0	-2040,139	-499,1338	-61,1945626	-560,3284	-82,185	-9,002289	-3772,83738	-3855,021888	-3781,839669
579	2,50188	-2040,139	-499,1338	-61,1945626	-560,3284	-82,185	-9,002289	-3772,83738	-3855,021888	-3781,839669
579	5,00376	-2040,139	-499,1338	-61,1945626	-560,3284	-82,185	-9,002289	-3772,83738	-3855,021888	-3781,839669
614	0	-7071,096	-2208,371	-220,923737	-2429,295	-136,29	-1,196136	-14051,01402	-14187,3046	-14052,21016
614	2,70559	-7071,096	-2208,371	-220,923737	-2429,295	-136,29	-1,196136	-14051,01402	-14187,3046	-14052,21016
614	5,41117	-7071,096	-2208,371	-220,923737	-2429,295	-136,29	-1,196136	-14051,01402	-14187,3046	-14052,21016
615	0	-6752,431	-2088,705	-225,211071	-2313,916	-149,94	0,825371	-13405,99311	-13555,9288	-13405,16774

615	2,65152	-6752,431	-2088,705	-225,211071	-2313,916	-149,94	0,825371	-13405,99311	-13555,9288	-13405,16774
615	5,30305	-6752,431	-2088,705	-225,211071	-2313,916	-149,94	0,825371	-13405,99311	-13555,9288	-13405,16774
616	0	-6359,191	-1937,622	-241,980032	-2179,602	-164,92	0,454393	-12626,15287	-12791,07128	-12625,69847
616	2,60736	-6359,191	-1937,622	-241,980032	-2179,602	-164,92	0,454393	-12626,15287	-12791,07128	-12625,69847
616	5,21473	-6359,191	-1937,622	-241,980032	-2179,602	-164,92	0,454393	-12626,15287	-12791,07128	-12625,69847
617	0	-5856,93	-1738,626	-256,840536	-1995,467	-184,33	-0,162634	-11604,94205	-11789,26835	-11605,10468
617	2,57216	-5856,93	-1738,626	-256,840536	-1995,467	-184,33	-0,162634	-11604,94205	-11789,26835	-11605,10468
617	5,14433	-5856,93	-1738,626	-256,840536	-1995,467	-184,33	-0,162634	-11604,94205	-11789,26835	-11605,10468
618	0	-7169,883	-2605,121	-393,438716	-2998,559	152,707	-0,811244	-15317,96662	-15165,25938	-15318,77787
618	2,62397	-7169,883	-2605,121	-393,438716	-2998,559	152,707	-0,811244	-15317,96662	-15165,25938	-15318,77787
618	5,24794	-7169,883	-2605,121	-393,438716	-2998,559	152,707	-0,811244	-15317,96662	-15165,25938	-15318,77787
619	0	-6516,389	-2423,071	-407,321577	-2830,392	150,928	-1,332269	-14132,0908	-13981,1624	-14133,42307
619	2,58591	-6516,389	-2423,071	-407,321577	-2830,392	150,928	-1,332269	-14132,0908	-13981,1624	-14133,42307
619	5,17182	-6516,389	-2423,071	-407,321577	-2830,392	150,928	-1,332269	-14132,0908	-13981,1624	-14133,42307
620	0	-5696,67	-2127,181	-404,556675	-2531,737	139,655	-2,781992	-12469,14599	-12329,49095	-12471,92799
620	2,55525	-5696,67	-2127,181	-404,556675	-2531,737	139,655	-2,781992	-12469,14599	-12329,49095	-12471,92799
620	5,1105	-5696,67	-2127,181	-404,556675	-2531,737	139,655	-2,781992	-12469,14599	-12329,49095	-12471,92799
621	0	-4470,78	-1655,237	-340,160608	-1995,398	105,937	-3,613014	-9802,809694	-9696,872561	-9806,422708
621	2,5318	-4470,78	-1655,237	-340,160608	-1995,398	105,937	-3,613014	-9802,809694	-9696,872561	-9806,422708
621	5,0636	-4470,78	-1655,237	-340,160608	-1995,398	105,937	-3,613014	-9802,809694	-9696,872561	-9806,422708
622	0	-2801,09	-950,6542	-140,868273	-1091,522	25,5404	-3,705641	-5824,461803	-5798,921417	-5828,167444
622	2,51519	-2801,09	-950,6542	-140,868273	-1091,522	25,5404	-3,705641	-5824,461803	-5798,921417	-5828,167444
622	5,03038	-2801,09	-950,6542	-140,868273	-1091,522	25,5404	-3,705641	-5824,461803	-5798,921417	-5828,167444
623	0	-1751,598	-452,3327	59,90811935	-392,4246	-60,536	-3,412339	-3061,926067	-3122,462471	-3065,338405
623	2,50441	-1751,598	-452,3327	59,90811935	-392,4246	-60,536	-3,412339	-3061,926067	-3122,462471	-3065,338405
623	5,00881	-1751,598	-452,3327	59,90811935	-392,4246	-60,536	-3,412339	-3061,926067	-3122,462471	-3065,338405
624	0	-1319,403	-161,1132	108,3877049	-52,72551	-156,37	-2,933939	-1820,674684	-1977,039877	-1823,608624
624	2,50014	-1319,403	-161,1132	108,3877049	-52,72551	-156,37	-2,933939	-1820,674684	-1977,039877	-1823,608624
624	5,00027	-1319,403	-161,1132	108,3877049	-52,72551	-156,37	-2,933939	-1820,674684	-1977,039877	-1823,608624
625	0	-1744,789	-230,3486	-29,2334216	-259,582	-215,28	-2,458977	-2787,389684	-3002,674207	-2789,848662
625	2,50198	-1744,789	-230,3486	-29,2334216	-259,582	-215,28	-2,458977	-2787,389684	-3002,674207	-2789,848662
625	5,00396	-1744,789	-230,3486	-29,2334216	-259,582	-215,28	-2,458977	-2787,389684	-3002,674207	-2789,848662
626	0	-3035,257	-656,658	-191,085133	-847,7432	-241,09	-1,78021	-5541,320254	-5882,414277	-5643,100464
626	2,50949	-3035,257	-656,658	-191,085133	-847,7432	-241,09	-1,78021	-5541,320254	-5882,414277	-5643,100464
626	5,01897	-3035,257	-656,658	-191,085133	-847,7432	-241,09	-1,78021	-5541,320254	-5882,414277	-5643,100464
627	0	-4253,907	-1109,401	-252,62577	-1362,026	-229,34	-1,177057	-8254,131969	-8483,474455	-8255,309026
627	2,52383	-4253,907	-1109,401	-252,62577	-1362,026	-229,34	-1,177057	-8254,131969	-8483,474455	-8255,309026

627	5,04766	-4253,907	-1109,401	-252,62577	-1362,026	-229,34	-1,177057	-8254,131969	-8483,474455	-8255,309026
628	0	-5182,773	-1471,039	-264,715055	-1735,754	-206,83	-0,654624	-10209,11182	-10415,94436	-10209,76645
628	2,54435	-5182,773	-1471,039	-264,715055	-1735,754	-206,83	-0,654624	-10209,11182	-10415,94436	-10209,76645
628	5,0887	-5182,773	-1471,039	-264,715055	-1735,754	-206,83	-0,654624	-10209,11182	-10415,94436	-10209,76645
629	0	-7490,58	-2698,777	-372,738995	-3071,516	144,422	-8,182334	-15880,78574	-15736,36413	-15888,96807
629	2,67282	-7490,58	-2698,777	-372,738995	-3071,516	144,422	-8,182334	-15880,78574	-15736,36413	-15888,96807
629	5,34564	-7490,58	-2698,777	-372,738995	-3071,516	144,422	-8,182334	-15880,78574	-15736,36413	-15888,96807
630	0	856,2155	489,6531	13,18057419	502,8337	-326,99	-0,135282	2118,747614	1791,752866	2118,612332
630	2,50218	856,2155	489,6531	13,18057419	502,8337	-326,99	-0,135282	2118,747614	1791,752866	2118,612332
630	5,00437	856,2155	489,6531	13,18057419	502,8337	-326,99	-0,135282	2118,747614	1791,752866	2118,612332
631	0	2085,661	1277,881	47,81001616	1325,691	-546,86	-0,465657	5362,741868	4815,881792	5362,276212
631	2,50669	2085,661	1277,881	47,81001616	1325,691	-546,86	-0,465657	5362,741868	4815,881792	5362,276212
631	5,01338	2085,661	1277,881	47,81001616	1325,691	-546,86	-0,465657	5362,741868	4815,881792	5362,276212
632	0	1277,056	954,8198	68,03242786	1022,852	-616,34	-0,771581	3705,537289	3089,537289	3705,105379
632	2,51369	1277,056	954,8198	68,03242786	1022,852	-616,34	-0,771581	3705,537289	3089,537289	3705,105379
632	5,02738	1277,056	954,8198	68,03242786	1022,852	-616,34	-0,771581	3705,537289	3089,537289	3705,105379
633	0	-233,5761	203,0268	78,66443159	281,6912	-594,9	-1,023819	259,7334462	-335,1677824	258,7096272
633	2,52356	-233,5761	203,0268	78,66443159	281,6912	-594,9	-1,023819	259,7334462	-335,1677824	258,7096272
633	5,04711	-233,5761	203,0268	78,66443159	281,6912	-594,9	-1,023819	259,7334462	-335,1677824	258,7096272
634	0	-1591,626	-517,2599	59,91874047	-457,3411	-551,28	-1,105862	-2983,795463	-3535,078223	-2984,901325
634	2,53756	-1591,626	-517,2599	59,91874047	-457,3411	-551,28	-1,105862	-2983,795463	-3535,078223	-2984,901325
634	5,07513	-1591,626	-517,2599	59,91874047	-457,3411	-551,28	-1,105862	-2983,795463	-3535,078223	-2984,901325
635	0	-2292,623	-1112,987	-53,9878865	-1166,975	-510,02	-0,774946	-5314,359371	-5824,381449	-5315,134317
635	2,55129	-2292,623	-1112,987	-53,9878865	-1166,975	-510,02	-0,774946	-5314,359371	-5824,381449	-5315,134317
635	5,10258	-2292,623	-1112,987	-53,9878865	-1166,975	-510,02	-0,774946	-5314,359371	-5824,381449	-5315,134317
636	0	-2776,466	-1596,009	-171,445228	-1767,454	-478,05	-0,629586	-7144,313768	-7622,3666	-7144,943354
636	2,56719	-2776,466	-1596,009	-171,445228	-1767,454	-478,05	-0,629586	-7144,313768	-7622,3666	-7144,943354
636	5,13438	-2776,466	-1596,009	-171,445228	-1767,454	-478,05	-0,629586	-7144,313768	-7622,3666	-7144,943354
637	0	-3252,243	-1984,385	-250,702773	-2235,088	-449,49	-3,333329	-8698,090929	-9147,578102	-8701,424258
637	2,58604	-3252,243	-1984,385	-250,702773	-2235,088	-449,49	-3,333329	-8698,090929	-9147,578102	-8701,424258
637	5,17207	-3252,243	-1984,385	-250,702773	-2235,088	-449,49	-3,333329	-8698,090929	-9147,578102	-8701,424258
771	0	-2767,826	-1546,26	-58,653725	-1614,913	8,04305	-1,523636	-5827,99895	-6819,956843	-6829,52353
771	2,53756	-2767,826	-1546,26	-58,653725	-1614,913	8,04305	-1,523636	-5827,99895	-6819,956843	-6829,52353
771	5,07513	-2767,826	-1546,26	-58,653725	-1614,913	8,04305	-1,523636	-5827,99895	-6819,956843	-6829,52353
772	0	-1536,79	-946,5662	-64,1392819	-1010,705	21,9437	-1,440705	-4019,237765	-3997,294017	-4020,678471
772	2,52356	-1536,79	-946,5662	-64,1392819	-1010,705	21,9437	-1,440705	-4019,237765	-3997,294017	-4020,678471
772	5,04711	-1536,79	-946,5662	-64,1392819	-1010,705	21,9437	-1,440705	-4019,237765	-3997,294017	-4020,678471

TABEL GAYA AXIAL KOLOM TEPI

FRAME	STA	PD		PL		PL TOT	ME		COMB1	COMB 2	COMB 3
		PL merata	PL Koef kejut	PE X	PE Y						
1	0	-490,394	-282,401	-60,9712993	-343,373	-343,373	22,77967	4,495402	-1324,257285	-1301,477615	-1319,761883
1	5,5	-490,394	-282,401	-60,9712993	-343,373	-343,373	22,77967	4,495402	-1324,257285	-1301,477615	-1319,761883
1	11	-490,394	-282,401	-60,9712993	-343,373	-343,373	22,77967	4,495402	-1324,257285	-1301,477615	-1319,761883
2	0	-168,005	-59,133	5,96452635	-53,1685	-53,1685	-23,3829	1,226091	-324,7440198	-348,1269171	-323,5179285
2	2,811	-168,005	-59,133	5,96452635	-53,1685	-53,1685	-23,3829	1,226091	-324,7440198	-348,1269171	-323,5179285
2	5,622	-168,005	-59,133	5,96452635	-53,1685	-53,1685	-23,3829	1,226091	-324,7440198	-348,1269171	-323,5179285
12	0	21,64251	-381,777	-107,001562	-488,778	-488,778	1,774144	8,295916	-949,4210026	-947,6468585	-941,1250868
12	3,683	21,64251	-381,777	-107,001562	-488,778	-488,778	1,774144	8,295916	-949,4210026	-947,6468585	-941,1250868
12	7,366	21,64251	-381,777	-107,001562	-488,778	-488,778	1,774144	8,295916	-949,4210026	-947,6468585	-941,1250868
41	0	-232,853	-104,68	0,590311054	-104,09	-104,09	-1,86076	1,358546	-510,8882865	-512,74905	-509,5297408
41	2,811	-232,853	-104,68	0,590311054	-104,09	-104,09	-1,86076	1,358546	-510,8882865	-512,74905	-509,5297408
41	5,622	-232,853	-104,68	0,590311054	-104,09	-104,09	-1,86076	1,358546	-510,8882865	-512,74905	-509,5297408
128	0	-134,821	-81,5191	-1,05451189	-82,5736	-82,5736	-0,19232	0,114857	-340,415168	-340,6074897	-340,3003115
128	0,179563	-134,821	-81,5191	-1,05451189	-82,5736	-82,5736	-0,19232	0,114857	-340,415168	-340,6074897	-340,3003115
128	0,359125	-134,821	-81,5191	-1,05451189	-82,5736	-82,5736	-0,19232	0,114857	-340,415168	-340,6074897	-340,3003115
137	0	-163,713	-93,7179	-0,41626526	-94,1341	-94,1341	0,139493	-0,16677	-401,0953776	-400,9558851	-401,262147
137	0,437625	-163,713	-93,7179	-0,41626526	-94,1341	-94,1341	0,139493	-0,16677	-401,0953776	-400,9558851	-401,262147
137	0,87525	-163,713	-93,7179	-0,41626526	-94,1341	-94,1341	0,139493	-0,16677	-401,0953776	-400,9558851	-401,262147
151	0	122,1003	-135,435	-49,3223757	-184,758	-184,758	0,399888	0,056937	-210,7852843	-210,3853962	-210,7283474
151	1,703813	122,1003	-135,435	-49,3223757	-184,758	-184,758	0,399888	0,056937	-210,7852843	-210,3853962	-210,7283474
151	3,407625	122,1003	-135,435	-49,3223757	-184,758	-184,758	0,399888	0,056937	-210,7852843	-210,3853962	-210,7283474
153	0	-199,016	-132,889	-12,5453539	-145,434	-145,434	0,034809	-0,00124	-549,58907	-549,5542613	-549,5903088
153	2,287875	-199,016	-132,889	-12,5453539	-145,434	-145,434	0,034809	-0,00124	-549,58907	-549,5542613	-549,5903088
153	4,57575	-199,016	-132,889	-12,5453539	-145,434	-145,434	0,034809	-0,00124	-549,58907	-549,5542613	-549,5903088
155	0	-198,383	-172,385	-20,5891515	-192,975	-192,975	2,376355	-0,81264	-643,8468532	-641,4704985	-644,6594979
155	2,946438	-198,383	-172,385	-20,5891515	-192,975	-192,975	2,376355	-0,81264	-643,8468532	-641,4704985	-644,6594979
155	5,892875	-198,383	-172,385	-20,5891515	-192,975	-192,975	2,376355	-0,81264	-643,8468532	-641,4704985	-644,6594979
274	0	-179,081	-69,3119	-38,2756402	-107,588	-107,588	-1,74417	0,306899	-447,9807615	-449,72493	-447,6738626
274	0,451281	-179,081	-69,3119	-38,2756402	-107,588	-107,588	-1,74417	0,306899	-447,9807615	-449,72493	-447,6738626
274	0,902563	-179,081	-69,3119	-38,2756402	-107,588	-107,588	-1,74417	0,306899	-447,9807615	-449,72493	-447,6738626
275	0	-181,048	-66,9646	-4,96349371	-71,9281	-71,9281	-1,59741	-1,2954	-379,2191888	-380,8166011	-380,5145904
275	0,50025	-181,048	-66,9646	-4,96349371	-71,9281	-71,9281	-1,59741	-1,2954	-379,2191888	-380,8166011	-380,5145904
275	1,0005	-181,048	-66,9646	-4,96349371	-71,9281	-71,9281	-1,59741	-1,2954	-379,2191888	-380,8166011	-380,5145904

278	0	-226.5	-87,2084	-4,46184371	-91,6702	-0,93403	-1,25519	-477,7908006	-478,7248319	-479,0459869
278	0,672219	-226.5	-87,2084	-4,46184371	-91,6702	-0,93403	-1,25519	-477,7908006	-478,7248319	-479,0459869
278	1,344438	-226.5	-87,2084	-4,46184371	-91,6702	-0,93403	-1,25519	-477,7908006	-478,7248319	-479,0459869
281	0	-265,104	-102,823	-6,50961224	-109,332	-0,38951	0,328434	-563,2994666	-563,6889731	-562,9710328
281	0,967688	-265,104	-102,823	-6,50961224	-109,332	-0,38951	0,328434	-563,2994666	-563,6889731	-562,9710328
281	1,935375	-265,104	-102,823	-6,50961224	-109,332	-0,38951	0,328434	-563,2994666	-563,6889731	-562,9710328
283	0	-291,725	-114,072	-6,47581468	-120,548	-0,0499	-0,49423	-620,3384531	-620,3883545	-620,8326819
283	1,388656	-291,725	-114,072	-6,47581468	-120,548	-0,0499	-0,49423	-620,3384531	-620,3883545	-620,8326819
283	2,777313	-291,725	-114,072	-6,47581468	-120,548	-0,0499	-0,49423	-620,3384531	-620,3883545	-620,8326819
285	0	-306,004	-120,264	-5,48615293	-125,75	0,097662	-0,58878	-649,3054405	-649,2077786	-649,8942167
285	1,936625	-306,004	-120,264	-5,48615293	-125,75	0,097662	-0,58878	-649,3054405	-649,2077786	-649,8942167
285	3,87325	-306,004	-120,264	-5,48615293	-125,75	0,097662	-0,58878	-649,3054405	-649,2077786	-649,8942167
287	0	-309,977	-122,521	-4,14052634	-126,662	0,024646	-0,40846	-656,2939929	-656,2693471	-656,7024501
287	2,616594	-309,977	-122,521	-4,14052634	-126,662	0,024646	-0,40846	-656,2939929	-656,2693471	-656,7024501
287	5,233188	-309,977	-122,521	-4,14052634	-126,662	0,024646	-0,40846	-656,2939929	-656,2693471	-656,7024501
294	0	-316,497	-126,458	-2,95258962	-129,411	0,836258	-0,47143	-670,2681572	-669,4318995	-670,7395852
294	3,432063	-316,497	-126,458	-2,95258962	-129,411	0,836258	-0,47143	-670,2681572	-669,4318995	-670,7395852
294	6,864125	-316,497	-126,458	-2,95258962	-129,411	0,836258	-0,47143	-670,2681572	-669,4318995	-670,7395852
296	0	-283,725	-111,617	-8,19636828	-119,813	-4,99363	-0,75379	-608,4682888	-613,4619172	-609,2220759
296	4,390531	-283,725	-111,617	-8,19636828	-119,813	-4,99363	-0,75379	-608,4682888	-613,4619172	-609,2220759
296	8,781063	-283,725	-111,617	-8,19636828	-119,813	-4,99363	-0,75379	-608,4682888	-613,4619172	-609,2220759
301	0	-330,036	-133,254	-10,9843318	-144,238	0,127913	-0,3003	-717,5240772	-717,396164	-717,8243768
301	1,050875	-330,036	-133,254	-10,9843318	-144,238	0,127913	-0,3003	-717,5240772	-717,396164	-717,8243768
301	2,10175	-330,036	-133,254	-10,9843318	-144,238	0,127913	-0,3003	-717,5240772	-717,396164	-717,8243768
303	0	-314,885	-127,162	-14,9472394	-142,109	0,009023	-0,66314	-693,5691747	-693,5601517	-694,232314
303	0,725844	-314,885	-127,162	-14,9472394	-142,109	0,009023	-0,66314	-693,5691747	-693,5601517	-694,232314
303	1,451688	-314,885	-127,162	-14,9472394	-142,109	0,009023	-0,66314	-693,5691747	-693,5601517	-694,232314
307	0	-231,563	-89,9395	-13,8738763	-103,813	-1,06883	-0,44126	-508,6591888	-509,728016	-509,1004507
307	0,524813	-231,563	-89,9395	-13,8738763	-103,813	-1,06883	-0,44126	-508,6591888	-509,728016	-509,1004507
307	1,049625	-231,563	-89,9395	-13,8738763	-103,813	-1,06883	-0,44126	-508,6591888	-509,728016	-509,1004507
309	0	-378,534	-134,123	-8,7582019	-142,881	0,285228	-0,95888	-777,8567368	-777,5715088	-778,8156128
309	2,090438	-378,534	-134,123	-8,7582019	-142,881	0,285228	-0,95888	-777,8567368	-777,5715088	-778,8156128
309	4,180875	-378,534	-134,123	-8,7582019	-142,881	0,285228	-0,95888	-777,8567368	-777,5715088	-778,8156128
311	0	-325,244	-135,092	-6,97036964	-142,063	0,104654	-0,19977	-706,9426203	-706,8379665	-707,1423948
311	1,504406	-325,244	-135,092	-6,97036964	-142,063	0,104654	-0,19977	-706,9426203	-706,8379665	-707,1423948
311	3,008813	-325,244	-135,092	-6,97036964	-142,063	0,104654	-0,19977	-706,9426203	-706,8379665	-707,1423948
321	0	-206,651	-115,986	0,245947956	-115,74	0,288765	0,030826	-500,1268398	-499,8380747	-500,096014

321	0,774688	-206,651	-115,986	0,245947956	-115,74	0,288765	0,030826	-500,1268398	-499,8380747	-500,096014
321	1,549375	-206,651	-115,986	0,245947956	-115,74	0,288765	0,030826	-500,1268398	-499,8380747	-500,096014
385	0	-312,536	-134,156	-10,8518485	-145,008	5,741988	-0,44491	-696,3132239	-690,5712358	-696,7581342
385	4,390531	-312,536	-134,156	-10,8518485	-145,008	5,741988	-0,44491	-696,3132239	-690,5712358	-696,7581342
385	8,781063	-312,536	-134,156	-10,8518485	-145,008	5,741988	-0,44491	-696,3132239	-690,5712358	-696,7581342
386	0	-305,635	-119,265	-2,11378755	-121,379	-2,48685	-0,08922	-640,0829438	-642,5697962	-640,17216
386	3,432063	-305,635	-119,265	-2,11378755	-121,379	-2,48685	-0,08922	-640,0829438	-642,5697962	-640,17216
386	6,864125	-305,635	-119,265	-2,11378755	-121,379	-2,48685	-0,08922	-640,0829438	-642,5697962	-640,17216
389	0	-304,817	-119,498	-3,79137805	-123,289	-1,33032	0,019603	-642,8407983	-644,1711218	-642,8211952
389	2,616594	-304,817	-119,498	-3,79137805	-123,289	-1,33032	0,019603	-642,8407983	-644,1711218	-642,8211952
389	5,233188	-304,817	-119,498	-3,79137805	-123,289	-1,33032	0,019603	-642,8407983	-644,1711218	-642,8211952
393	0	-298,533	-115,432	-4,92346742	-120,355	-2,11668	-0,0055	-628,8040831	-630,9207613	-628,8095793
393	1,936625	-298,533	-115,432	-4,92346742	-120,355	-2,11668	-0,0055	-628,8040831	-630,9207613	-628,8095793
393	3,87325	-298,533	-115,432	-4,92346742	-120,355	-2,11668	-0,0055	-628,8040831	-630,9207613	-628,8095793
398	0	-282,43	-107,757	-5,73863684	-113,495	-2,98226	-0,01204	-594,1494241	-597,1316831	-594,1614642
398	1,388656	-282,43	-107,757	-5,73863684	-113,495	-2,98226	-0,01204	-594,1494241	-597,1316831	-594,1614642
398	2,777313	-282,43	-107,757	-5,73863684	-113,495	-2,98226	-0,01204	-594,1494241	-597,1316831	-594,1614642
401	0	-254,867	-95,1394	-5,64454165	-100,784	-4,20489	0,003289	-532,8945914	-537,0994841	-532,8913022
401	0,967688	-254,867	-95,1394	-5,64454165	-100,784	-4,20489	0,003289	-532,8945914	-537,0994841	-532,8913022
401	1,935375	-254,867	-95,1394	-5,64454165	-100,784	-4,20489	0,003289	-532,8945914	-537,0994841	-532,8913022
411	0	-170,347	-62,9893	-4,49602386	-67,4853	-3,54261	0,050369	-356,4219738	-359,9645799	-356,3716049
411	0,50025	-170,347	-62,9893	-4,49602386	-67,4853	-3,54261	0,050369	-356,4219738	-359,9645799	-356,3716049
411	1,0005	-170,347	-62,9893	-4,49602386	-67,4853	-3,54261	0,050369	-356,4219738	-359,9645799	-356,3716049
412	0	-188,045	-73,8998	-38,8258778	-112,726	0,473629	0,072728	-469,9098948	-469,436266	-469,8371671
412	0,451281	-188,045	-73,8998	-38,8258778	-112,726	0,473629	0,072728	-469,9098948	-469,436266	-469,8371671
412	0,902563	-188,045	-73,8998	-38,8258778	-112,726	0,473629	0,072728	-469,9098948	-469,436266	-469,8371671
414	0	-243,167	-100,605	-15,1291077	-115,735	3,996849	0,072989	-547,5863248	-543,5894757	-547,5133355
414	0,524812	-243,167	-100,605	-15,1291077	-115,735	3,996849	0,072989	-547,5863248	-543,5894757	-547,5133355
414	1,049625	-243,167	-100,605	-15,1291077	-115,735	3,996849	0,072989	-547,5863248	-543,5894757	-547,5133355
416	0	-214,575	-78,157	-3,37879295	-81,5358	-4,80588	0,022088	-442,0189081	-446,8247928	-441,9968203
416	0,674719	-214,575	-78,157	-3,37879295	-81,5358	-4,80588	0,022088	-442,0189081	-446,8247928	-441,9968203
416	1,349438	-214,575	-78,157	-3,37879295	-81,5358	-4,80588	0,022088	-442,0189081	-446,8247928	-441,9968203
436	0	-184,845	-102,396	1,78368617	-100,612	-5,56982	0,003518	-441,5226808	-447,0924983	-441,5191632
436	0,774688	-184,845	-102,396	1,78368617	-100,612	-5,56982	0,003518	-441,5226808	-447,0924983	-441,5191632
436	1,549375	-184,845	-102,396	1,78368617	-100,612	-5,56982	0,003518	-441,5226808	-447,0924983	-441,5191632
438	0	-135,988	-75,114	1,713503755	-73,4005	-8,1064	-0,00121	-323,5851611	-331,6915605	-323,5863724
438	0,437625	-135,988	-75,114	1,713503755	-73,4005	-8,1064	-0,00121	-323,5851611	-331,6915605	-323,5863724

438	0,87525	-135,988	-75,114	1,713503755	-73,4005	-8,1064	-0,00121	-323,5851611	-331,6915605	-323,5863724
440	0	-108,545	-62,0449	1,176435422	-60,8685	-8,85467	-0,00264	-262,8454762	-271,7001471	-262,8481162
440	0,179563	-108,545	-62,0449	1,176435422	-60,8685	-8,85467	-0,00264	-262,8454762	-271,7001471	-262,8481162
440	0,359125	-108,545	-62,0449	1,176435422	-60,8685	-8,85467	-0,00264	-262,8454762	-271,7001471	-262,8481162
442	0	-174,808	-119,473	-11,029087	-130,502	-5,72542	-0,04437	-488,2550806	-493,9804997	-488,2994544
442	2,287875	-174,808	-119,473	-11,029087	-130,502	-5,72542	-0,04437	-488,2550806	-493,9804997	-488,2994544
442	4,57575	-174,808	-119,473	-11,029087	-130,502	-5,72542	-0,04437	-488,2550806	-493,9804997	-488,2994544
444	0	133,6435	-130,348	48,7773378	-179,125	-1,49802	0,062398	-184,5135355	-186,0115595	-184,4511372
444	1,703813	133,6435	-130,348	48,7773378	-179,125	-1,49802	0,062398	-184,5135355	-186,0115595	-184,4511372
444	3,407625	133,6435	-130,348	48,7773378	-179,125	-1,49802	0,062398	-184,5135355	-186,0115595	-184,4511372
446	0	-211,935	-119,515	-7,02016514	-126,535	-4,35275	0,030516	-528,5870322	-532,9397841	-528,5565162
446	1,19375	-211,935	-119,515	-7,02016514	-126,535	-4,35275	0,030516	-528,5870322	-532,9397841	-528,5565162
446	2,3875	-211,935	-119,515	-7,02016514	-126,535	-4,35275	0,030516	-528,5870322	-532,9397841	-528,5565162
453	0	-261,206	-220,96	-26,3025015	-247,262	25,35363	-0,5456	-834,0917591	-808,7381291	-834,637355
453	2,946438	-261,206	-220,96	-26,3025015	-247,262	25,35363	-0,5456	-834,0917591	-808,7381291	-834,637355
453	5,892875	-261,206	-220,96	-26,3025015	-247,262	25,35363	-0,5456	-834,0917591	-808,7381291	-834,637355
457	0	3,47229	-407,951	-109,986415	-517,937	13,40703	7,465898	-1031,3607	-1017,953671	-1023,894803
457	3,683	3,47229	-407,951	-109,986415	-517,937	13,40703	7,465898	-1031,3607	-1017,953671	-1023,894803
457	7,366	3,47229	-407,951	-109,986415	-517,937	13,40703	7,465898	-1031,3607	-1017,953671	-1023,894803
462	0	-394,759	-144,105	-9,88184542	-153,986	4,616354	-0,70681	-821,1593715	-816,5430177	-821,8661843
462	2,090438	-394,759	-144,105	-9,88184542	-153,986	4,616354	-0,70681	-821,1593715	-816,5430177	-821,8661843
462	4,180875	-394,759	-144,105	-9,88184542	-153,986	4,616354	-0,70681	-821,1593715	-816,5430177	-821,8661843
465	0	-343,013	-141,713	-11,9431788	-153,656	3,876201	0,050267	-753,2299619	-749,3537609	-753,1796945
465	1,050875	-343,013	-141,713	-11,9431788	-153,656	3,876201	0,050267	-753,2299619	-749,3537609	-753,1796945
465	2,10175	-343,013	-141,713	-11,9431788	-153,656	3,876201	0,050267	-753,2299619	-749,3537609	-753,1796945
467	0	-333,411	-139,85	-7,49729328	-147,347	2,083832	0,027428	-728,1292122	-726,0453798	-728,1017845
467	1,504406	-333,411	-139,85	-7,49729328	-147,347	2,083832	0,027428	-728,1292122	-726,0453798	-728,1017845
467	3,008813	-333,411	-139,85	-7,49729328	-147,347	2,083832	0,027428	-728,1292122	-726,0453798	-728,1017845
472	0	-333,743	-140,411	-16,4887648	-156,9	6,162514	0,043764	-747,6654569	-741,5029432	-747,6216931
472	0,725844	-333,743	-140,411	-16,4887648	-156,9	6,162514	0,043764	-747,6654569	-741,5029432	-747,6216931
472	1,451688	-333,743	-140,411	-16,4887648	-156,9	6,162514	0,043764	-747,6654569	-741,5029432	-747,6216931
535	0	-231,637	-130,916	-8,29448385	-139,21	0,411119	0,038052	-579,5495398	-579,1384205	-579,5114881
535	1,19375	-231,637	-130,916	-8,29448385	-139,21	0,411119	0,038052	-579,5495398	-579,1384205	-579,5114881
535	2,3875	-231,637	-130,916	-8,29448385	-139,21	0,411119	0,038052	-579,5495398	-579,1384205	-579,5114881

TABEL GAYA AXIAL KOLOM TENGAH

FRAME	STA	PD	PL			PL TOT		ME		COMB1 1,3PD + 2 (PQ+PP)	COMB 2 1,3PD + 2 (PQ+PP)+1PEX	COMB 3 1,3PD + 2 (PQ+PP)+1PEY
		PL merata	PL.Koef kejut		PE X	PE Y						
4	0	-238,9299	-76,33756	5,324840199		-71,01272	-24,42949	-2,647398		-452,6343149	-477,0638088	-455,2817129
4	2,811	-238,9299	-76,33756	5,324840199		-71,01272	-24,42949	-2,647398		-452,6343149	-477,0638088	-455,2817129
4	5,622	-238,9299	-76,33756	5,324840199		-71,01272	-24,42949	-2,647398		-452,6343149	-477,0638088	-455,2817129
43	0	-287,5174	-121,5509	-0,103021527		-121,6539	-2,282803	-2,390452		-617,080348	-619,3631513	-619,4707996
43	2,811	-287,5174	-121,5509	-0,103021527		-121,6539	-2,282803	-2,390452		-617,080348	-619,3631513	-619,4707996
43	5,622	-287,5174	-121,5509	-0,103021527		-121,6539	-2,282803	-2,390452		-617,080348	-619,3631513	-619,4707996
543	0	-945,7678	-331,7017	-121,119991		-452,8216	30,16129	-6,903924		-2135,141448	-2104,980159	-2142,045371
543	5,5	-945,7678	-331,7017	-121,119991		-452,8216	30,16129	-6,903924		-2135,141448	-2104,980159	-2142,045371
543	11	-945,7678	-331,7017	-121,119991		-452,8216	30,16129	-6,903924		-2135,141448	-2104,980159	-2142,045371
544	0	-406,258	-453,8868	-185,6351344		-639,5219	1,268544	-13,73197		-1807,179244	-1805,9107	-1820,911214
544	3,683	-406,258	-453,8868	-185,6351344		-639,5219	1,268544	-13,73197		-1807,179244	-1805,9107	-1820,911214
544	7,366	-406,258	-453,8868	-185,6351344		-639,5219	1,268544	-13,73197		-1807,179244	-1805,9107	-1820,911214
551	0	-194,3467	-83,78826	-1,583711043		-85,37197	-0,72972	0,180197		-423,3946763	-424,124396	-423,214479
551	0,179563	-194,3467	-83,78826	-1,583711043		-85,37197	-0,72972	0,180197		-423,3946763	-424,124396	-423,214479
551	0,359125	-194,3467	-83,78826	-1,583711043		-85,37197	-0,72972	0,180197		-423,3946763	-424,124396	-423,214479
555	0	-247,3456	-108,4158	-0,459369306		-108,8752	-0,222867	-0,113707		-539,2995582	-539,5224251	-539,4132651
555	0,437625	-247,3456	-108,4158	-0,459369306		-108,8752	-0,222867	-0,113707		-539,2995582	-539,5224251	-539,4132651
555	0,87525	-247,3456	-108,4158	-0,459369306		-108,8752	-0,222867	-0,113707		-539,2995582	-539,5224251	-539,4132651
560	0	0,460815	-161,6324	-81,32641496		-242,9589	-0,457629	0,082073		-485,3186693	-485,776298	-485,2365965
560	1,703813	0,460815	-161,6324	-81,32641496		-242,9589	-0,457629	0,082073		-485,3186693	-485,776298	-485,2365965
560	3,407625	0,460815	-161,6324	-81,32641496		-242,9589	-0,457629	0,082073		-485,3186693	-485,776298	-485,2365965
561	0	-298,6613	-157,7374	-20,68367623		-178,4211	-1,062061	-0,039739		-745,1018432	-746,1639039	-745,1415825
561	2,287875	-298,6613	-157,7374	-20,68367623		-178,4211	-1,062061	-0,039739		-745,1018432	-746,1639039	-745,1415825
561	4,57575	-298,6613	-157,7374	-20,68367623		-178,4211	-1,062061	-0,039739		-745,1018432	-746,1639039	-745,1415825
562	0	-307,6266	-200,8775	-31,29393995		-232,1714	3,109288	-0,676401		-864,2574316	-861,1481433	-864,933833
562	2,946438	-307,6266	-200,8775	-31,29393995		-232,1714	3,109288	-0,676401		-864,2574316	-861,1481433	-864,933833
562	5,892875	-307,6266	-200,8775	-31,29393995		-232,1714	3,109288	-0,676401		-864,2574316	-861,1481433	-864,933833
585	0	-267,0666	-78,45621	-66,26033745		-144,7165	-2,1417	0,908215		-636,6197097	-638,7614096	-635,7114949
585	0,451281	-267,0666	-78,45621	-66,26033745		-144,7165	-2,1417	0,908215		-636,6197097	-638,7614096	-635,7114949
585	0,902563	-267,0666	-78,45621	-66,26033745		-144,7165	-2,1417	0,908215		-636,6197097	-638,7614096	-635,7114949
586	0	-270,7672	-78,71002	-11,2873298		-89,99735	-2,056297	0,401404		-531,9920699	-534,0483673	-531,5906664
586	0,50025	-270,7672	-78,71002	-11,2873298		-89,99735	-2,056297	0,401404		-531,9920699	-534,0483673	-531,5906664
586	1,0005	-270,7672	-78,71002	-11,2873298		-89,99735	-2,056297	0,401404		-531,9920699	-534,0483673	-531,5906664

587	0	-326,6931	-98,64793	-6,177894938	-104,8258	-1,273574	0,253743	-634,3526119	-635,6261859	-634,0988688
587	0,672219	-326,6931	-98,64793	-6,177894938	-104,8258	-1,273574	0,253743	-634,3526119	-635,6261859	-634,0988688
587	1,344438	-326,6931	-98,64793	-6,177894938	-104,8258	-1,273574	0,253743	-634,3526119	-635,6261859	-634,0988688
588	0	-374,0288	-116,431	-8,051157387	-124,4822	-0,64409	1,987921	-735,2017895	-735,8458791	-733,213868
588	0,967688	-374,0288	-116,431	-8,051157387	-124,4822	-0,64409	1,987921	-735,2017895	-735,8458791	-733,213868
588	1,935375	-374,0288	-116,431	-8,051157387	-124,4822	-0,64409	1,987921	-735,2017895	-735,8458791	-733,213868
589	0	-407,4148	-129,0615	-7,74742361	-136,809	-0,2246	1,358272	-803,2571902	-803,48179	-801,8989182
589	1,388656	-407,4148	-129,0615	-7,74742361	-136,809	-0,2246	1,358272	-803,2571902	-803,48179	-801,8989182
589	2,777313	-407,4148	-129,0615	-7,74742361	-136,809	-0,2246	1,358272	-803,2571902	-803,48179	-801,8989182
590	0	-427,0603	-136,2718	-6,444951017	-142,7168	-0,040948	0,980541	-840,6120154	-840,6529631	-839,6314748
590	1,936625	-427,0603	-136,2718	-6,444951017	-142,7168	-0,040948	0,980541	-840,6120154	-840,6529631	-839,6314748
590	3,87325	-427,0603	-136,2718	-6,444951017	-142,7168	-0,040948	0,980541	-840,6120154	-840,6529631	-839,6314748
591	0	-436,812	-139,5482	-4,776426943	-144,3246	-0,094686	0,936582	-856,5048637	-856,5995498	-855,5682818
591	2,616594	-436,812	-139,5482	-4,776426943	-144,3246	-0,094686	0,936582	-856,5048637	-856,5995498	-855,5682818
591	5,233188	-436,812	-139,5482	-4,776426943	-144,3246	-0,094686	0,936582	-856,5048637	-856,5995498	-855,5682818
596	0	-447,7429	-144,1838	-2,830982787	-147,0148	0,667981	0,964744	-876,0952938	-875,4273131	-875,1305502
596	3,432063	-447,7429	-144,1838	-2,830982787	-147,0148	0,667981	0,964744	-876,0952938	-875,4273131	-875,1305502
596	6,864125	-447,7429	-144,1838	-2,830982787	-147,0148	0,667981	0,964744	-876,0952938	-875,4273131	-875,1305502
597	0	-431,1517	-129,4478	-16,52772701	-145,9755	-5,353501	0,077451	-852,4482444	-857,8017454	-852,3707932
597	4,390531	-431,1517	-129,4478	-16,52772701	-145,9755	-5,353501	0,077451	-852,4482444	-857,8017454	-852,3707932
597	8,781063	-431,1517	-129,4478	-16,52772701	-145,9755	-5,353501	0,077451	-852,4482444	-857,8017454	-852,3707932
601	0	-459,8263	-151,1458	-13,32129286	-164,4671	1,169887	0,681618	-926,7083508	-925,538464	-926,0267333
601	1,050875	-459,8263	-151,1458	-13,32129286	-164,4671	1,169887	0,681618	-926,7083508	-925,538464	-926,0267333
601	2,10175	-459,8263	-151,1458	-13,32129286	-164,4671	1,169887	0,681618	-926,7083508	-925,538464	-926,0267333
602	0	-442,8079	-144,5782	-19,98365451	-164,5619	0,864125	1,090644	-904,7739948	-903,9098695	-903,6833505
602	0,725844	-442,8079	-144,5782	-19,98365451	-164,5619	0,864125	1,090644	-904,7739948	-903,9098695	-903,6833505
602	1,451688	-442,8079	-144,5782	-19,98365451	-164,5619	0,864125	1,090644	-904,7739948	-903,9098695	-903,6833505
605	0	-337,5479	-105,4832	-23,79593784	-129,2792	-0,969052	1,058358	-697,3706251	-698,3396773	-696,312267
605	0,524813	-337,5479	-105,4832	-23,79593784	-129,2792	-0,969052	1,058358	-697,3706251	-698,3396773	-696,312267
605	1,049625	-337,5479	-105,4832	-23,79593784	-129,2792	-0,969052	1,058358	-697,3706251	-698,3396773	-696,312267
606	0	-572,3298	-149,7945	-12,49154945	-162,2861	1,553127	0,729188	-1068,600882	-1067,047755	-1067,871694
606	2,090438	-572,3298	-149,7945	-12,49154945	-162,2861	1,553127	0,729188	-1068,600882	-1067,047755	-1067,871694
606	4,180875	-572,3298	-149,7945	-12,49154945	-162,2861	1,553127	0,729188	-1068,600882	-1067,047755	-1067,871694
607	0	-450,2509	-153,1664	-7,633332143	-160,7997	1,253246	0,584384	-906,925714	-905,6724682	-906,3413303
607	1,504406	-450,2509	-153,1664	-7,633332143	-160,7997	1,253246	0,584384	-906,925714	-905,6724682	-906,3413303
607	3,008813	-450,2509	-153,1664	-7,633332143	-160,7997	1,253246	0,584384	-906,925714	-905,6724682	-906,3413303
613	0	-307,9848	-140,6186	1,433839006	-139,1848	-0,354019	-0,024028	-678,7497141	-679,1037328	-678,7737417

613	0,774688	-307,9848	-140,6186	1,433839006	-139,1848	-0,354019	-0,024028	-678,7497141	-679,1037328	-678,7737417
613	1,549375	-307,9848	-140,6186	1,433839006	-139,1848	-0,354019	-0,024028	-678,7497141	-679,1037328	-678,7737417
641	0	-455,8043	-152,8617	-19,28845339	-172,1501	5,809769	-0,206266	-936,8458454	-931,0360767	-937,0521113
641	4,390531	-455,8043	-152,8617	-19,28845339	-172,1501	5,809769	-0,206266	-936,8458454	-931,0360767	-937,0521113
641	8,781063	-455,8043	-152,8617	-19,28845339	-172,1501	5,809769	-0,206266	-936,8458454	-931,0360767	-937,0521113
642	0	-438,2815	-135,4007	-1,77723682	-137,178	-3,731087	0,071367	-844,1219401	-847,8530267	-844,0505733
642	3,432063	-438,2815	-135,4007	-1,77723682	-137,178	-3,731087	0,071367	-844,1219401	-847,8530267	-844,0505733
642	6,864125	-438,2815	-135,4007	-1,77723682	-137,178	-3,731087	0,071367	-844,1219401	-847,8530267	-844,0505733
643	0	-432,458	-135,5674	-4,292377924	-139,8598	-2,164891	0,107565	-841,9149371	-844,0798277	-841,8073726
643	2,616594	-432,458	-135,5674	-4,292377924	-139,8598	-2,164891	0,107565	-841,9149371	-844,0798277	-841,8073726
643	5,233188	-432,458	-135,5674	-4,292377924	-139,8598	-2,164891	0,107565	-841,9149371	-844,0798277	-841,8073726
644	0	-420,9086	-130,5661	-5,757713409	-136,3238	-2,931183	0,040521	-819,8288559	-822,7600386	-819,788335
644	1,936625	-420,9086	-130,5661	-5,757713409	-136,3238	-2,931183	0,040521	-819,8288559	-822,7600386	-819,788335
644	3,87325	-420,9086	-130,5661	-5,757713409	-136,3238	-2,931183	0,040521	-819,8288559	-822,7600386	-819,788335
648	0	-399,7884	-121,9147	-6,893869962	-128,8086	-3,798423	0,006835	-777,3420859	-781,1405091	-777,3352505
648	1,388656	-399,7884	-121,9147	-6,893869962	-128,8086	-3,798423	0,006835	-777,3420859	-781,1405091	-777,3352505
648	2,777313	-399,7884	-121,9147	-6,893869962	-128,8086	-3,798423	0,006835	-777,3420859	-781,1405091	-777,3352505
649	0	-366,3523	-108,0557	-7,112563226	-115,1682	-5,074831	-0,013816	-706,5943574	-711,6691882	-706,6081739
649	0,967688	-366,3523	-108,0557	-7,112563226	-115,1682	-5,074831	-0,013816	-706,5943574	-711,6691882	-706,6081739
649	1,935375	-366,3523	-108,0557	-7,112563226	-115,1682	-5,074831	-0,013816	-706,5943574	-711,6691882	-706,6081739
652	0	-265,4296	-73,90115	-10,6970748	-84,59823	-4,577692	-0,067144	-514,2549516	-518,8326441	-514,3220957
652	0,50025	-265,4296	-73,90115	-10,6970748	-84,59823	-4,577692	-0,067144	-514,2549516	-518,8326441	-514,3220957
652	1,0005	-265,4296	-73,90115	-10,6970748	-84,59823	-4,577692	-0,067144	-514,2549516	-518,8326441	-514,3220957
653	0	-273,4134	-83,6335	-66,86687832	-150,5004	0,249686	-0,095452	-656,188437	-656,188437	-656,533575
653	0,451281	-273,4134	-83,6335	-66,86687832	-150,5004	0,249686	-0,095452	-656,188437	-656,188437	-656,533575
653	0,902563	-273,4134	-83,6335	-66,86687832	-150,5004	0,249686	-0,095452	-656,188437	-656,188437	-656,533575
654	0	-350,4491	-118,0443	-25,29125916	-143,3356	5,084222	-0,110094	-742,2549368	-737,1707151	-742,3650304
654	0,524812	-350,4491	-118,0443	-25,29125916	-143,3356	5,084222	-0,110094	-742,2549368	-737,1707151	-742,3650304
654	1,049625	-350,4491	-118,0443	-25,29125916	-143,3356	5,084222	-0,110094	-742,2549368	-737,1707151	-742,3650304
655	0	-314,2902	-88,34126	-4,895444832	-93,23671	-5,892181	-0,034103	-595,0506914	-600,9428722	-595,0847947
655	0,674719	-314,2902	-88,34126	-4,895444832	-93,23671	-5,892181	-0,034103	-595,0506914	-600,9428722	-595,0847947
655	1,349438	-314,2902	-88,34126	-4,895444832	-93,23671	-5,892181	-0,034103	-595,0506914	-600,9428722	-595,0847947
661	0	-292,1979	-127,0135	3,152293217	-123,8612	-7,928527	-0,031213	-627,5795977	-635,5081248	-627,6108103
661	0,774688	-292,1979	-127,0135	3,152293217	-123,8612	-7,928527	-0,031213	-627,5795977	-635,5081248	-627,6108103
661	1,549375	-292,1979	-127,0135	3,152293217	-123,8612	-7,928527	-0,031213	-627,5795977	-635,5081248	-627,6108103
662	0	-224,4398	-88,05202	2,05382182	-85,9982	-10,99152	-0,023354	-463,7681183	-474,759636	-463,7914728
662	0,437625	-224,4398	-88,05202	2,05382182	-85,9982	-10,99152	-0,023354	-463,7681183	-474,759636	-463,7914728

662	0,87525	-224,4398	-88,05202	2,05382182	-85,9982	-10,99152	-0,023354	-463,7681183	-474,759636	-463,7914728
663	0	-168,6691	-60,67818	1,249542256	-59,42864	-12,82989	-0,012344	-338,1270545	-350,9569396	-338,1393989
663	0,179563	-168,6691	-60,67818	1,249542256	-59,42864	-12,82989	-0,012344	-338,1270545	-350,9569396	-338,1393989
663	0,359125	-168,6691	-60,67818	1,249542256	-59,42864	-12,82989	-0,012344	-338,1270545	-350,9569396	-338,1393989
664	0	-281,6359	-143,1685	-18,8313305	-161,9998	-9,231517	-0,023164	-690,1263658	-699,3578823	-690,1495299
664	2,287875	-281,6359	-143,1685	-18,8313305	-161,9998	-9,231517	-0,023164	-690,1263658	-699,3578823	-690,1495299
664	4,57575	-281,6359	-143,1685	-18,8313305	-161,9998	-9,231517	-0,023164	-690,1263658	-699,3578823	-690,1495299
665	0	7,230547	-156,4867	-80,61495175	-237,1016	-3,906776	0,100675	-464,8035072	-468,710283	-464,7028325
665	1,703813	7,230547	-156,4867	-80,61495175	-237,1016	-3,906776	0,100675	-464,8035072	-468,710283	-464,7028325
665	3,407625	7,230547	-156,4867	-80,61495175	-237,1016	-3,906776	0,100675	-464,8035072	-468,710283	-464,7028325
666	0	-319,9714	-146,1243	-13,2758349	-159,4001	-7,111636	-0,002816	-734,7629947	-741,8746306	-734,7658102
666	1,19375	-319,9714	-146,1243	-13,2758349	-159,4001	-7,111636	-0,002816	-734,7629947	-741,8746306	-734,7658102
666	2,3875	-319,9714	-146,1243	-13,2758349	-159,4001	-7,111636	-0,002816	-734,7629947	-741,8746306	-734,7658102
670	0	-360,8367	-251,3537	-37,25756643	-288,6113	27,24675	-0,673711	-1046,310301	-1019,063553	-1046,984012
670	2,948438	-360,8367	-251,3537	-37,25756643	-288,6113	27,24675	-0,673711	-1046,310301	-1019,063553	-1046,984012
670	5,892875	-360,8367	-251,3537	-37,25756643	-288,6113	27,24675	-0,673711	-1046,310301	-1019,063553	-1046,984012
673	0	-434,9848	-480,0768	-188,790563	-668,8674	14,66724	-12,48577	-1903,215003	-1888,547758	-1915,700771
673	3,683	-434,9848	-480,0768	-188,790563	-668,8674	14,66724	-12,48577	-1903,215003	-1888,547758	-1915,700771
673	7,366	-434,9848	-480,0768	-188,790563	-668,8674	14,66724	-12,48577	-1903,215003	-1888,547758	-1915,700771
676	0	-584,1271	-159,8147	-13,78768865	-173,6024	7,187745	0,312	-1106,570034	-1099,382289	-1106,258034
676	2,090438	-584,1271	-159,8147	-13,78768865	-173,6024	7,187745	0,312	-1106,570034	-1099,382289	-1106,258034
676	4,180875	-584,1271	-159,8147	-13,78768865	-173,6024	7,187745	0,312	-1106,570034	-1099,382289	-1106,258034
678	0	-470,5134	-160,4634	-14,51246095	-174,9759	6,242942	0,076068	-961,6191065	-955,3761646	-961,543038
678	1,050875	-470,5134	-160,4634	-14,51246095	-174,9759	6,242942	0,076068	-961,6191065	-955,3761646	-961,543038
678	2,10175	-470,5134	-160,4634	-14,51246095	-174,9759	6,242942	0,076068	-961,6191065	-955,3761646	-961,543038
679	0	-457,4335	-159,4895	-8,42307726	-167,9125	4,752794	0,174844	-930,4886197	-925,7358256	-930,3137762
679	1,504406	-457,4335	-159,4895	-8,42307726	-167,9125	4,752794	0,174844	-930,4886197	-925,7358256	-930,3137762
679	3,008813	-457,4335	-159,4895	-8,42307726	-167,9125	4,752794	0,174844	-930,4886197	-925,7358256	-930,3137762
682	0	-459,3353	-160,1855	-21,85249769	-182,038	8,582687	-0,086132	-961,211882	-952,6291949	-961,2980137
682	0,725844	-459,3353	-160,1855	-21,85249769	-182,038	8,582687	-0,086132	-961,211882	-952,6291949	-961,2980137
682	1,451688	-459,3353	-160,1855	-21,85249769	-182,038	8,582687	-0,086132	-961,211882	-952,6291949	-961,2980137
773	0	-333,6638	-157,5706	-14,75320218	-172,3238	-0,436703	-0,00521	-778,4105304	-778,847233	-778,4157405
773	1,19375	-333,6638	-157,5706	-14,75320218	-172,3238	-0,436703	-0,00521	-778,4105304	-778,847233	-778,4157405
773	2,3875	-333,6638	-157,5706	-14,75320218	-172,3238	-0,436703	-0,00521	-778,4105304	-778,847233	-778,4157405



Diagram Mn vs Pn kolom

	1%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	700				
h (mm)	700				
Ag(mm ²)	490000				
d' (mm)	80				
d (mm)	620				
cb (mm)	375,7575758				
fs' (Mpa)	472,25806				
fs' pakai (Mpa)	390				
Ast (mm ²)	4900				
As = As' (mm)	2450				
Cc (kN)	4732				
Cs (kN)	903,64575				
Ts (kN)	955,5				
PnB (kN)	4680				
y (mm)	350				
Mnb (kNm)	1402,479659				
Patah Desak (c>cb)					
c ambil (mm)	400	470	540	610	680
fs' Mpa	480	497,87234	511,111111	521,311475	529,411765
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
fs pakai (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
a (mm)	340	399,5	459	518,5	578
Cc (kN)	5037,27	5918,79225	6800,3145	7681,83675	8563,359
Cs (kN)	903,64575	903,64575	903,64575	903,64575	903,64575
Ts (kN)	808,5	469,148936	217,777778	24,0983607	-129,70588
Pn (kN)	5132,41575	6353,28906	7486,18247	8561,38414	9596,71063
Mn (kNm)	1368,98795	1259,9531	1122,22225	947,617595	731,328663
Patah Tarik (c<cb)					
c ambil (mm)	200	237,5	275	312,5	350
a (mm)	170	201,875	233,75	265,625	297,5
fs' (Mpa)	360	397,894737	425,454545	446,4	462,857143
fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390

Cc (kN)	2518,635	2990,87906	3463,12313	3935,36719	4407,61125
Cs (kN)	830,14575	903,64575	903,64575	903,64575	903,64575
Ts (kN)	955,5	955,5	955,5	955,5	955,5
Pn (kN)	2393,28075	2939,02481	3411,26888	3883,51294	4355,757
Mn (kNm)	1149,56263	1246,88517	1309,30993	1356,68191	1389,00112
Saat Mn = 0					
Pn ₀ (kN)	12178,1415	12178,1415	12178,1415	12178,1415	12178,1415
Lentur Murni (Pn = 0)					
a (mm)	64,4932672	64,4932672	64,4932672	64,4932672	64,4932672
Mn (kNm)	561,598342	561,598342	561,598342	561,598342	561,598342



Diagram Mn vs Pn Kolom

	2%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	700				
h (mm)	700				
Ag(mm ²)	490000				
d' (mm)	80				
d (mm)	620				
cb (mm)	375,7575758				
fs' (Mpa)	472,25806				
fs' pakai (Mpa)	390				
Ast (mm ²)	9800				
As = As' (mm)	4900				
Cc (kN)	4732				
Cs (kN)	1807,2915				
Ts (kN)	1911				
PnB (kN)	4628				
y (mm)	350				
Mnb (kNm)	1904,449011				
Patah Desak (c>cb)					
c ambil (mm)	400	470	540	610	680
fs' Mpa	480	497,87234	511,111111	521,311475	529,411765
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
fs pakai (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
a (mm)	340	399,5	459	518,5	578
Cc (kN)	5037,27	5918,79225	6800,3145	7681,83675	8563,359
Cs (kN)	1807,2915	1807,2915	1807,2915	1807,2915	1807,2915
Ts (kN)	1617	938,297872	435,555556	48,1967213	-259,41176
Pn (kN)	5227,5615	6787,78588	8172,05044	9440,93153	10630,0623
Mn (kNm)	1831,26731	1630,60767	1425,0066	1198,1085	940,292428
Patah Tarik (c<cb)					
c ambil (mm)	200	237,5	275	312,5	350
a (mm)	170	201,875	233,75	265,625	297,5
fs' (Mpa)	360	397,894737	425,454545	446,4	462,857143

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	2518,635	2990,87906	3463,12313	3935,36719	4407,61125
Cs (kN)	1660,2915	1807,2915	1807,2915	1807,2915	1807,2915
Ts (kN)	1911	1911	1911	1911	1911
Pn (kN)	2267,9265	2887,17056	3359,41463	3831,65869	4303,90275
Mn (kNm)	1631,68698	1748,85452	1811,27928	1858,65127	1890,97047
Saat Mn = 0					
Pn ₀ (kN)	13985,433	13985,433	13985,433	13985,433	13985,433
Lentur Murni (Pn = 0)					
a (mm)	128,986534	128,986534	128,986534	128,986534	128,986534
Mn (kNm)	1061,57337	1061,57337	1061,57337	1061,57337	1061,57337



Diagram M vs PN kolom

	3%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	700				
h (mm)	700				
Ag(mm ²)	490000				
d' (mm)	80				
d (mm)	620				
cb (mm)	375,7575758				
fs' (Mpa)	472,25806				
fs' pakai (Mpa)	390				
Ast (mm ²)	14700				
As = As' (mm)	7350				
Cc (kN)	4732				
Cs (kN)	2710,93725				
Ts (kN)	2866,5				
PnB (kN)	4576				
y (mm)	350				
Mnb (kNm)	2406,418364				
Patah Desak (c>cb)					
c ambil (mm)	400	470	540	610	680
fs' Mpa	480	497,87234	511,111111	521,311475	529,411765
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
fs pakai (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
a (mm)	340	399,5	459	518,5	578
Cc (kN)	5037,27	5918,79225	6800,3145	7681,83675	8563,359
Cs (kN)	2710,93725	2710,93725	2710,93725	2710,93725	2710,93725
Ts (kN)	2425,5	1407,44681	653,333333	72,295082	-389,11765
Pn (kN)	5322,70725	7222,28269	8857,91842	10320,4789	11663,4139
Mn (kNm)	2293,54666	2001,26223	1727,79095	1448,59941	1149,25619
Patah Tarik (c<cb)					
c ambil (mm)	200	237,5	275	312,5	350
a (mm)	170	201,875	233,75	265,625	297,5
fs' (Mpa)	360	397,894737	425,454545	446,4	462,857143

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	2518,635	2990,87906	3463,12313	3935,36719	4407,61125
Cs (kN)	2490,43725	2710,93725	2710,93725	2710,93725	2710,93725
Ts (kN)	2866,5	2866,5	2866,5	2866,5	2866,5
Pn (kN)	2142,57225	2835,31631	3307,56038	3779,80444	4252,0485
Mn (kNm)	2113,81133	2250,82387	2313,24864	2360,62062	2392,93982
Saat Mn = 0					
Pn ₀ (kN)	15792,7245	15792,7245	15792,7245	15792,7245	15792,7245
Lentur Murni (Pn = 0)					
a (mm)	193,479802	193,479802	193,479802	193,479802	193,479802
Mn (kNm)	1499,92507	1499,92507	1499,92507	1499,92507	1499,92507



Diagram M vs PN kolom

	4%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	700				
h (mm)	700				
Ag(mm ²)	490000				
d' (mm)	80				
d (mm)	620				
cb (mm)	375,7575758				
fs' (Mpa)	472,25806				
fs' pakai (Mpa)	390				
Ast (mm ²)	19600				
As = As' (mm)	9800				
Cc (kN)	4732				
Cs (kN)	3614,583				
Ts (kN)	3822				
PnB (kN)	4525				
y (mm)	350				
Mnb (kNm)	2908,387716				
Patah Desak (c>cb)					
c ambil (mm)	400	470	540	610	680
fs' Mpa	480	497,87234	511,111111	521,311475	529,411765
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
fs pakai (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
a (mm)	340	399,5	459	518,5	578
Cc (kN)	5037,27	5918,79225	6800,3145	7681,83675	8563,359
Cs (kN)	3614,583	3614,583	3614,583	3614,583	3614,583
Ts (kN)	3234	1876,59574	871,111111	96,3934426	-518,82353
Pn (kN)	5417,853	7656,77951	9543,78639	11200,0263	12696,7655
Mn (kNm)	2755,82601	2371,9168	2030,57531	1699,09032	1358,21996
Patah Tarik (c<cb)					
c ambil (mm)	200	237,5	275	312,5	350
a (mm)	170	201,875	233,75	265,625	297,5
fs' (Mpa)	360	397,894737	425,454545	446,4	462,857143

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	2518,635	2990,87906	3463,12313	3935,36719	4407,61125
Cs (kN)	3320,583	3614,583	3614,583	3614,583	3614,583
Ts (kN)	3822	3822	3822	3822	3822
Pn (kN)	2017,218	2783,46206	3255,70613	3727,95019	4200,19425
Mn (kNm)	2595,93569	2752,79323	2815,21799	2862,58997	2894,90917
Saat Mn = 0					
Pn ₀ (kN)	17600	17600	17600,016	17600,016	17600,016
Lentur Murni (Pn = 0)					
a (mm)	257,973069	257,973069	257,973069	257,973069	257,973069
Mn (kNm)	1876,65347	1876,65347	1876,65347	1876,65347	1876,65347



Diagram Mn vs Pn kolom

	5%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	700				
h (mm)	700				
Ag(mm ²)	490000				
d' (mm)	80				
d (mm)	620				
cb (mm)	375,7575758				
fs' (Mpa)	472,25806				
fs' pakai (Mpa)	390				
Ast (mm ²)	24500				
As = As' (mm)	12250				
Cc (kN)	4732				
Cs (kN)	4518,22875				
Ts (kN)	4777,5				
PnB (kN)	4473				
y (mm)	350				
Mnb (kNm)	3410,357069				
Patah Desak (c>cb)					
c ambil (mm)	400	470	540	610	680
fs' Mpa	480	497,87234	511,111111	521,311475	529,411765
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
fs pakai (Mpa)	330	191,489362	88,8888889	9,83606557	-52,941176
a (mm)	340	399,5	459	518,5	578
Cc (kN)	5037,27	5918,79225	6800,3145	7681,83675	8563,359
Cs (kN)	4518,22875	4518,22875	4518,22875	4518,22875	4518,22875
Ts (kN)	4042,5	2345,74468	1088,88889	120,491803	-648,52941
Pn (kN)	5512,99875	8091,27632	10229,6544	12079,5737	13730,1172
Mn (kNm)	3218,10536	2742,57136	2333,35966	1949,58123	1567,18372
Patah Tarik (c<cb)					
c ambil (mm)	200	237,5	275	312,5	350
a (mm)	170	201,875	233,75	265,625	297,5
fs' (Mpa)	360	397,894737	425,454545	446,4	462,857143
fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390

Cc (kN)	2518,635	2990,87906	3463,12313	3935,36719	4407,61125
Cs (kN)	4150,72875	4518,22875	4518,22875	4518,22875	4518,22875
Ts (kN)	4777,5	4777,5	4777,5	4777,5	4777,5
Pn (kN)	1891,86375	2731,60781	3203,85188	3676,09594	4148,34
Mn (kNm)	3078,06004	3254,76258	3317,18734	3364,55932	3396,87853
Saat Mn = 0					
Pn ₀ (kN)	19407,3075	19407,3075	19407,3075	19407,3075	19407,3075
Lentur Murni (Pn = 0)					
a (mm)	322,466336	322,466336	322,466336	322,466336	322,466336
Mn (kNm)	2191,75854	2191,75854	2191,75854	2191,75854	2191,75854



Ast = 1% Ag	Pn (kN)	0	2393,3	2939,025	3411,269	3883,513	4355,757	5132,416	6353,289	7486,182	8561,384	9596,711	12178,14
	Mn (kNm)	561,598	1149,6	1246,885	1309,31	1356,682	1389,001	1368,988	1259,953	1122,222	947,6176	731,3287	0
Ast = 2% Ag	Pn (kN)	0	2267,9	2887,171	3359,415	3831,659	4303,903	5227,562	6787,786	8172,05	9440,932	10630,06	13985,43
	Mn (kNm)	1061,57	1631,7	1748,855	1811,279	1858,651	1890,97	1831,267	1630,608	1425,007	1198,109	940,2924	0
Ast = 3% Ag	Pn (kN)	0	2142,6	2835,316	3307,56	3779,804	4252,049	5322,707	7222,283	8857,918	10320,48	11663,41	15792,72
	Mn (kNm)	1499,93	2113,8	2250,824	2313,249	2360,621	2392,94	2293,547	2001,262	1727,791	1448,599	1149,256	0
Ast = 4% Ag	Pn (kN)	0	2017,2	2783,462	3255,706	3727,95	4200,194	5417,853	7656,78	9543,786	11200,03	12696,77	17600,02
	Mn (kNm)	1876,65	2595,9	2752,793	2815,218	2862,59	2894,909	2755,826	2371,917	2030,575	1699,09	1358,22	0
Ast = 5% Ag	Pn (kN)	0	1891,9	2731,608	3203,852	3676,096	4148,34	5512,999	8091,276	10229,65	12079,57	13730,12	19407,31
	Mn (kNm)	2191,76	3078,1	3254,763	3317,187	3364,559	3396,879	3218,105	2742,571	2333,36	1949,581	1567,184	0

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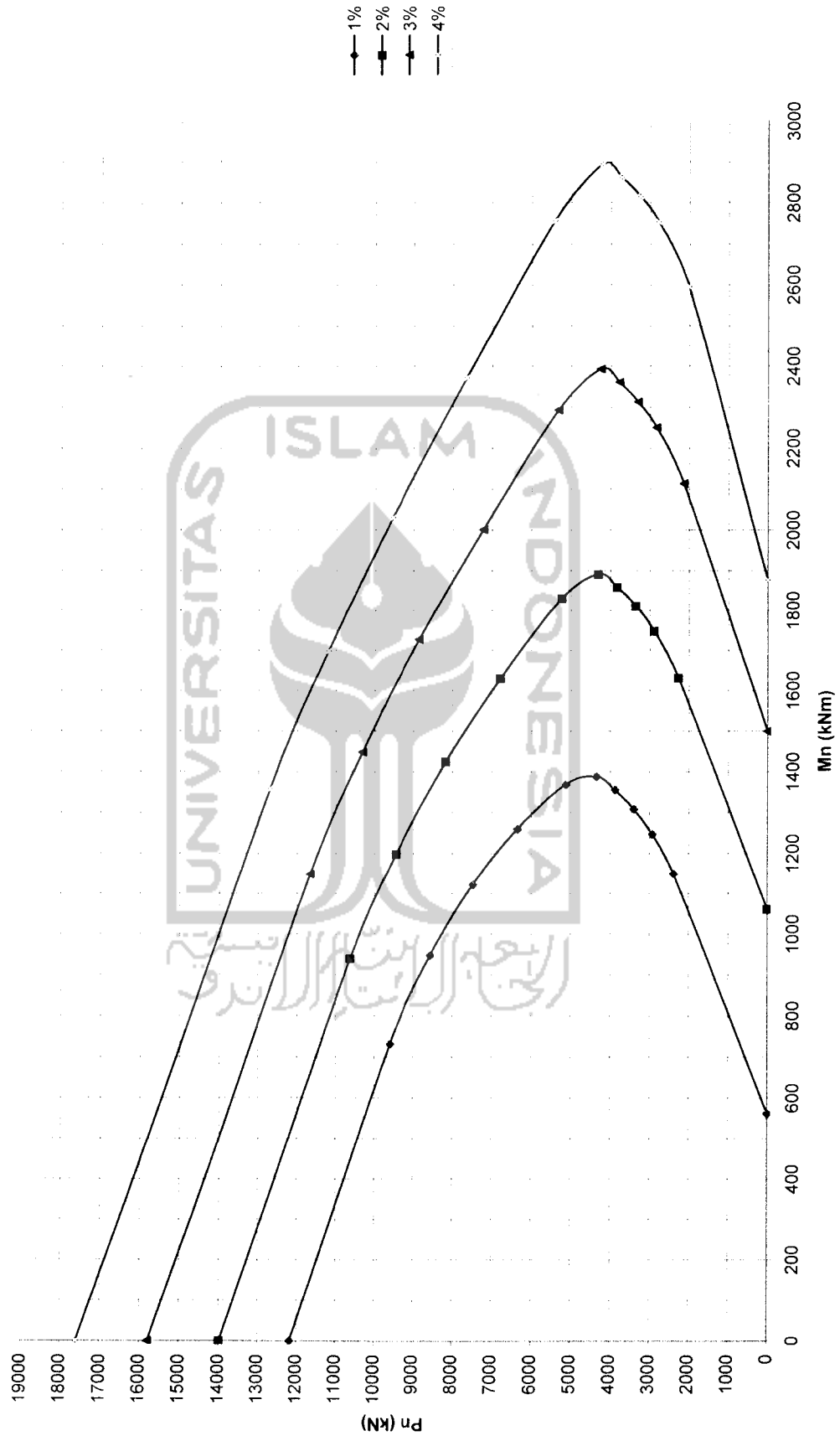


Diagram Mn vs Pn kolom

	1%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1200				
h (mm)	1200				
Ag(mm ²)	1440000				
d' (mm)	80				
d (mm)	1120				
cb (mm)	678,7878788				
fs' (Mpa)	529,28571				
fs' pakai (Mpa)	390				
Ast (mm ²)	14400				
As = As' (mm)	7200				
Cc (kN)	14654				
Cs (kN)	2655,612				
Ts (kN)	2808				
PnB (kN)	14501				
y (mm)	600				
Mnb (kNm)	7405,982756				
Patah Desak (c>cb)					
c ambil (mm)	700	830	960	1090	1222
fs' Mpa	531,428571	542,168675	550	555,963303	560,720131
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	360	209,638554	100	16,5137615	-50,081833
fs pakai (Mpa)	360	209,638554	100	16,5137615	-50,081833
a (mm)	595	705,5	816	926,5	1038,7
Cc (kN)	15111,81	17918,289	20724,768	23531,247	26380,9026
Cs (kN)	2655,612	2655,612	2655,612	2655,612	2655,612
Ts (kN)	2592	1509,39759	720	118,899083	-360,5892
Pn (kN)	15175,422	19064,5034	22660,38	26067,9599	29397,1038
Mn (kNm)	7300,08077	6596,10194	5734,4737	4660,64379	3321,03165
Patah Tarik (c<cb)					
c ambil (mm)	250	350	450	550	650
a (mm)	212,5	297,5	382,5	467,5	552,5
fs' (Mpa)	408	462,857143	493,333333	512,727273	526,153846

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5397,075	7555,905	9714,735	11873,565	14032,395
Cs (kN)	2655,612	2655,612	2655,612	2655,612	2655,612
Ts (kN)	2808	2808	2808	2808	2808
Pn (kN)	5244,687	7403,517	9562,347	11721,177	13880,007
Mn (kNm)	5505,88402	6250,68037	6811,97617	7189,77142	7384,06612
Saat Mn = 0					
Pn ₀ (kN)	35788,824	35788,824	35788,824	35788,824	35788,824
Lentur Murni (Pn = 0)					
a (mm)	110,559887	110,559887	110,559887	110,559887	110,559887
Mn (kNm)	2989,73392	2989,73392	2989,73392	2989,73392	2989,73392



fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5397,075	7555,905	9714,735	11873,565	14032,395
Cs (kN)	5311,224	5311,224	5311,224	5311,224	5311,224
Ts (kN)	5616	5616	5616	5616	5616
Pn (kN)	5092,299	7251,129	9409,959	11568,789	13727,619
Mn (kNm)	8346,96226	9091,75861	9653,05441	10030,8497	10225,1444
Saat Mn = 0					
Pn ₀ (kN)	41100,048	41100,048	41100,048	41100,048	41100,048
Lentur Murni (Pn = 0)					
a (mm)	221,119773	221,119773	221,119773	221,119773	221,119773
Mn (kNm)	5669,01568	5669,01568	5669,01568	5669,01568	5669,01568



Diagram M vs PN kolom

	3%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1200				
h (mm)	1200				
Ag(mm ²)	1440000				
d' (mm)	80				
d (mm)	1120				
cb (mm)	678,7878788				
fs' (Mpa)	529,28571				
fs' pakai (Mpa)	390				
Ast (mm ²)	43200				
As = As' (mm)	21600				
Cc (kN)	14654				
Cs (kN)	7966,836				
Ts (kN)	8424				
PnB (kN)	14197				
y (mm)	600				
Mnb (kNm)	13088,13924				
Patah Desak (c>cb)					
c ambil (mm)	700	830	960	1090	1222
fs' Mpa	531,428571	542,168675	550	555,963303	560,720131
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	360	209,638554	100	16,5137615	-50,081833
fs pakai (Mpa)	360	209,638554	100	16,5137615	-50,081833
a (mm)	595	705,5	816	926,5	1038,7
Cc (kN)	15111,81	17918,289	20724,768	23531,247	26380,9026
Cs (kN)	7966,836	7966,836	7966,836	7966,836	7966,836
Ts (kN)	7776	4528,19277	2160	356,697248	-1081,7676
Pn (kN)	15302,646	21356,9322	26531,604	31141,3858	35429,5062
Mn (kNm)	12757,5972	10927,7119	9245,11018	7546,13532	5707,85537
Patah Tarik (c<cb)					
c ambil (mm)	250	350	450	550	650
a (mm)	212,5	297,5	382,5	467,5	552,5
fs' (Mpa)	408	462,857143	493,333333	512,727273	526,153846

Diagram M vs PN kolom

	4%
f'c (Mpa)	24,9
fy (Mpa)	390
b (mm)	1200
h (mm)	1200
Ag(mm ²)	1440000
d' (mm)	80
d (mm)	1120
cb (mm)	678,7878788
fs' (Mpa)	529,28571
fs' pakai (Mpa)	390
Ast (mm ²)	57600
As = As' (mm)	28800
Cc (kN)	14654
Cs (kN)	10622,448
Ts (kN)	11232
PnB (kN)	14044
y (mm)	600
Mnb (kNm)	15929,21748
Patah Desak (c>cb)	
c ambil (mm)	700 830 960 1090 1222
fs' Mpa	531,428571 542,168675 550 555,963303 560,720131
fs' pakai (Mpa)	390 390 390 390 390
fs (Mpa)	360 209,638554 100 16,5137615 -50,081833
fs pakai (Mpa)	360 209,638554 100 16,5137615 -50,081833
a (mm)	595 705,5 816 926,5 1038,7
Cc (kN)	15111,81 17918,289 20724,768 23531,247 26380,9026
Cs (kN)	10622,448 10622,448 10622,448 10622,448 10622,448
Ts (kN)	10368 6037,59036 2880 475,59633 -1442,3568
Pn (kN)	15366,258 22503,1466 28467,216 33678,0987 38445,7074
Mn (kNm)	15486,3555 13093,5169 11000,4284 8988,88108 6901,26722
Patah Tarik (c<cb)	
c ambil (mm)	250 350 450 550 650
a (mm)	212,5 297,5 382,5 467,5 552,5
fs' (Mpa)	408 462,857143 493,333333 512,727273 526,153846

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5397,075	7555,905	9714,735	11873,565	14032,395
Cs (kN)	10622,448	10622,448	10622,448	10622,448	10622,448
Ts (kN)	11232	11232	11232	11232	11232
Pn (kN)	4787,523	6946,353	9105,183	11264,013	13422,843
Mn (kNm)	14029,1187	14773,9151	15335,2109	15713,0061	15907,3008
Saat Mn = 0					
Pn ₀ (kN)	51722	51722	51722,496	51722,496	51722,496
Lentur Murni (Pn = 0)					
a (mm)	442,239546	442,239546	442,239546	442,239546	442,239546
Mn (kNm)	10096,2227	10096,2227	10096,2227	10096,2227	10096,2227



Diagram Mn vs Pn kolom

	5%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1200				
h (mm)	1200				
Ag(mm ²)	1440000				
d' (mm)	80				
d (mm)	1120				
cb (mm)	678,7878788				
fs' (Mpa)	529,28571				
fs' pakai (Mpa)	390				
Ast (mm ²)	72000				
As = As' (mm)	36000				
Cc (kN)	14654				
Cs (kN)	13278,06				
Ts (kN)	14040				
PnB (kN)	13892				
y (mm)	600				
Mnb (kNm)	18770,29572				
Patah Desak (c>cb)					
c ambil (mm)	700	830	960	1090	1222
fs' Mpa	531,428571	542,168675	550	555,963303	560,720131
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	360	209,638554	100	16,5137615	-50,081833
fs pakai (Mpa)	360	209,638554	100	16,5137615	-50,081833
a (mm)	595	705,5	816	926,5	1038,7
Cc (kN)	15111,81	17918,289	20724,768	23531,247	26380,9026
Cs (kN)	13278,06	13278,06	13278,06	13278,06	13278,06
Ts (kN)	12960	7546,98795	3600	594,495413	-1802,946
Pn (kN)	15429,87	23649,361	30402,828	36214,8116	41461,9086
Mn (kNm)	18215,1137	15259,3219	12755,7467	10431,6268	8094,67908
Patah Tarik (c<cb)					
c ambil (mm)	250	350	450	550	650
a (mm)	212,5	297,5	382,5	467,5	552,5
fs' (Mpa)	408	462,857143	493,333333	512,727273	526,153846
fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390

Cc (kN)	5397,075	7555,905	9714,735	11873,565	14032,395
Cs (kN)	13278,06	13278,06	13278,06	13278,06	13278,06
Ts (kN)	14040	14040	14040	14040	14040
Pn (kN)	4635,135	6793,965	8952,795	11111,625	13270,455
Mn (kNm)	16870,197	17614,9933	18176,2891	18554,0844	18748,3791
Saat Mn = 0					
Pn _o (kN)	57033,72	57033,72	57033,72	57033,72	57033,72
Lentur Murni (Pn = 0)					
a (mm)	552,799433	552,799433	552,799433	552,799433	552,799433
Mn (kNm)	11844,148	11844,148	11844,148	11844,148	11844,148



Ast = 1% Ag	Pn (kN)	0	5244,7	7403,517	9562,347	11721,18	13880,01	15175,42	19064,5	22660,38	26067,96	29397,1	35788,82
	Mn (kNm)	2989,73	5505,9	6250,68	6811,976	7189,771	7384,066	7300,081	6596,102	5734,474	4660,644	3321,032	0
Ast = 2% Ag	Pn (kN)	0	5092,3	7251,129	9409,959	11568,79	13727,62	15239,03	20210,72	24595,99	28604,67	32413,3	41100,05
	Mn (kNm)	5669,02	8347	9091,759	9653,054	10030,85	10225,14	10028,84	8761,907	7489,792	6103,39	4514,444	0
Ast = 3% Ag	Pn (kN)	0	4939,9	7098,741	9257,571	11416,4	13575,23	15302,65	21356,93	26531,6	31141,39	35429,51	46411,27
	Mn (kNm)	8037,85	11188	11932,84	12494,13	12871,93	13066,22	12757,6	10927,71	9245,11	7546,135	5707,855	0
Ast = 4% Ag	Pn (kN)	0	4787,5	6946,353	9105,183	11264,01	13422,84	15366,26	22503,15	28467,22	33678,1	38445,71	51722,5
	Mn (kNm)	10096,2	14029	14773,92	15335,21	15713,01	15907,3	15486,36	13093,52	11000,43	8988,881	6901,267	0
Ast = 5% Ag	Pn (kN)	0	4635,1	6793,965	8952,795	11111,63	13270,46	15429,87	23649,36	30402,83	36214,81	41461,91	57033,72
	Mn (kNm)	11844,1	16870	17614,99	18176,29	18554,08	18748,38	18215,11	15259,32	12755,75	10431,63	8094,679	0

DIAGRAM INTERAKSI KOLOM
1200X1200

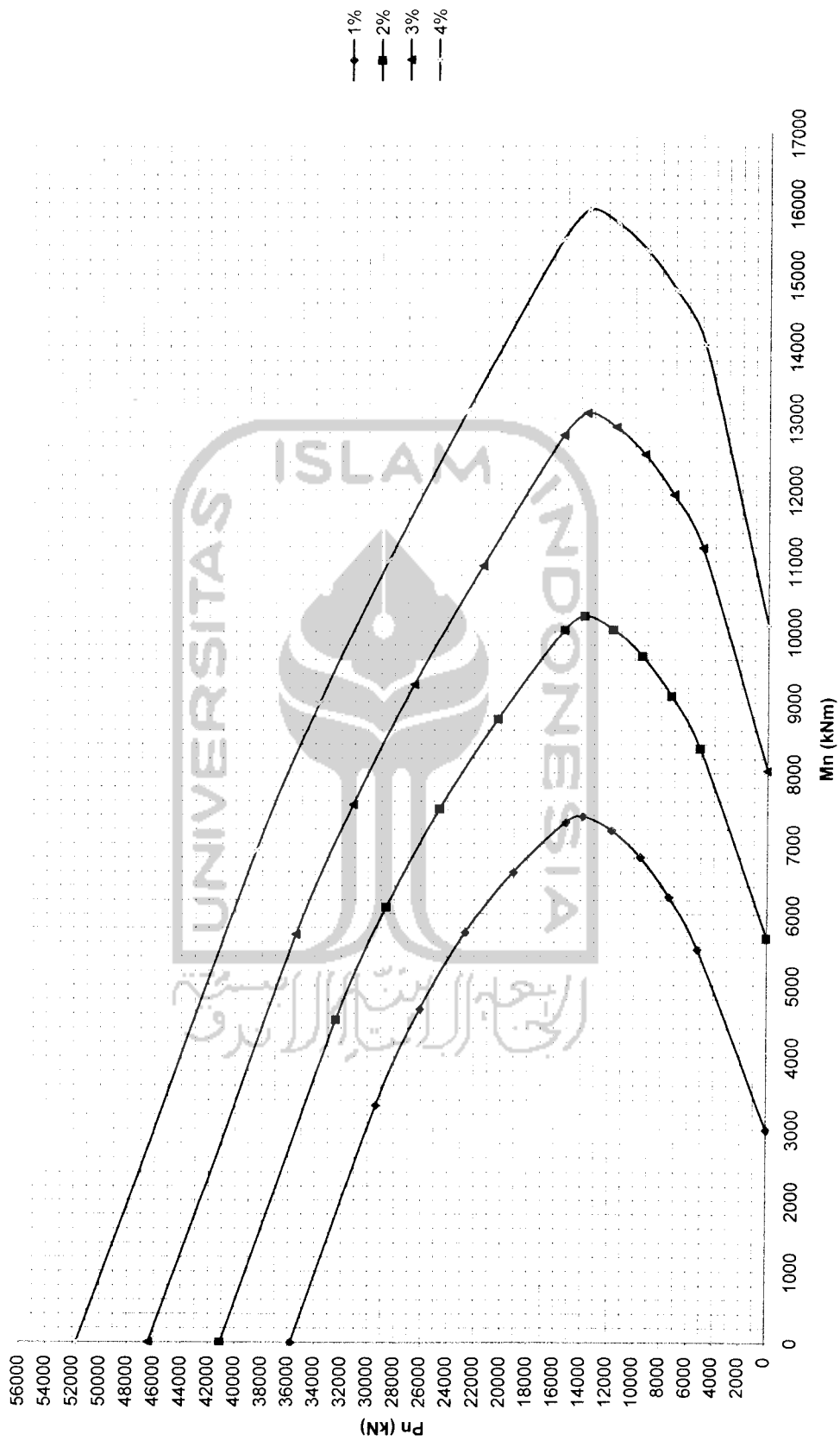


Diagram Mn vs Pn kolom

	1%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1400				
h (mm)	1400				
Ag(mm ²)	1960000				
d' (mm)	80				
d (mm)	1320				
cb (mm)	800				
fs' (Mpa)	540,00000				
fs' pakai (Mpa)	390				
Ast (mm ²)	19600				
As = As' (mm)	9800				
Cc (kN)	20149				
Cs (kN)	3614,583				
Ts (kN)	3822				
PnB (kN)	19942				
y (mm)	700				
Mnb (kNm)	11864,35026				
Patah Desak (c>cb)					
c ambil (mm)	850	1000	1150	1300	1450
fs' Mpa	543,529412	552	558,26087	563,076923	566,896552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
fs pakai (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
a (mm)	722,5	850	977,5	1105	1232,5
Cc (kN)	21408,3975	25186,35	28964,3025	32742,255	36520,2075
Cs (kN)	3614,583	3614,583	3614,583	3614,583	3614,583
Ts (kN)	3251,29412	1881,6	869,217391	90,4615385	-527,17241
Pn (kN)	21771,6864	26919,333	31709,6681	36266,3765	40661,9629
Mn (kNm)	11508,9385	10333,8797	8898,66515	7126,61023	4972,76194
Patah Tarik (c<cb)					
c ambil (mm)	250	375	500	625	750
a (mm)	212,5	318,75	425	531,25	637,5
fs' (Mpa)	408	472	504	523,2	536

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	6296,5875	9444,88125	12593,175	15741,4688	18889,7625
Cs (kN)	3614,583	3614,583	3614,583	3614,583	3614,583
Ts (kN)	3822	3822	3822	3822	3822
Pn (kN)	6089,1705	9237,46425	12385,758	15534,0518	18682,3455
Mn (kNm)	8349,28029	9716,82039	10749,8543	11448,3819	11812,4034
Saat Mn = 0					
Pn ₀ (kN)	48712,566	48712,566	48712,566	48712,566	48712,566
Lentur Murni (Pn = 0)					
a (mm)	128,986534	128,986534	128,986534	128,986534	128,986534
Mn (kNm)	4798,54673	4798,54673	4798,54673	4798,54673	4798,54673



Diagram Mn vs Pn Kolom

	2%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1400				
h (mm)	1400				
Ag(mm ²)	1960000				
d' (mm)	80				
d (mm)	1320				
cb (mm)	800				
fs' (Mpa)	540,00000				
fs' pakai (Mpa)	390				
Ast (mm ²)	39200				
As = As' (mm)	19600				
Cc (kN)	20149				
Cs (kN)	7229,166				
Ts (kN)	7644				
PnB (kN)	19734				
y (mm)	700				
Mnb (kNm)	16475,03172				
Patah Desak (c>cb)					
c ambil (mm)	850	1000	1150	1300	1450
fs' Mpa	543,529412	552	558,26087	563,076923	566,896552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
fs pakai (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
a (mm)	722,5	850	977,5	1105	1232,5
Cc (kN)	21408,3975	25186,35	28964,3025	32742,255	36520,2075
Cs (kN)	7229,166	7229,166	7229,166	7229,166	7229,166
Ts (kN)	6502,58824	3763,2	1738,43478	180,923077	-1054,3448
Pn (kN)	22134,9753	28652,316	34455,0337	39790,4979	44803,7183
Mn (kNm)	15765,7823	13741,5132	11678,6214	9423,73784	6886,95651
Patah Tarik (c<cb)					
c ambil (mm)	250	375	500	625	750
a (mm)	212,5	318,75	425	531,25	637,5
fs' (Mpa)	408	472	504	523,2	536

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	6296,5875	9444,88125	12593,175	15741,4688	18889,7625
Cs (kN)	7229,166	7229,166	7229,166	7229,166	7229,166
Ts (kN)	7644	7644	7644	7644	7644
Pn (kN)	5881,7535	9030,04725	12178,341	15326,6348	18474,9285
Mn (kNm)	12959,9617	14327,5018	15360,5357	16059,0634	16423,0849
Saat Mn = 0					
Pn ₀ (kN)	55941,732	55941,732	55941,732	55941,732	55941,732
Lentur Murni (Pn = 0)					
a (mm)	257,973069	257,973069	257,973069	257,973069	257,973069
Mn (kNm)	9104,10693	9104,10693	9104,10693	9104,10693	9104,10693



Diagram M vs PN kolom

	3%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1400				
h (mm)	1400				
Ag(mm ²)	1960000				
d' (mm)	80				
d (mm)	1320				
cb (mm)	800				
fs' (Mpa)	540,00000				
fs' pakai (Mpa)	390				
Ast (mm ²)	58800				
As = As' (mm)	29400				
Cc (kN)	20149				
Cs (kN)	10843,749				
Ts (kN)	11466				
PnB (kN)	19527				
y (mm)	700				
Mnb (kNm)	21085,71318				
Patah Desak (c>cb)					
c ambil (mm)	850	1000	1150	1300	1450
fs' Mpa	543,529412	552	558,26087	563,076923	566,896552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
fs pakai (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
a (mm)	722,5	850	977,5	1105	1232,5
Cc (kN)	21408,3975	25186,35	28964,3025	32742,255	36520,2075
Cs (kN)	10843,749	10843,749	10843,749	10843,749	10843,749
Ts (kN)	9753,88235	5644,8	2607,65217	271,384615	-1581,5172
Pn (kN)	22498,2641	30385,299	37200,3993	43314,6194	48945,4737
Mn (kNm)	20022,6261	17149,1466	14458,5776	11720,8655	8801,15107
Patah Tarik (c<cb)					
c ambil (mm)	250	375	500	625	750
a (mm)	212,5	318,75	425	531,25	637,5
fs' (Mpa)	408	472	504	523,2	536

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	6296,5875	9444,88125	12593,175	15741,4688	18889,7625
Cs (kN)	10843,749	10843,749	10843,749	10843,749	10843,749
Ts (kN)	11466	11466	11466	11466	11466
Pn (kN)	5674,3365	8822,63025	11970,924	15119,2178	18267,5115
Mn (kNm)	17570,6432	18938,1833	19971,2172	20669,7449	21033,7663
Saat Mn = 0					
Pn ₀ (kN)	63170,898	63170,898	63170,898	63170,898	63170,898
Lentur Murni (Pn = 0)					
a (mm)	386,959603	386,959603	386,959603	386,959603	386,959603
Mn (kNm)	12916,6806	12916,6806	12916,6806	12916,6806	12916,6806



Diagram M vs PN kolom

	4%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1400				
h (mm)	1400				
Ag(mm ²)	1960000				
d' (mm)	80				
d (mm)	1320				
cb (mm)	800				
fs' (Mpa)	540,00000				
fs' pakai (Mpa)	390				
Ast (mm ²)	78400				
As = As' (mm)	39200				
Cc (kN)	20149				
Cs (kN)	14458,332				
Ts (kN)	15288				
PnB (kN)	19319				
y (mm)	700				
Mnb (kNm)	25696,39464				
Patah Desak (c>cb)					
c ambil (mm)	850	1000	1150	1300	1450
fs' Mpa	543,529412	552	558,26087	563,076923	566,896552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
fs pakai (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
a (mm)	722,5	850	977,5	1105	1232,5
Cc (kN)	21408,3975	25186,35	28964,3025	32742,255	36520,2075
Cs (kN)	14458,332	14458,332	14458,332	14458,332	14458,332
Ts (kN)	13005,1765	7526,4	3476,86957	361,846154	-2108,6897
Pn (kN)	22001,553	32118,282	30945,7649	46838,7408	53087,2292
Mn (kNm)	24279,4699	20556,7801	17238,5339	14017,9931	10715,3456
Patah Tarik (c<cb)					
c ambil (mm)	250	375	500	625	750
a (mm)	212,5	318,75	425	531,25	637,5
fs' (Mpa)	408	472	504	523,2	536

fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	6296,5875	9444,88125	12593,175	15741,4688	18889,7625
Cs (kN)	14458,332	14458,332	14458,332	14458,332	14458,332
Ts (kN)	15288	15288	15288	15288	15288
Pn (kN)	5466,9195	8615,21325	11763,507	14911,8008	18060,0945
Mn (kNm)	22181,3247	23548,8648	24581,8987	25280,4263	25644,4478
Saat Mn = 0					
Pn ₀ (kN)	70400	70400	70400,064	70400,064	70400,064
Lentur Murni (Pn = 0)					
a (mm)	515,946137	515,946137	515,946137	515,946137	515,946137
Mn (kNm)	16236,2677	16236,2677	16236,2677	16236,2677	16236,2677



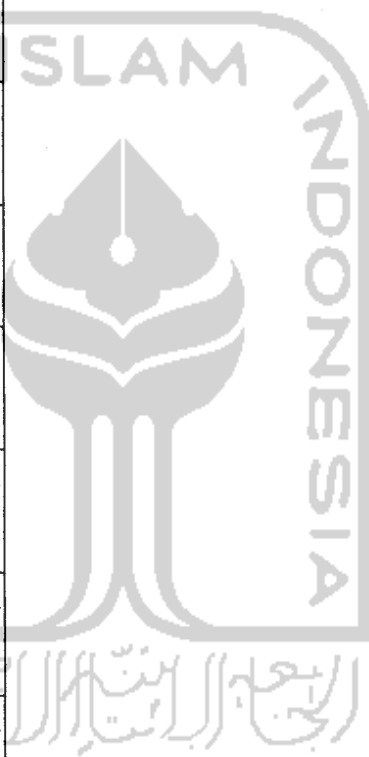
Diagram Mn vs Pn kolom

	5%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1400				
h (mm)	1400				
Ag(mm ²)	1960000				
d' (mm)	80				
d (mm)	1320				
cb (mm)	800				
fs' (Mpa)	540,00000				
fs' pakai (Mpa)	390				
Ast (mm ²)	98000				
As = As' (mm)	49000				
Cc (kN)	20149				
Cs (kN)	18072,915				
Ts (kN)	19110				
PnB (kN)	19112				
y (mm)	700				
Mnb (kNm)	30307,0761				
Patah Desak (c>cb)					
c ambil (mm)	850	1000	1150	1300	1450
fs' Mpa	543,529412	552	558,26087	563,076923	566,896552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
fs pakai (Mpa)	331,764706	192	88,6956522	9,23076923	-53,793103
a (mm)	722,5	850	977,5	1105	1232,5
Cc (kN)	21408,3975	25186,35	28964,3025	32742,255	36520,2075
Cs (kN)	18072,915	18072,915	18072,915	18072,915	18072,915
Ts (kN)	16256,4706	9408	4346,08696	452,307692	-2635,8621
Pn (kN)	23224,8419	33851,265	42691,1305	50362,8623	57228,9846
Mn (kNm)	28536,3137	23964,4136	20018,4901	16315,1207	12629,5402
Patah Tarik (c<cb)					
c ambil (mm)	250	375	500	625	750
a (mm)	212,5	318,75	425	531,25	637,5
fs' (Mpa)	408	472	504	523,2	536
fs' pakai (Mpa)	390	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390

Cc (kN)	6296,5875	9444,88125	12593,175	15741,4688	18889,7625
Cs (kN)	18072,915	18072,915	18072,915	18072,915	18072,915
Ts (kN)	19110	19110	19110	19110	19110
Pn (kN)	5259,5025	8407,79625	11556,09	14704,3838	17852,6775
Mn (kNm)	26792,0061	28159,5462	29192,5801	29891,1078	30255,1293
Saat Mn = 0					
Pn ₀ (kN)	77629,23	77629,23	77629,23	77629,23	77629,23
Lentur Murni (Pn = 0)					
a (mm)	644,932672	644,932672	644,932672	644,932672	644,932672
Mn (kNm)	19062,8683	19062,8683	19062,8683	19062,8683	19062,8683



Ast = 1% Ag	Pn (kN)	0	6089,2	9237,464	12385,76	15534,05	18682,35	21771,69	26919,33	31709,67	36266,38	40661,96	48712,57
	Mn (kNm)	4798,55	8349,3	9716,82	10749,85	11448,38	11812,4	11508,94	10333,88	8898,665	7126,61	4972,762	0
Ast = 2% Ag	Pn (kN)	0	5881,8	9030,047	12178,34	15326,63	18474,93	22134,98	28652,32	34455,03	39790,5	44803,72	55941,73
	Mn (kNm)	9104,11	12960	14327,5	15360,54	16059,06	16423,08	15765,78	13741,51	11678,62	9423,738	6886,957	0
Ast = 3% Ag	Pn (kN)	0	5674,3	8822,63	11970,92	15119,22	18267,51	22498,26	30385,3	37200,4	43314,62	48945,47	63170,9
	Mn (kNm)	12916,7	17571	18938,18	19971,22	20669,74	21033,77	20022,63	17149,15	14458,58	11720,87	8801,151	0
Ast = 4% Ag	Pn (kN)	0	5466,9	8615,213	11763,51	14911,8	18060,09	22861,55	32118,28	39945,76	46838,74	53087,23	70400,06
	Mn (kNm)	16236,3	22181	23548,86	24581,9	25280,43	25644,45	24279,47	20556,78	17238,53	14017,99	10715,35	0
Ast = 5% Ag	Pn (kN)	0	5259,5	8407,796	11556,09	14704,38	17852,68	23224,84	33851,27	42691,13	50362,86	57228,98	77629,23
	Mn (kNm)	19062,9	26792	28159,55	29192,58	29891,11	30255,13	28536,31	23964,41	20018,49	16315,12	12629,54	0



Mn Vs Pn 1400 x 1400

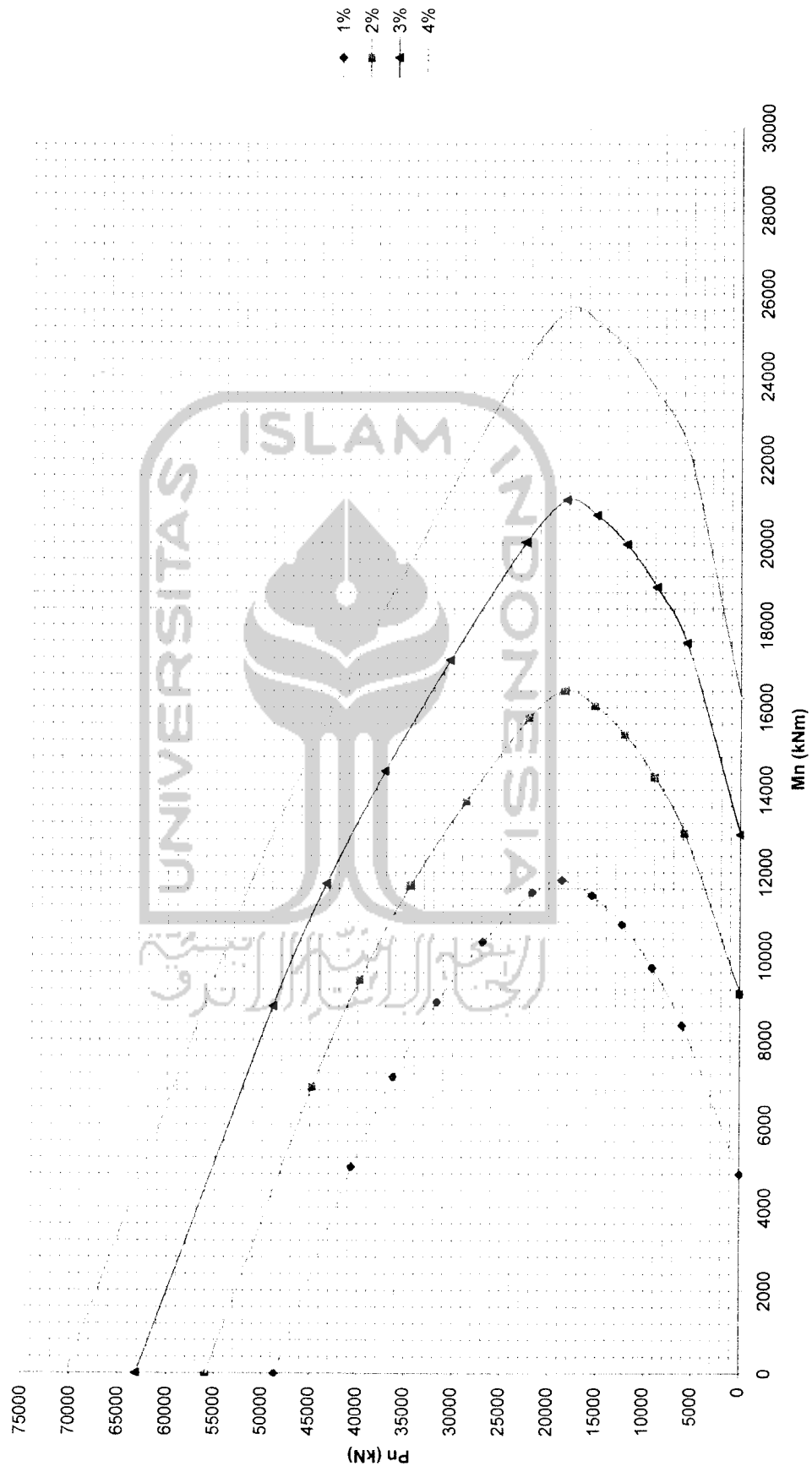


Diagram Mn vs Pn kolom

	1%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1600				
h (mm)	1000				
Ag(mm ²)	1600000				
d' (mm)	80				
d (mm)	920				
cb (mm)	557,5757576				
fs' (Mpa)	513,91304				
fs' pakai (Mpa)	390				
Ast (mm ²)	16000				
As = As' (mm)	8000				
Cc (kN)	16049				
Cs (kN)	2950,68				
Ts (kN)	3120				
PnB (kN)	15880				
y (mm)	500				
Mnb (kNm)	6771,186144				
Patah Desak (c>cb)					
c ambil (mm)	600	700	800	900	1000
fs' Mpa	520	531,428571	540	546,666667	552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	320	188,571429	90	13,3333333	-48
fs pakai (Mpa)	320	188,571429	90	13,3333333	-48
a (mm)	510	595	680	765	850
Cc (kN)	17270,64	20149,08	23027,52	25905,96	28784,4
Cs (kN)	2950,68	2950,68	2950,68	2950,68	2950,68
Ts (kN)	2560	1508,57143	720	106,666667	-384
Pn (kN)	17661,32	21591,1886	25258,2	28749,9733	32119,08
Mn (kNm)	6545,7924	5953,0743	5226,0888	4328,0359	3236,8356
Patah Tarik (c<cb)					
c ambil (mm)	200	275	350	425	500
a (mm)	170	233,75	297,5	361,25	425
fs' (Mpa)	360	425,454545	462,857143	487,058824	504

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5756,88	7915,71	10074,54	12233,37	14392,2
Cs (kN)	2710,68	2950,68	2950,68	2950,68	2950,68
Ts (kN)	3120	3120	3120	3120	3120
Pn (kN)	5347,56	7746,39	9905,22	12064,05	14222,88
Mn (kNm)	4837,9908	5582,39199	6088,36778	6456,71814	6687,4431
Saat Mn = 0					
Pn ₀ (kN)	39765,36	39765,36	39765,36	39765,36	39765,36
Lentur Murni (Pn = 0)					
a (mm)	92,1332388	92,1332388	92,1332388	92,1332388	92,1332388
Mn (kNm)	2726,67215	2726,67215	2726,67215	2726,67215	2726,67215



Diagram Mn vs Pn Kolom

	2%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1600				
h (mm)	1000				
Ag(mm ²)	1600000				
d' (mm)	80				
d (mm)	920				
cb (mm)	557,5757576				
fs' (Mpa)	513,91304				
fs' pakai (Mpa)	390				
Ast (mm ²)	32000				
As = As' (mm)	16000				
Cc (kN)	16049				
Cs (kN)	5901,36				
Ts (kN)	6240				
PnB (kN)	15711				
y (mm)	500				
Mnb (kNm)	9320,871744				
Patah Desak (c>cb)					
c ambil (mm)	600	700	800	900	1000
fs' Mpa	520	531,428571	540	546,666667	552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	320	188,571429	90	13,3333333	-48
fs pakai (Mpa)	320	188,571429	90	13,3333333	-48
a (mm)	510	595	680	765	850
Cc (kN)	17270,64	20149,08	23027,52	25905,96	28784,4
Cs (kN)	5901,36	5901,36	5901,36	5901,36	5901,36
Ts (kN)	5120	3017,14286	1440	213,333333	-768
Pn (kN)	18052	23033,2971	27488,88	31593,9867	35453,76
Mn (kNm)	8860,278	7825,9599	6767,7744	5612,1215	4314,8412
Patah Tarik (c<cb)					
c ambil (mm)	200	275	350	425	500
a (mm)	170	233,75	297,5	361,25	425
fs' (Mpa)	360	425,454545	462,857143	487,058824	504

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5756,88	7915,71	10074,54	12233,37	14392,2
Cs (kN)	5421,36	5901,36	5901,36	5901,36	5901,36
Ts (kN)	6240	6240	6240	6240	6240
Pn (kN)	4938,24	7577,07	9735,9	11894,73	14053,56
Mn (kNm)	7286,8764	8132,07759	8638,05338	9006,40374	9237,1287
Saat Mn = 0					
Pn ₀ (kN)	45666,72	45666,72	45666,72	45666,72	45666,72
Lentur Murni (Pn = 0)					
a (mm)	184,266478	184,266478	184,266478	184,266478	184,266478
Mn (kNm)	5165,88859	5165,88859	5165,88859	5165,88859	5165,88859



Diagram M vs PN kolom

	3%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1600				
h (mm)	1000				
Ag(mm ²)	1600000				
d' (mm)	80				
d (mm)	920				
cb (mm)	557,5757576				
fs' (Mpa)	513,91304				
fs' pakai (Mpa)	390				
Ast (mm ²)	48000				
As = As' (mm)	24000				
Cc (kN)	16049				
Cs (kN)	8852,04				
Ts (kN)	9360				
PnB (kN)	15542				
y (mm)	500				
Mnb (kNm)	11870,55734				
Patah Desak (c>cb)					
c ambil (mm)	600	700	800	900	1000
fs' Mpa	520	531,428571	540	546,666667	552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	320	188,571429	90	13,3333333	-48
fs pakai (Mpa)	320	188,571429	90	13,3333333	-48
a (mm)	510	595	680	765	850
Cc (kN)	17270,64	20149,08	23027,52	25905,96	28784,4
Cs (kN)	8852,04	8852,04	8852,04	8852,04	8852,04
Ts (kN)	7680	4525,71429	2160	320	-1152
Pn (kN)	18442,68	24475,4057	29719,56	34438	38788,44
Mn (kNm)	11174,7636	9698,8455	8309,46	6896,2071	5392,8468
Patah Tarik (c<cb)					
c ambil (mm)	200	275	350	425	500
a (mm)	170	233,75	297,5	361,25	425
fs' (Mpa)	360	425,454545	462,857143	487,058824	504

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5756,88	7915,71	10074,54	12233,37	14392,2
Cs (kN)	8132,04	8852,04	8852,04	8852,04	8852,04
Ts (kN)	9360	9360	9360	9360	9360
Pn (kN)	4528,92	7407,75	9566,58	11725,41	13884,24
Mn (kNm)	9735,762	10681,7632	11187,739	11556,0893	11786,8143
Saat Mn = 0					
Pn ₀ (kN)	51568,08	51568,08	51568,08	51568,08	51568,08
Lentur Murni (Pn = 0)					
a (mm)	276,399717	276,399717	276,399717	276,399717	276,399717
Mn (kNm)	7317,64933	7317,64933	7317,64933	7317,64933	7317,64933



Diagram M vs PN kolom

	4%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1600				
h (mm)	1000				
Ag(mm ²)	1600000				
d' (mm)	80				
d (mm)	920				
cb (mm)	557,5757576				
fs' (Mpa)	513,91304				
fs' pakai (Mpa)	390				
Ast (mm ²)	64000				
As = As' (mm)	32000				
Cc (kN)	16049				
Cs (kN)	11802,72				
Ts (kN)	12480				
PnB (kN)	15372				
y (mm)	500				
Mnb (kNm)	14420,24294				
Patah Desak (c>cb)					
c ambil (mm)	600	700	800	900	1000
fs' Mpa	520	531,428571	540	546,666667	552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	320	188,571429	90	13,3333333	-48
fs pakai (Mpa)	320	188,571429	90	13,3333333	-48
a (mm)	510	595	680	765	850
Cc (kN)	17270,64	20149,08	23027,52	25905,96	28784,4
Cs (kN)	11802,72	11802,72	11802,72	11802,72	11802,72
Ts (kN)	10240	6034,28571	2880	426,666667	-1536
Pn (kN)	18833,36	25917,5143	31950,24	37282,0133	42123,12
Mn (kNm)	13489,2492	11571,7311	9851,1456	8180,2927	6470,8524
Patah Tarik (c<cb)					
c ambil (mm)	200	275	350	425	500
a (mm)	170	233,75	297,5	361,25	425
fs' (Mpa)	360	425,454545	462,857143	487,058824	504

fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390
Cc (kN)	5756,88	7915,71	10074,54	12233,37	14392,2
Cs (kN)	10842,72	11802,72	11802,72	11802,72	11802,72
Ts (kN)	12480	12480	12480	12480	12480
Pn (kN)	4119,6	7238,43	9397,26	11556,09	13714,92
Mn (kNm)	12184,6476	13231,4488	13737,4246	14105,7749	14336,4999
Saat Mn = 0					
Pn ₀ (kN)	57469	57469	57469,44	57469,44	57469,44
Lentur Murni (Pn = 0)					
a (mm)	368,532955	368,532955	368,532955	368,532955	368,532955
Mn (kNm)	9181,95436	9181,95436	9181,95436	9181,95436	9181,95436



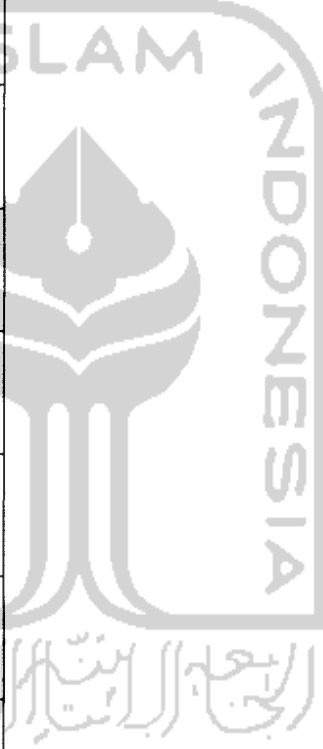
Diagram Mn vs Pn kolom

	5%				
f'c (Mpa)	24,9				
fy (Mpa)	390				
b (mm)	1600				
h (mm)	1000				
Ag(mm ²)	1600000				
d' (mm)	80				
d (mm)	920				
cb (mm)	557,5757576				
fs' (Mpa)	513,91304				
fs' pakai (Mpa)	390				
Ast (mm ²)	80000				
As = As' (mm)	40000				
Cc (kN)	16049				
Cs (kN)	14753,4				
Ts (kN)	15600				
PnB (kN)	15203				
y (mm)	500				
Mnb (kNm)	16969,92854				
Patah Desak (c>cb)					
c ambil (mm)	600	700	800	900	1000
fs' Mpa	520	531,428571	540	546,666667	552
fs' pakai (Mpa)	390	390	390	390	390
fs (Mpa)	320	188,571429	90	13,3333333	-48
fs pakai (Mpa)	320	188,571429	90	13,3333333	-48
a (mm)	510	595	680	765	850
Cc (kN)	17270,64	20149,08	23027,52	25905,96	28784,4
Cs (kN)	14753,4	14753,4	14753,4	14753,4	14753,4
Ts (kN)	12800	7542,85714	3600	533,333333	-1920
Pn (kN)	19224,04	27359,6229	34180,92	40126,0267	45457,8
Mn (kNm)	15803,7348	13444,6167	11392,8312	9464,3783	7548,858
Patah Tarik (c<cb)					
c ambil (mm)	200	275	350	425	500
a (mm)	170	233,75	297,5	361,25	425
fs' (Mpa)	360	425,454545	462,857143	487,058824	504
fs' pakai (Mpa)	360	390	390	390	390
fs = fy (Mpa)	390	390	390	390	390

Cc (kN)	5756,88	7915,71	10074,54	12233,37	14392,2
Cs (kN)	13553,4	14753,4	14753,4	14753,4	14753,4
Ts (kN)	15600	15600	15600	15600	15600
Pn (kN)	3710,28	7069,11	9227,94	11386,77	13545,6
Mn (kNm)	14633,5332	15781,1344	16287,1102	16655,4605	16886,1855
Saat Mn = 0					
Pn ₀ (kN)	63370,8	63370,8	63370,8	63370,8	63370,8
Lentur Murni (Pn = 0)					
a (mm)	460,666194	460,666194	460,666194	460,666194	460,666194
Mn (kNm)	10758,8037	10758,8037	10758,8037	10758,8037	10758,8037



Ast = 1% Ag	Pn (kN)	0	5347,6	7746,39	9905,22	12064,05	14222,88	17661,32	21591,19	25258,2	28749,97	32119,08	39765,36
	Mn (kNm)	2726,67	4838	5582,392	6088,368	6456,718	6687,443	6545,792	5953,074	5226,089	4328,036	3236,836	0
Ast = 2% Ag	Pn (kN)	0	4938,2	7577,07	9735,9	11894,73	14053,56	18052	23033,3	27488,88	31593,99	35453,76	45666,72
	Mn (kNm)	5165,89	7286,9	8132,078	8638,053	9006,404	9237,129	8860,278	7825,96	6767,774	5612,122	4314,841	0
Ast = 3% Ag	Pn (kN)	0	4528,9	7407,75	9566,58	11725,41	13884,24	18442,68	24475,41	29719,56	34438	38788,44	51568,08
	Mn (kNm)	7317,65	9735,8	10681,76	11187,74	11556,09	11786,81	11174,76	9698,846	8309,46	6896,207	5392,847	0
Ast = 4% Ag	Pn (kN)	0	4119,6	7238,43	9397,26	11556,09	13714,92	18833,36	25917,51	31950,24	37282,01	42123,12	57469,44
	Mn (kNm)	9181,95	12185	13231,45	13737,42	14105,77	14336,5	13489,25	11571,73	9851,146	8180,293	6470,852	0
Ast = 5% Ag	Pn (kN)	0	3710,3	7069,11	9227,94	11386,77	13545,6	19224,04	27359,62	34180,92	40126,03	45457,8	63370,8
	Mn (kNm)	10758,8	14634	15781,13	16287,11	16655,46	16886,19	15803,73	13444,62	11392,83	9464,378	7548,858	0





Hitungan Tulangan Balok		
FRAME 124 DAN 435		
	Tulangan Tumpuan	Tulangan Lapangan
Mu (kNm)	1833,620	1020,399
ϕ	0,8	0,8
Mn (kNm)	2292,0250	1275,4988
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	620,5123	345,3115
ambil b (mm)	700	700
d (mm)	941,513	702,355
d' (mm)	60	60
z (mm)	75	75
h	1016,513	777,355
ambil h (mm)	1000	1000
Desain Tulangan Rangkap		
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1407,0918	390,5656
As' (mm ²)	4171,0148	1157,7459
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	8,50143	2,35974
Jml Pakai	9	5
Tul Pakai	9D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6886,3264	3873,0575
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	14,0358	7,8941
Jml Pakai	15	9
Tul Pakai	15D25	9D25
Kontrol Momen Mg-		
As (mm ²)	7359	4416
As' (mm ²)	4416	2453
C ₂ (mm)	-103,9273	-74,3946
C ₂ (mm)	121,4591	94,2640
a (mm)	103,2402	80,1244
fs' (Mpa)	303,6039	218,0937
fs' pakai (Mpa)	303,6039	218,0937
Mn (kNm)	2495,5027	1513,2789
0,8 Mn (kNm)	1996,4021	1210,6231
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-220781,25	-250218,75
c	-158962500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

Hitungan Tulangan Balok		
FRAME 136 DAN 434		
	Tulangan Tumpuan	Tulangan Lapangan
Mu (kNm)	1346,443	1374,337
φ	0,8	0,8
Mn (kNm)	1683,0538	1717,9213
Fc (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	455,6475	465,0871
ambil b (mm)	700	700
d (mm)	806,799	815,114
d' (mm)	60	60
z (mm)	75	75
h	881,799	890,114
ambil h (mm)	1000	1000
Desain Tulangan Rangkap		
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	798,1206	832,9881
As' (mm ²)	2365,8532	2469,2102
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,82212	5,03279
Jml Pakai	5	6
Tul Pakai	5D25	6D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	5081,1648	5184,5219
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,3565	10,5672
Jml Pakai	11	11
Tul Pakai	11D25	11D25
Kontrol Momen Mg-		
As (mm ²)	5397	5397
As' (mm ²)	2453	2944
C ₂ (mm)	-62,3021	-79,2732
C ₂ (mm)	112,5600	106,1553
a (mm)	95,6760	90,2320
fs' (Mpa)	280,1706	260,8743
fs' pakai (Mpa)	280,1706	260,8743
Mn (kNm)	1837,8753	1840,5332
0,8 Mn (kNm)	1470,3002	1472,4265
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-338531,25
c	-88312500	-105975000
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 134 DAN 451		
Mu (kNm)	1684,690	367,166
Φ	0,8	0,8
Mn (kNm)	2105,8625	458,9575
f'_c (Mpa)	24,90	24,90
f_y (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R_1	3,3878	3,3878
$b \cdot d'$	621,6030	135,4739
ambil b (mm)	700	700
d (mm)	942,340	439,925
d' (mm)	60	60
z (mm)	75	75
h	1017,340	514,925
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,3551	1,3551
d (mm)	925	925
M_1 (kNm)	811,6306	811,6306
M_2 (kNm)	1294,2319	-352,6731
As' (mm ²)	3053,5140	-832,0706
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	6,22372	-1,69594
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As_{baru} (mm ²)	5016,4082	1130,8237
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,2245	2,3049
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5397	3925
As' (mm ²)	3434	2453
C_2 (mm)	-78,5794	-67,7168
C_2 (mm)	124,9413	103,5596
a (mm)	106,2001	88,0257
f_s' (Mpa)	311,8648	252,3742
f_s' pakai (Mpa)	311,8648	252,3742
Mn (kNm)	2298,3219	1684,4608
0,8 Mn (KNm)	1838,6575	1347,5687
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-583843,75	-451375
c	-123637500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 135 DAN 433		
	Tulangan Tumpuan	Tulangan Lapangan
Mu (kNm)	1541,329	760,756
ϕ	0,8	0,8
Mn (kNm)	1926,6613	950,9450
f_c (Mpa)	24,90	24,00
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0269
ρ_{max}	0,0210	0,0202
ρ_{pakai}	0,0105	0,0101
m	18,4266	19,1176
R_1	3,6938	3,5603
b d'	521,5986	267,1004
ambil b (mm)	700	700
d (mm)	863,215	617,715
d' (mm)	60	60
z (mm)	75	75
h	938,215	692,715
ambil h (mm)	1000	1000
Tulangan Desak		
V	0,4	0,4
R_2	1,4775	1,4241
d (mm)	925	925
M_1 (kNm)	884,9332	852,9476
M_2 (kNm)	1041,7281	97,9974
As' (mm ²)	3087,9741	290,4917
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	6,29396	0,59208
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
ρ baru	0,0042	0,0040
As baru (mm ²)	5803,2858	2907,6595
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,8284	5,9264
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5888	3925
As' (mm ²)	3434	2453
C_2 (mm)	-90,1748	-82,9070
C_2 (mm)	108,8754	87,7574
a (mm)	92,5441	74,5938
f_s' (Mpa)	269,3468	189,7784
f_s' pakai (Mpa)	269,3468	189,7784
Mn (kNm)	2004,9703	1348,2821
0,8 Mn (kNm)	1603,9763	1078,6257
Kontrol	Aman	Aman
a	12593,175	12138
b	-235500	-58875
c	-123637500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 148 DAN 449		
Mu (kNm)	1386,914	91,053
φ	0,8	0,8
Mn (kNm)	1733,6425	113,8163
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	469,3432	30,8131
ambil b (mm)	700	700
d (mm)	818,835	209,806
d' (mm)	60	60
z (mm)	75	75
h	893,835	284,806
ambil h (mm)	1000	1000
Desain Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	848,7093	-771,1169
A_s (mm ²)	2515,8124	-2285,8068
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	5,12777	-4,65897
Jml Pakai	6	5
Tul Pakai	6D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	5231,1241	429,5048
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,6622	0,8754
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	5397	3925
A_s' (mm ²)	2944	2453
C_2 (mm)	-79,2732	-81,4371
C_2 (mm)	106,1553	86,1122
a (mm)	90,2320	73,1954
f_s' (Mpa)	260,8743	181,9409
f_s' pakai (Mpa)	260,8743	181,9409
Mn (kNm)	1840,5332	1349,4768
0,8 Mn (KNm)	1472,4265	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-338531,25	-58875
c	-105975000	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 149 DAN 450		
	Tulangan Desak	Tulangan Tarik
Mu (kNm)	1848,607	166,299
φ	0,8	0,8
Mn (kNm)	2310,7588	207,8738
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	625,5840	56,2770
ambil b (mm)	700	700
d (mm)	945,353	283,541
d' (mm)	60	60
z (mm)	75	75
h	1020,353	358,541
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1425,8256	-677,0594
As' (mm ²)	4226,5468	-2006,9940
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	8,61462	-4,09069
Jml Pakai	9	5
Tul Pakai	9D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6941,8585	708,3176
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	14,1490	1,4437
Jml Pakai	15	8
Tul Pakai	15D25	8D25
Kontrol Momen Mg-		
As (mm ²)	7359	3925
As' (mm ²)	4416	2453
C ₂ (mm)	-103,9273	-81,4371
C ₂ (mm)	121,4591	86,1122
a (mm)	103,2402	73,1954
fs' (Mpa)	303,6039	181,9409
fs' pakai (Mpa)	303,6039	181,9409
Mn (kNm)	2495,5027	1349,4768
0,8 Mn (kNm)	1996,4021	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-220781,25	-58875
c	-158962500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 146 DAN 454		
Mu (kNm)	1636,075	161,264
φ	0,8	0,8
Mn (kNm)	2045,0938	201,5800
f _c (Mpa)	24,90	24,90
f _y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	553,6614	54,5731
ambil b (mm)	700	700
d (mm)	889,351	279,216
d' (mm)	60	60
z (mm)	75	75
h	964,351	354,216
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1160,1606	-683,3532
As' (mm ²)	3439,0413	-2025,6504
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	7,00951	-4,12871
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6154,3529	689,6612
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	12,5439	1,4057
Jml Pakai	13	8
Tul Pakai	13D25	8D25
Kontrol Momen Mg-		
As (mm ²)	6378	3925
As' (mm ²)	3434	2453
C ₂ (mm)	-83,5764	-81,4371
C ₂ (mm)	117,4712	86,1122
a (mm)	99,8505	73,1954
f _s ' (Mpa)	293,5420	181,9409
f _s ' pakai (Mpa)	293,5420	181,9409
Mn (kNm)	2166,5644	1349,4768
0,8 Mn (KNm)	1733,2515	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-426843,75	-58875
c	-123637500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 147 DAN 455		
Mu (kNm)	1840,470	45,164
Φ	0,8	0,8
Mn (kNm)	2300,5875	56,4550
f _c (Mpa)	24,90	24,90
f _y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	622,8304	15,2839
ambil b (mm)	700	700
d (mm)	943,270	147,764
d' (mm)	60	60
z (mm)	75	75
h	1018,270	222,764
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1415,6543	-828,4782
As' (mm ²)	4196,3964	-2455,8416
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	8,55316	-5,00554
Jml Pakai	9	5
Tul Pakai	9D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6911,7080	259,4700
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	14,0876	0,5289
Jml Pakai	15	8
Tul Pakai	15D25	8D25
Kontrol Momen Mg-		
As (mm ²)	7359	3925
As' (mm ²)	4416	2453
C ₂ (mm)	-103,9273	-81,4371
C ₂ (mm)	121,4591	86,1122
a (mm)	103,2402	73,1954
fs' (Mpa)	303,6039	181,9409
fs' pakai (Mpa)	303,6039	181,9409
Mn (kNm)	2495,5027	1349,4768
0,8 Mn (KNm)	1996,4021	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-220781,25	-58875
c	-158962500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 318 DAN 459		
Mu (kNm)	953,927	133,476
ϕ	0,8	0,8
Mn (kNm)	1192,4088	166,8450
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	322,8168	45,1694
ambil b (mm)	700	700
d (mm)	679,093	254,023
d' (mm)	60	60
z (mm)	75	75
h	754,093	329,023
ambil h (mm)	1000	1000
Desain Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	307,4756	-718,0882
As' (mm ²)	911,4438	-2128,6147
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	1,85772	-4,33858
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	3626,7555	586,6969
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,3921	1,1958
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C_2 (mm)	-81,4371	-81,4371
C_2 (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
f_s' (Mpa)	181,9409	181,9409
f_s' pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (kNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 319 DAN 460		
Mu (kNm)	1335,302	430,237
ϕ	0,8	0,8
Mn (kNm)	1669,1275	537,7963
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	451,8773	145,5958
ambil b (mm)	700	700
d (mm)	803,454	456,064
d' (mm)	60	60
z (mm)	75	75
h	878,454	531,064
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	784,1943	-347,1369
As' (mm ²)	2324,5719	-1029,0112
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,73798	-2,09735
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	5039,8835	1686,3004
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,2724	3,4370
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5397	3925
As' (mm ²)	2453	2453
C_2 (mm)	-62,3021	-81,4371
C_2 (mm)	112,5600	86,1122
a (mm)	95,6760	73,1954
f_s' (Mpa)	280,1706	181,9409
f_s' pakai (Mpa)	280,1706	181,9409
Mn (kNm)	1837,8753	1349,4768
0,8 Mn (kNm)	1470,3002	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 313 DAN 470		
Mu (kNm)	1330,867	229,555
ϕ	0,8	0,8
Mn (kNm)	1663,5838	286,9438
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	450,3765	77,6833
ambil b (mm)	700	700
d (mm)	802,119	333,131
d' (mm)	60	60
z (mm)	75	75
h	877,119	408,131
ambil h (mm)	1000	1000
Desain Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	778,6506	-597,9894
A_s (mm ²)	2308,1387	-1772,6083
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,70449	-3,61296
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	5023,4503	942,7033
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,2389	1,9214
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	5397	3925
A_s' (mm ²)	2453	2453
C_2 (mm)	-62,3021	-81,4371
C_2 (mm)	112,5600	86,1122
a (mm)	95,6760	73,1954
f_s' (Mpa)	280,1706	181,9409
f_s' pakai (Mpa)	280,1706	181,9409
Mn (kNm)	1837,8753	1349,4768
0,8 Mn (kNm)	1470,3002	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-58875
c	-88312500	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 314 DAN 471		
Mu (kNm)	1093,228	208,148
ϕ	0,8	0,8
Mn (kNm)	1366,5350	260,1850
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	369,9575	70,4390
ambil b (mm)	700	700
d (mm)	726,987	317,218
d' (mm)	60	60
z (mm)	75	75
h	801,987	392,218
ambil h (mm)	1000	1000
Desain Tulangan Desak		
Tulangan Desak		
y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	481,6018	-624,7482
As (mm ²)	1427,6029	-1851,9288
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,90976	-3,77463
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	4142,9145	863,3828
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,4442	1,7598
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4416	3925
As (mm ²)	2453	2453
C_2 (mm)	-74,3946	-81,4371
C_2 (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
f_s' (Mpa)	218,0937	181,9409
f_s' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 304 DAN 474		
Mu (kNm)	1344,276	120,224
Φ	0,8	0,8
Mn (kNm)	1680,3450	150,2800
Pc (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	454,9142	40,6848
ambil b (mm)	700	700
d (mm)	806,150	241,083
d' (mm)	60	60
z (mm)	75	75
h	881,150	316,083
ambil h (mm)	1000	1000
Desain Tulangan		
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	795,4118	-734,6532
As' (mm ²)	2357,8237	-2177,7180
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,80576	-4,43866
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	5073,1353	537,5936
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,3401	1,0957
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5397	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-62,3021	-81,4371
C ₂ (mm)	112,5600	86,1122
a (mm)	95,6760	73,1954
fs' (Mpa)	280,1706	181,9409
fs' pakai (Mpa)	280,1706	181,9409
Mn (kNm)	1837,8753	1349,4768
0,8 Mn (KNm)	1470,3002	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 305 DAN 475		
Mu (kNm)	1446,625	192,187
Ψ	0,8	0,8
Mn (kNm)	1808,2813	240,2338
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d$	489,5499	65,0377
ambil b (mm)	700	700
d (mm)	836,276	304,813
d' (mm)	60	60
z (mm)	75	75
h	911,276	379,813
ambil h (mm)	1000	1000
Desain Tulangan		
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	923,3481	-644,6994
A_s (mm ²)	2737,0626	-1911,0699
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	5,57873	-3,89517
Jml Pakai	6	5
Tul Pakai	6D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	5452,3743	804,2418
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,1131	1,6392
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	5888	3925
A_s' (mm ²)	2944	2453
C_2 (mm)	-73,0781	-81,4371
C_2 (mm)	115,1545	86,1122
a (mm)	97,8813	73,1954
f_s' (Mpa)	287,3765	181,9409
f_s' pakai (Mpa)	287,3765	181,9409
Mn (kNm)	2002,1860	1349,4768
0,8 Mn (kNm)	1601,7488	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-529875	-58875
c	-105975000	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 247 DAN 407		
Mu (kNm)	801,441	694,519
φ	0,8	0,8
Mn (kNm)	1001,8013	868,1488
f'c (Mpa)	24,90	24,90
fy (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R ₁	3,3878	3,3878
b d'	295,7091	256,2579
ambil b (mm)	700	700
d (mm)	649,955	605,048
d' (mm)	60	60
z (mm)	75	75
h	724,955	680,048
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,3551	1,3551
d (mm)	925	925
M ₁ (kNm)	811,6306	811,6306
M ₂ (kNm)	190,1706	56,5181
As' (mm ²)	448,6744	133,3447
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	0,91450	0,27179
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As baru (mm ²)	2411,5687	2096,2389
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	4,9153	4,2726
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-67,7168	-67,7168
C ₂ (mm)	103,5596	103,5596
a (mm)	88,0257	88,0257
fs' (Mpa)	252,3742	252,3742
fs' pakai (Mpa)	252,3742	252,3742
Mn (kNm)	1684,4608	1684,4608
0,8 Mn (kNm)	1347,5687	1347,5687
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-451375	-451375
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 248 DAN 408		
Mu (kNm)	996,848	618,146
Φ	0,8	0,8
Mn (kNm)	1246,0600	772,6825
f'c (Mpa)	24,90	24,00
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0269
ρ_{max}	0,0210	0,0202
ρ_{pakai}	0,0105	0,0101
m	18,4266	19,1176
R ₁	3,6938	3,5603
b d'	337,3417	217,0302
ambil b (mm)	700	700
d (mm)	694,202	556,815
d' (mm)	60	60
z (mm)	75	75
h	769,202	631,815
ambil h (mm)	1000	1000
Detail Tulangan		
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4241
d (mm)	925	925
M ₁ (kNm)	884,9332	852,9476
M ₂ (kNm)	361,1268	-80,2651
As' (mm ²)	1070,4812	-237,9284
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,18187	-0,48495
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0040
As baru (mm ²)	3785,7928	2379,2395
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,7163	4,8494
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-81,4371	-82,9070
C ₂ (mm)	86,1122	87,7574
a (mm)	73,1954	74,5938
fs' (Mpa)	181,9409	189,7784
fs' pakai (Mpa)	181,9409	189,7784
Mn (kNm)	1349,4768	1348,2821
0,8 Mn (KNm)	1079,5815	1078,6257
Kontrol	Aman	Aman
a	12593,175	12138
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 292 DAN 418		
Mu (kNm)	1003,294	143,612
Φ	0,8	0,8
Mn (kNm)	1254,1175	179,5150
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	339,5230	48,5995
ambil b (mm)	750	750
d (mm)	672,828	254,557
d' (mm)	60	60
z (mm)	75	75
h	747,828	329,557
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	948,1427	948,1427
M ₂ (kNm)	305,9748	-768,6277
As' (mm ²)	906,9952	-2278,4280
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	1,84865	-4,64393
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	3816,2576	630,8345
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,7784	1,2858
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-78,7502	-78,7502
C ₂ (mm)	83,1136	83,1136
a (mm)	70,6466	70,6466
fs' (Mpa)	166,8581	166,8581
fs' pakai (Mpa)	166,8581	166,8581
Mn (kNm)	1351,7719	1351,7719
0,8 Mn (KNm)	1081,4175	1081,4175
Kontrol	Aman	Aman
a	13492,6875	13492,6875
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1500	1500
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	11,30667471	11,30667471
Jumlah pakai	6	6

FRAME 272 DAN 419		
Mu (kNm)	894,394	359,393
Φ	0,8	0,8
Mn (kNm)	1117,9925	449,2413
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	302,6704	121,6216
ambil b (mm)	700	700
d (mm)	657,561	416,827
d' (mm)	60	60
z (mm)	75	75
h	732,561	491,827
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	233,0593	-435,6919
A_s (mm ²)	690,8532	-1291,5130
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	1,40811	-2,63238
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	3406,1648	1423,7986
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	6,9425	2,9020
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	3925	3925
A_s (mm ²)	2453	2453
C_2 (mm)	-81,4371	-81,4371
C_2 (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
f_s (Mpa)	181,9409	181,9409
f_s pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (kNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 290 DAN 395

Mu (kNm)	1199,433	933,507
Φ	0,8	0,8
Mn (kNm)	1499,2913	1166,8838
Pc (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	405,8981	315,9065
ambil b (mm)	700	700
d (mm)	761,482	671,785
d' (mm)	60	60
z (mm)	75	75
h	836,482	746,785
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	614,3581	281,9506
As' (mm ²)	1821,1296	835,7806
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,71186	1,70350
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	4536,4412	3551,0922
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	9,2462	7,2379
Jml Pakai	10	8
Tul Pakai	10D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4906	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-68,0257	-81,4371
C ₂ (mm)	103,0894	86,1122
a (mm)	87,6259	73,1954
fs' (Mpa)	250,7884	181,9409
fs' pakai (Mpa)	250,7884	181,9409
Mn (kNm)	1676,1378	1349,4768
0,8 Mn (kNm)	1340,9102	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-441562,5	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 291 DAN 396

	Tulangan Tarik	Tulangan Desak
Mu (kNm)	1209,250	875,359
Φ	0,8	0,8
Mn (kNm)	1511,5625	1094,1988
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d	409,2203	296,2288
ambil b (mm)	700	700
d (mm)	764,592	650,526
d' (mm)	60	60
z (mm)	75	75
h	839,592	725,526
ambil h (mm)	1000	1000
Tulangan Desak		
v	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	626,6293	209,2656
As' (mm ²)	1857,5050	620,3219
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,78600	1,26435
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ baru	0,0042	0,0042
As baru (mm ²)	4572,8167	3335,6335
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	9,3204	6,7987
Jml Pakai	10	8
Tul Pakai	10D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4906	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-68,0257	-81,4371
C ₂ (mm)	103,0894	86,1122
a (mm)	87,6259	73,1954
fs' (Mpa)	250,7884	181,9409
fs' pakai (Mpa)	250,7884	181,9409
Mn (kNm)	1676,1378	1349,4768
0,8 Mn (KNm)	1340,9102	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-441562,5	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 299 DAN 382		
Mu (kNm)	978,660	707,350
ϕ	0,8	0,8
Mn (kNm)	1223,3250	884,1875
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d	331,1867	239,3731
ambil b (mm)	700	700
d (mm)	687,840	584,775
d' (mm)	60	60
z (mm)	75	75
h	762,840	659,775
ambil h (mm)	1000	1000
Desain Tulangan Ringgir		
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	338,3918	-0,7457
As' (mm ²)	1003,0883	-2,2104
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,04451	-0,00451
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	3718,3999	2713,1012
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,5789	5,5299
Jml Pakai	9	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4416	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-74,3946	-81,4371
C ₂ (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
fs' (Mpa)	218,0937	181,9409
fs' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 289 DAN 394		
Mu (kNm)	1111,071	841,639
ϕ	0,8	0,8
Mn (kNm)	1388,8388	1052,0488
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4268	18,4268
R_1	3,6938	3,6938
$b \cdot d'$	375,9957	284,8176
ambil b (mm)	700	700
d (mm)	732,896	637,873
d' (mm)	60	60
z (mm)	75	75
h	807,896	712,873
ambil h (mm)	1000	1000
Desain Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	503,9056	167,1156
A_s (mm ²)	1493,7174	495,3774
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,04452	1,00969
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	4209,0291	3210,6891
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,5789	6,5441
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg		
A_s (mm ²)	4416	3925
A_s' (mm ²)	2453	2453
C_2 (mm)	-74,3948	-81,4371
C_2 (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
f_s' (Mpa)	218,0937	181,9409
f_s' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 297 DAN 380		
Mu (kNm)	670,926	140,786
ϕ	0,8	0,8
Mn (kNm)	838,6575	175,9825
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	227,0469	47,6432
ambil b (mm)	700	700
d (mm)	569,520	260,886
d' (mm)	60	60
z (mm)	75	75
h	644,520	335,886
ambil h (mm)	1000	1000
Desain Tulangan		
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	-46,2757	-708,9507
As (mm ²)	-137,1741	-2101,5286
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	-0,27959	-4,28337
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tank		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	2578,1376	613,7830
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	5,2548	1,2510
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As (mm ²)	2453	2453
C_2 (mm)	-81,4371	-81,4371
C_2 (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
f_s' (Mpa)	181,9409	181,9409
f_s' pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (kNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 298 DAN 381		
Mu (kNm)	846,111	507,270
ϕ	0,8	0,8
Mn (kNm)	1057,6388	634,0875
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	286,3310	171,6644
ambil b (mm)	700	700
d (mm)	639,566	495,212
d' (mm)	60	60
z (mm)	75	75
h	714,566	570,212
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	172,7056	-250,8457
As' (mm ²)	511,9478	-743,5769
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	1,04346	-1,51557
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	3227,2594	1971,7347
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	6,5779	4,0188
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-81,4371	-81,4371
C ₂ (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
fs' (Mpa)	181,9409	181,9409
fs' pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (kNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

LAMPIRAN
TABEL PERHITUNGAN
TULANGAN BALOK INDUK TENGAH



FRAME 550 DAN 660		
Mu (kNm)	2170,432	1185,623
φ	0,8	0,8
Mn (kNm)	2713,0400	1482,0288
f'_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d	734,4923	401,2247
ambil b (mm)	700	700
d (mm)	1024,341	757,085
d' (mm)	60	60
z (mm)	75	75
h	1099,341	832,085
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	1828,1068	597,0956
As' (mm ²)	5419,0213	1769,9587
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	11,04514	3,60756
Jml Pakai	11	5
Tul Pakai	11D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	8134,3329	4485,2704
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	16,5795	9,1420
Jml Pakai	17	10
Tul Pakai	17D25	10D25
Kontrol Momen Mg-		
As (mm ²)	8341	4906
As' (mm ²)	5397	2453
C_2 (mm)	-123,6265	-68,0257
C_2 (mm)	124,7953	103,0894
a (mm)	106,0760	87,6259
f_s' (Mpa)	311,5275	250,7884
f_s' pakai (Mpa)	311,5275	250,7884
Mn (kNn.i)	2824,6511	1676,1378
0,8 Mn (KNm)	2259,7209	1340,9102
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-14718,75	-441562,5
c	-194287500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 554 DAN 659		
Mu (kNm)	1654,386	1547,378
Φ	0,8	0,8
Mn (kNm)	2067,9825	1934,2225
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	559,8580	523,6456
ambil b (mm)	700	700
d (mm)	894,314	864,908
d' (mm)	60	60
z (mm)	75	75
h	969,314	939,908
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	1183,0493	1049,2893
A_s (mm ²)	3506,8900	3110,3878
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	7,14780	6,33964
Jml Pakai	8	7
Tul Pakai	8D25	7D25
Tulangan Tarik		
ρ baru	0,0042	0,0042
A_s baru (mm ²)	6222,2016	5825,6994
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	12,6822	11,8740
Jml Pakai	13	12
Tul Pakai	13D25	12D25
Kontrol Momen Mg-		
A_s (mm ²)	6378	5888
A_s' (mm ²)	3925	3434
C_2 (mm)	-100,7972	-90,1748
C_2 (mm)	111,3163	108,8754
a (mm)	94,6188	92,5441
f_s' (Mpa)	276,5971	269,3468
f_s' pakai (Mpa)	276,5971	269,3468
Mn (kNm)	2169,4505	2004,9703
0,8 Mn (KNm)	1735,5604	1603,9763
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-132468,75	-235500
c	-141300000	-123637500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 552 DAN 669		
Mu (kNm)	1921,715	367,985
Φ	0,8	0,8
Mn (kNm)	2402,1438	459,9813
f_c (Mpa)	24,90	24,90
f_y (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R_1	3,3878	3,3878
$b \cdot d'$	709,0585	135,7761
ambil b (mm)	700	700
d (mm)	1006,450	440,415
d' (mm)	60	60
z (mm)	75	75
h	1081,450	515,415
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,3551	1,3551
d (mm)	925	925
M_1 (kNm)	811,6306	811,6306
M_2 (kNm)	1590,5131	-351,6494
As' (mm ²)	3752,5378	-829,6552
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	7,64848	-1,69102
Jml Pakai	8	5
Tul Pakai	8D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As_{baru} (mm ²)	5715,4320	1133,2391
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,6493	2,3098
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5888	3925
As' (mm ²)	3925	2453
C_2 (mm)	-86,9570	-67,7168
C_2 (mm)	129,0334	103,5596
a (mm)	109,6784	88,0257
f_s' (Mpa)	321,0025	252,3742
f_s' pakai (Mpa)	321,0025	252,3742
Mn (kNm)	2503,8029	1684,4608
0,8 Mn (kNm)	2003,0423	1347,5687
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-529875	-451375
c	-141300000	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 553 DAN 658		
Mu (kNm)	1824,349	806,007
ϕ	0,8	0,8
Mn (kNm)	2280,4363	1007,5088
f_c (Mpa)	24,90	24,00
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0269
ρ_{max}	0,0210	0,0202
ρ_{pakai}	0,0105	0,0101
m	18,4266	19,1176
R_1	3,6938	3,5603
$b \cdot d$	617,3749	282,9880
ambil b (mm)	700	700
d (mm)	939,129	635,821
d' (mm)	60	60
z (mm)	75	75
h	1014,129	710,821
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4241
d (mm)	925	925
M_1 (kNm)	884,9332	852,9476
M_2 (kNm)	1395,5031	154,5611
As (mm ²)	4136,6624	458,1625
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	8,43141	0,93383
Jml Pakai	9	5
Tul Pakai	9D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0040
As_{baru} (mm ²)	6851,9741	3075,3303
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	13,9658	6,2682
Jml Pakai	14	8
Tul Pakai	14D25	8D25
Kontrol Momen Mg-		
As (mm ²)	6869	3925
As' (mm ²)	4416	2453
C_2 (mm)	-111,1890	-82,9070
C_2 (mm)	113,5266	87,7574
a (mm)	96,4976	74,5938
f_s' (Mpa)	282,8937	189,7784
f_s' pakai (Mpa)	282,8937	189,7784
Mn (kNm)	2333,9730	1348,2821
0,8 Mn (KNm)	1867,1784	1078,6257
Kontrol	Aman	Aman
a	12593,175	12138
b	-29437,5	-58875
c	-158962500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 558 DAN 667		
Mu (kNm)	1692,111	112,836
φ	0,8	0,8
Mn (kNm)	2115,1388	141,0450
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	572,6244	38,1846
ambil b (mm)	700	700
d (mm)	904,453	233,558
d' (mm)	60	60
z (mm)	75	75
h	979,453	308,558
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1230,2056	-743,8882
As' (mm ²)	3646,6743	-2205,0931
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	7,43271	-4,49446
Jml Pakai	8	5
Tul Pakai	8D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6361,9859	510,2185
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	12,9671	1,0399
Jml Pakai	13	8
Tul Pakai	13D25	8D25
Kontrol Momen Mg-		
As (mm ²)	6378	3925
As' (mm ²)	3925	2453
C ₂ (mm)	-100,7972	-81,4371
C ₂ (mm)	111,3163	86,1122
a (mm)	94,6188	73,1954
fs' (Mpa)	276,5971	181,9409
fs' pakai (Mpa)	276,5971	181,9409
Mn (kNm)	2169,4505	1349,4768
0,8 Mn (KNm)	1735,5604	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-132468,75	-58875
c	-141300000	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 559 DAN 668		
Mu (kNm)	2057,595	172,891
φ	0,8	0,8
Mn (kNm)	2571,9938	216,1138
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	696,3073	58,5078
ambil b (mm)	700	700
d (mm)	997,359	289,106
d' (mm)	60	60
z (mm)	75	75
h	1072,359	364,106
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1687,0606	-668,8194
As' (mm ²)	5000,9206	-1982,5683
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	10,19296	-4,04090
Jml Pakai	10	5
Tul Pakai	10D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	7716,2323	732,7433
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	15,7274	1,4935
Jml Pakai	16	8
Tul Pakai	16D25	8D25
Kontrol Momen Mg-		
As (mm ²)	7850	3925
As' (mm ²)	4906	2453
C ₂ (mm)	-113,8462	-81,4371
C ₂ (mm)	123,1965	86,1122
a (mm)	104,7170	73,1954
fs' (Mpa)	307,7839	181,9409
fs' pakai (Mpa)	307,7839	181,9409
Mn (kNm)	2660,0528	1349,4768
0,8 Mn (kNm)	2128,0422	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-117750	-58875
c	-176625000	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 556 DAN 671		
Mu (kNm)	1915,511	141,518
Φ	0,8	0,8
Mn (kNm)	2394,3888	176,8975
Pc (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	648,2249	47,8909
ambil b (mm)	700	700
d (mm)	962,307	261,564
d' (mm)	60	60
z (mm)	75	75
h	1037,307	336,564
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	1509,4556	-708,0357
As' (mm ²)	4474,4496	-2098,8163
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	9,11990	-4,27784
Jml Pakai	10	5
Tul Pakai	10D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	7189,7612	616,4953
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	14,6543	1,2566
Jml Pakai	15	8
Tul Pakai	15D25	8D25
Kontrol Momen Mg-		
As (mm ²)	7359	3925
As' (mm ²)	4906	2453
C ₂ (mm)	-121,3871	-81,4371
C ₂ (mm)	115,5432	86,1122
a (mm)	98,2117	73,1954
fs' (Mpa)	288,4282	181,9409
fs' pakai (Mpa)	288,4282	181,9409
Mn (kNm)	2498,5367	1349,4768
0,8 Mn (kNm)	1998,8294	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	73593,75	-58875
c	-176625000	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 557 DAN 672		
Mu (kNm)	2150,296	61,494
φ	0,8	0,8
Mn (kNm)	2687,8700	76,8675
f'_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d	727,6781	20,8101
ambil b (mm)	700	700
d (mm)	1019,578	172,420
d' (mm)	60	60
z (mm)	75	75
h	1094,578	247,420
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	1802,9368	-808,0657
A_s (mm ²)	5344,4103	-2395,3333
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	10,89307	-4,88221
Jml Pakai	11	5
Tul Pakai	11D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	8059,7220	319,9784
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	16,4275	0,6522
Jml Pakai	17	8
Tul Pakai	17D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	8341	3925
A_s' (mm ²)	5397	2453
C_2 (mm)	-123,6265	-81,4371
C_2 (mm)	124,7953	86,1122
a (mm)	106,0760	73,1954
f_s' (Mpa)	311,5275	181,9409
f_s' pakai (Mpa)	311,5275	181,9409
Mn (kNm)	2824,6511	1349,4768
0,8 Mn (KNm)	2259,7209	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-14718,75	-58875
c	-194287500	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 611 DAN 674		
Mu (kNm)	1125,446	131,673
ϕ	0,8	0,8
Mn (kNm)	1406,8075	164,5913
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	380,8603	44,5592
ambil b (mm)	700	700
d (mm)	737,622	252,302
d' (mm)	60	60
z (mm)	75	75
h	812,622	327,302
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	521,8743	-720,3419
A_s (mm ²)	1546,9819	-2135,2955
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,15308	-4,35219
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	4262,2935	580,0162
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,6875	1,1822
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg-		
A_s (mm ²)	4416	3925
A_s' (mm ²)	2453	2453
C_2 (mm)	-74,3946	-81,4371
C_2 (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
f_s' (Mpa)	218,0937	181,9409
f_s' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
A_s	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 612 DAN 675		
Mu (kNm)	1535,208	490,541
ϕ	0,8	0,8
Mn (kNm)	1919,0100	613,1763
f'c (Mpa)	24,90	24,90
f'y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	519,5272	166,0032
ambil b (mm)	700	700
d (mm)	861,500	486,978
d' (mm)	60	60
z (mm)	75	75
h	936,500	561,978
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1034,0768	-271,7569
As (mm ²)	3065,2937	-805,5637
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	6,24773	-1,64191
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	5780,6053	1909,7479
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,7821	3,8925
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5888	3925
As' (mm ²)	3434	2453
C ₂ (mm)	-90,1748	-81,4371
C ₂ (mm)	108,8754	86,1122
a (mm)	92,5441	73,1954
f's (Mpa)	269,3468	181,9409
f's pakai (Mpa)	269,3468	181,9409
Mn (kNm)	2004,9703	1349,4768
0,8 Mn (kNm)	1603,9763	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-235500	-58875
c	-123637500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 608 DAN 680		
Mu (kNm)	1542,101	242,867
ϕ	0,8	0,8
Mn (kNm)	1927,6263	303,5838
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d	521,8598	82,1882
ambil b (mm)	700	700
d (mm)	863,432	342,654
d' (mm)	60	60
z (mm)	75	75
h	938,432	417,654
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1042,6931	-581,3494
As (mm ²)	3090,8347	-1723,2827
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	6,29979	-3,51242
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	5806,1463	992,0289
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,8342	2,0220
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5888	3925
As' (mm ²)	3434	2453
C ₂ (mm)	-90,1748	-81,4371
C ₂ (mm)	108,8754	86,1122
a (mm)	92,5441	73,1954
fs' (Mpa)	269,3468	181,9409
fs' pakai (Mpa)	269,3468	181,9409
Mn (kNm)	2004,9703	1349,4768
0,8 Mn (kNm)	1603,9763	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-235500	-58875
c	-123637500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 609 DAN 681		
Mu (kNm)	1265,045	206,098
ϕ	0,8	0,8
Mn (kNm)	1581,3063	257,6225
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	428,1018	69,7453
ambil b (mm)	700	700
d (mm)	782,032	315,652
d' (mm)	60	60
z (mm)	75	75
h	857,032	390,652
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	696,3731	-627,3107
As' (mm ²)	2064,2451	-1859,5247
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,20738	-3,79011
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	4779,5567	855,7869
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	9,7418	1,7443
Jml Pakai	10	8
Tul Pakai	10D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4906	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-68,0257	-81,4371
C ₂ (mm)	103,0894	86,1122
a (mm)	87,6259	73,1954
fs' (Mpa)	250,7884	181,9409
fs' pakai (Mpa)	250,7884	181,9409
Mn (kNm)	1676,1378	1349,4768
0,8 Mn (kNm)	1340,9102	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-441562,5	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 603 DAN 683		
Mu (kNm)	1554,696	123,174
Φ	0,8	0,8
Mn (kNm)	1943,3700	153,9675
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	526,1221	41,6831
ambil b (mm)	700	700
d (mm)	866,950	244,023
d' (mm)	60	60
z (mm)	75	75
h	941,950	319,023
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	1058,4368	-730,9657
As' (mm ²)	3137,5036	-2166,7872
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	6,39491	-4,41638
Jml Pakai	7	5
Tul Pakai	7D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	5852,8152	548,5244
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	11,9293	1,1180
Jml Pakai	12	8
Tul Pakai	12D25	8D25
Kontrol Momen Mg-		
As (mm ²)	5888	3925
As' (mm ²)	3434	2453
C_2 (mm)	-90,1748	-81,4371
C_2 (mm)	108,8754	86,1122
a (mm)	92,5441	73,1954
f_s' (Mpa)	269,3468	181,9409
f_s' pakai (Mpa)	269,3468	181,9409
Mn (kNm)	2004,9703	1349,4768
0,8 Mn (kNm)	1603,9763	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-235500	-58875
c	-123637500	-86312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 604 DAN 684		
Mu (kNm)	1678,545	202,202
φ	0,8	0,8
Mn (kNm)	2098,1813	252,7525
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	568,0336	68,4268
ambil b (mm)	700	700
d (mm)	900,820	312,654
d' (mm)	60	60
z (mm)	75	75
h	975,820	387,654
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	1213,2481	-632,1807
As' (mm ²)	3596,4075	-1873,9608
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	7,33026	-3,81954
Jml Pakai	8	5
Tul Pakai	8D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	6311,7191	841,3508
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	12,8647	1,7149
Jml Pakai	13	8
Tul Pakai	13D25	8D25
Kontrol Momen Mg-		
As (mm ²)	6378	3925
As' (mm ²)	3925	2453
C ₂ (mm)	-100,7972	-81,4371
C ₂ (mm)	111,3163	86,1122
a (mm)	94,6188	73,1954
fs' (Mpa)	276,5971	181,9409
fs' pakai (Mpa)	276,5971	181,9409
Mn (kNm)	2169,4505	1349,4768
0,8 Mn (KNm)	1735,5604	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-132468,75	-58875
c	-141300000	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 580 DAN 650		
Mu (kNm)	985,214	824,134
Φ	0,8	0,8
Mn (kNm)	1231,5175	1030,1675
f'_c (Mpa)	24,90	24,90
f_y (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R_1	3,3878	3,3878
b d'	363,5161	304,0821
ambil b (mm)	700	700
d (mm)	720,631	659,093
d' (mm)	60	60
z (mm)	75	75
h	795,631	734,093
ambil h (mm)	1000	1000
Desain Tulangan (Pakai)		
Tulangan Desak		
V	0,4	0,4
R_2	1,3551	1,3551
d (mm)	925	925
M_1 (kNm)	811,6306	811,6306
M_2 (kNm)	419,8869	218,5369
As' (mm ²)	990,6497	515,5996
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,01916	1,05090
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As baru (mm ²)	2953,5440	2478,4939
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	6,0200	5,0517
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-67,7168	-67,7168
C ₂ (mm)	103,5596	103,5596
a (mm)	88,0257	88,0257
fs' (Mpa)	252,3742	252,3742
fs' pakai (Mpa)	252,3742	252,3742
Mn (kNm)	1684,4608	1684,4608
0,8 Mn (kNm)	1347,5687	1347,5687
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-451375	-451375
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	10,55289639	12,38499646
Jumlah pakai	6	6

FRAME 581 DAN 651		
Mu (kNm)	1332,388	647,609
Φ	0,8	0,8
Mn (kNm)	1665,4850	809,5113
f'c (Mpa)	24,90	24,00
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0269
ρ_{max}	0,0210	0,0202
ρ_{pakai}	0,0105	0,0101
m	18,4266	19,1176
R ₁	3,6938	3,5603
b d'	450,8912	227,3746
ambil b (mm)	700	700
d (mm)	802,577	569,931
d' (mm)	60	60
z (mm)	75	75
h	877,577	644,931
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4241
d (mm)	925	925
M ₁ (kNm)	884,9332	852,9476
M ₂ (kNm)	780,5518	-43,4364
As' (mm ²)	2313,7745	-128,7576
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,71597	-0,26244
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0040
As baru (mm ²)	5029,0861	2488,4102
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,2504	5,0719
Jml Pakai	11	8
Tul Pakai	11D25	8D25
Kontrol Momen Mg		
As (mm ²)	5397	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-62,3021	-82,9070
C ₂ (mm)	112,5600	87,7574
a (mm)	95,6760	74,5938
fs' (Mpa)	280,1706	189,7784
fs' pakai (Mpa)	280,1706	189,7784
Mn (kNm)	1837,8753	1348,2821
0,8 Mn (KNm)	1470,3002	1078,6257
Kontrol	Aman	Aman
a	12593,175	12138
b	-632906,25	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 595 DAN 656		
Mu (kNm)	1160,419	118,995
φ	0,8	0,8
Mn (kNm)	1450,5238	148,7438
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	392,6954	40,2689
ambil b (mm)	750	750
d (mm)	723,598	231,715
d' (mm)	60	60
z (mm)	75	75
h	798,598	306,715
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	948,1427	948,1427
M ₂ (kNm)	502,3811	-799,3989
As' (mm ²)	1489,1984	-2369,6426
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,03531	-4,82984
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	4398,4608	539,6198
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,9650	1,0999
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4416	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-72,1597	-78,7502
C ₂ (mm)	90,7045	83,1136
a (mm)	77,0988	70,6466
fs' (Mpa)	203,1068	166,8581
fs' pakai (Mpa)	203,1068	166,8581
Mn (kNm)	1515,8633	1351,7719
0,8 Mn (kNm)	1212,6907	1081,4175
Kontrol	Aman	Aman
a	13492,6875	13492,6875
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1500	1500
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	11,30667471	11,30667471
Jumlah pakai	6	6

FRAME 584 DAN 657		
Mu (kNm)	1046,066	356,365
φ	0,8	0,8
Mn (kNm)	1307,5825	445,4563
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b_d	353,9974	120,5969
ambil b (mm)	700	700
d (mm)	711,133	415,068
d' (mm)	60	60
z (mm)	75	75
h	786,133	490,068
ambil h (mm)	1000	1000
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	422,6493	-439,4769
As' (mm ²)	1252,8511	-1302,7328
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,55358	-2,65525
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	3968,1628	1412,5788
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,0880	2,8791
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4416	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-74,3946	-81,4371
C ₂ (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
fs' (Mpa)	218,0937	181,9409
fs' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 593 DAN 646		
Mu (kNm)	1347,090	1035,126
ϕ	0,8	0,8
Mn (kNm)	1683,8625	1293,9075
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	455,8665	350,2953
ambil b (mm)	700	700
d (mm)	806,993	707,405
d' (mm)	60	60
z (mm)	75	75
h	881,993	782,405
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	798,9293	408,9743
As' (mm ²)	2368,2506	1212,3146
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,82701	2,47096
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	5083,5622	3927,6262
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,3614	8,0054
Jml Pakai	11	9
Tul Pakai	11D25	9D25
Kontrol Momen Mg-		
As (mm ²)	5397	4416
As' (mm ²)	2453	2453
C ₂ (mm)	-62,3021	-74,3946
C ₂ (mm)	112,5600	94,2640
a (mm)	95,6760	80,1244
fs' (Mpa)	280,1706	218,0937
fs' pakai (Mpa)	280,1706	218,0937
Mn (kNm)	1837,8753	1513,2789
0,8 Mn (kNm)	1470,3002	1210,6231
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-250218,75
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 594 DAN 647		
Mu (kNm)	1367,691	1106,505
φ	0,8	0,8
Mn (kNm)	1709,6138	1383,1313
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	462,8380	374,4505
ambil b (mm)	700	700
d (mm)	813,140	731,389
d' (mm)	60	60
z (mm)	75	75
h	888,140	806,389
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	824,6806	498,1981
As' (mm ²)	2444,5845	1476,7988
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	4,98259	3,01004
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	5159,8961	4192,1104
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	10,5170	8,5444
Jml Pakai	11	9
Tul Pakai	11D25	9D25
Kontrol Momen Mg-		
As (mm ²)	5397	4416
As' (mm ²)	2453	2453
C ₂ (mm)	-62,3021	-74,3946
C ₂ (mm)	112,5600	94,2640
a (mm)	95,6760	80,1244
fs' (Mpa)	280,1706	218,0937
fs' pakai (Mpa)	280,1706	218,0937
Mn (kNm)	1837,8753	1513,2789
0,8 Mn (KNm)	1470,3002	1210,6231
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-632906,25	-250218,75
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 600 DAN 640		
Mu (kNm)	1104,961	847,222
ϕ	0,8	0,8
Mn (kNm)	1381,2013	1059,0275
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	373,9280	286,7070
ambil b (mm)	700	700
d (mm)	730,878	639,985
d' (mm)	60	60
z (mm)	75	75
h	805,878	714,985
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	496,2681	174,0943
As' (mm ²)	1471,0777	516,0644
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,99838	1,05185
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tank		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	4186,3894	3231,3760
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	8,5328	6,5862
Jml Pakai	9	8
Tul Pakai	9D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4416	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-74,3946	-81,4371
C ₂ (mm)	94,2640	86,1122
a (mm)	80,1244	73,1954
fs' (Mpa)	218,0937	181,9409
fs' pakai (Mpa)	218,0937	181,9409
Mn (kNm)	1513,2789	1349,4768
0,8 Mn (kNm)	1210,6231	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-250218,75	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 592 DAN 645		
Mu (kNm)	1235,062	946,377
ϕ	0,8	0,8
Mn (kNm)	1543,8275	1182,9713
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	417,9553	320,2619
ambil b (mm)	700	700
d (mm)	772,709	676,400
d' (mm)	60	60
z (mm)	75	75
h	847,709	751,400
ambil h (mm)	1000	1000
Tulangan Desak		
y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	658,8943	298,0381
As' (mm ²)	1953,1476	883,4684
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	3,98094	1,80070
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	4668,4592	3598,7801
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	9,5153	7,3351
Jml Pakai	10	8
Tul Pakai	10D25	8D25
Kontrol Momen Mg-		
As (mm ²)	4906	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-68,0257	-81,4371
C ₂ (mm)	103,0894	86,1122
a (mm)	87,6259	73,1954
fs' (Mpa)	250,7884	181,9409
fs' pakai (Mpa)	250,7884	181,9409
Mn (kNm)	1676,1378	1349,4768
0,8 Mn (kNm)	1340,9102	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-441562,5	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

FRAME 598 DAN 638		
Mu (kNm)	1032,289	203,025
ϕ	0,8	0,8
Mn (kNm)	1290,3613	253,7813
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	349,3352	68,7053
ambil b (mm)	700	700
d (mm)	706,435	313,290
d' (mm)	60	60
z (mm)	75	75
h	781,435	388,290
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	925	925
M ₁ (kNm)	884,9332	884,9332
M ₂ (kNm)	405,4281	-631,1519
As' (mm ²)	1201,8025	-1870,9113
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,44953	-3,81332
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	3917,1141	844,4003
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,9839	1,7211
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C ₂ (mm)	-81,4371	-81,4371
C ₂ (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
fs' (Mpa)	181,9409	181,9409
fs' pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (kNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	10,55289639	10,55289639
Jumlah pakai	6	6

FRAME 599 DAN 639		
Mu (kNm)	1011,681	710,794
ϕ	0,8	0,8
Mn (kNm)	1264,6013	888,4925
f'_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d$	342,3613	240,5386
ambil b (mm)	700	700
d (mm)	699,348	586,197
d' (mm)	60	60
z (mm)	75	75
h	774,348	661,197
ambil h (mm)	1000	1000
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	925	925
M_1 (kNm)	884,9332	884,9332
M_2 (kNm)	379,6681	3,5593
As (mm ²)	1125,4426	10,5508
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml Tulangan	2,29390	0,02150
Jml Pakai	5	5
Tul Pakai	5D25	5D25
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	3840,7543	2725,8625
Pakai tulangan D	25	25
A (mm ²)	491	491
Jml tulangan	7,8283	5,5559
Jml Pakai	8	8
Tul Pakai	8D25	8D25
Kontrol Momen Mg-		
As (mm ²)	3925	3925
As' (mm ²)	2453	2453
C_2 (mm)	-81,4371	-81,4371
C_2 (mm)	86,1122	86,1122
a (mm)	73,1954	73,1954
f_s' (Mpa)	181,9409	181,9409
f_s' pakai (Mpa)	181,9409	181,9409
Mn (kNm)	1349,4768	1349,4768
0,8 Mn (KNm)	1079,5815	1079,5815
Kontrol	Aman	Aman
a	12593,175	12593,175
b	-58875	-58875
c	-88312500	-88312500
Tulangan Susut		
As	1400	1400
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	12,38499646	12,38499646
Jumlah pakai	6	6

LAMPIRAN
TABEL PERHITUNGAN
TULANGAN BALOK LINTANG



BALOK LINTANG STRUKTUR ATAS

	663,998	394,718
Mu (kNm)	0,8	0,8
Φ	829,9975	493,3973
Mn (kNm)	24,90	24,90
f'c (Mpa)	390	390
fy (mpa)	0,85	0,85
β_1	0,0280	0,0280
ρ_b	0,0210	0,0210
ρ_{max}	0,0105	0,0105
ρ_{pakai}	18,4266	18,4266
m	3,6938	3,6938
R ₁	224,7024	133,5758
b d'	400	400
ambil b (mm)	749,504	577,875
d (mm)	60	60
d' (mm)	75	75
z (mm)	824,504	652,875
h	800	800
ambil h (mm)		

Tulangan Desak

	0,4	0,4
Y	1,4775	1,4775
R ₂	725	725
d (mm)	310,6454	310,6454
M ₁ (kNm)	519,3521	182,7518
M ₂ (kNm)	2002,5142	704,6532
As' (mm ²)	22	22
Pakai tulangan D	380	380
A (mm ²)	5,27061	1,85464
Jml Tulangan	6	4
Jml Pakai	6D22	4D22
Tul Pakai		

Tulangan Tarik

	0,0042	0,0042
p baru	3218,6384	1920,7774
As baru (mm ²)		
	22	22
Pakai tulangan D	380	380
A (mm ²)	8,4714	5,0555
Jml tulangan	9	6
Jml Pakai	9D22	6D22
Tul Pakai		

Kontrol Momen Mg-

As (mm ²)	3419	2280
As' (mm ²)	2280	1520
C ₂ (mm)	-109,1936	-88,7930
C ₂ (mm)	104,4418	85,6252
a (mm)	88,7755	72,7814
fs' (Mpa)	255,3104	179,5628
fs' pakai (Mpa)	255,3104	179,5628
Mn (kNm)	898,5707	605,7719
0,8 Mn (KNm)	718,8566	484,6175
Kontrol	Aman	Aman
a	7196,1	7196,1
b	34194,6	22796,4
c	-82067040	-54711360

Tulangan Susut

As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

BALOK LINTANG STRUKTUR ATAS		
Mu (kNm)	883,727	546,214
ϕ	0,8	0,8
Mn (kNm)	1104,6588	682,7676
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	299,0606	184,8434
ambil b (mm)	400	400
d (mm)	864,668	679,786
d' (mm)	60	60
z (mm)	75	75
h	939,668	754,786
ambil h (mm)	800	800
Tulangan Desak		
y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	794,0133	372,1222
As (mm ²)	3061,5512	1434,8263
Pakai tulangan D	22	22
A (mm ²)	380	380
Jml Tulangan	8,05799	3,77645
Jml Pakai	8	4
Tul Pakai	8D22	4D22
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	4277,6754	2650,9504
Pakai tulangan D	22	22
A (mm ²)	380	380
Jml tulangan	11,2588	6,9773
Jml Pakai	12	7
Tul Pakai	12D22	7D22
Kontrol Momen Mg-		
As (mm ²)	4559	2660
As' (mm ²)	3040	1520
C_2 (mm)	-126,5205	-78,9172
C_2 (mm)	120,1848	96,3405
a (mm)	102,1570	81,8894
fs' (Mpa)	300,4612	226,3254
fs' pakai (Mpa)	300,4612	226,3254
Mn (kNm)	1190,1651	702,9726
0,8 Mn (KNm)	952,1321	562,3781
Kontrol	Aman	Aman
a	7196,1	7196,1
b	45592,8	-125380,2
c	-109422720	-54711360
Tulangan Susut		
As	640	640
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	4,824181208	5,661712668
Jumlah pakai	6	6

BALOK LINTANG STRUKTUR BAWAH		
Mu (kNm)	216,8254387	105,1677257
ϕ	0,8	0,8
Mn (kNm)	271,0318	131,4597
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
$\sigma_{\sigma'}$	73,3755	35,5896
ambil b (mm)	400	400
d (mm)	428,298	298,285
d' (mm)	60	60
z (mm)	75	75
h	503,298	373,285
ambil h (mm)	800	800
Tulangan Desak		
V	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-39,6136	-179,1858
As' (mm ²)	-152,7420	-690,9033
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-0,53899	-2,43804
Jml Pakai	4	4
Tul Pakai	4D22	4D22
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	1063,3821	525,2208
Pakai tulangan D	22	22
A (mm ²)	380	380
Jml tulangan	2,7988	1,3824
Jml Pakai	6	6
Tul Pakai	6D22	6D22
Kontrol Momen Mg-		
As (mm ²)	2280	2280
As' (mm ²)	1134	1134
C ₂ (mm)	-62,1738	-62,1738
C ₂ (mm)	91,2084	91,2084
a (mm)	77,5271	77,5271
fs' (Mpa)	205,2994	205,2994
fs' pakai (Mpa)	205,2994	205,2994
Mn (kNm)	605,1631	605,1631
0,8 Mn (KNm)	484,1304	484,1304
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-208935,6	-208935,6
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6



FRAME 1448 DAN 1457

Mu (kNm)	121,107	93,723
φ	0,8	0,8
Mn (kNm)	151,3838	117,1538
f _c (Mpa)	24,90	24,90
f _y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d	40,9836	31,7166
ambil b (mm)	400	400
d (mm)	320,092	281,588
d' (mm)	60	60
z (mm)	75	75
h	395,092	356,588
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-159,2617	-193,4917
As' (mm ²)	-614,0801	-746,0639
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,16695	-2,63269
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	602,0440	470,0602
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	2,1245	1,6587
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (KNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	4,824181208	5,661712668
Jumlah pakai	6	6

FRAME 1447 DAN 1456		
Mu (kNm)	156,379	43,898
φ	0,8	0,8
Mn (kNm)	195,4738	54,8725
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d$	52,9200	14,8554
ambil b (mm)	400	400
d (mm)	363,731	192,714
d' (mm)	60	60
z (mm)	75	75
h	438,731	267,714
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	-115,1717	-255,7729
As (mm ²)	-444,0782	-986,2076
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-1,56705	-3,48010
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	772,0459	229,9166
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	2,7244	0,8113
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C_2 (mm)	-76,4952	-76,4952
C_2 (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f_s' (Mpa)	114,3823	114,3823
f_s' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1443 DAN 1459		
Mu (kNm)	87,156	9,854
Φ	0,8	0,8
Mn (kNm)	108,9450	12,3175
f'c (Mpa)	24,90	24,90
fy (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R ₁	3,3878	3,3878
b d'	32,1581	3,6358
ambil b (mm)	400	400
d (mm)	283,541	95,339
d' (mm)	60	60
z (mm)	75	75
h	358,541	170,339
ambil h (mm)	800	800
Tulangan Desak		
V	0,4	0,4
R ₂	1,3551	1,3551
d (mm)	725	725
M ₁ (kNm)	284,9134	284,9134
M ₂ (kNm)	-175,9684	-272,5959
As' (mm ²)	-540,0289	-836,5687
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-1,90564	-2,95206
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As baru (mm ²)	339,1052	42,5654
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,1966	0,1502
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-65,4188	-65,4188
C ₂ (mm)	86,6842	86,6842
a (mm)	73,6815	73,6815
fs' (Mpa)	184,6992	184,6992
fs' pakai (Mpa)	184,6992	184,6992
Mn (kNm)	568,4925	568,4925
0,8 Mn (KNm)	454,7940	454,7940
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-153027,9	-153027,9
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	4,824181208	5,661712668
Jumlah pakai	6	6

FRAME 1449 DAN 1458		
Mu (kNm)	87,071	93,723
φ	0,8	0,8
Mn (kNm)	108,8388	117,1538
f'c (Mpa)	24,90	24,00
fy (mpa)	390	390
β_1	0,85	0,85
ρ b	0,0280	0,0269
ρ max	0,0210	0,0202
ρ pakai	0,0105	0,0101
m	18,4266	19,1176
R ₁	3,6938	3,5603
b d	29,4656	32,9060
ambil b (mm)	400	400
d (mm)	271,411	286,819
d' (mm)	60	60
z (mm)	75	75
h	346,411	361,819
ambil h (mm)	800	800
Tulangan Desak		
V	0,4	0,4
R ₂	1,4775	1,4241
d (mm)	725	725
M ₁ (kNm)	310,6454	299,4173
M ₂ (kNm)	-201,8067	-182,2635
As (mm ²)	-778,1249	-702,7705
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,74582	-2,47991
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ baru	0,0042	0,0040
As baru (mm ²)	437,9993	469,3973
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,5456	1,6564
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-77,9390
C ₂ (mm)	74,1324	75,4876
a (mm)	63,0125	64,1644
fs' (Mpa)	114,3823	123,1003
fs' pakai (Mpa)	114,3823	123,1003
Mn (kNm)	456,1758	455,5926
0,8 Mn (KNm)	364,9406	364,4741
Kontrol	Aman	Aman
a	7196,1	6936
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1445 DAN 1461		
Mu (kNm)	104,948	19,652
Φ	0,8	0,8
Mn (kNm)	131,1850	24,5650
f'_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d	35,5153	6,6504
ambil b (mm)	400	400
d (mm)	297,973	128,942
d' (mm)	60	60
z (mm)	75	75
h	372,973	203,942
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	-179,4604	-286,0804
A_s (mm ²)	-691,9623	-1103,0670
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,44177	-3,89247
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	524,1618	113,0571
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,8496	0,3990
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
A_s (mm ²)	1700	1700
A_s' (mm ²)	1134	1134
C_2 (mm)	-76,4952	-76,4952
C_2 (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f_s' (Mpa)	114,3823	114,3823
f_s' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
A_s	640	640
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	4,824181208	4,824181208
Jumlah pakai	6	6



FRAME 1444 DAN 1460		
Mu (kNm)	102,709	8,913
Φ	0,8	0,8
Mn (kNm)	128,3863	11,1413
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d	34,7576	3,0162
ambil b (mm)	400	400
d (mm)	294,778	86,837
d' (mm)	60	60
z (mm)	75	75
h	369,778	161,837
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-182,2592	-299,5042
As' (mm ²)	-702,7537	-1154,8262
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,47986	-4,07511
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	513,3704	61,2979
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,8116	0,2163
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (KNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1442 DAN 1465		
Mu (kNm)	94,176	123,097
Φ	0,8	0,8
Mn (kNm)	117,7200	153,8713
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	31,8699	41,6570
ambil b (mm)	400	400
d (mm)	282,267	322,711
d' (mm)	60	60
z (mm)	75	75
h	357,267	397,711
ambil h (mm)	800	800
Tulangan Desak		
v	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-192,9254	-156,7742
As' (mm ²)	-743,8806	-604,4889
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,62498	-2,13310
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	472,2435	611,6353
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,6664	2,1583
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	4,824181208	4,824181208
Jumlah pakai	6	6

FRAME 1446 DAN 1464		
Mu (kNm)	88,873	54,166
Φ	0,8	0,8
Mn (kNm)	111,0913	67,7075
f _c (Mpa)	24,90	24,90
f _y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	30,0754	18,3302
ambil b (mm)	400	400
d (mm)	274,205	214,069
d' (mm)	60	60
z (mm)	75	75
h	349,205	289,069
ambil h (mm)	800	800
Tulangan Desak		
V	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-199,5542	-242,9379
As' (mm ²)	-769,4397	-936,7185
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,71517	-3,30546
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	446,6844	279,4057
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,5762	0,9860
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1441 DAN 1463		
Mu (kNm)	195,318	177,027
ϕ	0,8	0,8
Mn (kNm)	244,1475	221,2838
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	66,0972	59,9074
ambil b (mm)	400	400
d (mm)	406,501	386,999
d' (mm)	60	60
z (mm)	75	75
h	481,501	461,999
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-66,4979	-89,3617
As' (mm ²)	-256,4023	-344,5602
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-0,90478	-1,21587
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	959,7218	871,5639
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	3,3866	3,0755
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1440 DAN 1482		
Mu (kNm)	188,352	221,049
ϕ	0,8	0,8
Mn (kNm)	235,4400	276,3113
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	63,7399	74,8048
ambil b (mm)	400	400
d (mm)	399,186	432,449
d' (mm)	60	60
z (mm)	75	75
h	474,186	507,449
ambil h (mm)	800	800
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	-75,2054	-34,3342
As^* (mm ²)	-289,9766	-132,3855
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-1,02326	-0,46716
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	926,1475	1083,7386
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	3,2682	3,8243
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As^* (mm ²)	1134	1134
C_2 (mm)	-76,4952	-76,4952
C_2 (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f_s' (Mpa)	114,3823	114,3823
f_s' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1451 DAN 1479		
Mu (kNm)	142,005	34,003
φ	0,8	0,8
Mn (kNm)	177,5063	42,5038
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R _r	3,6938	3,6938
b d'	48,0557	11,5069
ambil b (mm)	400	400
d (mm)	346,611	169,609
d' (mm)	60	60
z (mm)	75	75
h	421,611	244,609
ambil h (mm)	800	800
Tulangan Desak		
γ	0,4	0,4
R _z	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-133,1392	-268,1417
As' (mm ²)	-513,3572	-1033,8989
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-1,81152	-3,64839
Jml Pakai	3	3
Tul Pakai	3D19	3D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	702,7669	182,2252
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	2,4799	0,6430
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	850	850
C ₂ (mm)	-55,4440	-55,4440
C ₂ (mm)	76,7094	76,7094
a (mm)	65,2030	65,2030
fs' (Mpa)	130,6965	130,6965
fs' pakai (Mpa)	130,6965	130,6965
Mn (kNm)	456,0996	456,0996
0,8 Mn (kNm)	364,8797	364,8797
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-153027,9	-153027,9
c	-30605580	-30605580
Tulangan Susut		
As	640	640
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	4,824181208	4,824181208
Jumlah pakai	6	6

FRAME 1450 DAN 1478		
Mu (kNm)	132,859	55,883
Φ	0,8	0,8
Mn (kNm)	166,0738	69,8538
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
$b \cdot d'$	44,9606	18,9113
ambil b (mm)	400	400
d (mm)	335,263	217,435
d' (mm)	60	60
z (mm)	75	75
h	410,263	292,435
ambil h (mm)	800	800
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	-144,5717	-240,7917
As' (mm ²)	-557,4385	-928,4430
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-1,96707	-3,27626
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As_{baru} (mm ²)	658,6856	287,6812
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	2,3243	1,0152
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C_2 (mm)	-76,4952	-76,4952
C_2 (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f_s' (Mpa)	114,3823	114,3823
f_s' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1455 DAN 1475		
Mu (kNm)	345,788	59,727
Φ	0,8	0,8
Mn (kNm)	432,2350	74,6588
f _c (Mpa)	24,90	24,90
f _y (mpa)	490	490
β_1	0,85	0,85
ρ_b	0,0202	0,0202
ρ_{max}	0,0152	0,0152
ρ_{pakai}	0,0076	0,0076
m	23,1514	23,1514
R ₁	3,3878	3,3878
b d'	127,5860	22,0376
ambil b (mm)	400	400
d (mm)	564,770	234,721
d' (mm)	60	60
z (mm)	75	75
h	639,770	309,721
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R ₂	1,3551	1,3551
d (mm)	725	725
M ₁ (kNm)	284,9134	284,9134
M ₂ (kNm)	147,3216	-210,2547
As' (mm ²)	452,1147	-645,2499
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	1,59541	-2,27694
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0030	0,0030
As baru (mm ²)	1331,2488	233,8842
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	4,6977	0,8253
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-65,4188	-65,4188
C ₂ (mm)	86,6842	86,6842
a (mm)	73,6815	73,6815
f _s ' (Mpa)	184,6992	184,6992
f _s ' pakai (Mpa)	184,6992	184,6992
Mn (kNm)	568,4925	568,4925
0,8 Mn (KNm)	454,7940	454,7940
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-153027,9	-153027,9
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	13	12
A1 Tualangan (mm ²)	133	113
Jumlah Tulangan	4,824181208	5,661712668
Jumlah pakai	6	6

FRAME 1436 DAN 1472		
Mu (kNm)	327,807	118,356
φ	0,8	0,8
Mn (kNm)	409,7588	147,9450
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	110,9326	40,0527
ambil b (mm)	400	400
d (mm)	526,623	316,436
d' (mm)	60	60
z (mm)	75	75
h	601,623	391,436
ambil h (mm)	800	800
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	99,1133	-162,7004
As' (mm ²)	382,1605	-627,3392
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	1,34856	-2,21373
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	1598,2846	588,7849
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	5,6400	2,0777
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (KNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1439 DAN 1470		
Mu (kNm)	46,894	65,692
Φ	0,8	0,8
Mn (kNm)	58,6174	82,1150
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	15,8693	22,2307
ambil b (mm)	400	400
d (mm)	199,181	235,747
d' (mm)	60	60
z (mm)	75	75
h	274,181	310,747
ambil h (mm)	800	800
Tulangan Desak		
v	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-252,0281	-228,5304
As' (mm ²)	-971,7681	-881,1661
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-3,42914	-3,10943
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	244,3560	334,9580
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	0,8623	1,1820
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	4,824181208	4,824181208
Jumlah pakai	6	6

FRAME 1438 DAN 1469		
Mu (kNm)	61,230	54,489
φ	0,8	0,8
Mn (kNm)	76,5375	68,1113
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_1	3,6938	3,6938
b d'	20,7207	18,4395
ambil b (mm)	400	400
d (mm)	227,600	214,706
d' (mm)	60	60
z (mm)	75	75
h	302,600	289,706
ambil h (mm)	800	800
Tulangan Desak		
γ	0,4	0,4
R_2	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	-234,1079	-242,5342
A_s (mm ²)	-902,6718	-935,1617
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-3,18532	-3,29997
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	313,4523	280,9624
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,1061	0,9915
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
A_s (mm ²)	1700	1700
A_s' (mm ²)	1134	1134
C_2 (mm)	-76,4952	-76,4952
C_2 (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f_s' (Mpa)	114,3823	114,3823
f_s' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (KNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
A_s	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

Hitungan Tulangan Balok		
FRAME 1434 DAN 1466		
	Tulangan Tumpuan	Tulangan Lapangan
Mu (kNm)	250,876	240,704
ϕ	0,8	0,8
Mn (kNm)	313,5950	300,8800
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
p b	0,0280	0,0280
p max	0,0210	0,0210
p pakai	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	84,8985	81,4562
ambil b (mm)	400	400
d (mm)	460,702	451,266
d' (mm)	60	60
z (mm)	75	75
h	535,702	526,266
ambil h (mm)	800	800
Desain Tulangan Rangkap		
Tulangan Desak		
Y	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	2,9496	-9,7654
As' (mm ²)	11,3729	-37,6535
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	0,04013	-0,13287
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
p baru	0,0042	0,0042
As baru (mm ²)	1227,4970	1178,4706
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	4,3316	4,1585
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
fs' (Mpa)	114,3823	114,3823
fs' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

Hitungan Tulangan Balok		
FRAME 1433 DAN 1471		
	Tulangan Tumpuan	Tulangan Lapangan
Mu (kNm)	96,908	114,077
ϕ	0,8	0,8
Mn (kNm)	121,1350	142,5963
f _c (Mpa)	24,90	24,90
f _y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b _d	32,7945	38,6046
ambil b (mm)	400	400
d (mm)	286,332	310,663
d' (mm)	60	60
z (mm)	75	75
h	361,332	385,663
ambil h (mm)	800	800
Desain Tulangan Rangkap		
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	-189,5104	-168,0492
As (mm ²)	-730,7131	-647,9629
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	-2,57852	-2,28651
Jml Pakai	4	4
Tul Pakai	4D19	4D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	485,4111	568,1612
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	1,7129	2,0049
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	1134	1134
C ₂ (mm)	-76,4952	-76,4952
C ₂ (mm)	74,1324	74,1324
a (mm)	63,0125	63,0125
f _s ' (Mpa)	114,3823	114,3823
f _s ' pakai (Mpa)	114,3823	114,3823
Mn (kNm)	456,1758	456,1758
0,8 Mn (kNm)	364,9406	364,9406
Kontrol	Aman	Aman
a	7196,1	7196,1
b	17003,1	17003,1
c	-40807440	-40807440
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tualangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1435 DAN 1467		
Mu (kNm)	253,710	297,335
ϕ	0,8	0,8
Mn (kNm)	317,1375	371,6688
f'c (Mpa)	24,90	24,90
fy (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R ₁	3,6938	3,6938
b d'	85,8576	100,6206
ambil b (mm)	400	400
d (mm)	463,297	501,549
d' (mm)	60	60
z (mm)	75	75
h	538,297	576,549
ambil h (mm)	800	800
Tulangan Desak		
γ	0,4	0,4
R ₂	1,4775	1,4775
d (mm)	725	725
M ₁ (kNm)	310,6454	310,6454
M ₂ (kNm)	6,4921	61,0233
As' (mm ²)	25,0321	235,2933
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	0,08833	0,83030
Jml Pakai	3	3
3D19	3D19	3D19
Tulangan Tank		
ρ_{baru}	0,0042	0,0042
As baru (mm ²)	1241,1562	1451,4174
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	4,3798	5,1217
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
As (mm ²)	1700	1700
As' (mm ²)	850	850
C ₂ (mm)	-55,4440	-55,4440
C ₂ (mm)	76,7094	76,7094
a (mm)	65,2030	65,2030
fs' (Mpa)	130,6965	130,6965
fs' pakai (Mpa)	130,6965	130,6965
Mn (kNm)	456,0996	456,0996
0,8 Mn (kNm)	364,8797	364,8797
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-153027,9	-153027,9
c	-30605580	-30605580
Tulangan Susut		
As	640	640
Pakai P (mm)	12	12
A1 Tulangan (mm ²)	113	113
Jumlah Tulangan	5,661712668	5,661712668
Jumlah pakai	6	6

FRAME 1432 DAN 1468		
Mu (kNm)	344,907	251,028
ϕ	0,8	0,8
Mn (kNm)	431,1338	313,7850
f_c (Mpa)	24,90	24,90
f_y (mpa)	390	390
β_1	0,85	0,85
ρ_b	0,0280	0,0280
ρ_{max}	0,0210	0,0210
ρ_{pakai}	0,0105	0,0105
m	18,4266	18,4266
R_s	3,6938	3,6938
b d	116,7194	84,9500
ambil b (mm)	400	400
d (mm)	540,184	460,842
d' (mm)	60	60
z (mm)	75	75
h	615,184	535,842
ambil h (mm)	800	800
Tulangan Desak		
v	0,4	0,4
R_z	1,4775	1,4775
d (mm)	725	725
M_1 (kNm)	310,6454	310,6454
M_2 (kNm)	120,4883	3,1396
A_s (mm ²)	464,5780	12,1055
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml Tulangan	1,63939	0,04272
Jml Pakai	3	3
Tul Pakai	3D19	3D19
Tulangan Tarik		
ρ_{baru}	0,0042	0,0042
A_s baru (mm ²)	1680,7022	1228,2296
Pakai tulangan D	19	19
A (mm ²)	283	283
Jml tulangan	5,9308	4,3341
Jml Pakai	6	6
Tul Pakai	6D19	6D19
Kontrol Momen Mg-		
A_s (mm ²)	1700	1700
A_s' (mm ²)	850	850
C_2 (mm)	-55,4440	-55,4440
C_2 (mm)	76,7094	76,7094
a (mm)	65,2030	65,2030
f_s' (Mpa)	130,6965	130,6965
f_s' pakai (Mpa)	130,6965	130,6965
Mn (kNm)	456,0996	456,0996
0,8 Mn (kNm)	364,8797	364,8797
Kontrol	Aman	Aman
a	7196,1	7196,1
b	-153027,9	-153027,9
c	-30605580	-30605580
Tulangan Susut		
A_s	640	640
Pakai D (mm)	13	13
A1 Tualangan (mm ²)	133	133
Jumlah Tulangan	4,824181208	4,824181208
Jumlah pakai	6	6



MOMEN KAPASITAS				
Frame 124 dan 435				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	15		5	
A _l (mm ²)	491		491	
As ada (mm ²)	7359		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		9	
A _l (mm ²)	491		491	
As' ada (mm ²)	4416		4416	
C _c	12593,175	c	12593,175	c
C _s	2649375	$\frac{c - 60}{c}$	2649375	$\frac{c - 75}{c}$
T _s	3587695,313		1195898,438	
c ₁	-81,1123		-195,9440	
C ₂	155,6226		80,5262	
C pakai (mm)	155,6226		80,5262	
a (mm)	132,2792		68,4473	
f _s ' (Mpa)	368,6711		41,1759	
f _s ' pakai (Mpa)	368,6711		41,1759	
momen kapasitas (Mpr) (kNm)	3091,3242		1078,5299	
0,8*Mn (kNm)	2473,0594		862,8239	
a	12593,175		12593,175	
b	-938320		1453477	
c	-158962500		-198703125	

MOMEN KAPASITAS				
Frame 136 dan 434				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		6	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2944	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		11	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		5397	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	3238125	$\frac{c - 75}{c}$
Ts	2630976,563		1435078,125	
c ₁	-49,5335		-227,8249	
C ₂	141,5755		84,6484	
C pakai (mm)	141,5755		84,6484	
a (mm)	120,3392		71,9511	
fs' (Mpa)	345,7187		68,3889	
fs' pakai (Mpa)	345,7187		68,3889	
momen kapasitas (Mpr) (kNm)	2275,4924		1288,4786	
0,8*Mn (kNm)	1820,3939		1030,7829	
a	12593,175		12593,175	
b	-1159102		1803047	
c	-88312500		-242859375	

MOMEN KAPASITAS				
Frame 135 dan 433				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A _t (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
Cc	12593,175	c	12593,175	c
Cs	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2870156,25		1195898,438	
c ₁	-72,0260		-173,0777	
C ₂	136,3093		81,0356	
C pakai (mm)	136,3093		81,0356	
a (mm)	115,8629		68,8803	
fs' (Mpa)	335,8948		44,6886	
fs' pakai (Mpa)	335,8948		44,6886	
momen kapasitas (Mpr) (kNm)	2486,2359		1078,4744	
0,8*Mn (kNm)	1988,9887		862,7795	
a	12593,175		12593,175	
b	-809531		1159102	
c	-123637500		-176625000	

MOMEN KAPASITAS				
Frame 134 dan 451				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
C _c	12593,175	c	12593,175	c
C _s	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2630976,563		1195898,438	
c ₁	-78,9944		-173,0777	
C ₂	124,2850		81,0356	
C pakai (mm)	124,2850		81,0356	
a (mm)	105,6422		68,8803	
fs' (Mpa)	310,3431		44,6886	
fs' pakai (Mpa)	310,3431		44,6886	
momen kapasitas (Mpr) (kNm)	2287,0307		1078,4744	
0,8*Mn (kNm)	1829,6246		862,7795	
a	12593,175		12593,175	
b	-570352		1159102	
c	-123637500		-176625000	

MOMEN KAPASITAS				
Frame 149 dan 450				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	15		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	7359		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	4416		3925	
C _c	12593,175	c	12593,175	c
C _s	2649375	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	3587695,313		1195898,438	
c ₁	-81,1123		-173,0777	
C ₂	155,6226		81,0356	
C pakai (mm)	155,6226		81,0356	
a (mm)	132,2792		68,8803	
f _s ' (Mpa)	368,6711		44,6886	
f _s ' pakai (Mpa)	368,6711		44,6886	
momen kapasitas (Mpr) (kNm)	3091,3242		1078,4744	
0,8*M _n (kNm)	2473,0594		862,7795	
a	12593,175		12593,175	
b	-938320		1159102	
c	-158962500		-176625000	

MOMEN KAPASITAS				
Frame 148 dan 449				
	Mpr		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	6		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2944		3925	
C _c	12593,175	c	12593,175	c
C _s	1766250	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2630976,563		1195898,438	
C ₁	-63,6160		-173,0777	
C ₂	132,2823		81,0356	
C pakai (mm)	132,2823		81,0356	
a (mm)	112,4400		68,8803	
f _s ' (Mpa)	327,8547		44,6886	
f _s ' pakai (Mpa)	327,8547		44,6886	
momen kapasitas (Mpr) (kNm)	2282,0917		1078,4744	
0,8*Mn (kNm)	1825,6734		862,7795	
a	12593,175		12593,175	
b	-864727		1159102	
c	-105975000		-176625000	

MOMEN KAPASITAS				
Frame 147 dan 455				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	15		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	7359		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	4416		3925	
Cc	12593,175	c	12593,175	c
Cs	2649375	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3587695,313		1195898,438	
c ₁	-81,1123		-173,0777	
C ₂	155,6226		81,0356	
C pakai (mm)	155,6226		81,0356	
a (mm)	132,2792		68,8803	
fs' (Mpa)	368,6711		44,6886	
fs' pakai (Mpa)	368,6711		44,6886	
momen kapasitas (Mpr) (kNm)	3091,3242		1078,4744	
0,8*Mn (kNm)	2473,0594		862,7795	
a	12593,175		12593,175	
b	-938320		1159102	
c	-158962500		-176625000	

MOMEN KAPASITAS				
Frame 146 dan 454				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	13		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	6378		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
Cc	12593,175	c	12593,175	c
Cs	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3109335,938		1195898,438	
c ₁	-65,8401		-173,0777	
C ₂	149,1162		81,0356	
C pakai (mm)	149,1162		81,0356	
a (mm)	126,7488		68,8803	
fs' (Mpa)	358,5775		44,6886	
fs' pakai (Mpa)	358,5775		44,6886	
momen kapasitas (Mpr) (kNm)	2683,2390		1078,4744	
0,8*Mn (kNm)	2146,5912		862,7795	
a	12593,175		12593,175	
b	-1048711		1159102	
c	-123637500		-176625000	

MOMEN KAPASITAS				
Frame 319 dan 460				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2630976,563		1195898,438	
c ₁	-49,5335		-173,0777	
C ₂	141,5755		81,0356	
C pakai (mm)	141,5755		81,0356	
a (mm)	120,3392		68,8803	
f _s ' (Mpa)	345,7187		44,6886	
f _s ' pakai (Mpa)	345,7187		44,6886	
momen kapasitas (Mpr) (kNm)	2275,4924		1078,4744	
0,8*M _n (kNm)	1820,3939		862,7795	
a	12593,175		12593,175	
b	-1159102		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 318 dan 459				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,438	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
f _s ' (Mpa)	250,7884		44,6886	
f _s ' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 314 dan 471				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2152617,2		1195898,4	
c ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
fs' (Mpa)	287,0218		44,6886	
fs' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*M _n (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 313 dan 470				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2630976,6		1195898,4	
C ₁	-49,5335		-173,0777	
C ₂	141,5755		81,0356	
C pakai (mm)	141,5755		81,0356	
a (mm)	120,3392		68,8803	
fs' (Mpa)	345,7187		44,6886	
fs' pakai (Mpa)	345,7187		44,6886	
momen kapasitas (Mpr) (kNm)	2275,4924		1078,4744	
0,8*Mn (kNm)	1820,3939		862,7795	
a	12593,175		12593,175	
b	-1159102		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 305 dan 475				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	6		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2944		3925	
Cc	12593,175	c	12593,175	c
Cs	1766250	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2870156,3		1195898,4	
c ₁	-57,8381		-173,0777	
C ₂	145,4971		81,0356	
C pakai (mm)	145,4971		81,0356	
a (mm)	123,6726		68,8803	
fs' (Mpa)	352,5725		44,6886	
fs' pakai (Mpa)	352,5725		44,6886	
momen kapasitas (Mpr) (kNm)	2479,3206		1078,4744	
0,8*Mn (kNm)	1983,4565		862,7795	
a	12593,175		12593,175	
b	-1103906		1159102	
c	-1,06E+08		-176625000	

MOMEN KAPASITAS				
Frame 304 dan 474				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2630976,6		1195898,4	
C ₁	-49,5335		-173,0777	
C ₂	141,5755		81,0356	
C pakai (mm)	141,5755		81,0356	
a (mm)	120,3392		68,8803	
f _s ' (Mpa)	345,7187		44,6886	
f _s ' pakai (Mpa)	345,7187		44,6886	
momen kapasitas (Mpr) (kNm)	2275,4924		1078,4744	
0,8*M _n (kNm)	1820,3939		862,7795	
a	12593,175		12593,175	
b	-1159102		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 248 dan 408				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 247 dan 407				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 272 dan 419				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 292 dan 418				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 291 dan 396				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	10		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4906		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2391796,9		1195898,4	
c ₁	-54,8361		-173,0777	
C ₂	127,8853		81,0356	
C pakai (mm)	127,8853		81,0356	
a (mm)	108,7025		68,8803	
fs' (Mpa)	318,4978		44,6886	
fs' pakai (Mpa)	318,4978		44,6886	
momen kapasitas (Mpr) (kNm)	2078,0015		1078,4744	
0,8*Mn (kNm)	1662,4012		862,7795	
a	12593,175		12593,175	
b	-919922		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 290 dan 395				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	10		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4906		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2391796,9		1195898,4	
c ₁	-54,8361		-173,0777	
C ₂	127,8853		81,0356	
C pakai (mm)	127,8853		81,0356	
a (mm)	108,7025		68,8803	
fs' (Mpa)	318,4978		44,6886	
fs' pakai (Mpa)	318,4978		44,6886	
momen kapasitas (Mpr) (kNm)	2078,0015		1078,4744	
0,8*Mn (kNm)	1662,4012		862,7795	
a	12593,175		12593,175	
b	-919922		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 289 dan 394				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2152617,2		1195898,4	
c ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
fs' (Mpa)	287,0218		44,6886	
fs' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*Mn (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 299 dan 382				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 298 dan 381				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A _t (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{e}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 297 dan 380				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,4	
C ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
f _s ' (Mpa)	250,7884		44,6886	
f _s ' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*M _n (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	



LAMPIRAN
TABEL PERHITUNGAN
MOMEN KAPASITAS
BALOK INDUK TENGAH

MOMEN KAPASITAS				
Frame 550 dan 660				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	17		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	8341		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		10	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	5397		4906	
Cc	12593,175	c	12593,175	c
Cs	3238125	$\frac{c - 60}{c}$	2943750	$\frac{c - 75}{c}$
Ts	4066054,688		1195898,438	
c ₁	-95,6136		-218,8884	
C ₂	161,3579		80,0948	
C pakai (mm)	161,3579		80,0948	
a (mm)	137,1542		68,0806	
fs' (Mpa)	376,8934		38,1657	
fs' pakai (Mpa)	376,8934		38,1657	
momen kapasitas (Mpr) (kNm)	3499,7086		1078,5748	
0,8*Mn (kNm)	2799,7669		862,8599	
a	12593,175		12593,175	
b	-827930		1747852	
c	-194287500		-220781250	

MOMEN KAPASITAS				
Frame 554 dan 659				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	13		7	
A ₁ (mm ²)	491		491	
As ada (mm ²)	6378		3434	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		12	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3925		5888	
C _c	12593,175	c	12593,175	c
C _s	2355000	$\frac{c - 60}{c}$	3532500	$\frac{c - 75}{c}$
T _s	3109335,938		1674257,813	
c ₁	-80,1288		-236,5115	
C ₂	140,0291		88,9520	
C pakai (mm)	140,0291		88,9520	
a (mm)	119,0248		75,6092	
fs' (Mpa)	342,9107		94,1094	
fs' pakai (Mpa)	342,9107		94,1094	
momen kapasitas (Mpr) (kNm)	2690,4354		1498,2099	
0,8*Mn (kNm)	2152,3484		1198,5679	
a	12593,175		12593,175	
b	-754336		1858242	
c	-141300000		-264937500	

MOMEN KAPASITAS				
Frame 553 dan 658				
	Mpr		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	14		5	
A _l (mm ²)	491		491	
As ada (mm ²)	6869		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		8	
A _l (mm ²)	491		491	
As' ada (mm ²)	4416		3925	
Cc	12593,175	c	12593,175	c
Cs	2649375	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3348515,625		1195898,438	
c ₁	-87,9714		-173,0777	
C ₂	143,4888		81,0356	
C pakai (mm)	143,4888		81,0356	
a (mm)	121,9655		68,8803	
fs' (Mpa)	349,1093		44,6886	
fs' pakai (Mpa)	349,1093		44,6886	
momen kapasitas (Mpr) (kNm)	2894,6902		1078,4744	
0,8*Mn (kNm)	2315,7522		862,7795	
a	12593,175		12593,175	
b	-699141		1159102	
c	-158962500		-176625000	

MOMEN KAPASITAS				
Frame 652 dan 669				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A _l (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		8	
A _l (mm ²)	491		491	
As' ada (mm ²)	3925		3925	
Cc	12593,175	c	12593,175	c
Cs	2355000	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2870156,25		1195898,438	
C ₁	-87,4291		-173,0777	
C ₂	128,3367		81,0356	
C pakai (mm)	128,3367		81,0356	
a (mm)	109,0862		68,8803	
fs' (Mpa)	319,4879		44,6886	
fs' pakai (Mpa)	319,4879		44,6886	
momen kapasitas (Mpr) (kNm)	2491,5044		1078,4744	
0,8*Mn (kNm)	1993,2035		862,7795	
a	12593,175		12593,175	
b	-515156		1159102	
c	-141300000		-176625000	

MOMEN KAPASITAS				
Frame 559 dan 668				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	16		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	7850		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	10		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	4906		3925	
Cc	12593,175	c	12593,175	c
Cs	2943750	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3826875		1195898,438	
c ₁	-88,4471		-173,0777	
C ₂	158,5744		81,0356	
C pakai (mm)	158,5744		81,0356	
a (mm)	134,7883		68,8803	
fs' (Mpa)	372,9772		44,6886	
fs' pakai (Mpa)	372,9772		44,6886	
momen kapasitas (Mpr) (kNm)	3295,4811		1078,4744	
0,8*Mn (kNm)	2636,3849		862,7795	
a	12593,175		12593,175	
b	-883125		1159102	
c	-176625000		-176625000	

MOMEN KAPASITAS				
Frame 557 dan 672				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	17		5	
A _t (mm ²)	491		491	
As ada (mm ²)	8341		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	5397		3925	
C _c	12593,175	c	12593,175	c
C _s	3238125	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	4066054,688		1195898,438	
C ₁	-95,6136		-173,0777	
C ₂	161,3579		81,0356	
C pakai (mm)	161,3579		81,0356	
a (mm)	137,1542		68,8803	
f _s ' (Mpa)	376,8934		44,6886	
f _s ' pakai (Mpa)	376,8934		44,6886	
momen kapasitas (Mpr) (kNm)	3499,7086		1078,4744	
0,8*M _n (kNm)	2799,7669		862,7795	
a	12593,175		12593,175	
b	-827930		1159102	
c	-194287500		-176625000	

MOMEN KAPASITAS				
Frame 556 dan 671				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	15		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	7359		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	10		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	4906		3925	
Cc	12593,175	c	12593,175	c
Cs	2943750	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3587695,313		1195898,438	
C ₁	-95,5903		-173,0777	
C ₂	146,7247		81,0356	
C pakai (mm)	146,7247		81,0356	
a (mm)	124,7160		68,8803	
fs' (Mpa)	354,6426		44,6886	
fs' pakai (Mpa)	354,6426		44,6886	
momen kapasitas (Mpr) (kNm)	3098,9995		1078,4744	
0,8*Mn (kNm)	2479,1996		862,7795	
a	12593,175		12593,175	
b	-643945		1159102	
c	-176625000		-176625000	

MOMEN KAPASITAS				
Frame 612 dan 675				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
C _c	12593,175	c	12593,175	c
C _s	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2870156,25		1195898,438	
C ₁	-72,0260		-173,0777	
C ₂	136,3093		81,0356	
C pakai (mm)	136,3093		81,0356	
a (mm)	115,8629		68,8803	
f _s ' (Mpa)	335,8948		44,6886	
f _s ' pakai (Mpa)	335,8948		44,6886	
momen kapasitas (Mpr) (kNm)	2486,2359		1078,4744	
0,8*M _n (kNm)	1988,9887		862,7795	
a	12593,175		12593,175	
b	-809531		1159102	
c	-123637500		-176625000	

MOMEN KAPASITAS				
Frame 611 dan 674				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A _t (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	2152617,188		1195898,438	
C ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
f _s ' (Mpa)	287,0218		44,6886	
f _s ' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*Mn (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 609 dan 681				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	10		5	
A _t (mm ²)	491		491	
As ada (mm ²)	4906		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2391796,9		1195898,4	
c ₁	-54,8361		-173,0777	
C ₂	127,8853		81,0356	
C pakai (mm)	127,8853		81,0356	
a (mm)	108,7025		68,8803	
fs' (Mpa)	318,4978		44,6886	
fs' pakai (Mpa)	318,4978		44,6886	
momen kapasitas (Mpr) (kNm)	2078,0015		1078,4744	
0,8*Mn (kNm)	1662,4012		862,7795	
a	12593,175		12593,175	
b	-919922		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 608 dan 680				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
Cc	12593,175	c	12593,175	c
Cs	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2870156,3		1195898,4	
C ₁	-72,0260		-173,0777	
C ₂	136,3093		81,0356	
C pakai (mm)	136,3093		81,0356	
a (mm)	115,8629		68,8803	
fs' (Mpa)	335,8948		44,6886	
fs' pakai (Mpa)	335,8948		44,6886	
momen kapasitas (Mpr) (kNm)	2486,2359		1078,4744	
0,8*Mn (kNm)	1988,9887		862,7795	
a	12593,175		12593,175	
b	-809531		1159102	
c	-1,24E+08		-176625000	

MOMEN KAPASITAS				
Frame 604 dan 684				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	13		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	6378		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3925		3925	
Cc	12593,175	c	12593,175	c
Cs	2355000	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	3109335,9		1195898,4	
c ₁	-80,1288		-173,0777	
C ₂	140,0291		81,0356	
C pakai (mm)	140,0291		81,0356	
a (mm)	119,0248		68,8803	
fs' (Mpa)	342,9107		44,6886	
fs' pakai (Mpa)	342,9107		44,6886	
momen kapasitas (Mpr) (kNm)	2690,4354		1078,4744	
0,8*Mn (kNm)	2152,3484		862,7795	
a	12593,175		12593,175	
b	-754336		1159102	
c	-1,41E+08		-176625000	

MOMEN KAPASITAS				
Frame 603 dan 683				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	12		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5888		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	7		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	3434		3925	
Cc	12593,175	c	12593,175	c
Cs	2060625	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2870156,3		1195898,4	
c ₁	-72,0260		-173,0777	
C ₂	136,3093		81,0356	
C pakai (mm)	136,3093		81,0356	
a (mm)	115,8629		68,8803	
fs' (Mpa)	335,8948		44,6886	
fs' pakai (Mpa)	335,8948		44,6886	
momen kapasitas (Mpr) (kNm)	2486,2359		1078,4744	
0,8*Mn (kNm)	1988,9887		862,7795	
a	12593,175		12593,175	
b	-809531		1159102	
c	-123637500		-1,77E+08	

MOMEN KAPASITAS			
Frame 581 dan 651			
	Mpr ⁻		Mpr ⁺
f _c (Mpa)	24,9		24,9
f _y (Mpa)	390		390
b (mm)	700		700
h (mm)	1000		1000
d' (mm)	60		60
z (mm)	75		75
d (mm)	925		940
TARIK			
pakai tulangan D (mm)	25		25
jumlah tulangan	11		5
A ₁ (mm ²)	491		491
As ada (mm ²)	5397		2453
DESAK			
pakai tulangan D (mm)	25		25
jumlah tulangan	5		8
A ₁ (mm ²)	491		491
As' ada (mm ²)	2453		3925
Cc	12593,175	c	12593,175
Cs	1471875	$\frac{c - 60}{c}$	2355000
		c	$\frac{c - 75}{c}$
Ts	2630976,6		1195898,4
c ₁	-49,5335		-173,0777
C ₂	141,5755		81,0356
C pakai (mm)	141,5755		81,0356
a (mm)	120,3392		68,8803
fs' (Mpa)	345,7187		44,6886
fs' pakai (Mpa)	345,7187		44,6886
momen kapasitas (Mpr) (kNm)	2275,4924		1078,4744
0,8*Mn (kNm)	1820,3939		862,7795
a	12593,175		12593,175
b	-1159102		1159102
c	-88312500		-1,77E+08

MOMEN KAPASITAS				
Frame 580 dan 650				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
fs' (Mpa)	250,7884		44,6886	
fs' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*Mn (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 584 dan 657				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2152617,2		1195898,4	
c ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
fs' (Mpa)	287,0218		44,6886	
fs' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*Mn (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 595 dan 656				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2152617,2		1195898,4	
c ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
fs' (Mpa)	287,0218		44,6886	
fs' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*Mn (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 594 dan 647				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		9	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		4416	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2649375	$\frac{c - 75}{c}$
Ts	2630976,6		1195898,4	
c ₁	-49,5335		-195,9440	
C ₂	141,5755		80,5262	
C pakai (mm)	141,5755		80,5262	
a (mm)	120,3392		68,4473	
fs' (Mpa)	345,7187		41,1759	
fs' pakai (Mpa)	345,7187		41,1759	
momen kapasitas (Mpr) (kNm)	2275,4924		1078,5299	
0,8*Mn (kNm)	1820,3939		862,8239	
a	12593,175		12593,175	
b	-1159102		1453477	
c	-88312500		-198703125	

MOMEN KAPASITAS				
Frame 593 dan 646				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	11		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	5397		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		9	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		4416	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2649375	$\frac{c - 75}{c}$
T _s	2630976,6		1195898,4	
C ₁	-49,5335		-195,9440	
C ₂	141,5755		80,5262	
C pakai (mm)	141,5755		80,5262	
a (mm)	120,3392		68,4473	
f _s ' (Mpa)	345,7187		41,1759	
f _s ' pakai (Mpa)	345,7187		41,1759	
momen kapasitas (Mpr) (kNm)	2275,4924		1078,5299	
0,8*Mn (kNm)	1820,3939		862,8239	
a	12593,175		12593,175	
b	-1159102		1453477	
c	-88312500		-1,99E+08	

MOMEN KAPASITAS			
Frame 592 dan 645			
	Mpr ⁻		Mpr ⁺
f'c (Mpa)	24,9		24,9
fy (Mpa)	390		390
b (mm)	700		700
h (mm)	1000		1000
d' (mm)	60		60
z (mm)	75		75
d (mm)	925		940
TARIK			
pakai tulangan D (mm)	25		25
jumlah tulangan	10		5
A ₁ (mm ²)	491		491
As ada (mm ²)	4906		2453
DESAK			
pakai tulangan D (mm)	25		25
jumlah tulangan	5		8
A ₁ (mm ²)	491		491
As' ada (mm ²)	2453		3925
Cc	12593,175	c	12593,175 c
Cs	1471875	$\frac{c - 60}{c}$	2355000 $\frac{c - 75}{c}$
Ts	2391796,9		1195898,4
c ₁	-54,8361		-173,0777
C ₂	127,8853		81,0356
C pakai (mm)	127,8853		81,0356
a (mm)	108,7025		68,8803
fs' (Mpa)	318,4978		44,6886
fs' pakai (Mpa)	318,4978		44,6886
momen kapasitas (Mpr) (kNm)	2078,0015		1078,4744
0,8*Mn (kNm)	1662,4012		862,7795
a	12593,175		12593,175
b	-919922		1159102
c	-88312500		-1,77E+08

MOMEN KAPASITAS				
Frame 600 dan 640				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	9		5	
A ₁ (mm ²)	491		491	
As ada (mm ²)	4416		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A ₁ (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
Cc	12593,175	c	12593,175	c
Cs	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
Ts	2152617,2		1195898,4	
c ₁	-60,9675		-173,0777	
C ₂	115,0240		81,0356	
C pakai (mm)	115,0240		81,0356	
a (mm)	97,7704		68,8803	
fs' (Mpa)	287,0218		44,6886	
fs' pakai (Mpa)	287,0218		44,6886	
momen kapasitas (Mpr) (kNm)	1878,1139		1078,4744	
0,8*Mn (kNm)	1502,4911		862,7795	
a	12593,175		12593,175	
b	-680742		1159102	
c	-88312500		-176625000	

MOMEN KAPASITAS				
Frame 599 dan 639				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A _l (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A _l (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,4	
C ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
f _s ' (Mpa)	250,7884		44,6886	
f _s ' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*M _n (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	

MOMEN KAPASITAS				
Frame 598 dan 638				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	700		700	
h (mm)	1000		1000	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	925		940	
TARIK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	8		5	
A _t (mm ²)	491		491	
As ada (mm ²)	3925		2453	
DESAK				
pakai tulangan D (mm)	25		25	
jumlah tulangan	5		8	
A _t (mm ²)	491		491	
As' ada (mm ²)	2453		3925	
C _c	12593,175	c	12593,175	c
C _s	1471875	$\frac{c - 60}{c}$	2355000	$\frac{c - 75}{c}$
T _s	1913437,5		1195898,4	
c ₁	-68,0257		-173,0777	
C ₂	103,0894		81,0356	
C pakai (mm)	103,0894		81,0356	
a (mm)	87,6259		68,8803	
f _s ' (Mpa)	250,7884		44,6886	
f _s ' pakai (Mpa)	250,7884		44,6886	
momen kapasitas (Mpr) (kNm)	1676,1378		1078,4744	
0,8*M _n (kNm)	1340,9102		862,7795	
a	12593,175		12593,175	
b	-441563		1159102	
c	-88312500		-1,77E+08	

LAMPIRAN
TABEL PERHITUNGAN
MOMEN KAPASITAS
BALOK ANAK
BALOK LINTANG

الجامعة الإسلامية
البحرين

MOMEN KAPASITAS				
BALOK ANAK				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	400		400	
h (mm)	800		800	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	725		740	
TARIK				
pakai tulangan D (mm)	19		19	
jumlah tulangan	6		4	
A ₁ (mm ²)	283		283	
As ada (mm ²)	1700		1134	
DESAK				
pakai tulangan D (mm)	19		19	
jumlah tulangan	4		6	
A ₁ (mm ²)	283		283	
As' ada (mm ²)	1134		1700	
Cc	7196,1	c	7196,1	c
Cs	680124	$\frac{c - 60}{c}$	1020186	$\frac{c - 75}{c}$
Ts	828901,125		552600,75	
c ₁	-65,6734		-140,6009	
C ₂	86,3481		75,6233	
C pakai (mm)	86,3481		75,6233	
a (mm)	73,3959		64,2798	
fs' (Mpa)	183,0828		4,9451	
fs' pakai (Mpa)	183,0828		4,9451	
momen kapasitas (Mpr) (kNm)	565,6984		390,9298	
0,8*Mn (kNm)	452,5588		312,7438	
a	7196,1		7196,1	
b	-148777		467585	
c	-40807440		-76513950	

MOMEN KAPASITAS				
BALOK LINTANG STRUKTUR BAWAH				
	Mpr ⁻		Mpr ⁺	
f'c (Mpa)	24,9		24,9	
fy (Mpa)	390		390	
b (mm)	400		400	
h (mm)	800		800	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	725		740	
TARIK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	6		4	
A _t (mm ²)	380		380	
As ada (mm ²)	2280		1520	
DESAK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	4		6	
A _t (mm ²)	380		380	
As' ada (mm ²)	1520		2280	
Cc	7196,1	c	7196,1	c
Cs	911856	$\frac{c - 60}{c}$	1367784	$\frac{c - 75}{c}$
Ts	1111324,5		740883	
c ₁	-74,4298		-170,6521	
C ₂	102,1488		83,5353	
C pakai (mm)	102,1488		83,5353	
a (mm)	86,8265		71,0050	
fs' (Mpa)	247,5730		61,3056	
fs' pakai (Mpa)	247,5730		61,3056	
momen kapasitas (Mpr) (kNm)	751,2233		518,5266	
0,8*Mn (kNm)	600,9786		414,8213	
a	7196,1		7196,1	
b	-199469		626901	
c	-54711360		-102583800	

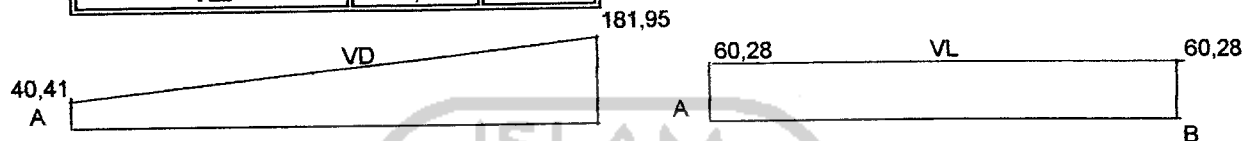
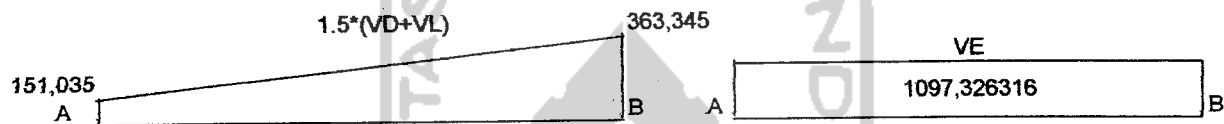
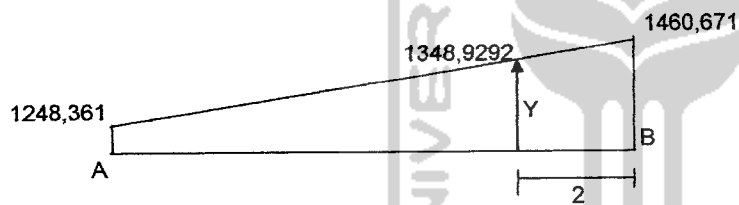
MOMEN KAPASITAS				
BALOK LINTANG STRUKTUR ATAS JENIS 1				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	400		400	
h (mm)	800		800	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	725		740	
TARIK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	9		4	
A _t (mm ²)	380		380	
As ada (mm ²)	3419		1520	
DESAK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	6		6	
A _t (mm ²)	380		380	
As' ada (mm ²)	2280		2280	
Cc	7196,1	c	7196,1	c
Cs	1367784	$\frac{c - 60}{c}$	1367784	$\frac{c - 75}{c}$
Ts	1666986,75		740883	
c ₁	-88,0068		-170,6521	
C ₂	129,5852		83,5353	
C pakai (mm)	129,5852		83,5353	
a (mm)	110,1474		71,0050	
fs' (Mpa)	322,1906		61,3056	
fs' pakai (Mpa)	322,1906		61,3056	
momen kapasitas (Mpr) (kNm)	1113,1400		518,5266	
0,8*Mn (kNm)	890,5120		414,8213	
a	7196,1		7196,1	
b	-299203		626901	
c	-82067040		-102583800	

MOMEN KAPASITAS				
BALOK LINTANG STRUKTUR ATAS JENIS 2				
	Mpr ⁻		Mpr ⁺	
f _c (Mpa)	24,9		24,9	
f _y (Mpa)	390		390	
b (mm)	400		400	
h (mm)	800		800	
d' (mm)	60		60	
z (mm)	75		75	
d (mm)	725		740	
TARIK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	12		4	
A ₁ (mm ²)	380		380	
As ada (mm ²)	4559		1520	
DESAK				
pakai tulangan D (mm)	22		22	
jumlah tulangan	8		7	
A ₁ (mm ²)	380		380	
As' ada (mm ²)	3040		2660	
Cc	7196,1	c	7196,1	c
Cs	1823712	$\frac{c - 60}{c}$	1595748	$\frac{c - 75}{c}$
Ts	2222649		740883	
C ₁	-98,6700		-201,3819	
C ₂	154,1080		82,5863	
C pakai (mm)	154,1080		82,5863	
a (mm)	130,9918		70,1983	
fs' (Mpa)	366,3975		55,1154	
fs' pakai (Mpa)	366,3975		55,1154	
momen kapasitas (Mpr) (kNm)	1471,9668		518,5990	
0,8*Mn (kNm)	1177,5734		414,8792	
a	7196,1		7196,1	
b	-398937		854865	
c	-109422720		-119681100	

LAMPIRAN
PERHITUNGAN TULANGAN GESER
BALOK INDUK TEPI



Perhitungan Sengkang frame 124 dan 435		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG^-	3091,32	KNm
MG^+	1078,52	KNm
VE	1097,3263	KN
VDa	40,41	KN
VDb	181,95	KN
VL _a	60,28	KN
VL _b	60,28	KN

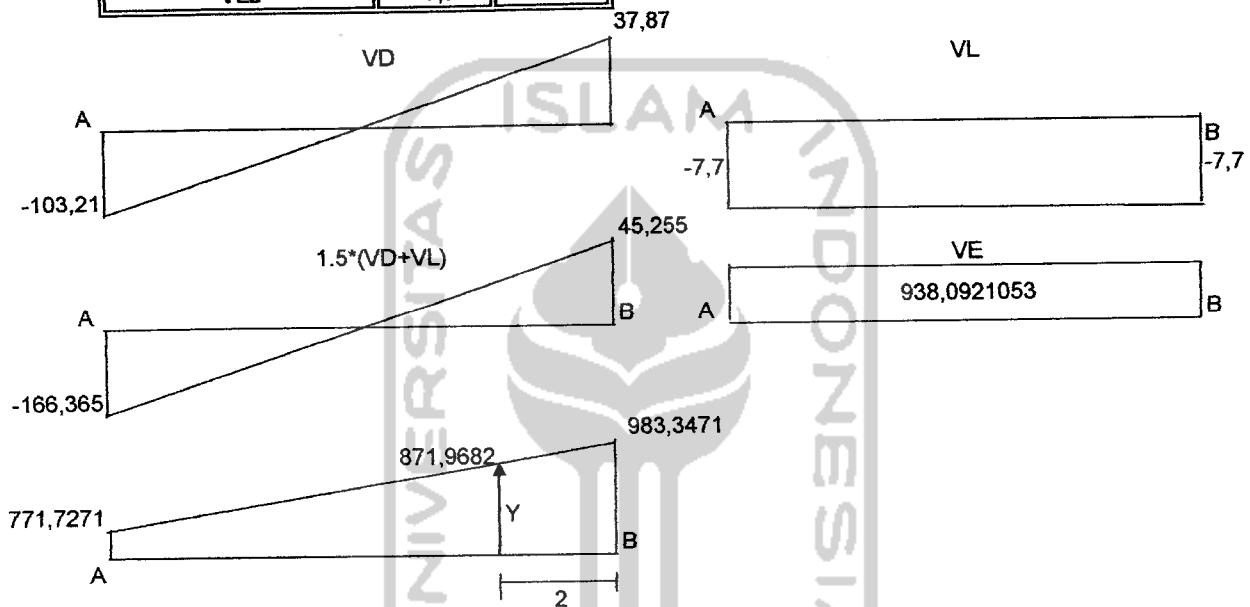


B	700	mm
H	1000	mm
f_c	24,9	MPa
F_y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
Vc	0	KN
V_{s1}	2434,452	KN
Diameter	13	mm
$A_{\phi 1}$	132,665	mm ²
Kaki	4	
S	78,63601	mm
S PAKAI 2D13-75		

Luar Sendi Plastis		
Vc	538,5042	KN
V_{s2}	1709,711	KN
Diameter	13	mm
$A_{\phi 1}$	132,665	mm ²
Kaki	4	
S	111,9696	mm
S PAKAI 2D ₁₃ -100		

Perhitungan Sengkang frame 136 dan 434		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2486,23	KNm
MG ⁺	1078,52	KNm
VE	938,0921	KN
VDa	-103,21	KN
VDb	37,87	KN
VL _a	-7,7	KN
VL _b	-7,7	KN

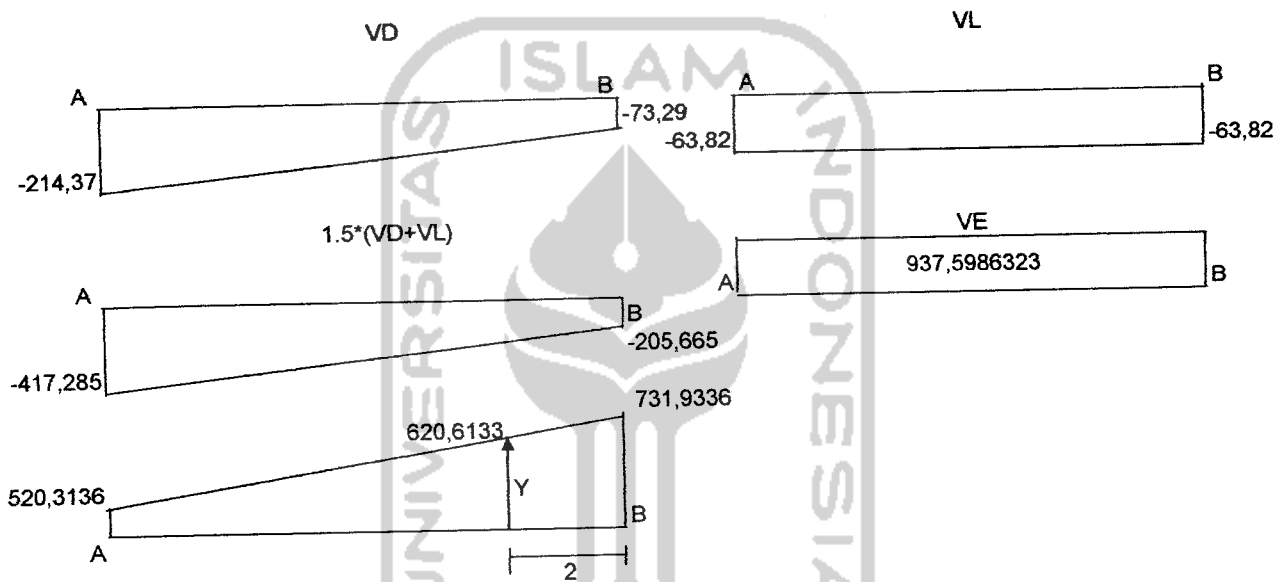


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1638,912	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	116,8065	mm
S PAKAI 2D13-100		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	914,7761	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	209,2704	mm
S PAKAI 2D13-200		

Perhitungan Senggang frame 135 dan 433		
B Kolom	1,2	m
L Balok	5,002	m
L netto	3,802	m
MG ⁻	2486,23	KNm
MG ⁺	1078,52	KNm
VE	937,5986	KN
VDa	-214,37	KN
VDb	-73,29	KN
VL _a	-63,82	KN
VL _b	-63,82	KN

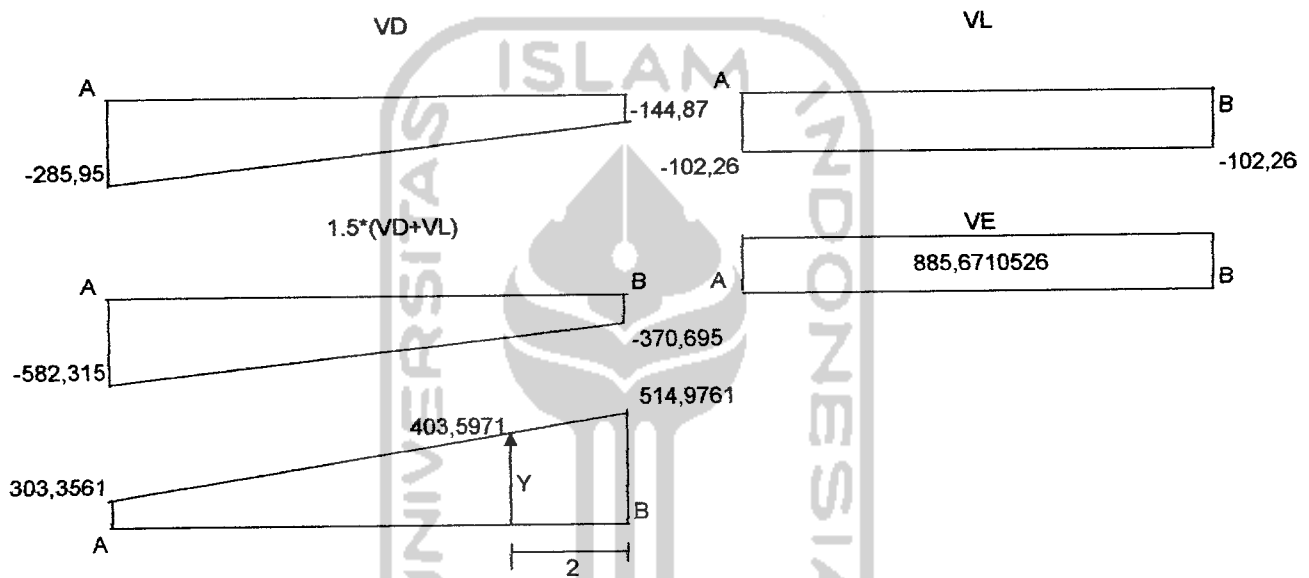


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1219,889	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	156,9287	mm
S PAKAI 2D13-150		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	495,8513	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	386,0746	mm
S PAKAI 2D ₁₃ -200		

Perhitungan Sengkang frame 134 dan 451		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2287,03	KNm
MG ⁺	1078,52	KNm
VE	885,6711	KN
VDa	-285,95	KN
VDb	-144,87	KN
VL _a	-102,26	KN
VL _b	-102,26	KN

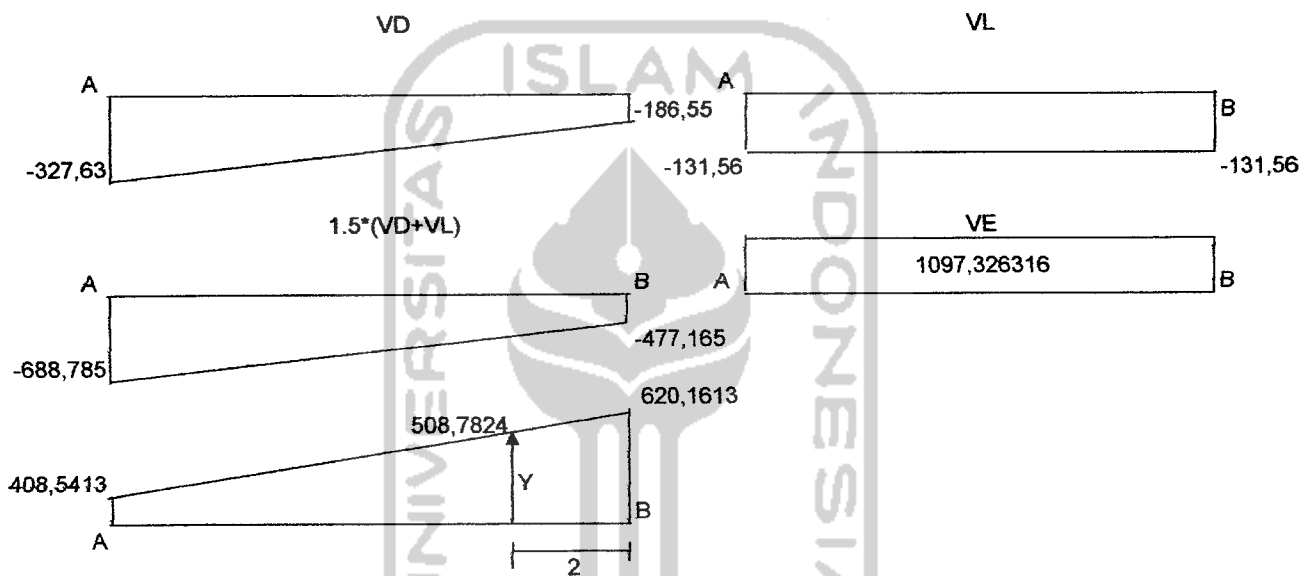


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	858,2934	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	223,0421	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	134,1577	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	713,4724	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 149 dan 450		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	3091,32	KNm
MG ⁺	1078,52	KNm
VE	1097,326	KN
VDa	-327,63	KN
VDb	-186,55	KN
VL _a	-131,56	KN
VL _b	-131,56	KN

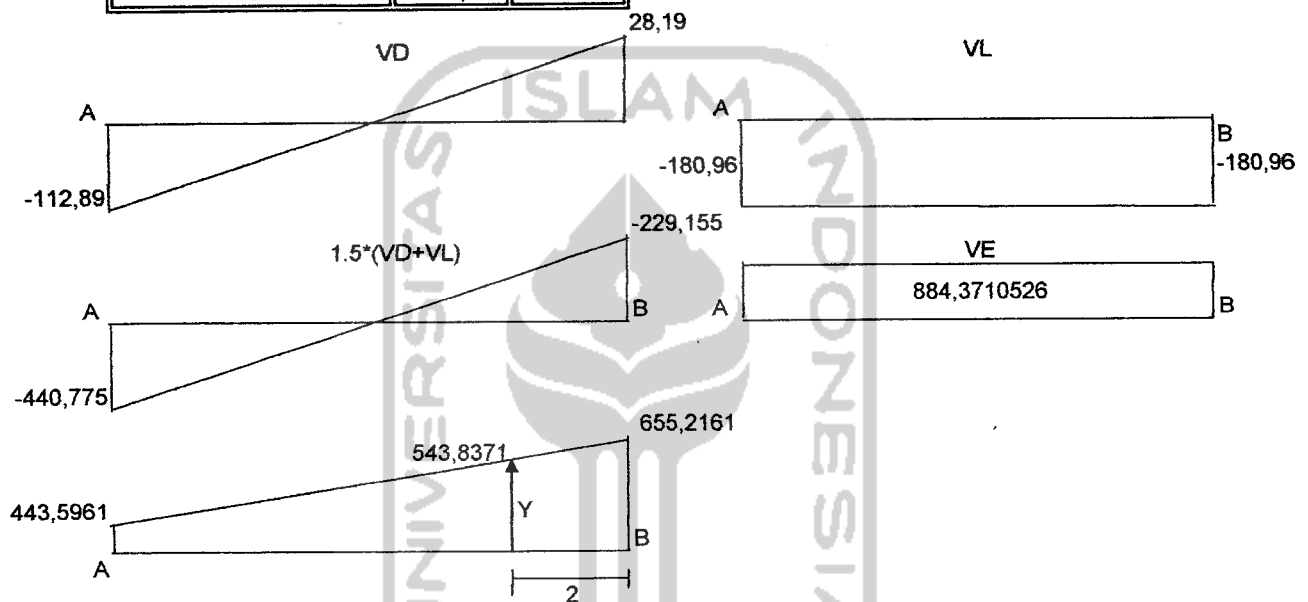


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1033,602	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	185,2121	mm
S PAKAI 2D ₁₃ -180		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	309,4665	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	309,2994	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 148 dan 449		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2282,09	KNm
MG ⁺	1078,52	KNm
VE	884,3711	KN
VDa	-112,89	KN
VDb	28,19	KN
VLa	-180,96	KN
VLb	-180,96	KN

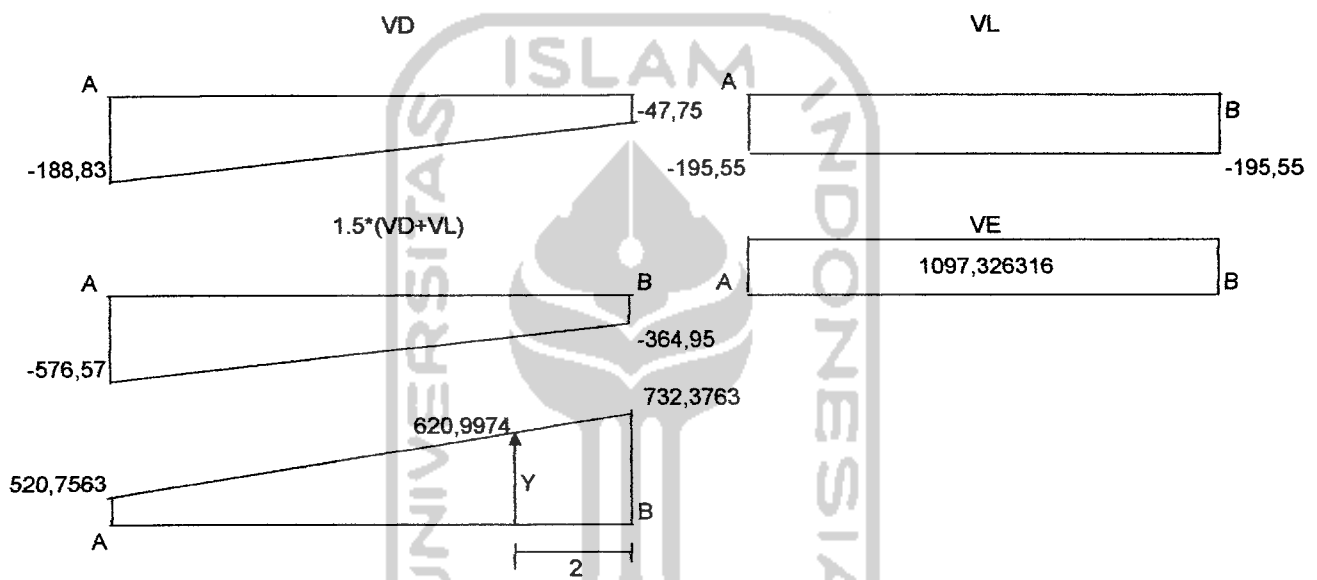


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1092,027	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	175,303	mm
S PAKAI 2D13-170		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	367,891	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	260,1798	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 147 dan 455		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	3091,32	KNm
MG ⁺	1078,52	KNm
VE	1097,326	KN
VDa	-188,83	KN
VDb	-47,75	KN
VL _a	-195,55	KN
VL _b	-195,55	KN

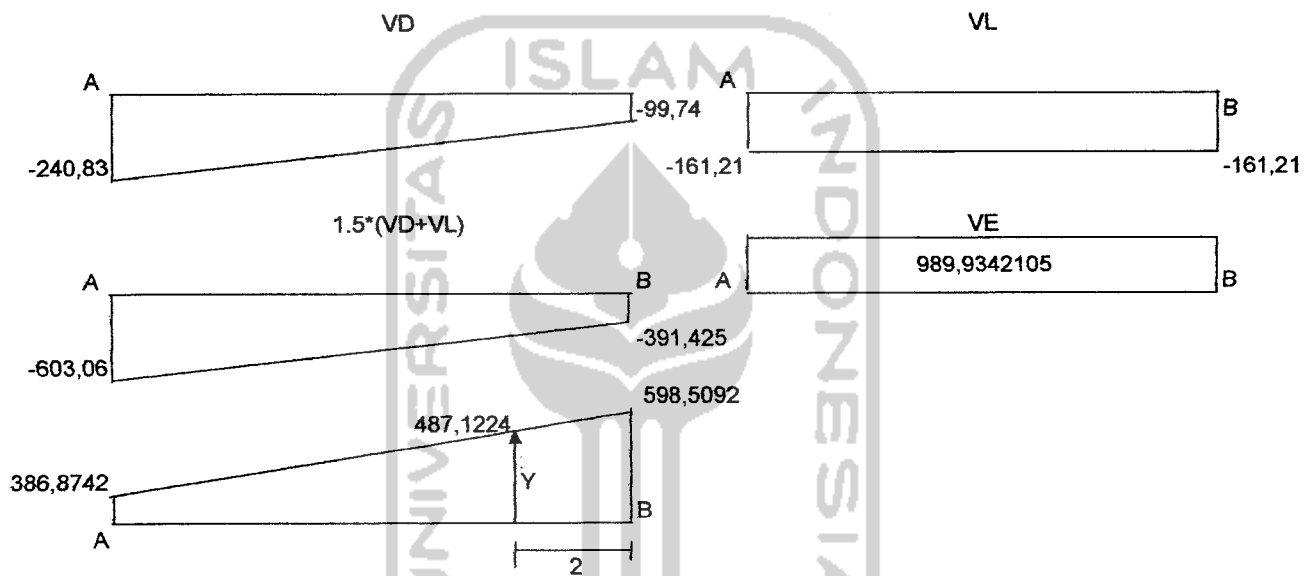


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s₁}	1220,627	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	156,8338	mm
S PAKAI 2D13-150		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s₂}	496,4915	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	192,7884	mm
S PAKAI D ₁₃ -190		

Perhitungan Sengkang frame 146 dan 454		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2683,23	KNm
MG ⁺	1078,52	KNm
VE	989,9342	KN
VDa	-240,83	KN
VDb	-99,74	KN
VL _a	-161,21	KN
VL _b	-161,21	KN

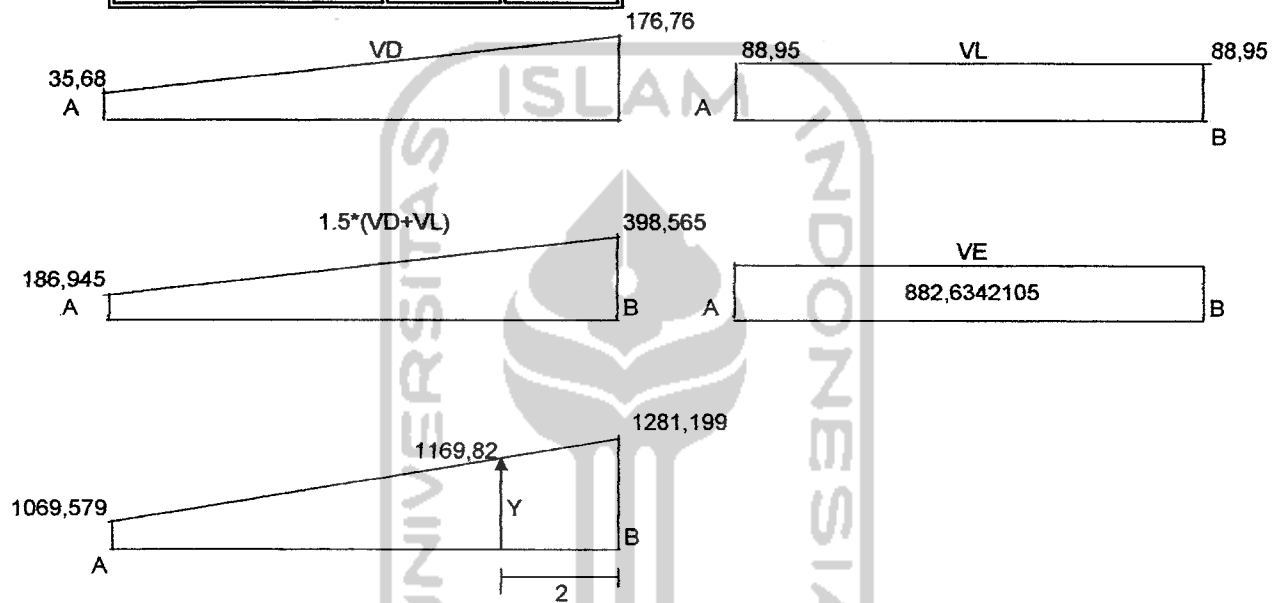


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	997,5154	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	191,9124	mm
S PAKAI 2D ₁₃ -190		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	273,3665	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	2	
S	350,1446	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 319 dan 460		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2275,49	KNm
MG ⁺	1078,52	KNm
VE	882,6342	KN
VDa	35,68	KN
VDb	176,76	KN
VL _a	88,95	KN
VL _b	88,95	KN

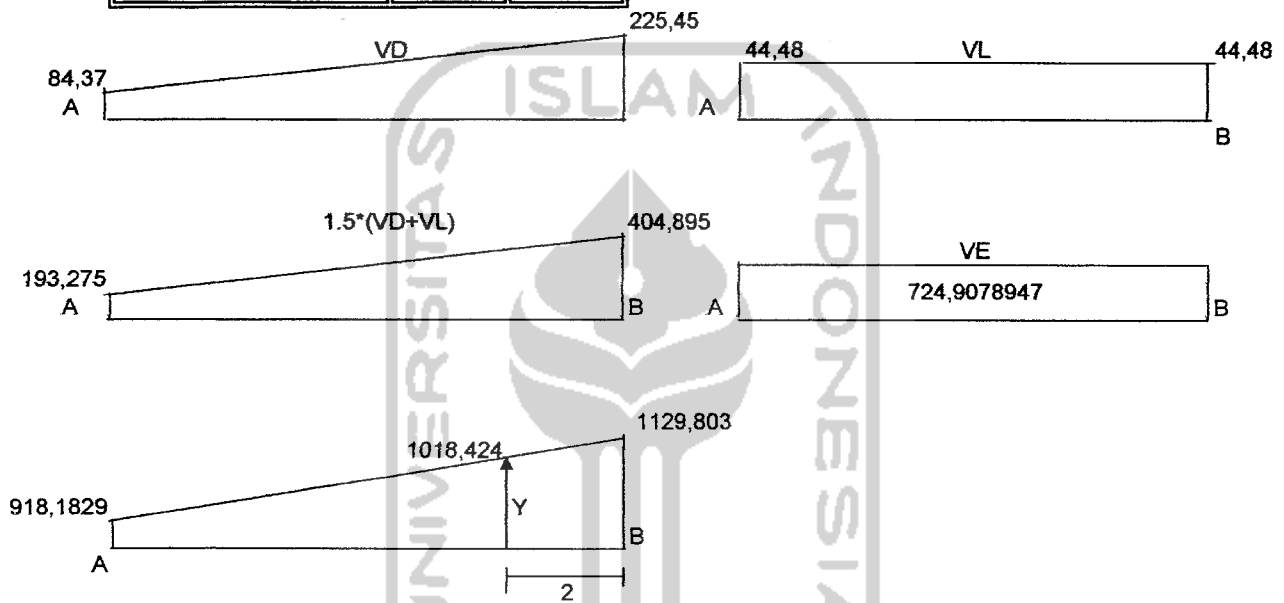


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2135,332	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	89,65144	mm
S PAKAI 2D13-80		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1411,196	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	135,6548	mm
S PAKAI 2D ₁₃₋₁₃₀		

Perhitungan Sengkang frame 318 dan 459		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG	1676,13	KNm
MG*	1078,52	KNm
VE	724,9079	KN
VDa	84,37	KN
VDb	225,45	KN
VLa	44,48	KN
VLb	44,48	KN

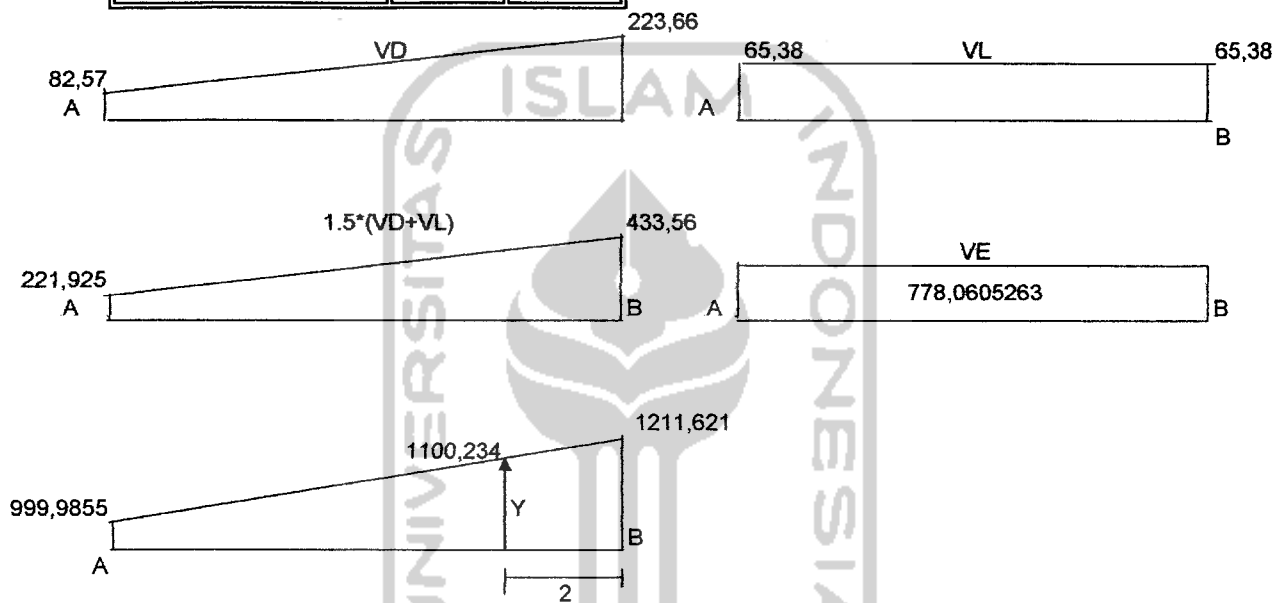


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1883,005	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	101,665	mm
S PAKAI 2D13-100		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1158,869	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	165,1917	mm
S PAKAI 2D ₁₃ -160		

Perhitungan Sengkang frame 314 dan 471		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	778,0605	KN
VDa	82,57	KN
VDb	223,66	KN
VL _a	65,38	KN
VL _b	65,38	KN

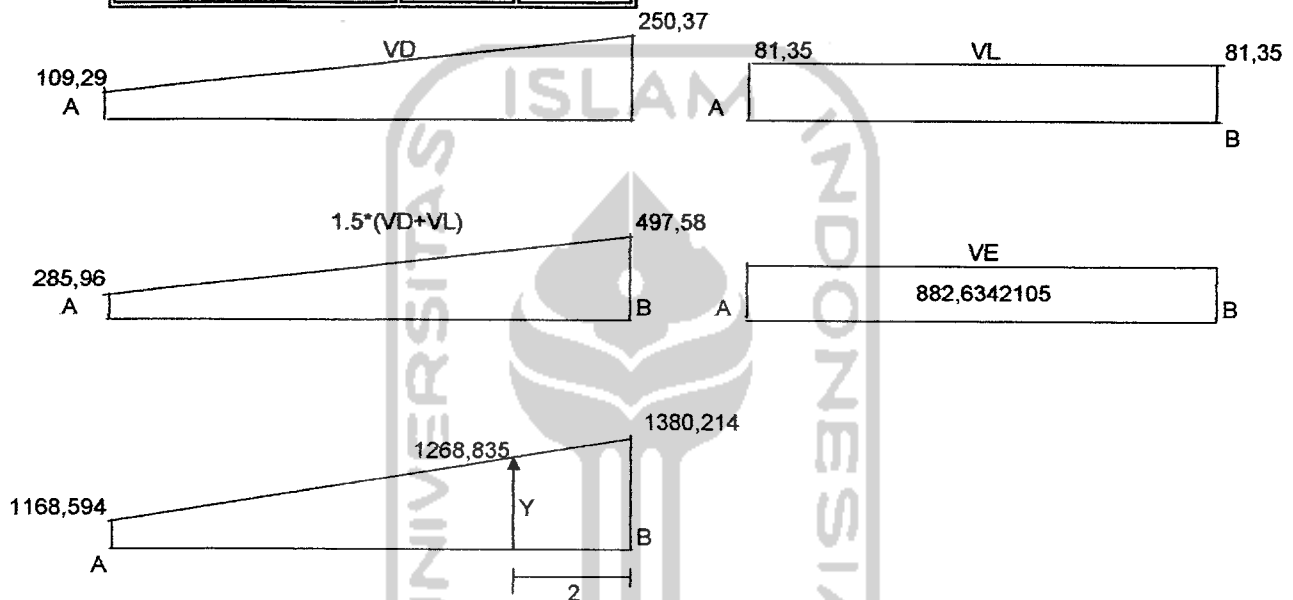


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2019,368	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	94,79978	mm
S PAKAI 2D13-90		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1295,219	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	147,8018	mm
S PAKAI 2D ₁₃ -140		

Perhitungan Sengkang frame 313 dan 470		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2275,49	KNm
MG ⁺	1078,52	KNm
VE	882,6342	KN
VDa	109,29	KN
VDb	250,37	KN
VL _a	81,35	KN
VL _b	81,35	KN

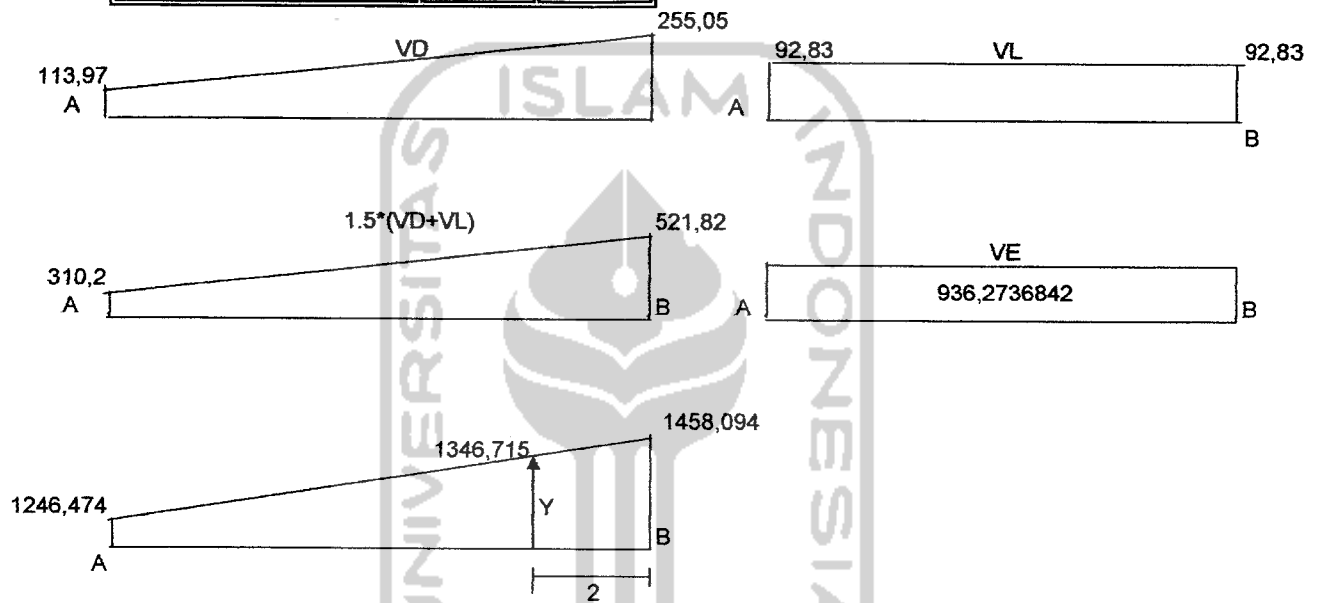


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2300,357	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	83,21995	mm
S PAKAI 2D13-80		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1576,221	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	121,4522	mm
S PAKAI 2D ₁₃ -120		

Perhitungan Senggang frame 305 dan 475		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2479,32	KNm
MG ⁺	1078,52	KNm
VE	936,2737	KN
VDa	113,97	KN
VDb	255,05	KN
VL _a	92,83	KN
VL _b	92,83	KN

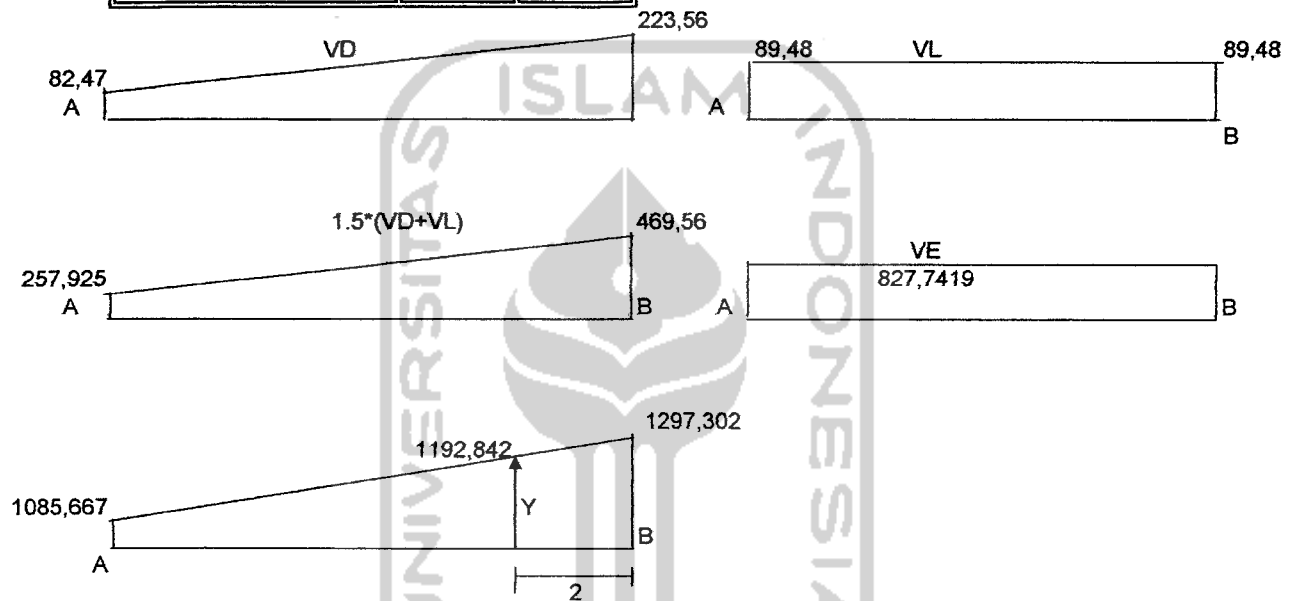


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2430,1561	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	78,775019	mm
S PAKAI 2D13-75		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1706,02	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	112,2118	mm
S PAKAI 2D ₁₃ -100		

Perhitungan Senggang frame 304 dan 474		
B Kolom	1,2	m
L Balok	5	m
L netto	4,052	m
MG	2275,49	KNm
MG ⁺	1078,52	KNm
VE	827,7419	KN
VDa	82,47	KN
VDb	223,56	KN
VL _a	89,48	KN
VL _b	89,48	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

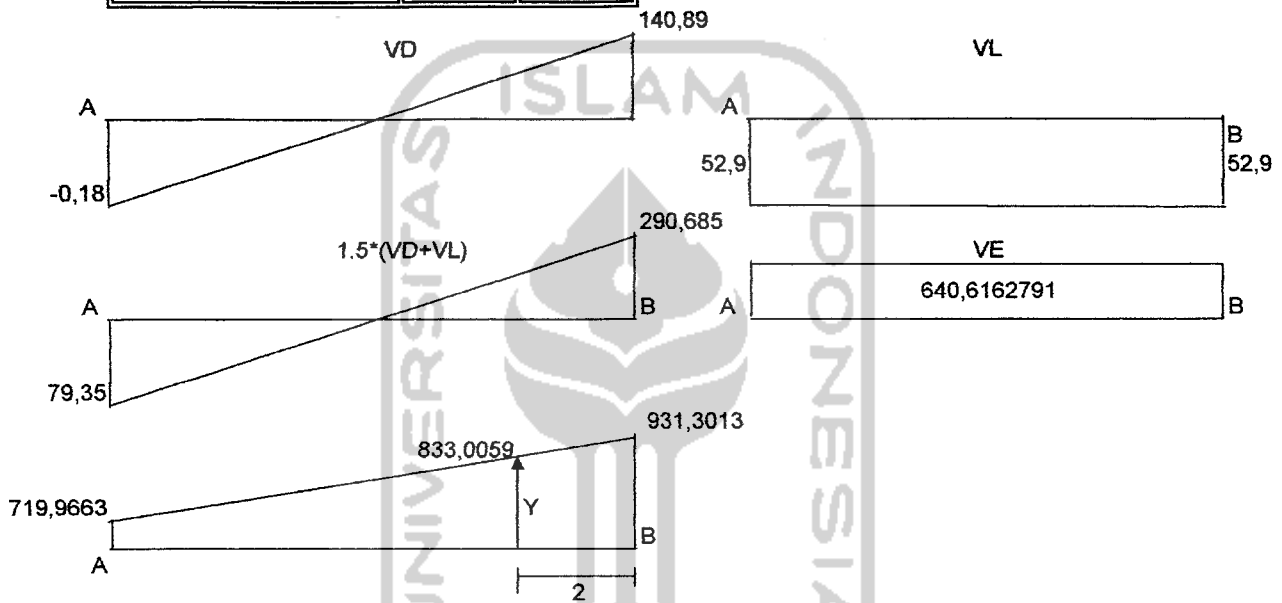
Dalam Sendi Plastis

V _c	0	KN
V _{s1}	2162,17	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	88,53865	mm
S PAKAI 2D13-80		

Luar Sendi Plastis

V _c	538,5042	KN
V _{s2}	1449,566	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	132,064	mm
S PAKAI 2D ₁₃ -130		

Perhitungan Senggang frame 248 dan 408		
B Kolom	0,7	m
L Balok	5	m
L netto	4,3	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	640,6163	KN
VDa	-0,18	KN
VDb	140,89	KN
VL _a	52,9	KN
VL _b	52,9	KN

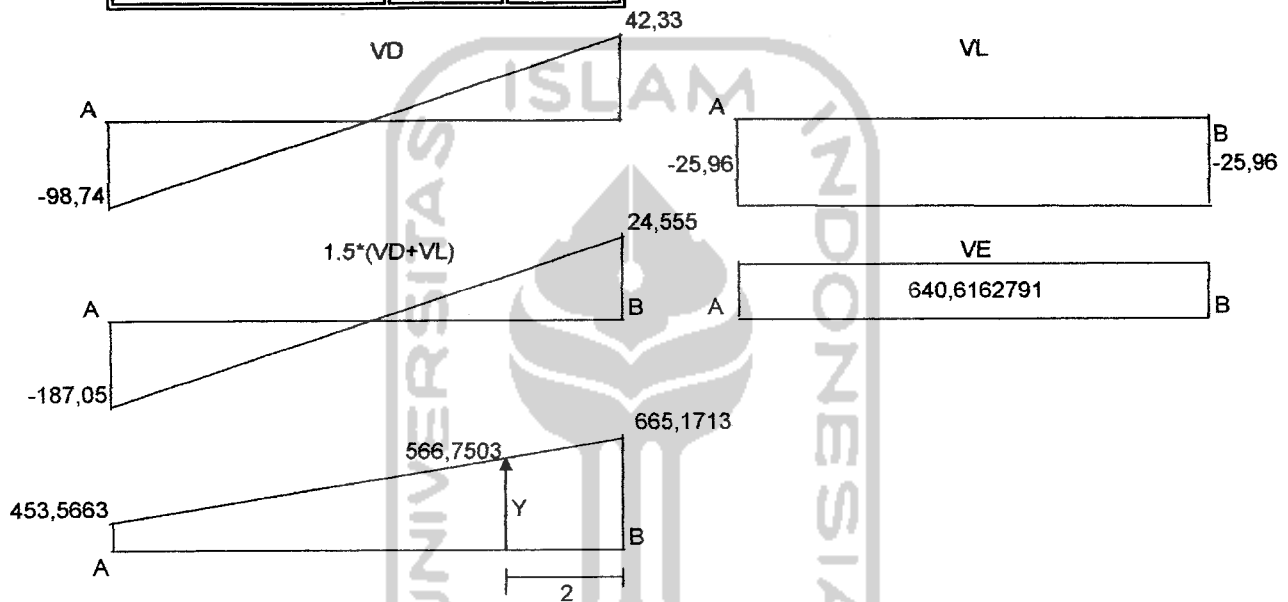


B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1552,169	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	123,3343	mm
S PAKAI 2D13-120		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	849,8391	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	225,261	mm
S PAKAI 2D ₁₃ -200		

Perhitungan Senggang frame 247 dan 407		
B Kolom	0,7	m
L Balok	5	m
L netto	4,3	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	640,6163	KN
VDa	-98,74	KN
VDb	42,33	KN
VL _a	-25,96	KN
VL _b	-25,96	KN

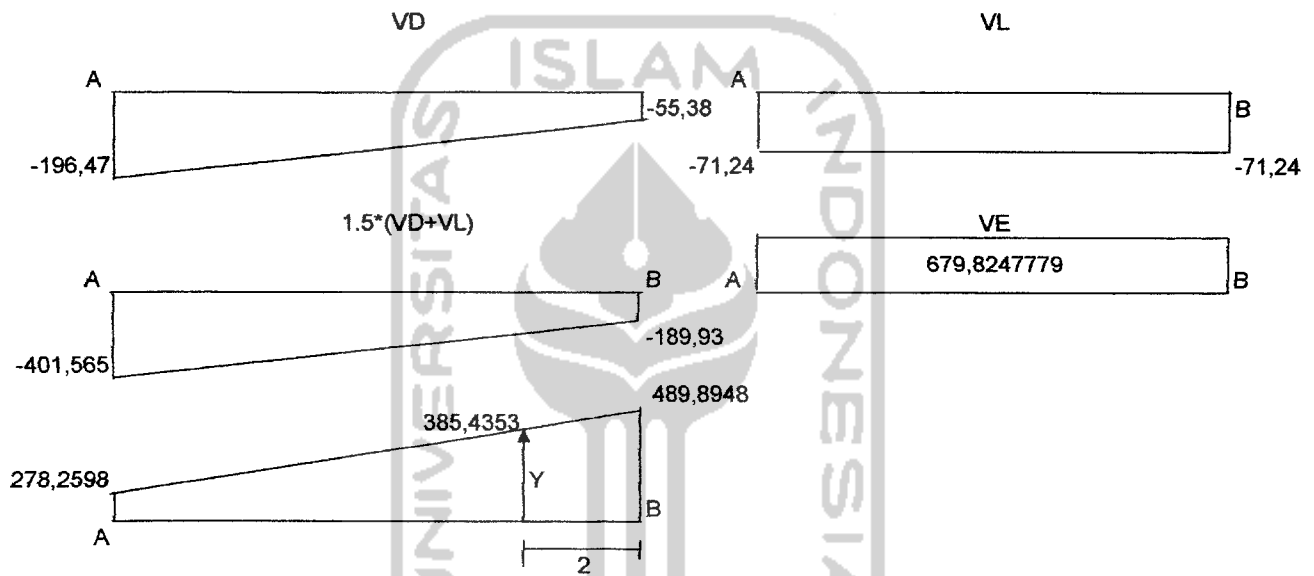


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1108,619	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	172,6794	mm
S PAKAI 2D13-170		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	406,0798	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	235,7118	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 272 dan 419		
B Kolom	1,2	m
L Balok	5	m
L netto	4,052	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	679,8248	KN
VDa	-196,47	KN
VDb	-55,38	KN
VL _a	-71,24	KN
VL _b	-71,24	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	816,4913	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	234,4613	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	103,8879	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	921,3563	mm
S PAKAI D ₁₃ -200		

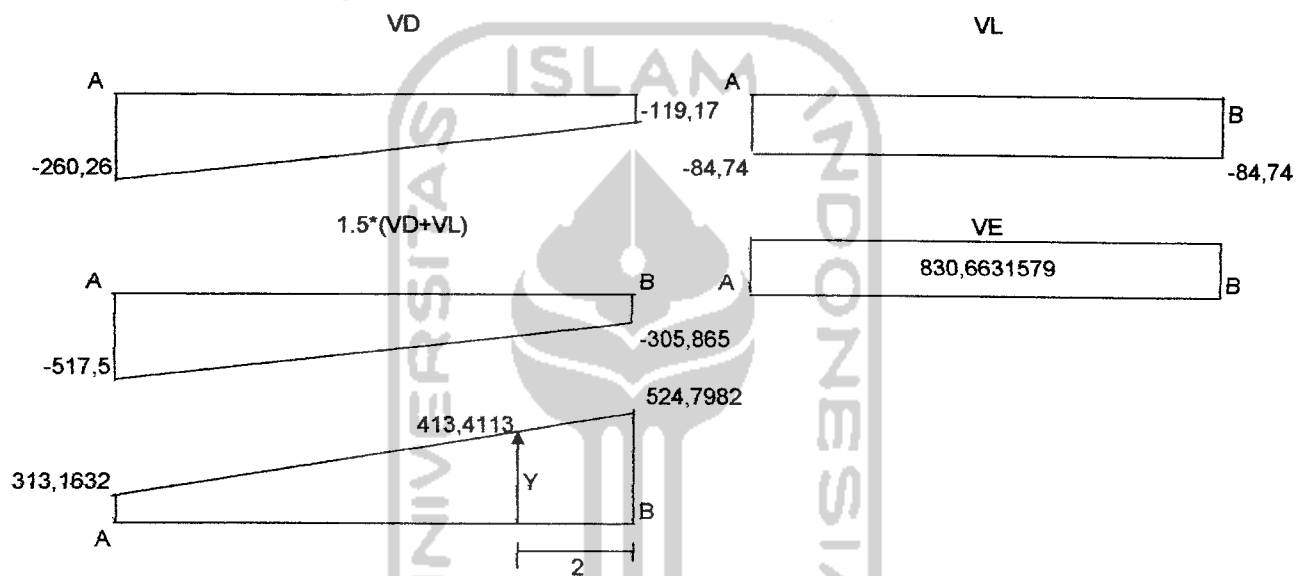
VD

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S PAKAI 2D₁₃-200

S PAKAI D₁₃-200

Perhitungan Sengkang frame 291 dan 396		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2078	KNm
MG ⁺	1078,52	KNm
VE	830,6632	KN
VDa	-260,26	KN
VDb	-119,17	KN
VL _a	-84,74	KN
VL _b	-84,74	KN

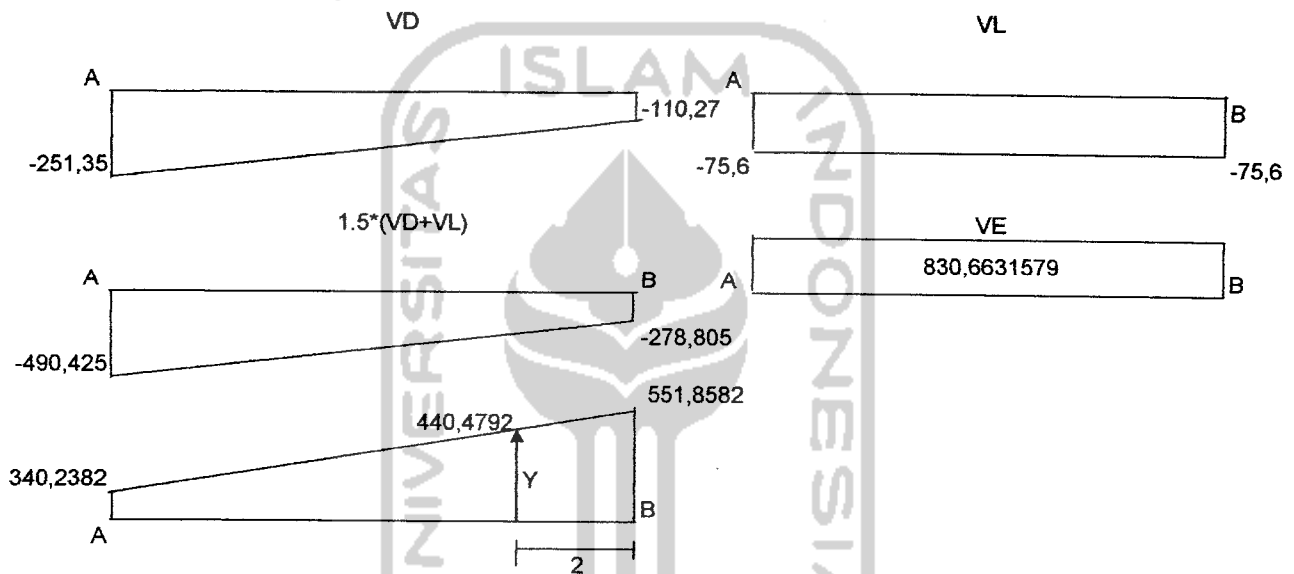


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s₁}	874,6636	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	218,8677	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s₂}	150,5147	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	635,9366	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 290 dan 395		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2078	KNm
MG ⁺	1078,52	KNm
VE	830,6632	KN
VDa	-251,35	KN
VDb	-110,27	KN
VLa	-75,6	KN
VLb	-75,6	KN

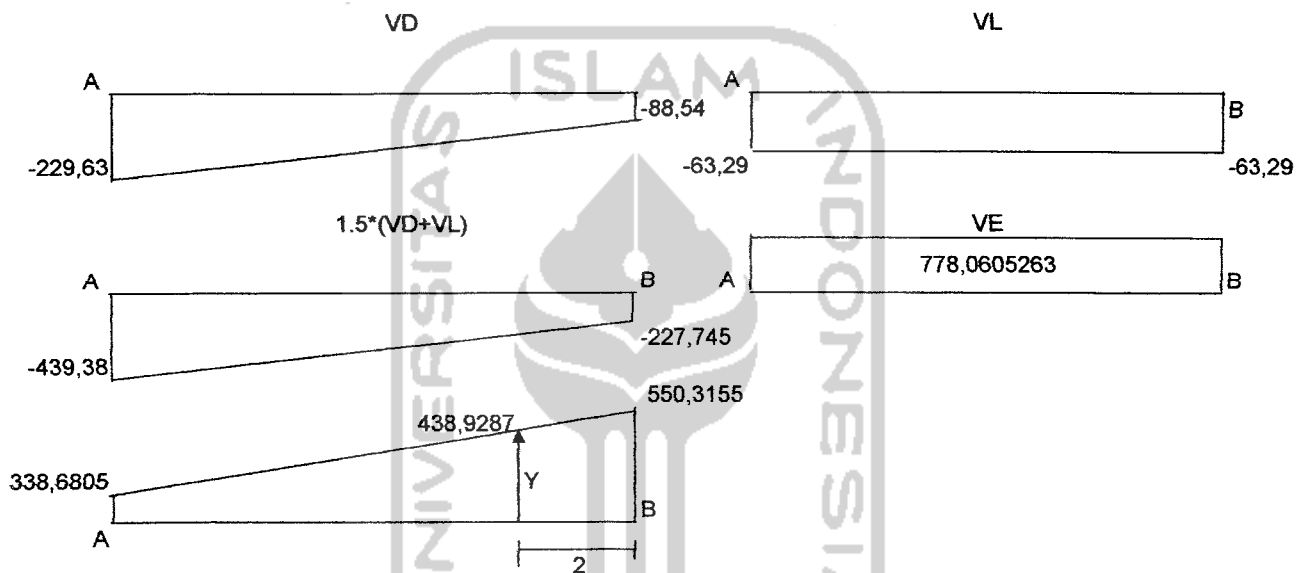


B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	919,7636	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	208,1357	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	195,6279	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	489,2851	mm
S PAKAI D ₁₃ -200		

Perhitungan Senggang frame 289 dan 394		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	778,0605	KN
VDa	-229,63	KN
VDb	-88,54	KN
VL _a	-63,29	KN
VL _b	-63,29	KN

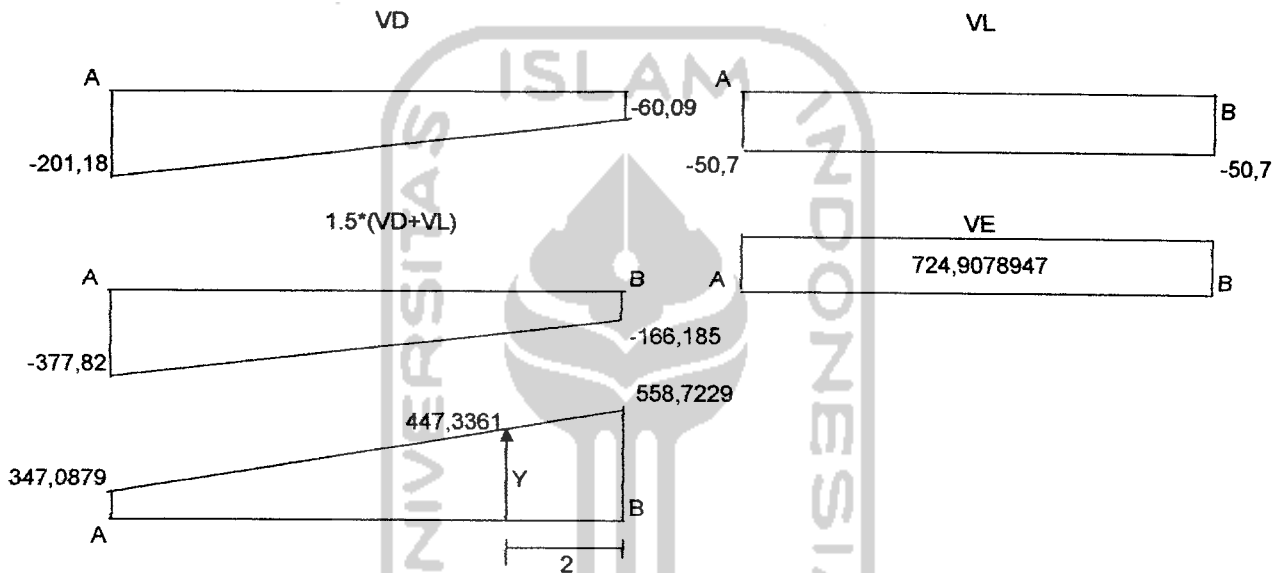


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	917,1925	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	208,7191	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	193,0436	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	495,835	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 299 dan 382		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	724,9079	KN
VDa	-201,18	KN
VDb	-60,09	KN
VLa	-50,7	KN
VLb	-50,7	KN

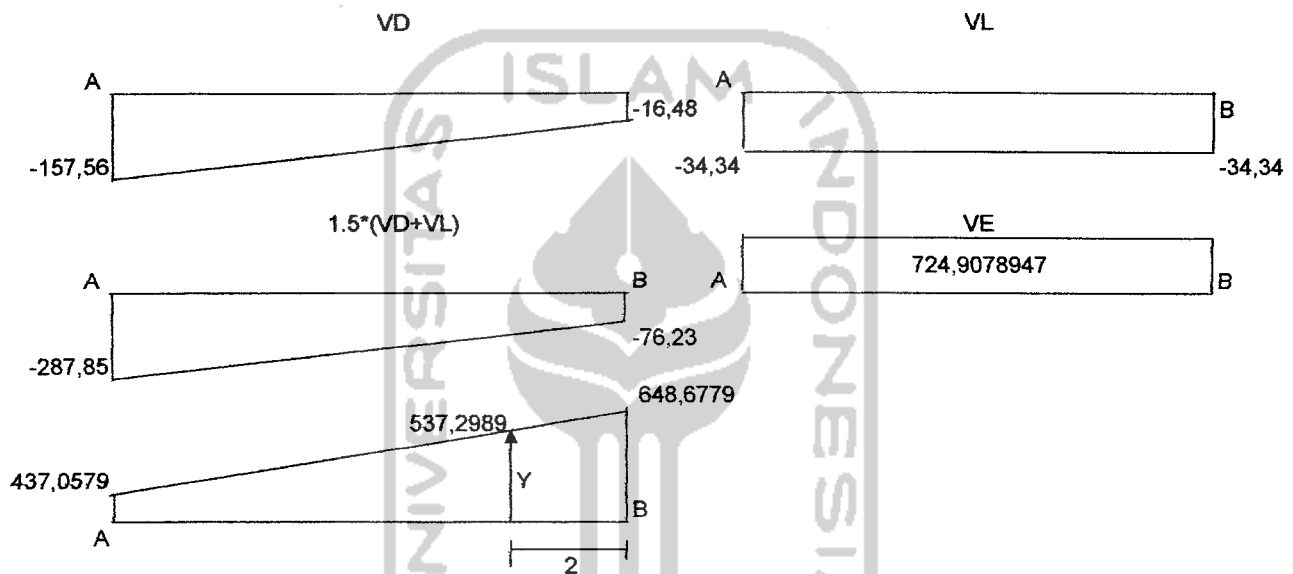


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	931,2048	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	205,5784	mm
S PAKAI 2D ₁₃ -200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	207,0559	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	462,2799	mm
S PAKAI D ₁₃ -200		

Perhitungan Senggang frame 298 dan 381		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	724,9079	KN
VDa	-157,56	KN
VDb	-16,48	KN
VL _a	-34,34	KN
VL _b	-34,34	KN

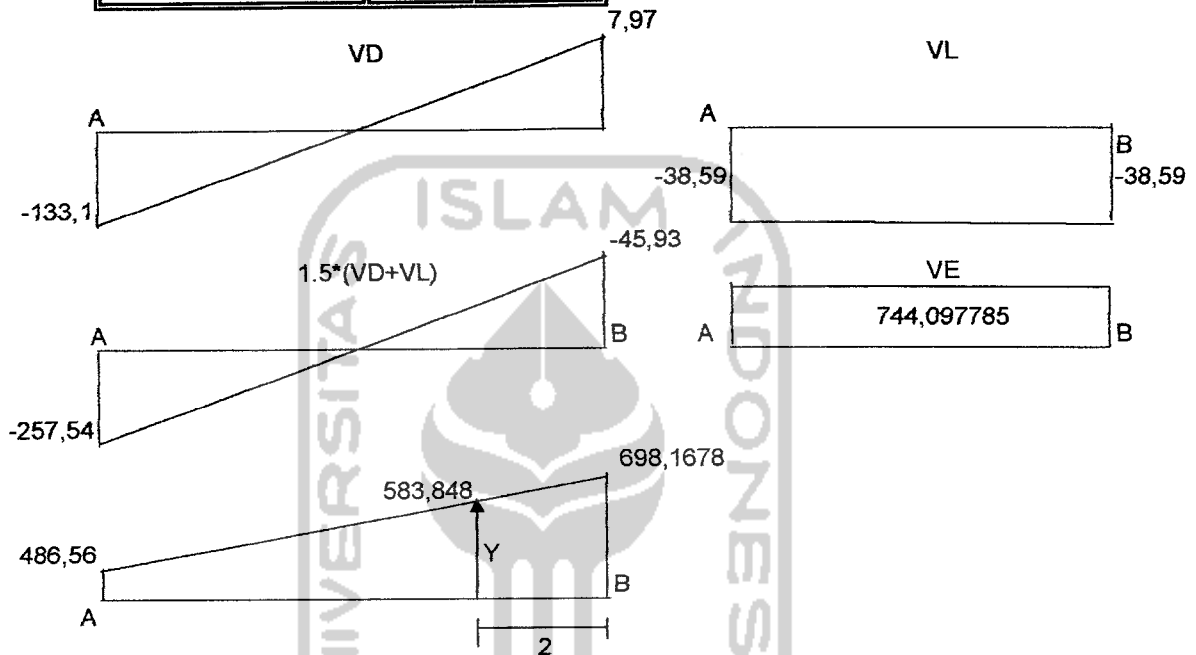


B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1081,13	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	177,0699	mm
S PAKAI 2D ₁₃ -170		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	356,9941	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	2	
S	268,1215	mm
S PAKAI D ₁₃ -200		

Perhitungan Senggang frame 297 dan 380		
B Kolom	1,2	m
L Balok	5	m
L netto	3,702	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	744,098	KN
VDa	-133,1	KN
VDb	7,97	KN
VL _a	-38,59	KN
VL _b	-38,59	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

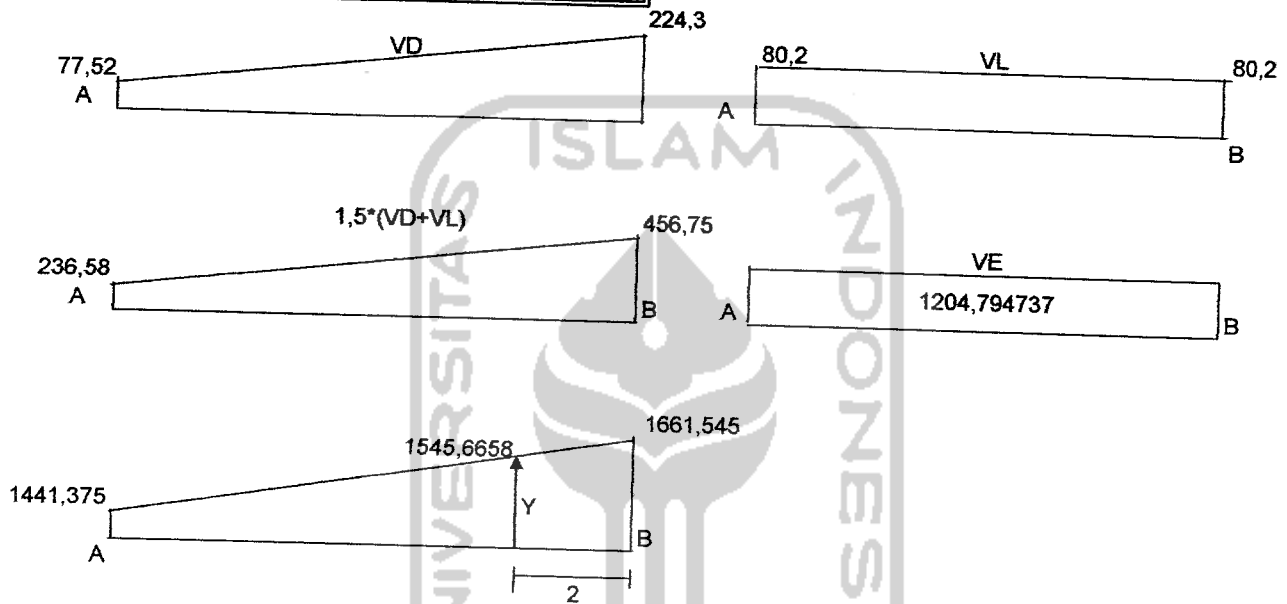
Dalam Sendi Plastis		
V _c	0	KN
V _{s₁}	1163,61	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	164,518	mm
S PAKAI 2D13-160		

Luar Sendi Plastis		
V _c	538,504	KN
V _{s₂}	434,577	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	220,255	mm
S PAKAI D ₁₃₋₂₀₀		

LAMPIRAN
PERHITUNGAN TULANGAN GESER
BALOK INDUK TENGAH



Perhitungan Senggang frame 550 dan 660		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	3499,7	KNm
MG ⁺	1078,52	KNm
VE	1204,7947	KN
VDa	77,52	KN
VDb	224,3	KN
VL _a	80,2	KN
VL _b	80,2	KN

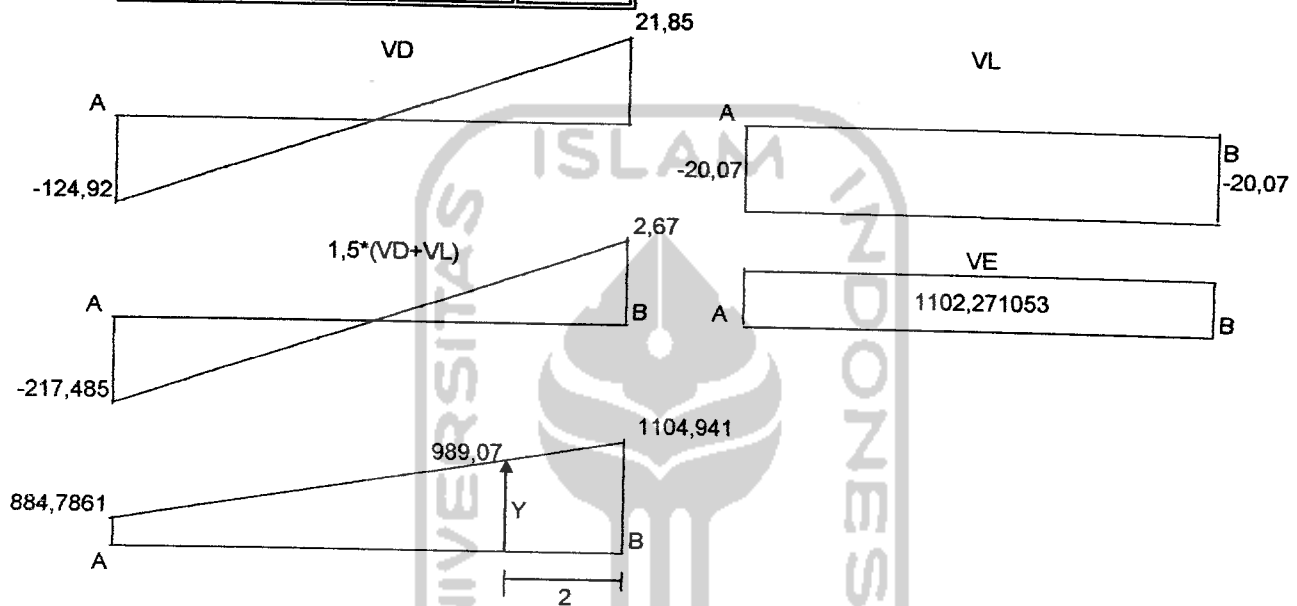


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2769,241	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	69,12926	mm
S PAKAI 2D13-65		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	2037,605	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	93,95126	mm
S PAKAI 2D13-90		

Perhitungan Sengkang frame 554 dan 660		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2690,43	KNm
MG ⁺	1498,2	KNm
VE	1102,271	KN
VDa	-124,92	KN
VDb	21,85	KN
VLa	-20,07	KN
VLb	-20,07	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Sengkang	390	MPa
Z	75	mm
D	925	mm

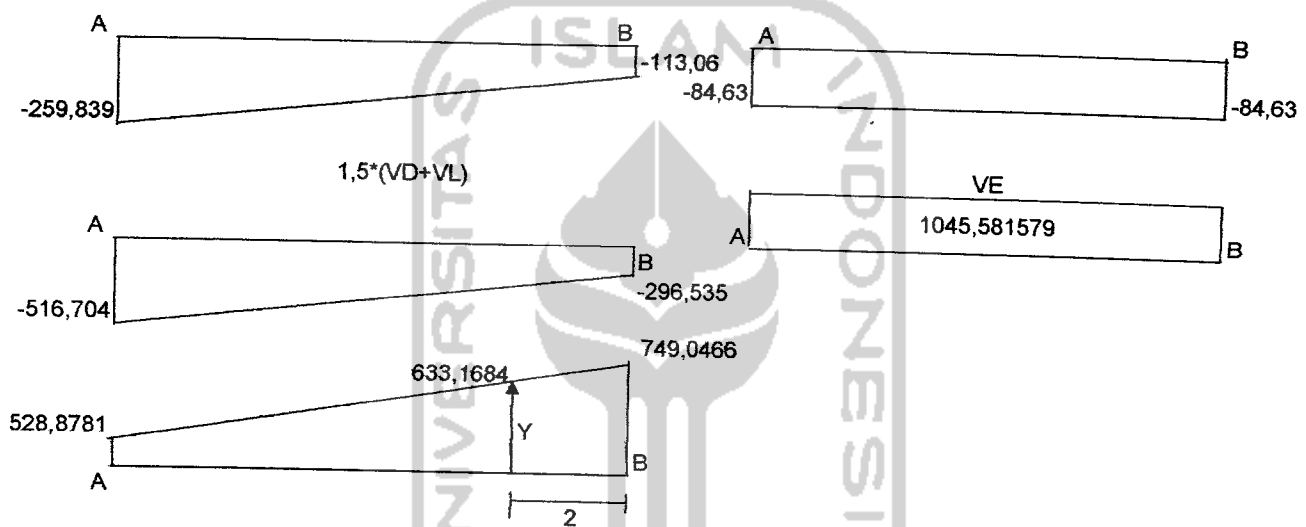
Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1841,568	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	103,9525	mm
S PAKAI 2D13-100		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1109,946	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	172,4729	mm
S PAKAI 2D ₁₃ -170		

B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2894,69	KNm
MG ⁺	1078,52	KNm
VE	1045,582	KN
VDa	-259,839	KN
VDb	-113,06	KN
VLa	-84,63	KN
VLb	-84,63	KN

VD

VL



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastik		
Vc	0	KN
Vs ₁	1248,411	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	153,3434	mm
S PAKAI 2D13-150		

Luar Sendi Plastik		
Vc	538,5042	KN
Vs ₂	516,7765	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	185,2209	mm
S PAKAI D13-180		

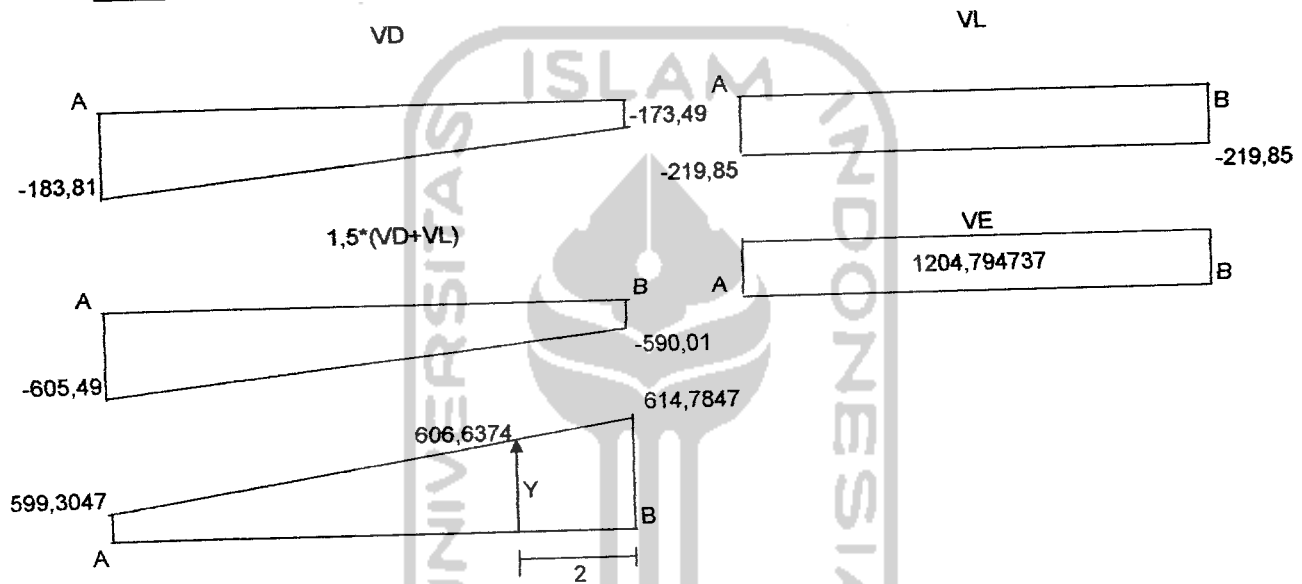
VD

The diagram shows a trapezoidal cross-section of a dam. The top horizontal edge is labeled 'A' and has a length of 26,72. The bottom horizontal edge is labeled 'B' and has a length of 353,64. The left vertical edge is labeled 'Y' and has a height of 209,04. The right vertical edge is labeled 'B' and has a height of 638,1889. The bottom horizontal edge is labeled '2' and has a length of 2. The diagram is overlaid on a large watermark of the Indonesian national emblem (Garuda Pancasila) and the text 'ISLAM' and 'INDONESIA'.

S PAKAI 2D₁₃-170

S PAKAI D₁₃-200

Perhitungan Sengkan frame 557 dan 672		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	3499,7	KNm
MG ⁺	1078,52	KNm
VE	1204,795	KN
VDa	-183,81	KN
VDb	-173,49	KN
VLa	-219,85	KN
VLb	-219,85	KN

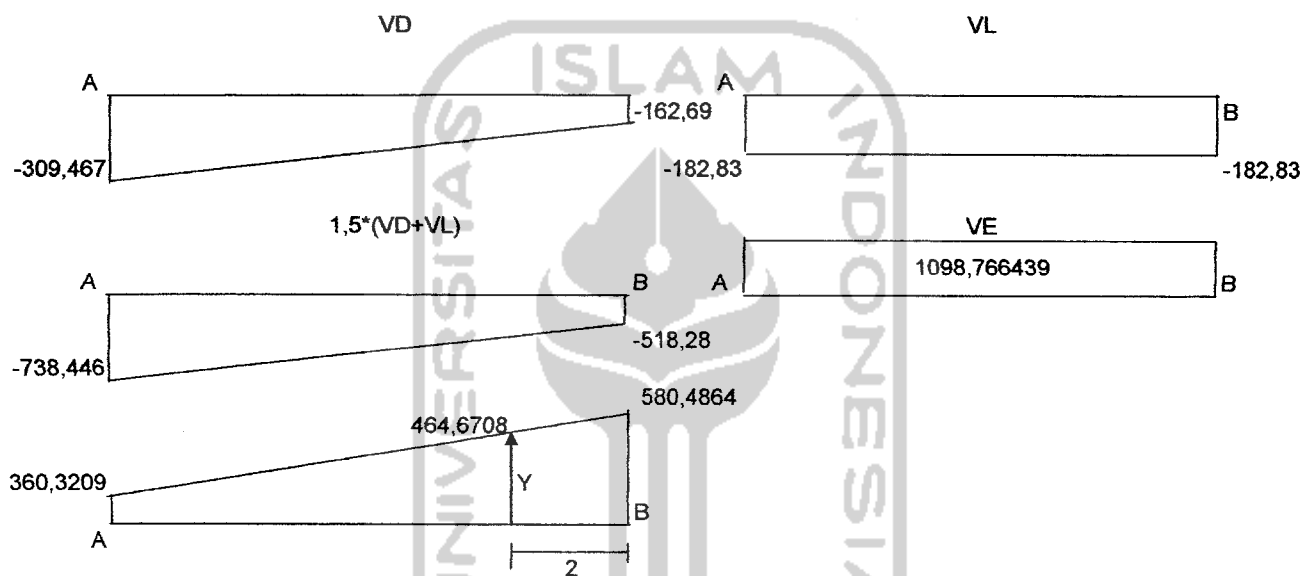


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkan	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1024,641	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	186,8318	mm
S PAKAI 2D ₁₃ -180		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	472,5581	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	202,5524	mm
S PAKAI D ₁₃ -200		

Perhitungan Senggang frame 556 dan 671		
B Kolom	1,2	m
L Balok	5,002	m
L netto	3,802	m
MG ⁻	3098,99	KNm
MG ⁺	1078,52	KNm
VE	1098,766	KN
VDa	-309,467	KN
VDb	-162,69	KN
VL _a	-182,83	KN
VL _b	-182,83	KN

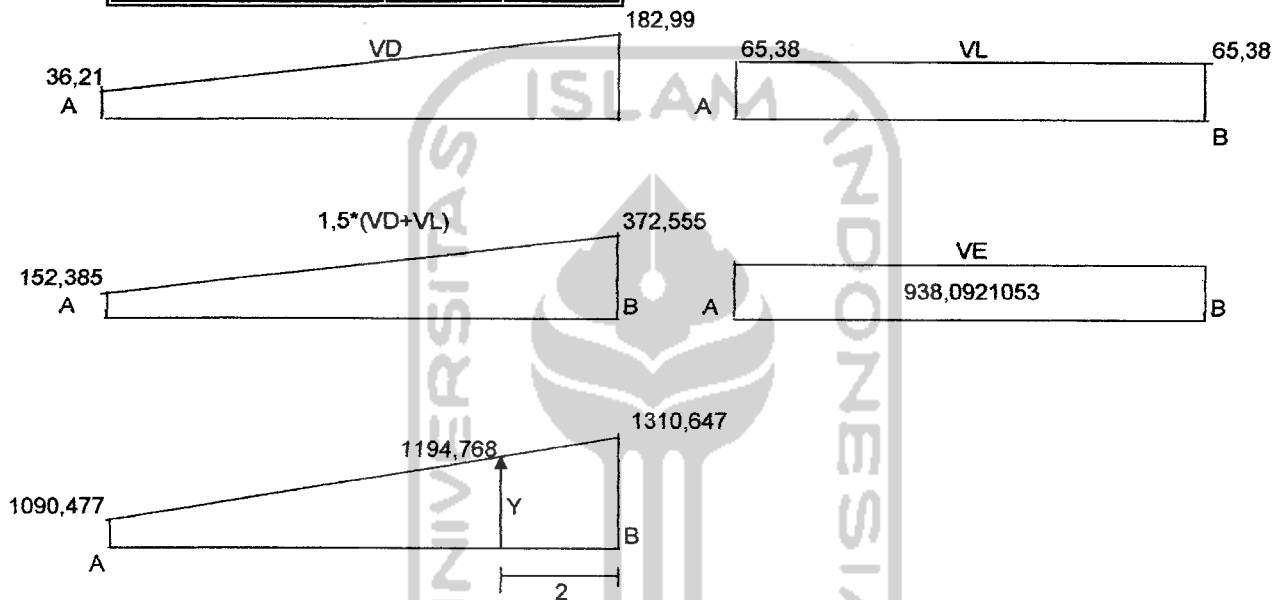


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	967,4774	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	197,8709	mm
S PAKAI 2D ₁₃ -190		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	235,9472	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	405,6747	mm
S PAKAI D ₁₃ -200		

Perhitungan Sengkang frame 612 dan 675		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2486,23	KNm
MG ⁺	1078,52	KNm
VE	938,0921	KN
VDa	36,21	KN
VDb	182,99	KN
VL _a	65,38	KN
VL _b	65,38	KN

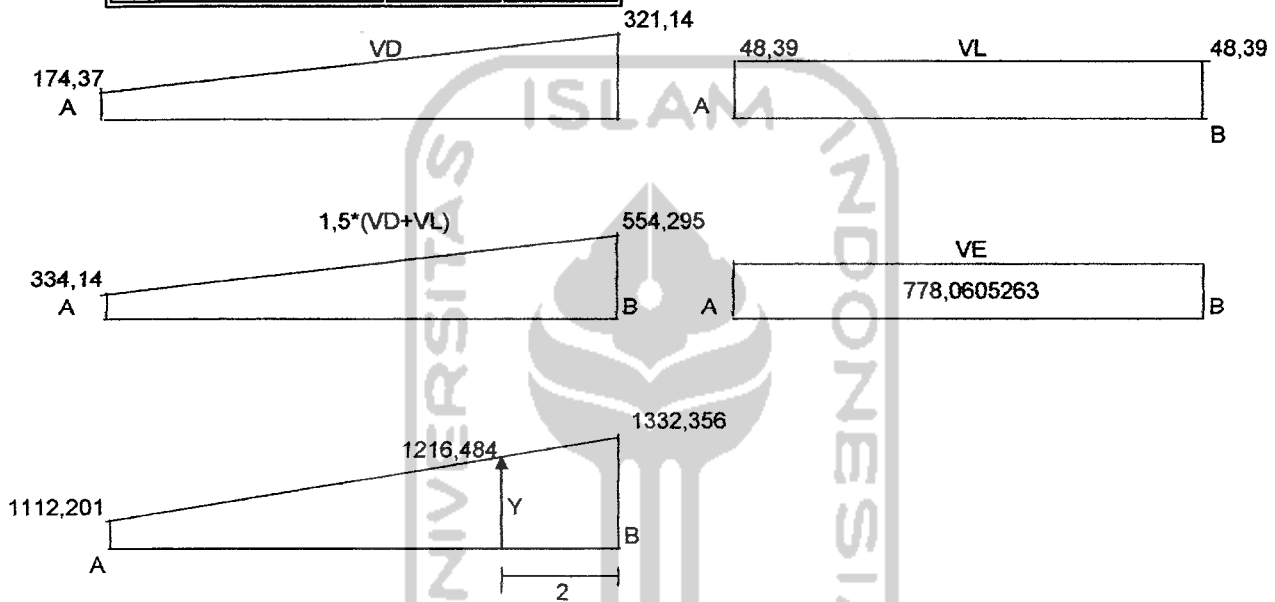


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2184,412	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	87,63713	mm
S PAKAI 2D13-80		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1452,776	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	131,7723	mm
S PAKAI 2D13-130		

Perhitungan Sengkang frame 611 dan 674		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	778,0605	KN
VDa	174,37	KN
VDb	321,14	KN
VLa	48,39	KN
VLb	48,39	KN

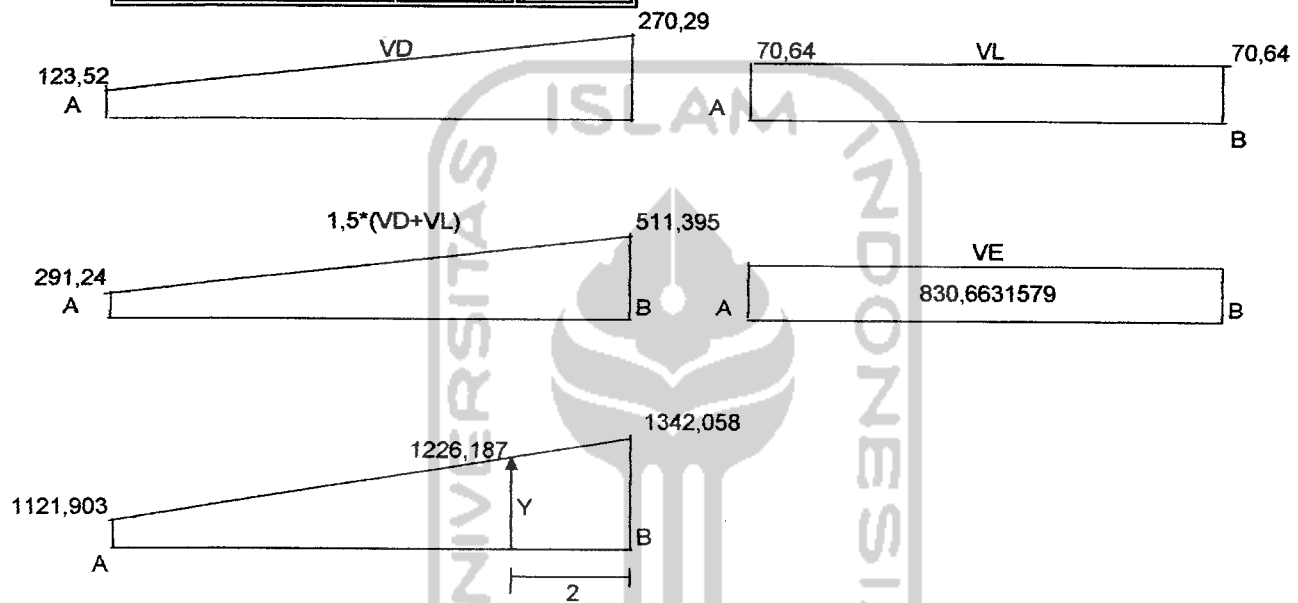


B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2220,593	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	86,20924	mm
S PAKAI 2D13-80		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1488,97	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	128,5691	mm
S PAKAI 2D13-120		

Perhitungan Sengkang frame 609 dan 681		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2078	KNm
MG ⁺	1078,52	KNm
VE	830,6632	KN
VDa	123,52	KN
VDb	270,29	KN
VL _a	70,64	KN
VL _b	70,64	KN

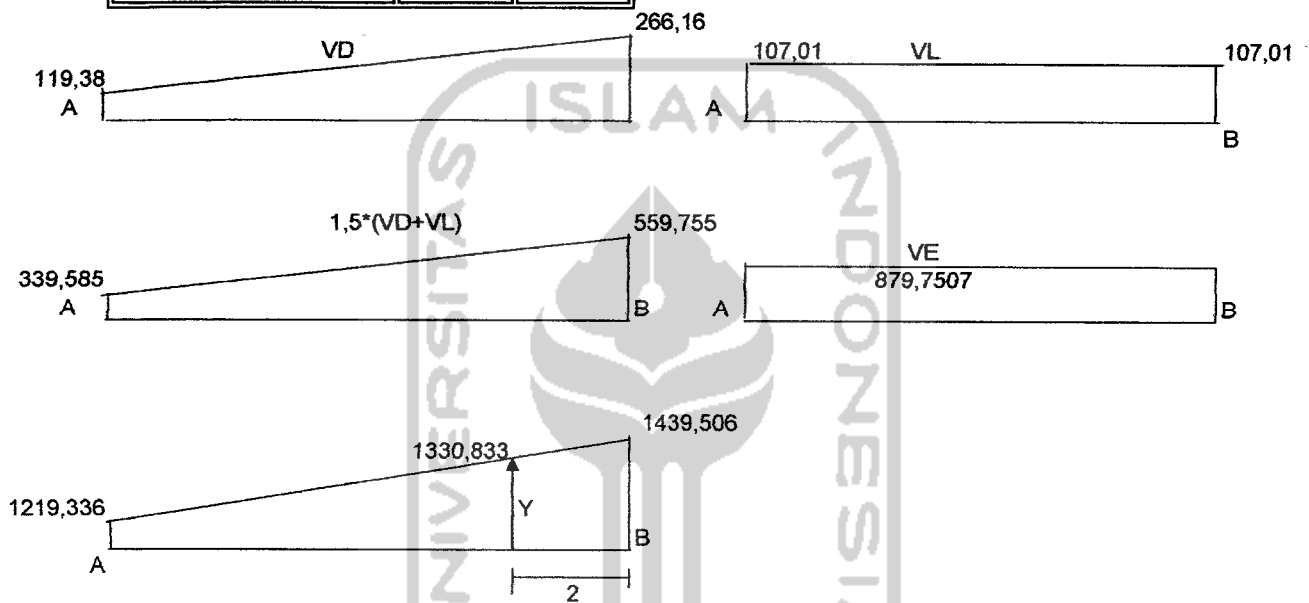


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	2236,764	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	85,58598	mm
S PAKAI 2D13-80		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	1505,141	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	127,1878	mm
S PAKAI 2D13-120		

Perhitungan Senggang frame 603 dan 683		
B Kolom	1,2	m
L Balok	5	m
L netto	4,052	m
MG ⁻	2486,23	KNm
MG ⁺	1078,52	KNm
VE	879,7507	KN
VDa	119,38	KN
VDb	266,16	KN
VL _a	107,01	KN
VL _b	107,01	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Senggang	390	MPa
Z	75	mm
D	925	mm

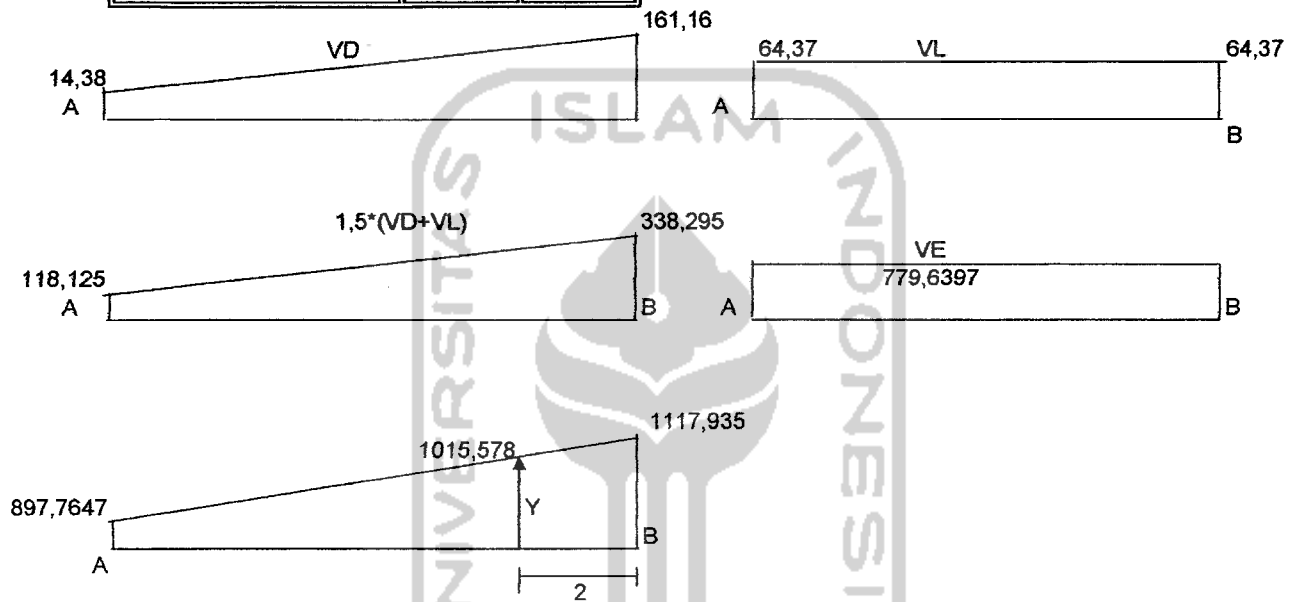
Dalam Sendi Plastis

V _c	0	KN
V _{s1}	2399,176	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	79,79222	mm
S PAKAI 2D13-70		

Luar Sendi Plastis

V _c	538,5042	KN
V _{s2}	1679,552	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	113,9802	mm
S PAKAI 2D13-100		

Perhitungan Senggang frame 581 dan 651		
B Kolom	0,7	m
L Balok	5	m
L netto	4,302	m
MG	2275,49	KNm
MG ⁺	1078,52	KNm
VE	779,6397	KN
VDa	14,38	KN
VDb	161,16	KN
VL _a	64,37	KN
VL _b	64,37	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Senggang	390	MPa
Z	75	mm
D	925	mm

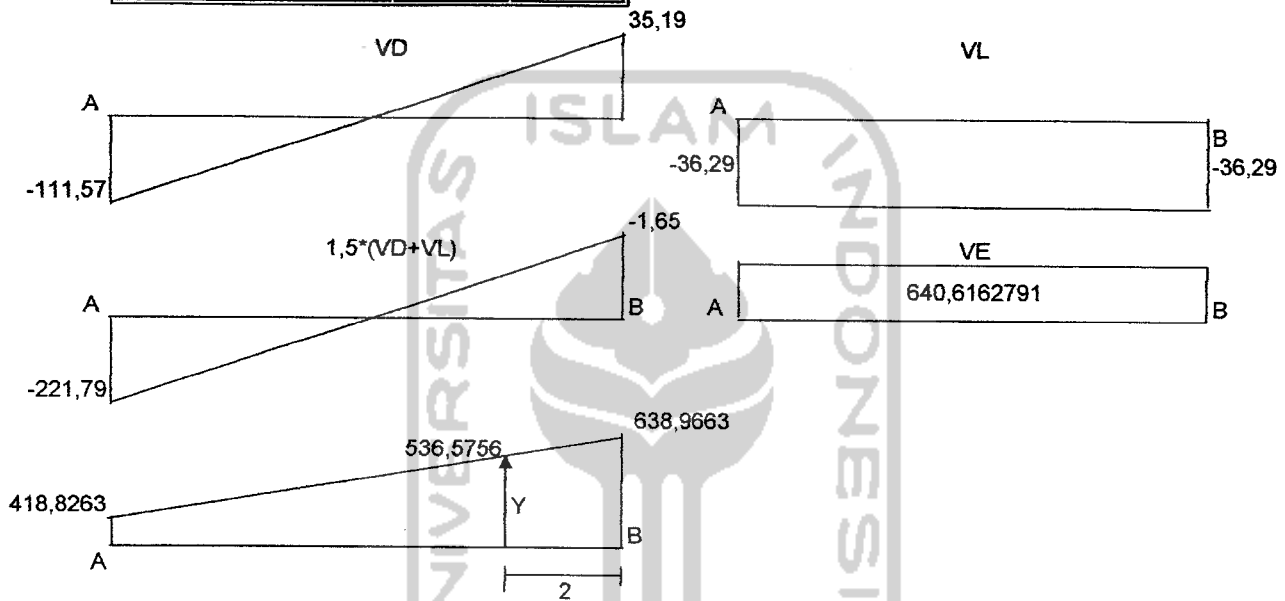
Dalam Sendi Plastis

V _c	0	KN
V _{s1}	1863,225	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	102,7442	mm
S PAKAI 2D13-100		

Luar Sendi Plastis

V _c	538,5042	KN
V _{s2}	1154,125	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	165,8707	mm
S PAKAI 2D13-160		

Perhitungan Sengkang frame 580 dan 650		
B Kolom	0,7	m
L Balok	5	m
L netto	4,3	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	640,6163	KN
VDa	-111,57	KN
VDb	35,19	KN
VL _a	-36,29	KN
VL _b	-36,29	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

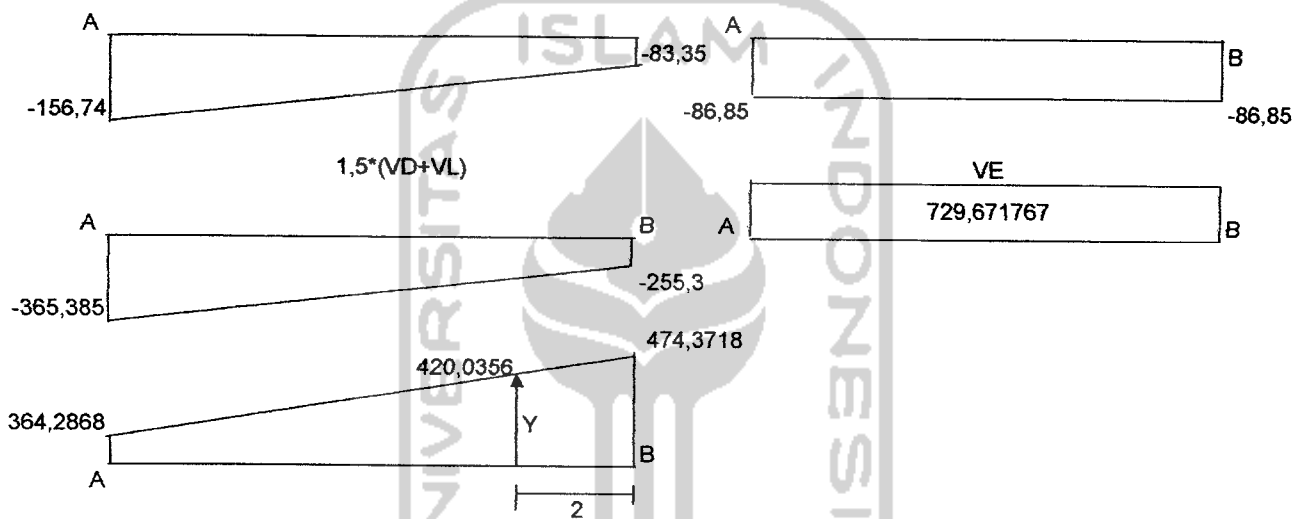
Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	1064,944	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	179,7612	mm
S PAKAI 2D13-170		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	355,7885	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	2	
S	269,0301	mm
S PAKAI D13-200		

Perhitungan Senggang frame 584 dan 657		
B Kolom	1,2	m
L Balok	5	m
L netto	4,052	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	729,6718	KN
VDa	-156,74	KN
VDb	-83,35	KN
VL _a	-86,85	KN
VL _b	-86,85	KN

VD

VL



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

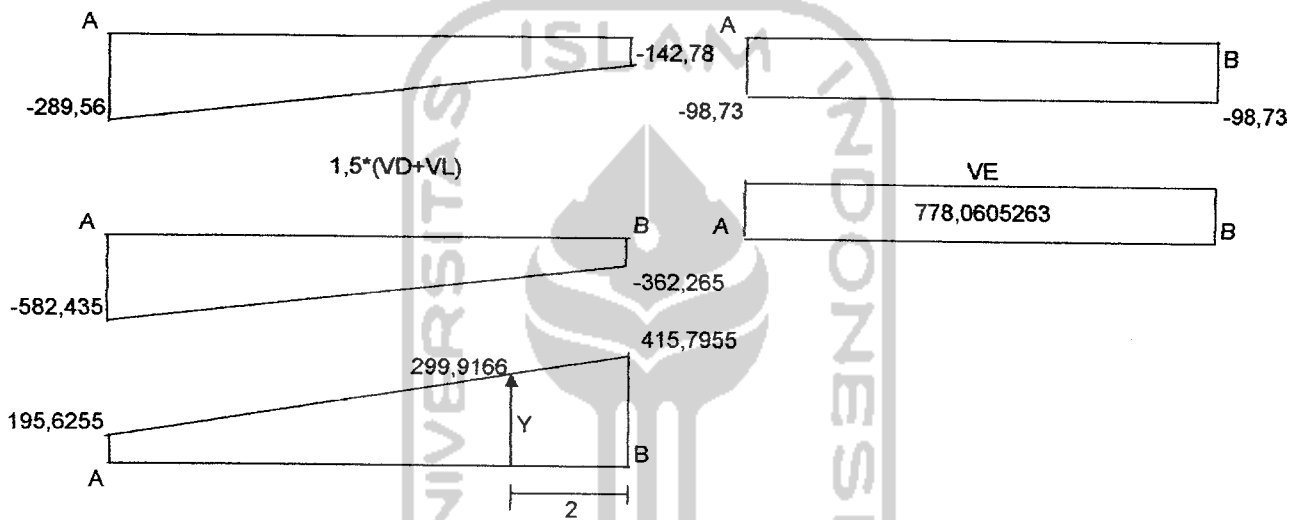
Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	790,6196	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	242,1336	mm
S PAKAI 2D ₁₃₋₂₀₀		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	161,5552	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	592,4772	mm
S PAKAI D ₁₃₋₂₀₀		

Perhitungan Senggang frame 595 dan 656		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	778,0605	KN
VDa	-289,56	KN
VDb	-142,78	KN
VL _a	-98,73	KN
VL _b	-98,73	KN

VD

VL

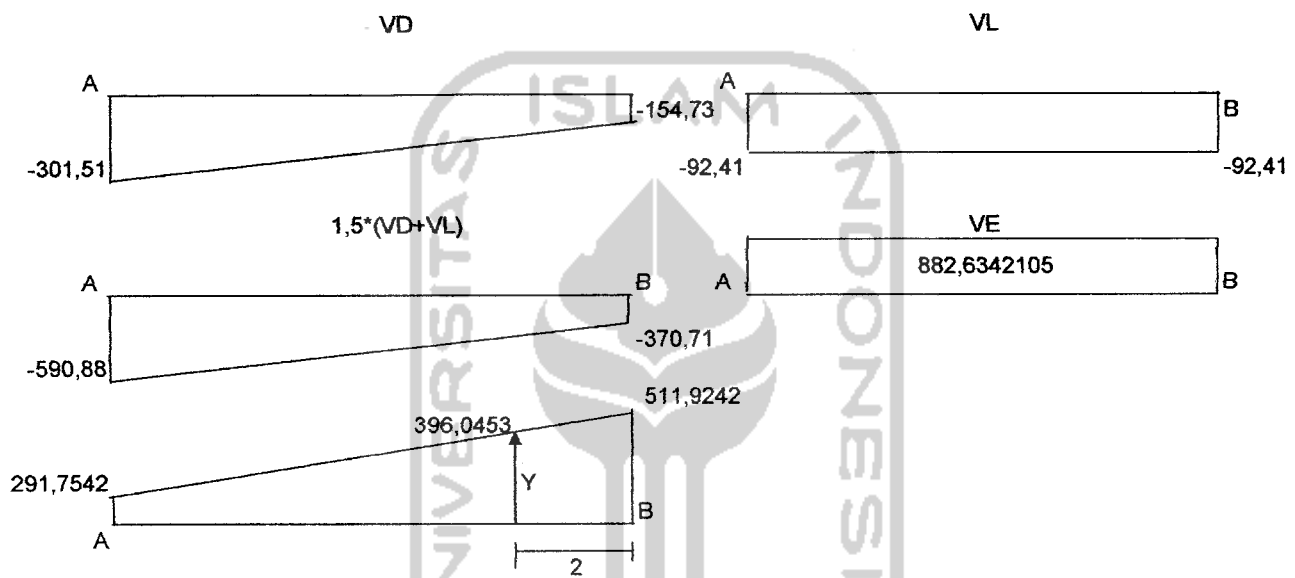


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	692,9925	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	276,2448	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	-38,6432	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	2	
S	-2476,96	mm
S PAKAI D13-200		

Perhitungan Sengkang frame 594 dan 647		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2275,49	KNm
MG ⁺	1078,52	KNm
VE	882,6342	KN
VDa	-301,51	KN
VDb	-154,73	KN
VL _a	-92,41	KN
VL _b	-92,41	KN

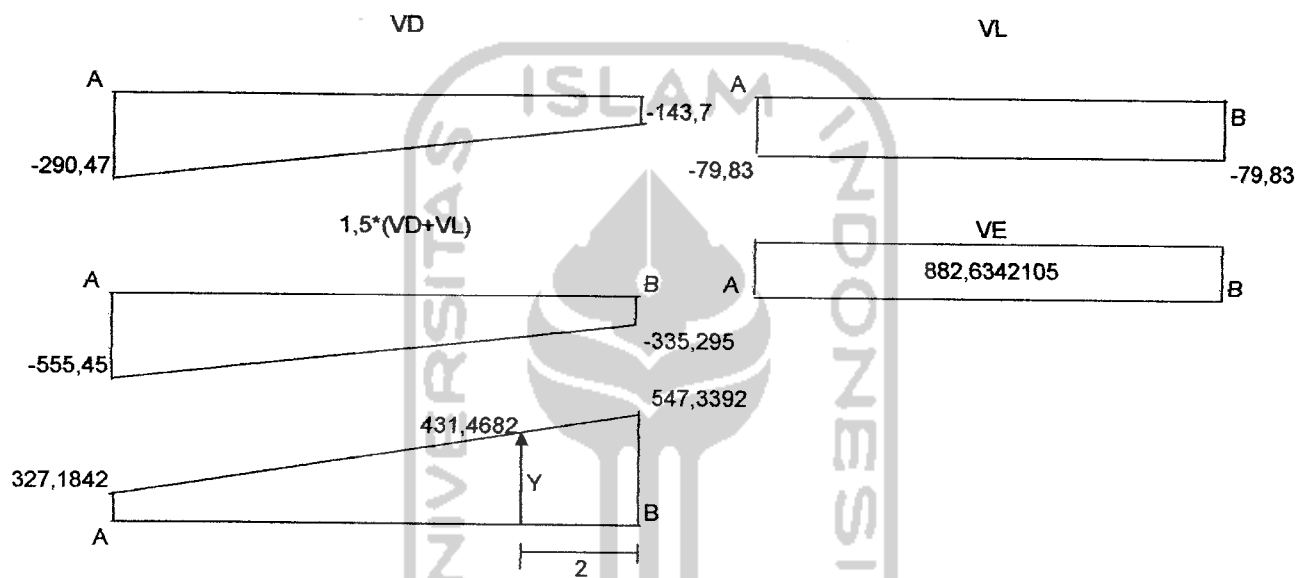


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	853,207	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	224,3718	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	121,5713	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	2	
S	787,3389	mm
S PAKAI D13-200		

Perhitungan Sengkang frame 593 dan 646		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2275,49	KNm
MG ⁺	1078,52	KNm
VE	882,6342	KN
VDa	-290,47	KN
VDb	-143,7	KN
VL _a	-79,83	KN
VL _b	-79,83	KN

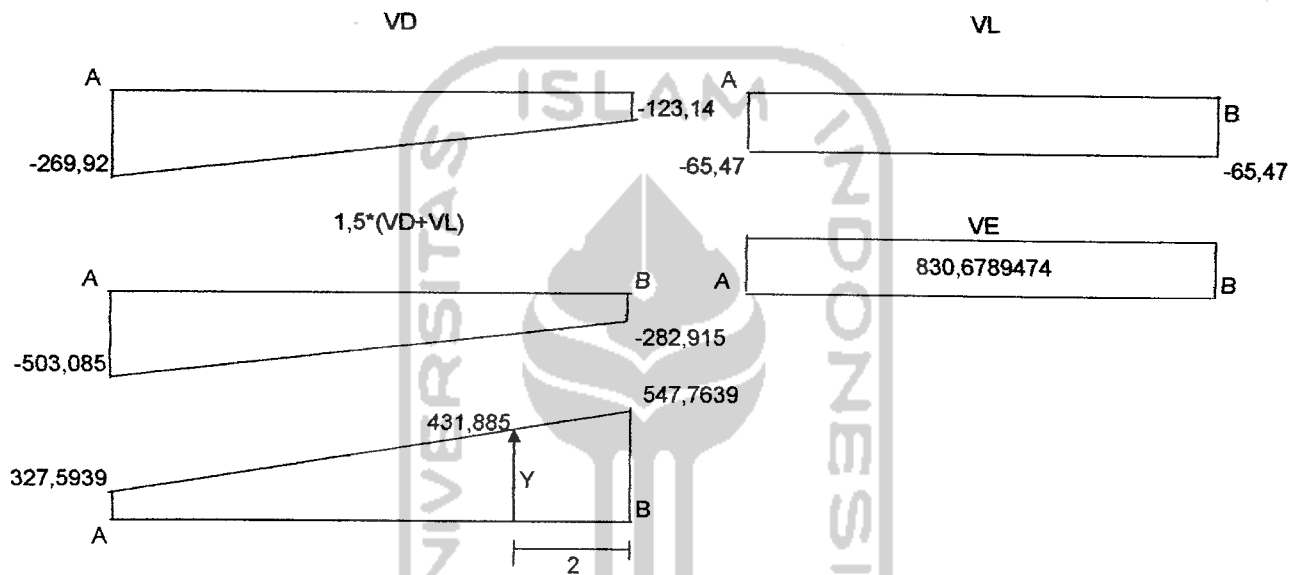


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	912,232	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	4	
S	209,8541	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	180,6094	KN
Diameter	13	mm
A ₀₁	132,665	mm ²
Kaki	2	
S	529,9712	mm
S PAKAI D13-200		

Perhitungan Senggang frame 592 dan 645		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	2078,06	KNm
MG ⁺	1078,52	KNm
VE	830,6789	KN
VDa	-269,92	KN
VDb	-123,14	KN
VLa	-65,47	KN
VLb	-65,47	KN

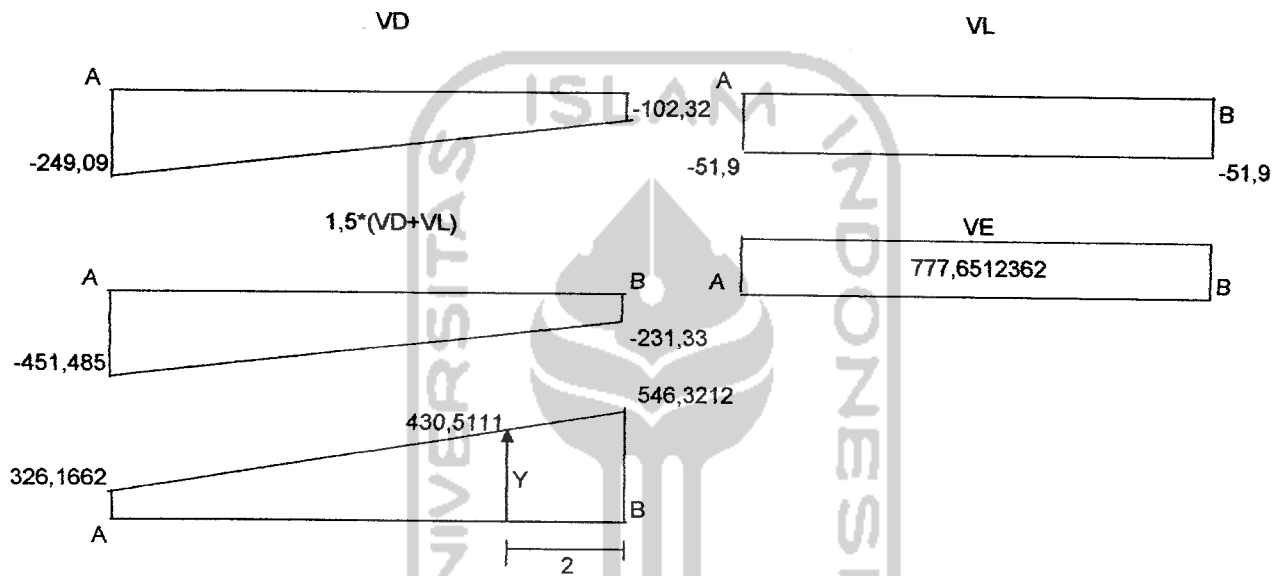


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	912,9399	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	209,6913	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	181,3042	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	2	
S	527,9404	mm
S PAKAI D13-200		

Perhitungan Sengkang frame 600 dan 640		
B Kolom	1,2	m
L Balok	5,002	m
L netto	3,802	m
MG ⁻	1878,11	KNm
MG ⁺	1078,52	KNm
VE	777,6512	KN
VDa	-249,09	KN
VDb	-102,32	KN
VL _a	-51,9	KN
VL _b	-51,9	KN

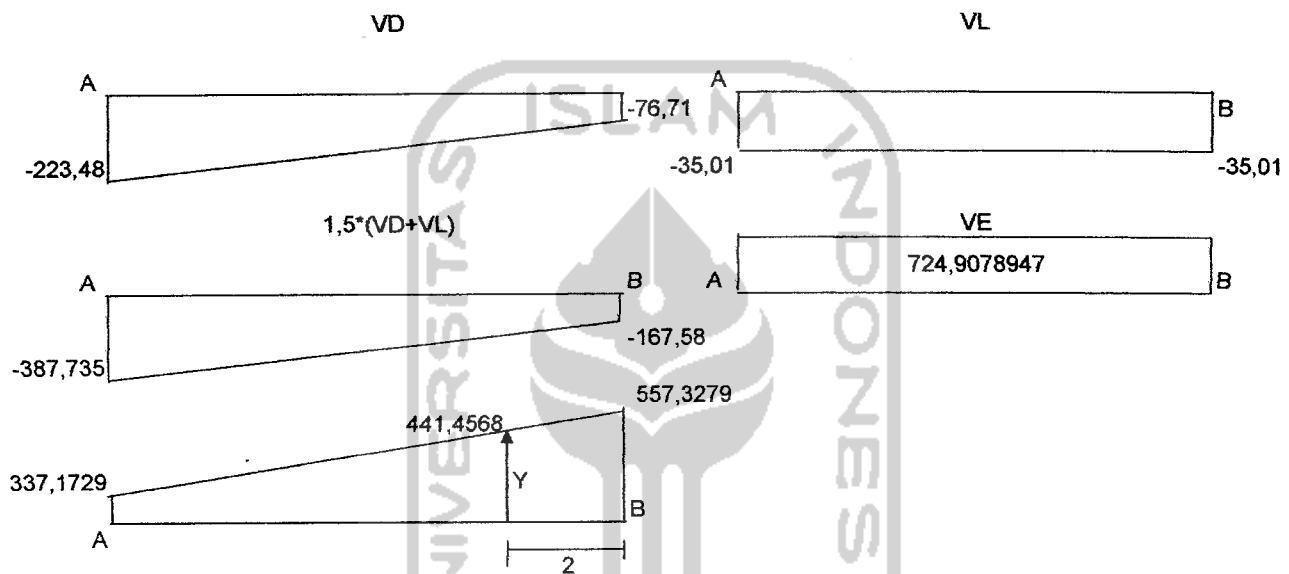


B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Sengkang	390	MPa
Z	75	mm
D	925	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	910,5354	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	210,2451	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	179,0144	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	534,6933	mm
S PAKAI D13-200		

Perhitungan Senggang frame 599 dan 639		
B Kolom	1,2	m
L Balok	5	m
L netto	3,8	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	724,9079	KN
VDa	-223,48	KN
VDb	-76,71	KN
VL _a	-35,01	KN
VL _b	-35,01	KN



B	700	mm
H	1000	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	925	mm

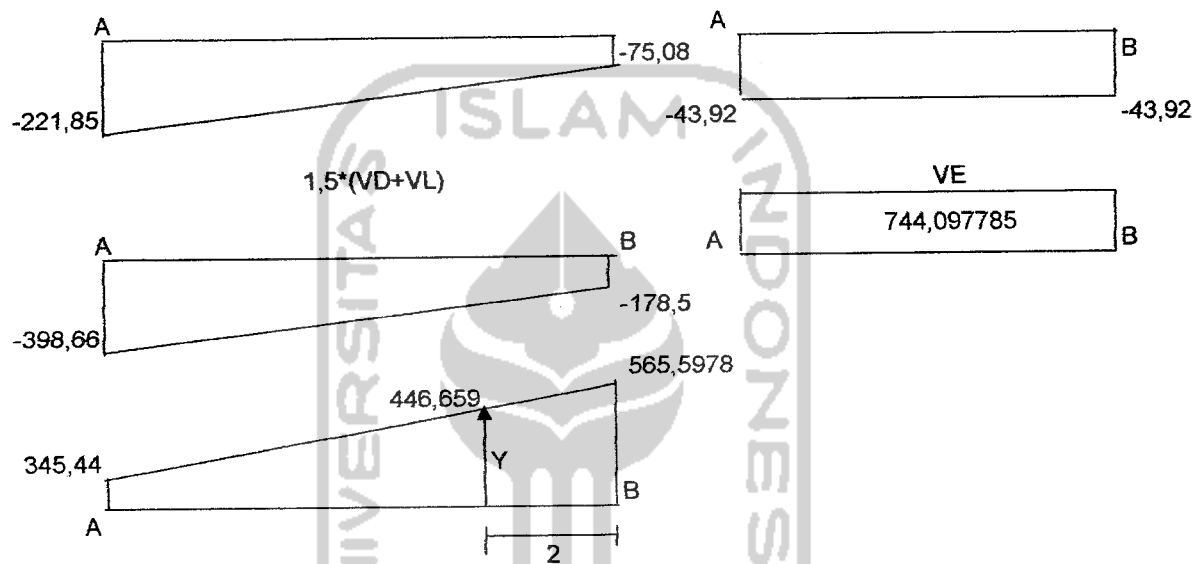
Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	928,8798	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	4	
S	206,093	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,5042	KN
V _{s2}	197,2572	KN
Diameter	13	mm
A _{Ø1}	132,665	mm ²
Kaki	2	
S	485,2435	mm
S PAKAI D13-200		

Perhitungan Senggang frame 598 dan 638		
B Kolom	1,2	m
L Balok	5	m
L netto	3,702	m
MG ⁻	1676,13	KNm
MG ⁺	1078,52	KNm
VE	744,098	KN
VDa	-221,85	KN
VDb	-75,08	KN
VL _a	-43,92	KN
VL _b	-43,92	KN

VD

VL



B	700	mm
H	1000	mm
f _c	24,9	MPa
Fy Senggang	390	MPa
Z	75	mm
D	925	mm

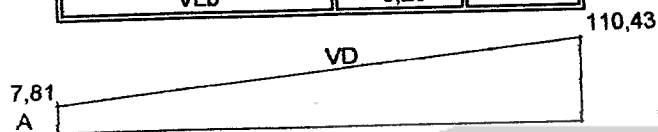
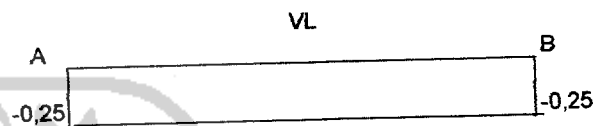
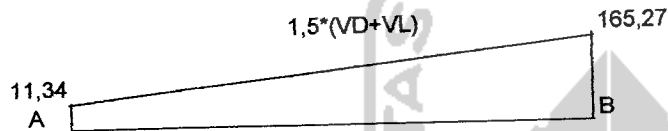
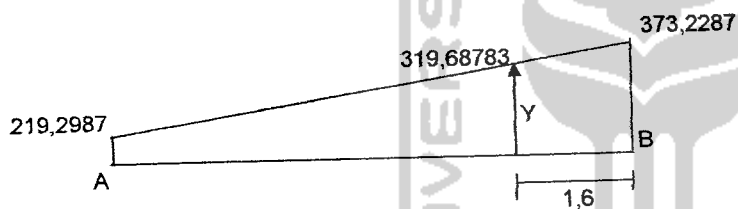
Dalam Sendi Plastis		
V _c	0	KN
V _{s₁}	942,663	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	4	
S	203,08	mm
S PAKAI 2D13-200		

Luar Sendi Plastis		
V _c	538,504	KN
V _{s₂}	205,928	KN
Diameter	13	mm
A _{ø1}	132,665	mm ²
Kaki	2	
S	464,812	mm
S PAKAI D13-200		

LAMPIRAN
TABEL PERHITUNGAN
TULANGAN GESER
BALOK ANAK
BALOK LINTANG ATAS
BALOK LINTANG BAWAH

الْحَمْدُ لِلَّهِ الرَّحْمَنِ الرَّحِيمِ

Perhitungan Senggang Balok Anak		
B Balok Lintang	0,4	m
L Balok	5	m
L netto	4,6	m
MG ⁻	565,69	KNm
MG ⁺	390,92	KNm
VE	207,9587	KN
VDa	7,81	KN
VDb	110,43	KN
VL _a	-0,25	KN
VL _b	-0,25	KN

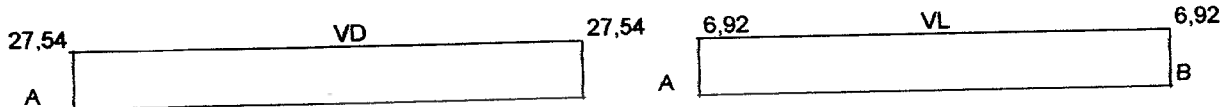
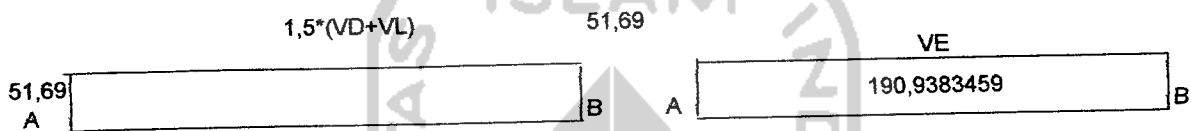
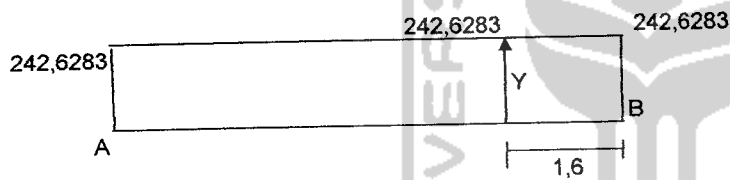


B	400	mm
H	800	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	725	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	622,0478	KN
Diameter	10	mm
A ₀₁	78,5	mm ²
Kaki	4	
S	142,7278	mm
S PAKAI 2D10-140		

Luar Sendi Plastis		
V _c	241,1833	KN
V _{s2}	291,6297	KN
Diameter	10	mm
A ₀₁	78,5	mm ²
Kaki	4	
S	304,4391	mm
S PAKAI 2D10-200		

Perhitungan Senggang Balok Lintang Bawah		
B Balok Lengkung	1,6	m
L Balok	8,25	m
L netto	6,65	m
MG ⁻	751,22	KNm
MG ⁺	518,52	KNm
VE	190,9383	KN
VDa	27,54	KN
VDb	27,54	KN
VL _a	6,92	KN
VL _b	6,92	KN

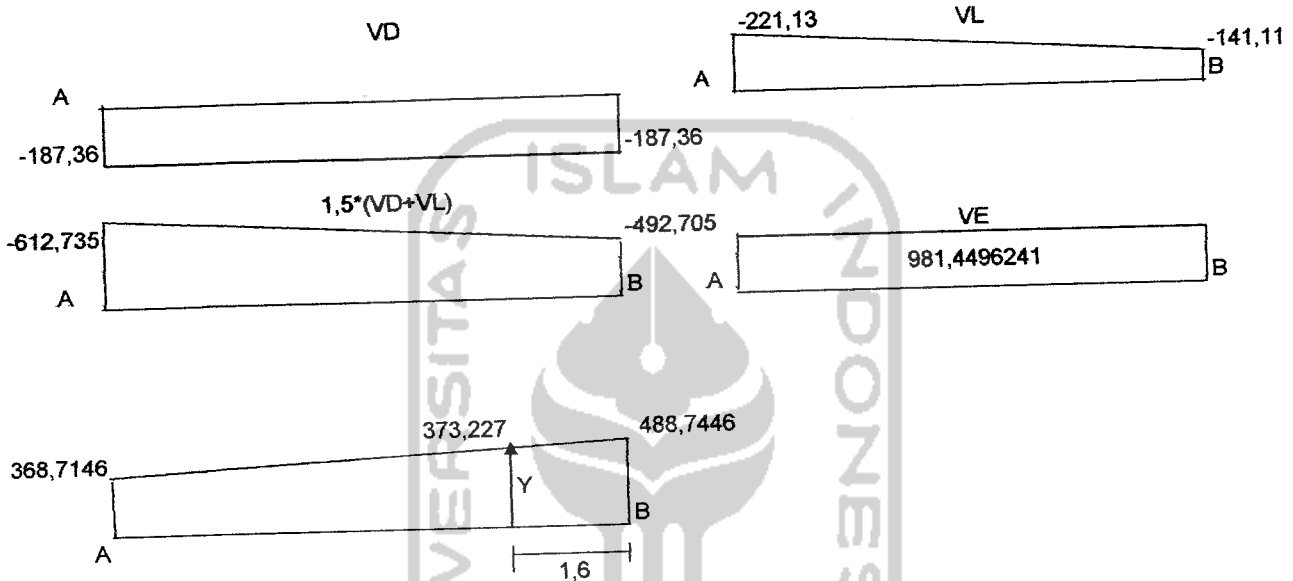


B	400	mm
H	800	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	725	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	404,3806	KN
Diameter	10	mm
A _{Ø1}	78,5	mm ²
Kaki	2	
S	109,7772	mm
S PAKAI D10-100		

Luar Sendi Plastis		
V _c	241,1833	KN
V _{s2}	163,1972	KN
Diameter	10	mm
A _{Ø1}	78,5	mm ²
Kaki	2	
S	272,0129	mm
S PAKAI D10-200		

Perhitungan Senggang Balok Lintang Atas-1		
B Balok Anak	0,4	m
L Balok	2,0625	m
L netto	1,6625	m
MG ⁻	1113,14	KNm
MG ⁺	518,52	KNm
VE	981,4496	KN
VDa	-187,36	KN
VDb	-187,36	KN
VL _a	-221,13	KN
VL _b	-141,11	KN

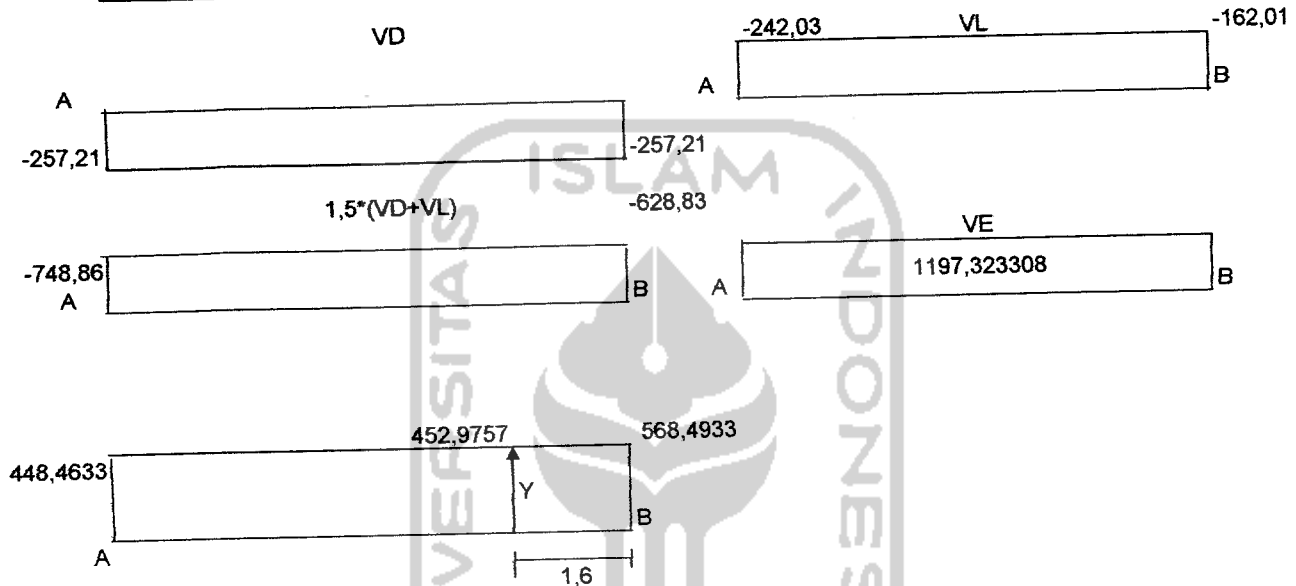


B	400	mm
H	800	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	725	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	814,5744	KN
Diameter	10	mm
A ₀₁	78,5	mm ²
Kaki	4	
S	108,9937	mm
S PAKAI 2D10-100		

Luar Sendi Plastis		
V _c	241,1833	KN
V _{s2}	380,8617	KN
Diameter	10	mm
A ₀₁	78,5	mm ²
Kaki	4	
S	233,1122	mm
S PAKAI 2D10-200		

Perhitungan Senggang Balok Lintang Atas-2		
B Balok Anak	0,4	m
L Balok	2,0625	m
L netto	1,6625	m
MG ⁻	1471,96	KNm
MG ⁺	518,59	KNm
VE	1197,323	KN
VDa	-257,21	KN
VDb	-257,21	KN
VL _a	-242,03	KN
VL _b	-162,01	KN

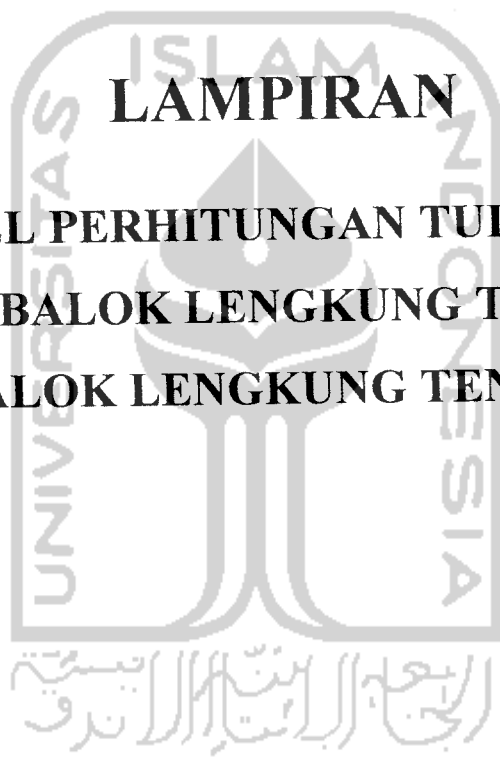


B	400	mm
H	800	mm
f _c	24,9	MPa
F _y Senggang	390	MPa
Z	75	mm
D	725	mm

Dalam Sendi Plastis		
V _c	0	KN
V _{s1}	947,4888	KN
Diameter	10	mm
A _{Ø1}	78,5	mm ²
Kaki	4	
S	93,70401	mm
S PAKAI 2D10-90		

Luar Sendi Plastis		
V _c	241,1833	KN
V _{s2}	513,7762	KN
Diameter	10	mm
A _{Ø1}	78,5	mm ²
Kaki	4	
S	172,8058	mm
S PAKAI 2D ₁₀ -170		

LAMPIRAN
TABEL PERHITUNGAN TULANGAN
BALOK LENGKUNG TEPI
BALOK LENGKUNG TENGAH



Disain Balok Lengkung Tepi Arah X

[illegible]

Disain Balok Lengkung Tepi Arah X

[illegible]

Disain Balok Lengkung Tepi Arah X

KOLOM	224 dan 351	231 dan 352	230 dan 326	227 dan 325	187 dan 324	167 dan 323
b (mm)	1600	1600	1600	1600	1600	1600
h (mm)	1000	1000	1000	1000	1000	1000
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	1226,79	1223,64	1100,48	951,08	750,57	850,29
Nu,k (kN)	8236,74	9836,11	10947,78	11689,81	12209,43	12561,7
Mn,k (kN.m)	1887,369231	1882,523077	1693,046154	1463,2	1154,723077	1308,138462
Nn,k (kN)	12671,90769	15132,47692	16842,73846	17984,32308	18783,73846	19325,69231
r (%)	1	1	1	1	1	1
As (mm)	16000	16000	16000	16000	16000	16000
Diameter tul. (mm)	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ³)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497
n pakai	34D25	34D25	34D25	34D25	34D25	34D25

Disain Balok Lengkung Tepi Arah Y

[illegible]

Disain Balok Lengkung Tepi Arah Y

[illegible]

Disain Balok Lengkung Tepi Arah Y

KOLOM	224 dan 351	231 dan 352	230 dan 326	227 dan 325	187 dan 324	167 dan 323
b (mm)	1600	1600	1600	1600	1600	1600
h (mm)	1000	1000	1000	1000	1000	1000
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	153,31	121,45	116,197	173,57	522,45	1119,8
Nu,k (kN)	8236,74	9836,11	10947,78	11689,81	12209,43	12561,7
Mn,k (kN.m)	235,8615385	186,8461538	178,7646154	267,0307692	803,7692308	1722,769231
Nn,k (kN)	12671,90769	15132,47692	16842,73846	17984,32308	18783,73846	19325,69231
r (%)	1	1	1	1	1	1
As (mm)	16000	16000	16000	16000	16000	16000
Diameter tul. (mm)	25	25	25	25	25	25
ΔØ tul. (mm ³)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497
n pakai	34D25	34D25	34D25	34D25	34D25	34D25

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Disain Balok Lengkung Tengah Arah X

549 dan 630	548 dan 631	563 dan 632	772 dan 633	771 dan 634	547 dan 635	546 dan 636	545 dan 637	566 dan 629
1600	1600	1600	1600	1600	1600	1600	1600	1600
1000	1000	1000	1000	1000	1000	1000	1000	1000
80	80	80	80	80	80	80	80	80
2863,62	2187,02	2373,01	2380,56	2427,49	1935,8	2210,86	4164,33	492,82
2118,74	5362,74	3705,87	4020,67	6829,52	8783,04	10331,09	11648,07	15888,96
4405,56923	3364,64615	3650,784615	3662,4	3734,6	2978,153846	3401,323077	6406,661538	758,184615
3259,6	8250,36923	5701,338462	6185,64615	10506,95385	13512,36923	15893,98462	17920,10769	24444,5538
1,1	1	1	1	1	1	1	1	1
17600	16000	16000	16000	16000	16000	16000	16000	16000
25	25	25	25	25	25	25	25	25
490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
35,8726115	32,611465	32,61146497	32,611465	32,61146497	32,61146497	32,61146497	32,61146497	32,611465
36	34	34	34	34	34	34	34	34

Disain Balok Lengkung Tengah Arah X

[illegible]

Disain Balok Lengkung Tengah Arah X

KOLOM	574 dan 627	577 dan 628	576 dan 617	575 dan 616	565 dan 613	564 dan 614
b (mm)	1600	1600	1600	1600	1600	1600
h (mm)	1000	1000	1000	1000	1000	1000
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	1489,05	1390,9	1234,97	1147,49	904,88	1252,19
Nu,k (kN)	9650,82	11512,58	12765,75	13700,81	14392,96	14939,09
Mn,k (kN.m)	2290,846154	2139,846154	1899,953846	1765,369231	1392,123077	1926,446154
Nn,k (kN)	14847,41538	17711,66154	19639,61538	21078,16923	22143,01538	22983,21538
r (%)	1	1	1	1	1	1
As (mm)	16000	16000	16000	16000	16000	16000
Diameter tul. (	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ³)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497
n pakai	34	34	34	34	34	34

LOM	549 dan 630	548 dan 631	563 dan 632	772 dan 633	771 dan 634	547 dan 635	546 dan 636	545 dan 637	566 dan 629
	1600	1600	1600	1600	1600	1600	1600	1600	1600
	1000	1000	1000	1000	1000	1000	1000	1000	1000
	80	80	80	80	80	80	80	80	80
	313,59	308,29	229,7	262,11	344,44	523,59	869,46	1493,05	1084,77
	2118,74	5362,74	3705,87	4020,67	6829,52	8783,04	10331,09	11648,07	15888,96
	482,446154	474,292308	353,3846154	403,2461538	529,9076923	805,5230769	1337,630769	2297	1668,876923
	3259,6	8250,36923	5701,338462	6185,646154	10506,95385	13512,36923	15893,98462	17920,10769	24444,55385
	1	1	1	1	1	1	1	1	1
	16000	16000	16000	16000	16000	16000	16000	16000	16000
	25	25	25	25	25	25	25	25	25
	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
	32,611465	32,611465	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497
	36	34	34	34	34	34	34	34	34

[illegible]

Disain Balok Lengkung Tengah Arah Y

KOLOM	574 dan 627	577 dan 628	576 dan 617	575 dan 616	565 dan 613	564 dan 614
b (mm)	1600	1600	1600	1600	1600	1600
h (mm)	1000	1000	1000	1000	1000	1000
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	311,48	231,48	185,76	229,99	514,52	1187,51
Nu,k (kN)	9650,82	11512,58	12765,75	13700,81	14392,96	14939,09
Mn,k (kN.m)	479,2	356,1230769	285,7846154	353,8307692	791,5692308	1826,938462
Nn,k (kN)	14847,41538	17711,66154	19639,61538	21078,16923	22143,01538	22983,21538
r (%)	1	1	1	1	1	1
As (mm ²)	16000	16000	16000	16000	16000	16000
Diameter tul. (mm)	25	25	25	25	25	25
ΔØ tul. (mm ³)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497	32,61146497
n pakai	34	34	34	34	34	34

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LAMPIRAN

TABEL PERHITUNGAN

TULANGAN GESER

BALOK LENGKUNG TEPI

BALOK LENGKUNG TENGAH

TABEL PERHITUNGAN TULANGAN GESER BALOK LINGKUNG TEPI

[illegible]

TABEL PERHITUNGAN TULANGAN GESER BALOK LINGKUNG TEPI						
Balok lengkung	224 dan 351	231 dan 352	230 dan 326	227 dan 325	187 dan 324	167 dan 323
f _c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9
f _y (Mpa)	390	390	390	390	390	390
b kolom (mm)	1600	1600	1600	1600	1600	1600
h kolom (mm)	1000	1000	1000	1000	1000	1000
d kolom (mm)	920	920	920	920	920	920
P _u (kN)	8236,74	9836,11	10947,78	11688,81	12209,43	12581,7
V _u (kN)	462,933	433,389	376,626	309,915	221,759	157,335
V _s (kN)	771,555	722,315	627,710	516,525	369,598	262,225
Dalam Sendi Plastis						
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
A1Ø	132,732	132,732	132,732	132,732	132,732	132,732
S	246,901	263,732	303,480	368,806	515,417	726,465
Pakai Tulangan	2D13-100	2D13-100	2D13-100	2D13-100	2D13-100	2D13-100
Luar Sendi Plastis						
V _c (kN)	1674,367	1761,777	1822,532	1863,086	1891,484	1910,736
V _{s1} (kN)	-902,812	-1039,462	-1194,822	-1346,561	-1521,886	-1648,511
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
A1Ø	132,732	132,732	132,732	132,732	132,732	132,732
S	-211,004	-183,265	-159,436	-141,470	-125,172	-115,557
Pakai Tulangan	2D13-200	2D13-200	2D13-200	2D13-200	2D13-200	2D13-200

TABEL PERHITUNGAN TULANGAN GESER BALOK LENGKUNG TENGAH						
Balok lengkung	574 dan 627	577 dan 628	576 dan 617	575 dan 616	565 dan 615	564 dan 614
f_c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9
f_y (Mpa)	390	390	390	390	390	390
b kolom (mm)	1600	1600	1600	1600	1600	1600
h kolom (mm)	1000	1000	1000	1000	1000	1000
d kolom (mm)	920	920	920	920	920	920
P_u (kN)	9650,82	11512,58	12765,75	13700,81	14392,96	14939,09
V_u (kN)	538,986	493,877	431,122	372,405	303,065	295,173
V_s (kN)	898,310	823,128	718,537	620,675	505,108	491,955
Dalam Sendi Plastik						
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
$A_{1\phi}$	132,732	132,732	132,732	132,732	132,732	132,732
S	212,062	231,431	265,119	306,920	377,142	387,225
Pakai Tulangan	2D13-100	2D13-100	2D13-100	2D13-100	2D13-100	2D13-100
Luar Sendi Plastik						
V_c (kN)	1751,650	1853,400	1921,888	1972,991	2010,819	2040,666
V_{s1} (kN)	-853,340	-1030,271	-1203,351	-1352,316	-1505,710	-1548,711
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
$A_{1\phi}$	132,732	132,732	132,732	132,732	132,732	132,732
S	-223,237	-184,900	-158,306	-140,867	-126,517	-123,004
Pakai Tulangan	2D13-200	2D13-200	2D13-200	2D13-200	2D13-200	2D13-200



Disain Kolom Tepi Arah X

KOLOM	128 dan 440	137 dan 438	321 dan 436	535 dan 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457	41 dan 2
b (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	496,81	477,31	1968,46	2598,29	2526,56	2473,04	2549,93	416,89	860,94
Nu,k (kN)	340,600	401,090	500,120	579,540	210,780	549,580	834,090	1023,890	512,740
Mn,k (kN.m)	764,3230769	734,3230769	3028,4	3997,36923	3887,015385	3804,676923	3922,969231	641,3692308	1324,52308
Nn,k (kN)	524	617,0615385	769,4153846	891,6	324,2769231	845,5076923	1283,215385	1575,215385	788,830769
r (%)	1	1	1,1	1,2	1,2	1,1	1,1	1	1
As (mm)	14400	14400	15840	17280	17280	15840	15840	19600	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	32,28535032	35,2203822	35,22038217	32,28535032	32,28535032	39,94904459	29,3503185
n pakai	30	30	34	36	36	34	34	40	30

Disain Kolom Tepi Arah X

KOLOM	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411	278 dan 416	281 dan 401
b (mm)	1200	1200	1200	1200	700	700	700	1200	1200
h (mm)	1200	1200	1200	1200	700	700	700	1200	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	1557,22	1822,29	2125,42	2221,96	1174,53	493,06	553,22	1627,2	1988,17
Nu,k (kN)	821,860	728,120	753,220	747,660	547,580	469,900	380,510	479,040	563,080
Mn,k (kN.m)	1946,525	2803,523077	3269,876923	2777,45	1488,1625	616,325	691,525	2034	2485,2125
Nn,k (kN)	1264,4	1120,184615	1158,8	1150,24615	842,4307692	722,9230769	585,4	736,9846154	866,276923
r (%)	1	1	1	1	2,5	1	1	1	1
As (mm)	14400	14400	14400	14400	12250	4900	4900	14400	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,3503185	24,96815287	9,987261146	9,987261146	29,35031847	29,3503185
n pakai	30	30	30	30	26	10	10	30	30

Disain Kolom Tepi Arah X

KOLOM	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
b (mm)	1200	1200	1200	1200	1200	1400
h (mm)	1200	1200	1200	1200	1200	1400
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	2147,43	2071,07	1844,55	1485,24	978,72	359,12
Nu,k (kN)	620,830	649,890	656,700	670,730	696,750	1324,250
Mn,k (kN.m)	3303,738462	3186,261538	2837,769231	2284,984615	1505,723077	552,4923077
Nn,k (kN)	955,1230769	999,8307692	1010,307692	1031,892308	1071,923077	2037,307692
r (%)	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	19600
Diameter tul. (mm)	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ²)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,35031847	29,35031847	39,94904459
n pakai	30	30	30	30	30	40

Disain Kolom Tepi Arah Y

KOLOM	128 dan 440	137 dan 438	321 dan 436	535 dan 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457	41 dan 2
b (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	287,54	97,6	130,93	203,97	194,74	147,71	115,83	1202,55	5,83
Nu,k (kN)	340,600	401,090	500,120	579,540	210,780	549,580	834,090	1023,890	512,740
Mn,k (kN.m)	442,3692308	150,1538462	201,4307692	313,8	299,6	227,2461538	178,2	1850,076923	8,96923077
Nn,k (kN)	524	617,0615385	769,4153846	891,6	324,2769231	845,5076923	1283,215385	1575,215385	788,830769
r (%)	1	1	1	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	14400	14400	19600	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,3503185	29,35031847	29,35031847	29,35031847	39,94904459	29,3503185
n pakai	30	30	34	36	36	34	34	40	30

Disain Kolom Tepi Arah Y

KOLOM	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411	278 dan 416	281 dan 401
b (mm)	1200	1200	1200	1200	700	700	700	1200	1200
h (mm)	1200	1200	1200	1200	700	700	700	1200	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	83,32	113,19	123,29	12,39	53,8	61,42	115,55	59,14	163
Nu,k (kN)	821,860	728,120	753,220	747,660	547,580	469,900	380,510	479,040	563,080
Mn,k (kN.m)	104,15	174,1384615	189,6769231	15,4875	67,25	76,775	144,4375	73,925	203,75
Nn,k (kN)	1264,4	1120,184615	1158,8	1150,24615	842,4307692	722,9230769	585,4	736,9846154	866,276923
r (%)	1	1	1	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	4900	4900	4900	14400	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,3503185	9,987261146	9,987261146	9,987261146	29,35031847	29,3503185
n pakai	30	30	30	30	26	10	10	30	30

Disain Kolom Tepi Arah Y

KOLOM	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
b (mm)	1200	1200	1200	1200	1200	1400
h (mm)	1200	1200	1200	1200	1200	1400
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	171,53	144,98	97,41	34,81	113,78	567,78
Nu,k (kN)	620,830	649,890	656,700	670,730	696,750	1324,250
Min,k (kN.m)	263,8923077	223,046154	149,8615385	53,55384615	175,0461538	873,50769
Nn,k (kN)	955,1230769	999,830769	1010,307692	1031,892308	1071,923077	2037,3077
r (%)	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	19600
Diameter tul. (mm)	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,3503185	29,35031847	29,35031847	29,35031847	39,949045
n pakai	30	30	30	30	30	40

Tulangan Kolom Tepi

Tulangan Kolom Tepi								
KOLOM	128 dan 440	137 dan 438	321 dan 436	535 da 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457
Tulangan arah X	30	30	34	36	36	34	34	40
Tulangan arah Y	30	30	34	36	36	34	34	40
Tulangan tiap baris	16	16	18	19	19	18	18	21
Tulangan terpasang	60D25	60D25	68D25	72D25	72D25	68D25	68D25	80D25

KOLOM	41 dan 2	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411
Tulangan arah X	30	30	30	30	30	26	10	10
Tulangan arah Y	30	30	30	30	30	26	10	10
Tulangan tiap baris	16	16	16	16	16	14	6	6
Tulangan terpasang	60	60	60	60	60	52	20	20
	60D25	60D25	60D25	60D25	60D25	52D25	20D25	20D25

[illegible]

Disain Kolom Tengah Arah X

KOLOM	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673	43 dan 4
b (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	518,48	702,88	2441,31	3102,32	3134,1	3182,3	3204,46	321,21	1286,36
Nu,k (kN)	424,120	539,520	679,100	778,840	485,770	746,160	1046,980	1915,710	619,470
Mn,k (kN.m)	797,6615385	1081,353846	3755,861538	4772,8	4821,692308	4895,846154	4929,938462	494,1692308	1979,01538
Nn,k (kN)	652,4923077	830,0307692	1044,789231	1198,21538	747,3384615	1147,938462	1610,738462	2947,246154	953,030769
r (%)	1	1	1,2	1,5	1,5	1,5	1,5	1	1
As (mm)	14400	14400	17280	21600	21600	21600	21600	19600	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	35,22038217	44,0254777	44,02547771	44,02547771	44,02547771	39,94904459	29,3503185
n pakai	30	30	36	44	44	44	44	40	30

Disain Kolom Tengah Arah X

KOLOM	606 dan 676	607 dan 679	601 dan 678	602 dan 682	605 dan 654	585 dan 653	586 dan 652	587 dan 655	588 dan 649
b (mm)	1200	1200	1200	1200	700	700	700	1200	1200
h (mm)	1200	1200	1200	1200	700	700	700	1200	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	2052,75	2243,11	2563,59	2668,84	1381,39	530,83	714,01	1989,99	2585,91
Nu,k (kN)	1106,570	930,480	961,610	961,290	742,360	656,530	534,040	635,620	735,840
Mn,k (kN.m)	2565,9375	3450,938462	3943,984615	3336,05	1726,7375	663,5375	892,5125	2487,4875	3232,3875
Nn,k (kN)	1702,415385	1431,507692	1479,4	1478,90769	1142,092308	1010,046154	821,6	977,8769231	1132,06154
r (%)	1	1	1,1	1	2,8	1	1,2	1	1
As (mm)	14400	14400	15840	14400	13720	4900	5880	14400	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	32,28535032	29,3503185	27,96433121	9,987261146	11,98471338	29,35031847	29,3503185
n pakai	30	30	30	30	28	10	12	30	30

Disain Kolom Tengah Arah X

KOLOM	589 dan 648	590 dan 644	591 dan 642	596 dan 642	597 dan 641	543
b (mm)	1200	1200	1200	1200	1200	1400
h (mm)	1200	1200	1200	1200	1200	1400
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	2467,44	2442,27	1865,74	1862,25	1410,81	345,23
Nu,k (kN)	803,250	840,610	856,590	876,090	937,050	2142,040
Mn,k (kN.m)	3796,061538	3757,338462	2870,369231	2865	2170,476923	531,1230769
Nn,k (kN)	1235,769231	1293,246154	1317,880769	1347,830769	1441,615385	3295,446154
r (%)	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	19600
Diameter tul. (mm)	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,35031847	29,35031847	39,94904459
n pakai	30	30	30	30	30	40

Disain Kolom Tengah Arah Y

KOLOM	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673	43 dan 4
b (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	15,54	27,89	24,11	12,3	13,77	60,99	122,08	128,79	47,7
Nu,k (kN)	424,120	539,520	679,100	778,840	485,770	746,160	1046,980	1915,710	619,470
Mn,k (kN.m)	23,90769231	42,90769231	37,09230769	18,9230769	21,18461538	93,83076923	187,8153846	198,1384615	73,3846154
Nn,k (kN)	652,4923077	830,0307692	1044,769231	1198,21538	747,3384615	1147,938462	1610,738462	2947,246154	953,030769
r (%)	1	1	1	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	14400	14400	19600	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,3503185	29,35031847	29,35031847	29,35031847	39,94904459	29,3503185
n pakai	30	30	36	44	44	44	44	40	30

Disain Kolom Tengah Arah Y

KOLOM	606 dan 676	607 dan 679	601 dan 678	602 dan 682	605 dan 654	585 dan 653	586 dan 652	587 dan 655	588 dan 649
b (mm)	1200	1200	1200	1200	700	700	700	1200	1200
h (mm)	1200	1200	1200	1200	700	700	700	1200	1200
d' (mm)	80	80	80	80	80	80	80	80	80
Mu,k (kN.m)	73,36	51,74	24,69	22,34	13,45	47,2	58,1	13,45	16,78
Nu,k (kN)	1106,570	930,480	961,610	961,290	742,360	656,530	534,040	635,620	735,840
Mn,k (kN.m)	91,7	79,6	37,98461538	27,925	16,8125	59	72,625	16,8125	20,975
Nn,k (kN)	1702,415385	1431,507692	1479,4	1478,90769	1142,092308	1010,046154	821,6	977,8769231	1132,06154
r (%)	1	1	1	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	4900	4900	4900	14400	14400
Diameter tul. (mm)	25	25	25	25	25	25	25	25	25
ΔØ tul. (mm²)	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,35031847	29,35031847	29,3503185	9,987261146	9,987261146	9,987261146	29,35031847	29,3503185
n pakai	30	30	30	30	28	10	12	30	30

Disain Kolom Tengah Arah Y

KOLOM	589 dan 648	590 dan 644	591 dan 642	596 dan 642	597 dan 641	543
b (mm)	1200	1200	1200	1200	1200	1400
h (mm)	1200	1200	1200	1200	1200	1400
d' (mm)	80	80	80	80	80	80
Mu,k (kN.m)	19,54	49,53	41,87	126,2	261,84	504,44
Nu,k (kN)	803,250	840,610	856,590	876,090	937,050	2142,040
Mn,k (kN.m)	30,06153846	76,2	64,41538462	194,1538462	402,8307692	776,06154
Nn,k (kN)	1235,769231	1293,24615	1317,830769	1347,830769	1441,615385	3295,4462
r (%)	1	1	1	1	1	1
As (mm)	14400	14400	14400	14400	14400	19600
Diameter tul. (mm)	25	25	25	25	25	25
$\Delta\phi$ tul. (mm ²)	490,625	490,625	490,625	490,625	490,625	490,625
n tulangan	29,35031847	29,3503185	29,35031847	29,35031847	29,35031847	39,949045
n pakai	30	30	30	30	30	40

KOLOM	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673
Tulangan arah X	30	30	36	44	44	44	44	40
Tulangan arah Y	30	30	36	44	44	44	44	40
Tulangan tiap baris	16	16	19	23	23	23	23	21
Tulangan terpasang	60	60	72	88	88	88	88	80
	60D25	60D25	72D25	88D25	88D25	88D25	88D25	80D25

[illegible]

TABEL PERHITUNGAN TULANGAN GESER KOLOM TEPI									
KOLOM	128 dan 440	137 dan 438	321 dan 436	535 da 446	151 dan 444	153 dan 442	155 dan 453	12 dan 457	41 dan 2
f _c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9
f _y (Mpa)	390	390	390	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h kolom (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d kolom (mm)	1120	1120	1120	1120	1120	1120	1120	1320	1120
P _u (kN)	340,600	401,090	500,120	579,540	210,780	549,580	834,090	1023,890	512,740
V _u (kN)	2060,7645	1170,948571	2384,0025	2290,205623	1548,167555	1112,128691	900,4807364	392,4705	337,9214083
V _s (kN)	3434,608	1951,581	3973,338	3817,009	2580,279	1853,548	1500,801	654,118	563,202
Dalam Sendi Plastis									
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A ₁ Ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	67,522	118,832	58,367	60,757	89,878	125,117	154,524	417,849	411,770
Pakai Tulangan	2D13-60	2D13-100	2D13-50	2D13-60	2D13-80	2D13-100	2D13-100	2D13-100	2D13-100
Luar Sendi Plastis									
V _c (kN)	1136,642	1139,996	1145,487	1149,890	1129,444	1148,229	1164,003	1594,265	1146,186
V _{s1} (kN)	2297,965	811,585	2827,851	2667,119	1450,835	705,319	336,798	-940,148	-582,984
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A ₁ Ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	100,920	285,749	82,009	86,951	159,846	328,801	688,573	-290,723	-397,798
Pakai Tulangan	2D13-100	2D13-200	2D13-80	2D13-80	2D13-150	2D13-200	2D13-200	2D13-200	2D13-200

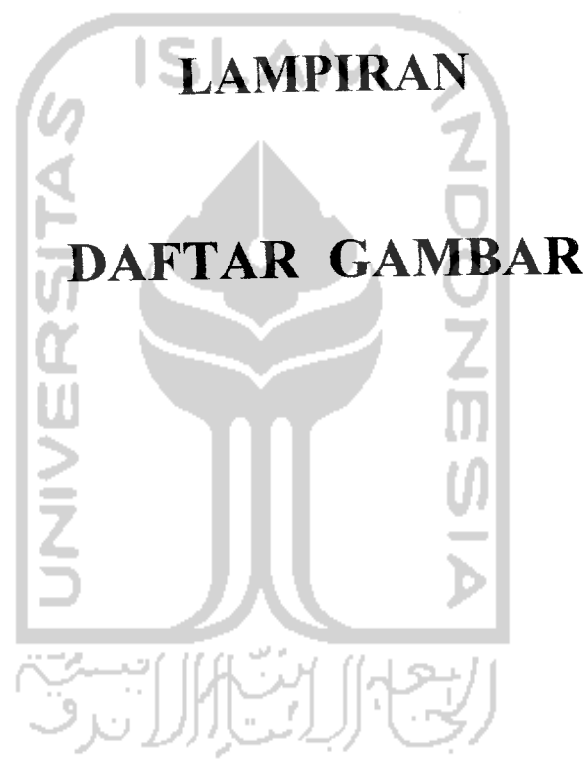
TABEL PERHITUNGAN TULANGAN GESER KOLOM TEPI										
KOLOM	309 dan 462	311 dan 467	301 dan 465	303 dan 472	307 dan 414	274 dan 412	275 dan 411	278 dan 416	281 dan 401	
f _c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9
f _y (Mpa)	390	390	390	390	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	700	700	700	1200	1200	1200
h kolom (mm)	1200	1200	1200	1200	700	700	700	1200	1200	1200
d kolom (mm)	1120	1120	1120	1120	620	620	620	1120	1120	1120
P _u (kN)	821,860	728,120	753,220	747,660	547,580	489,900	380,510	479,040	563,080	563,080
V _u (kN)	747,5623202	1238,639547	2078,58	3204,7365	2279,2635	1129,124169	1093,7535	2520,6465	2125,2045	2125,2045
V _s (kN)	1245,937	2064,399	3464,300	5341,228	3798,773	1881,874	1822,923	4201,078	3542,008	3542,008
Dalam Sendi Plastis										
Pakai Diameter	13	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	186,133	112,338	66,943	43,419	33,795	68,219	70,425	55,202	65,474	65,474
Pakai Tulangan	2D13-100	2D13-100	2D13-60	2D13-40	2D13-30	2D13-60	2D13-70	2D13-50	2D13-60	2D13-60
Luar Sendi Plastis										
V _c (kN)	1163,325	1158,128	1159,520	1159,211	389,754	385,667	380,963	1144,318	1148,977	1148,977
V _{s1} (kN)	82,612	906,271	2304,780	4182,016	3409,019	1496,207	1441,959	3056,760	2393,030	2393,030
Pakai Diameter	13	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	2807,219	255,894	100,621	55,454	37,659	85,803	89,031	75,868	96,911	96,911
Pakai Tulangan	2 D13-200	2 D13-200	2 D13-100	2 D13-50	2 D13-30	2 D13-80	2 D13-80	2 D13-70	2 D13-90	2 D13-90

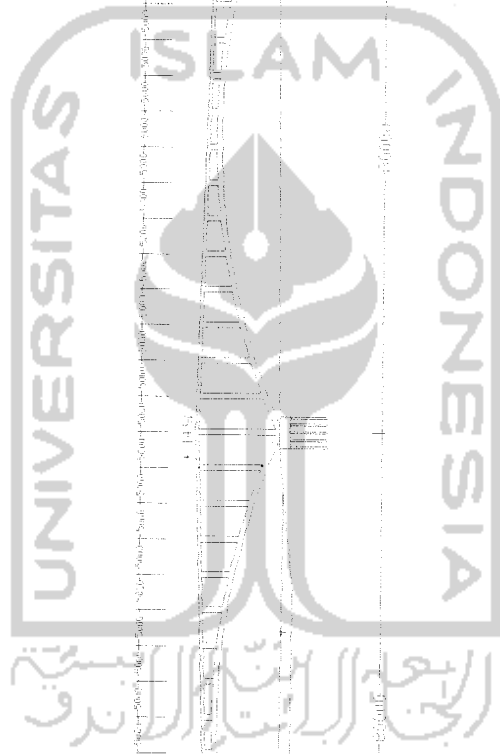
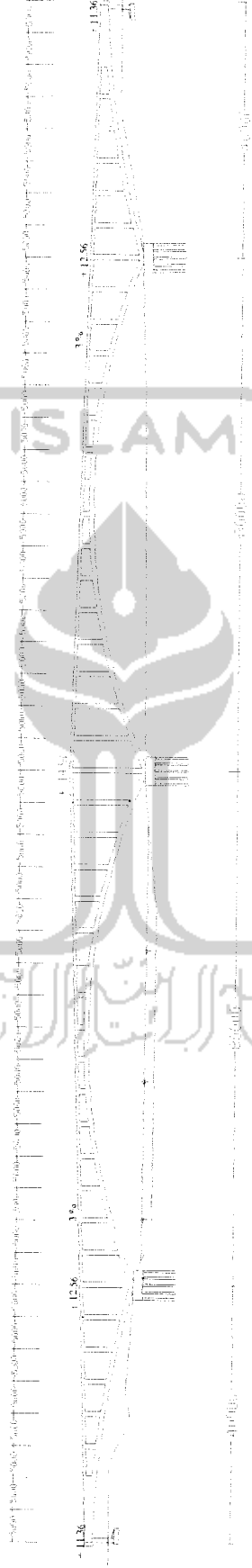
TABEL PERHITUNGAN TULANGAN GESER KOLOM TEPI						
KOLOM	283 dan 398	285 dan 393	287 dan 389	294 dan 386	296 dan 385	1
f _c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9
f _y (Mpa)	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	1200	1400
h kolom (mm)	1200	1200	1200	1200	1200	1400
d kolom (mm)	1120	1120	1120	1120	1120	1320
P _u (kN)	620,830	649,890	656,700	670,730	696,750	1324,250
V _u (kN)	1604,897371	1093,150013	709,3689228	435,9688228	224,868466	160,3709091
V _s (kN)	2674,829	1821,917	1182,282	726,615	374,781	267,285
Dalam Sendi Plastis						
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
A _{1ø}	132,732	132,732	132,732	132,732	132,732	132,732
S	86,701	127,289	196,155	319,165	618,788	1022,588
Pakai Tulangan	2 D13-80	2 D13-100	2 D13-100	2 D13-100	2 D13-100	2 D13-100
Luar Sendi Plastis						
V _c (kN)	1152,179	1153,790	1154,168	1154,946	1156,388	1611,088
V _{s1} (kN)	1522,650	668,126	28,113	-428,331	-781,608	-1343,803
Pakai Diameter	10	10	10	10	10	10
Jml Kaki	4	4	4	4	4	4
A _{1ø}	78,540	78,540	78,540	78,540	78,540	78,540
S	90,122	205,387	4881,101	-320,371	-175,567	-120,352
Pakai Tulangan	2 D13-90	2 D13-200	2 D13-200	2 D13-200	2 D13-200	2 D13-200

TABEL PERHITUNGAN TULANGAN GESER KOLOM TENGAH									
KOLOM	551 dan 663	555 dan 662	613 dan 661	773 dan 666	560 dan 665	561 dan 664	562 dan 670	544 dan 673	43 dan 4
f _c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9
f _y (Mpa)	390	390	390	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
h kolom (mm)	1200	1200	1200	1200	1200	1200	1200	1400	1200
d kolom (mm)	1120	1120	1120	1120	1120	1120	1120	1320	1120
P _u (kN)	424,120	539,520	679,100	778,840	485,770	746,160	1046,980	1915,710	619,470
V _u (kN)	2560,4217	1738,617143	3020,84394	2726,508603	1746,6945	1427,882327	1131,726901	344,9805	490,8979374
V _s (kN)	4267,370	2897,695	5034,740	4544,181	2911,158	2379,804	1886,212	574,968	818,163
Dalam Sendi Plastis									
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	54,345	80,033	46,062	51,034	79,662	97,449	122,950	475,370	283,452
Pakai Tulangan	2D13-50	2D13-80	2D13-40	2D13-50	2D13-70	2D13-90	2D13-100	2D13-100	2D13-100
Luar Sendi Plastis									
V _c (kN)	1141,273	1147,671	1155,410	1160,940	1144,691	1159,128	1175,807	1644,216	1152,104
V _{s1} (kN)	3126,097	1750,024	3879,330	3383,241	1766,467	1220,676	710,405	-1069,249	-333,941
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	74,185	132,518	59,781	68,547	131,285	189,985	326,448	-255,621	-694,464
Pakai Tulangan	2D13-70	2D13-130	2D13-50	2D13-60	2D13-130	2D13-180	2D13-200	2D13-200	2D13-200

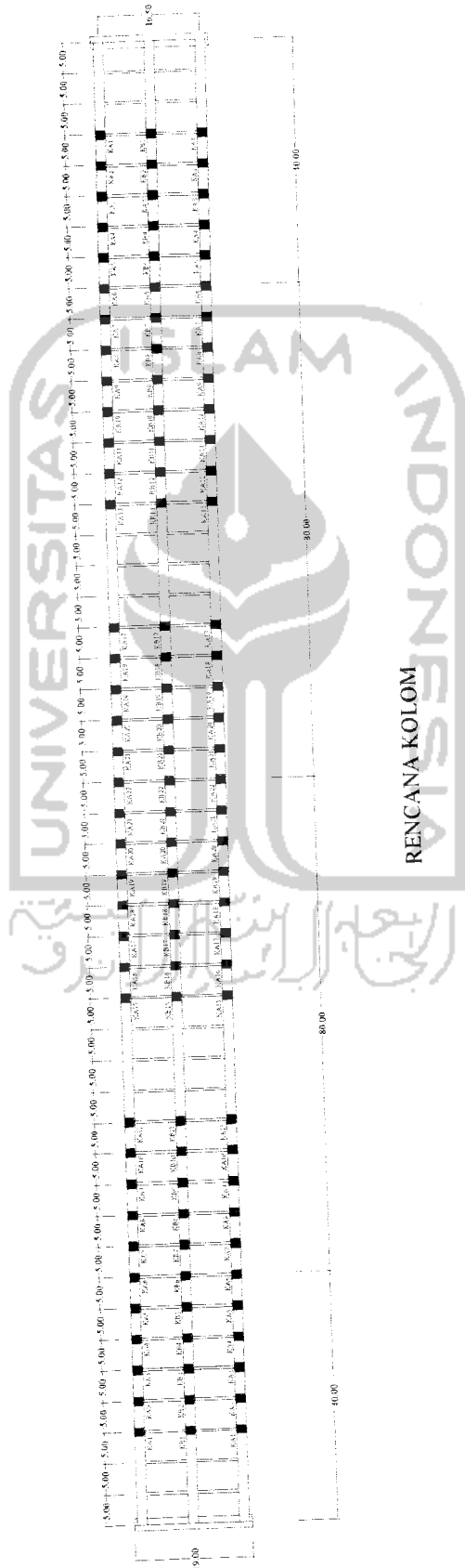
TABEL PERHITUNGAN TULANGAN GESER KOLOM TENGAH									
KOLOM	606 dan 676	607 dan 679	601 dan 678	602 dan 682	605 dan 654	585 dan 653	586 dan 652	587 dan 655	588 dan 649
f'c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9	24,9
fy (Mpa)	390	390	390	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	700	700	700	1200	1200
h kolom (mm)	1200	1200	1200	1200	700	700	700	1200	1200
d kolom (mm)	1120	1120	1120	1120	620	620	620	1120	1120
Pu (kN)	1106,570	930,480	961,610	961,290	742,360	656,530	534,040	635,620	735,840
Vu (kN)	988,7607862	1506,003	2526,125179	3435,8955	2103,327	1214,556541	1402,134	2805,8625	2551,906977
Vs (kN)	1647,935	2510,005	4210,209	5726,493	3505,545	2024,261	2336,890	4676,438	4253,178
Dalam Sendi Plastik									
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	140,728	92,394	55,083	40,498	36,622	63,420	54,936	49,591	54,526
Pakai Tulangan	2D13-100	2D13-90	2D13-50	2D13-40	2D13-30	2D13-60	2D13-50	2D13-40	2D13-50
Luar Sendi Plastik									
Vc (kN)	1179,111	1169,348	1171,074	1171,056	400,002	395,486	389,041	1152,999	1158,556
Vs1 (kN)	468,824	1340,657	3039,135	4555,437	3105,543	1628,775	1947,849	3523,438	3094,622
Pakai Diameter	13	13	13	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732	132,732
S	494,663	172,982	76,308	50,908	41,339	78,819	65,908	65,819	74,940
Pakai Tulangan	2 D13-200	2 D13-170	2 D13-70	2 D13-50	2 D13-40	2 D13-70	2 D13-60	2 D13-60	2 D13-70

TABEL PERHITUNGAN TULANGAN GESER KOLOM TENGAH						
KOLOM	589 dan 648	590 dan 644	591 dan 643	596 dan 642	597 dan 641	543
f_c (Mpa)	24,9	24,9	24,9	24,9	24,9	24,9
f_y (Mpa)	390	390	390	390	390	390
b kolom (mm)	1200	1200	1200	1200	1200	1400
h kolom (mm)	1200	1200	1200	1200	1200	1400
d kolom (mm)	1120	1120	1120	1120	1120	1320
Pu (kN)	803,250	840,610	856,590	876,090	937,050	2142,040
Vu (kN)	1776,0495	1150,506	711,8436606	538,1279138	322,4370801	181,9927273
Vs (kN)	2960,083	1917,510	1186,406	896,880	537,395	303,321
Dalam Sendi Plastik						
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732
S	78,346	120,943	195,473	258,574	431,544	901,099
Pakai Tulangan	2 D13-70	2 D13-100	2 D13-100	2 D13-100	2 D13-100	2 D13-100
Luar Sendi Plastik						
Vc (kN)	1162,293	1164,365	1165,251	1166,332	1169,712	1656,893
Vs1 (kN)	1797,789	753,145	21,155	-269,452	-632,317	-1353,572
Pakai Diameter	13	13	13	13	13	13
Jml Kaki	4	4	4	4	4	4
A1ø	132,732	132,732	132,732	132,732	132,732	132,732
S	128,997	307,922	10962,266	-860,672	-366,762	-201,927
Pakai Tulangan	2 D13-120	2 D13-200	2 D13-200	2 D13-200	2 D13-200	3 D13-200

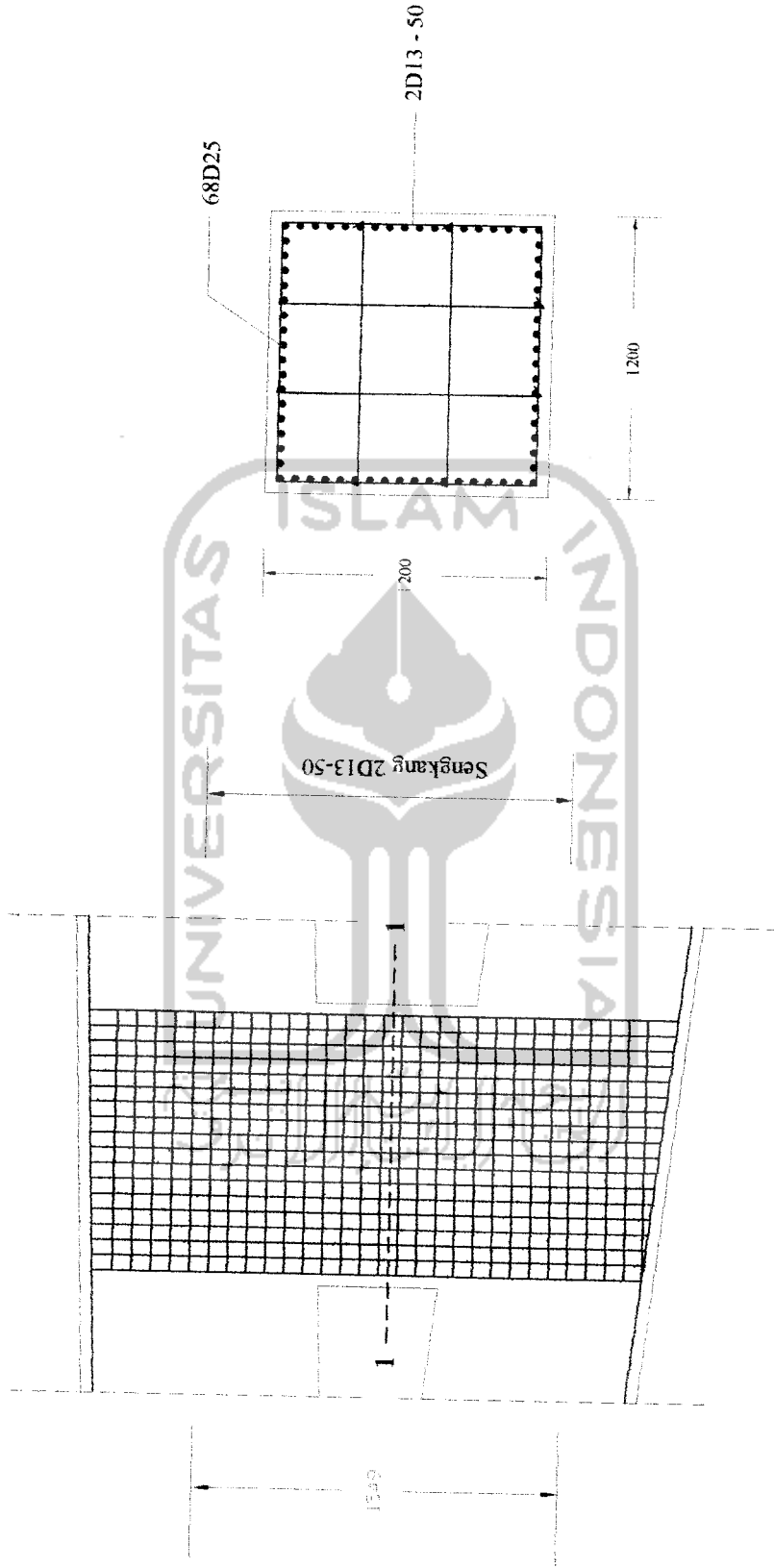




PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	GAMBAR TAMPAK MEMANJANG JEMBATAN KRETEK II				

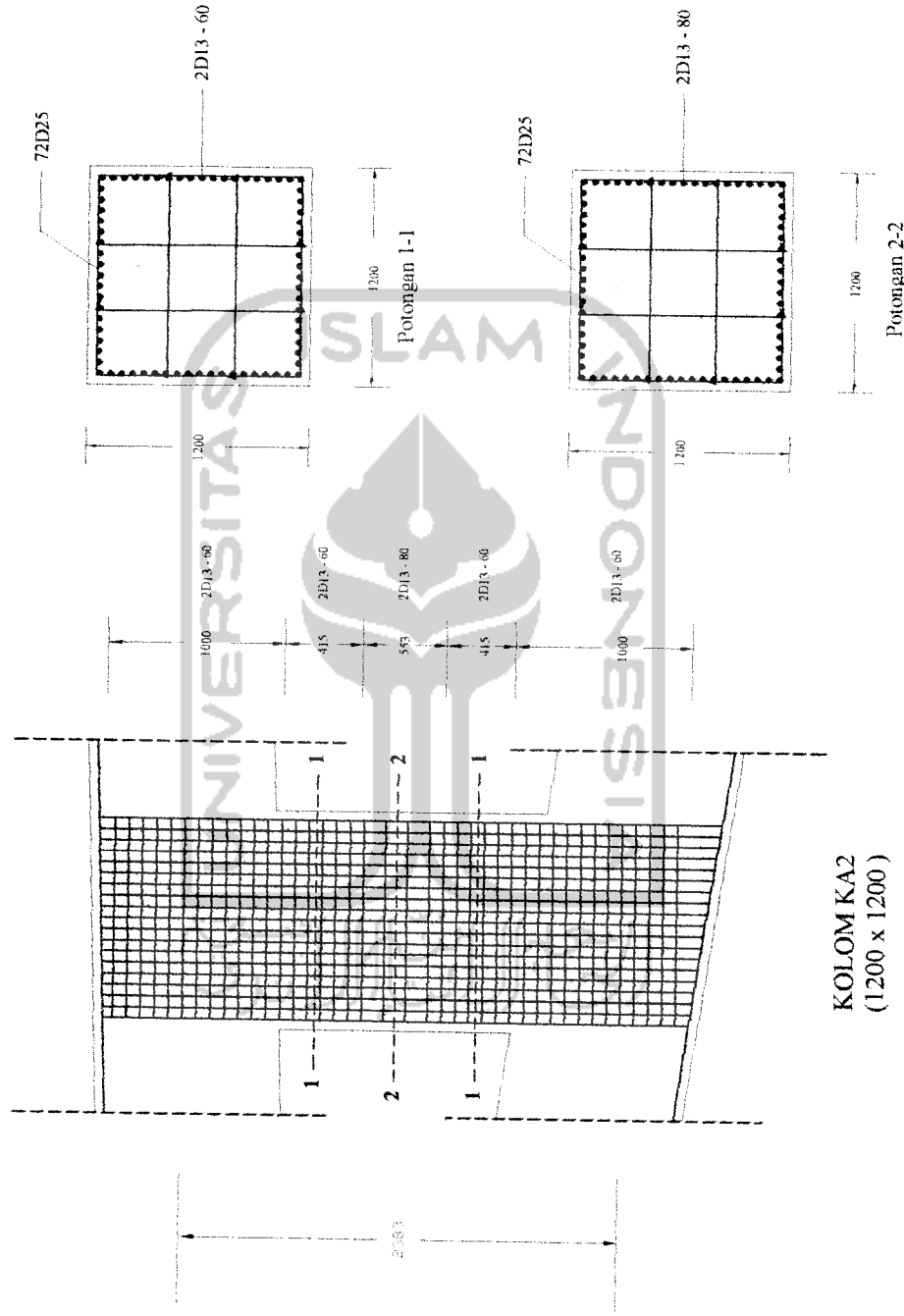


JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	RENCANA KOLOM			

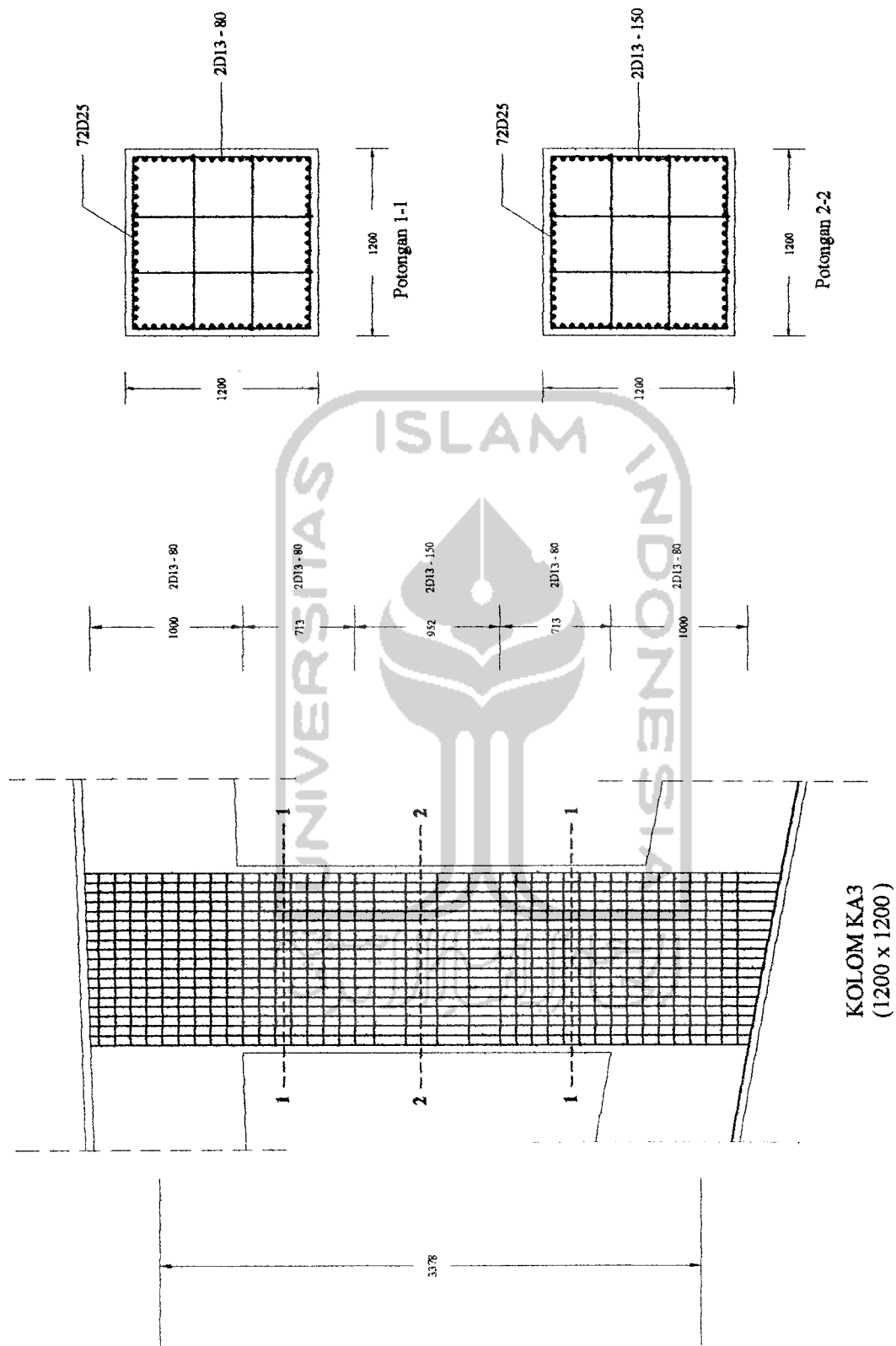


KOLOM KAI
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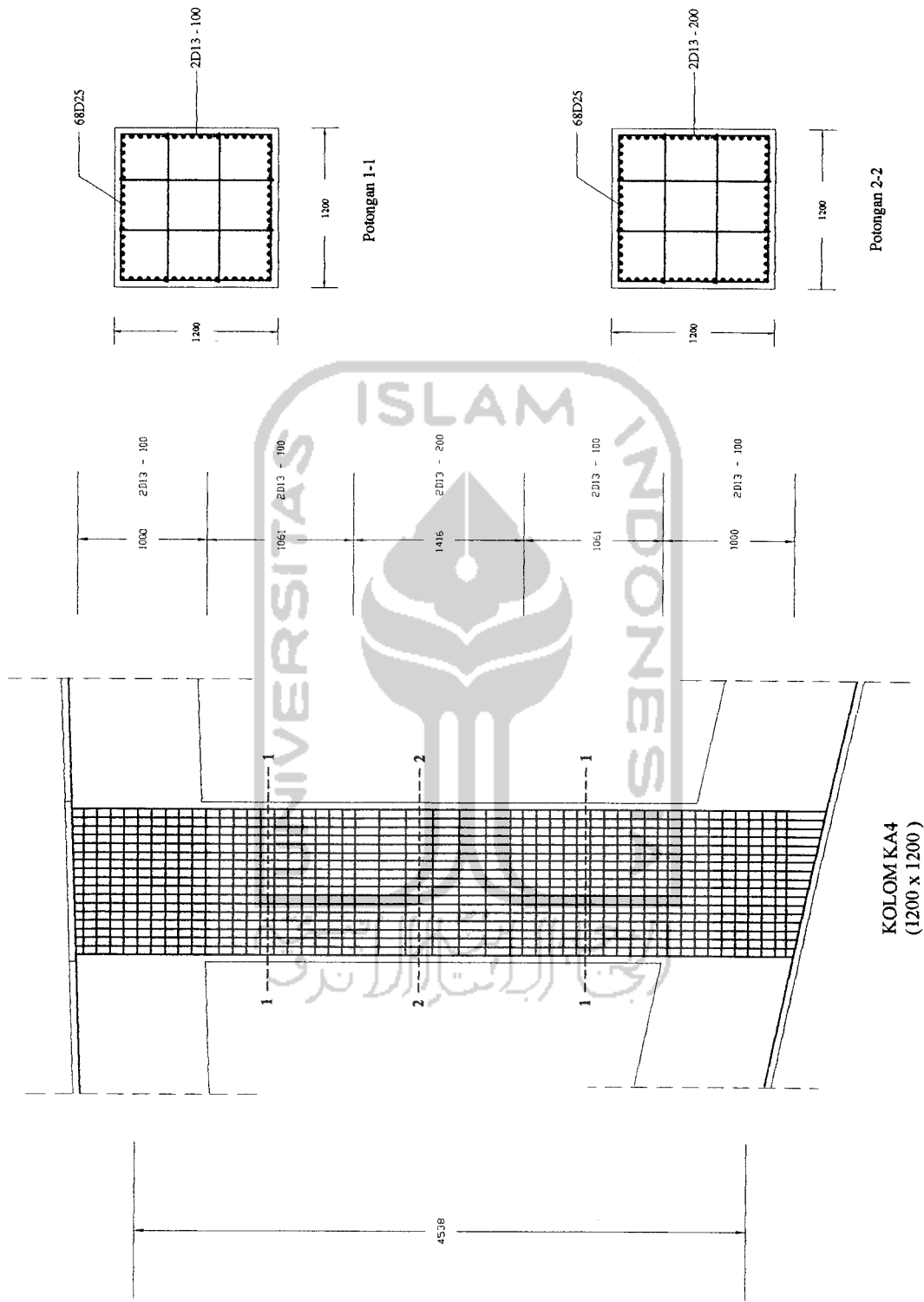
PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul	JUDUL GAMBAR DETIL PENULANGAN KOLOM KA I	SKALA	KODE	NO	JML. LBR



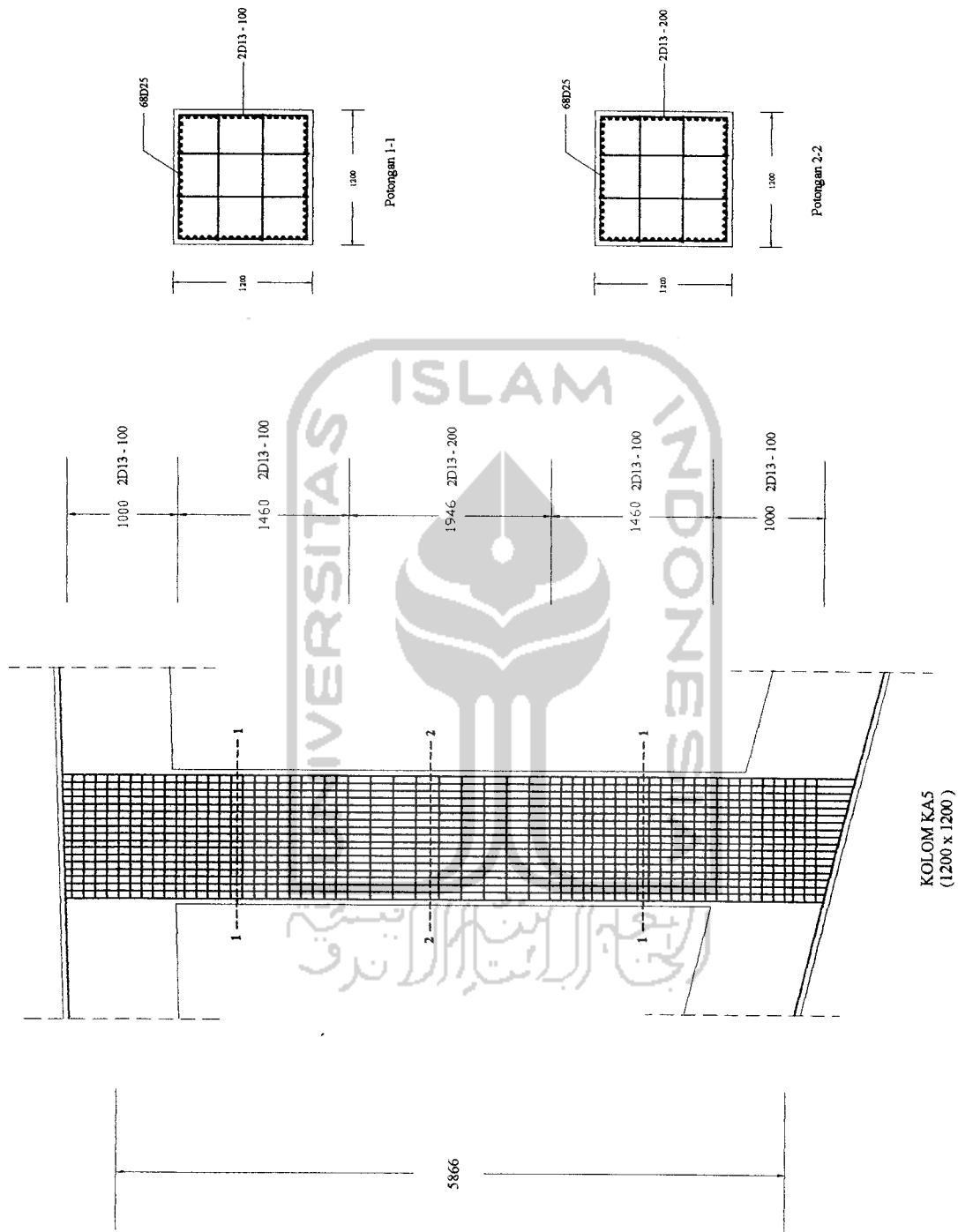
JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	DETIL PENULANGAN KOLOM KA 2			



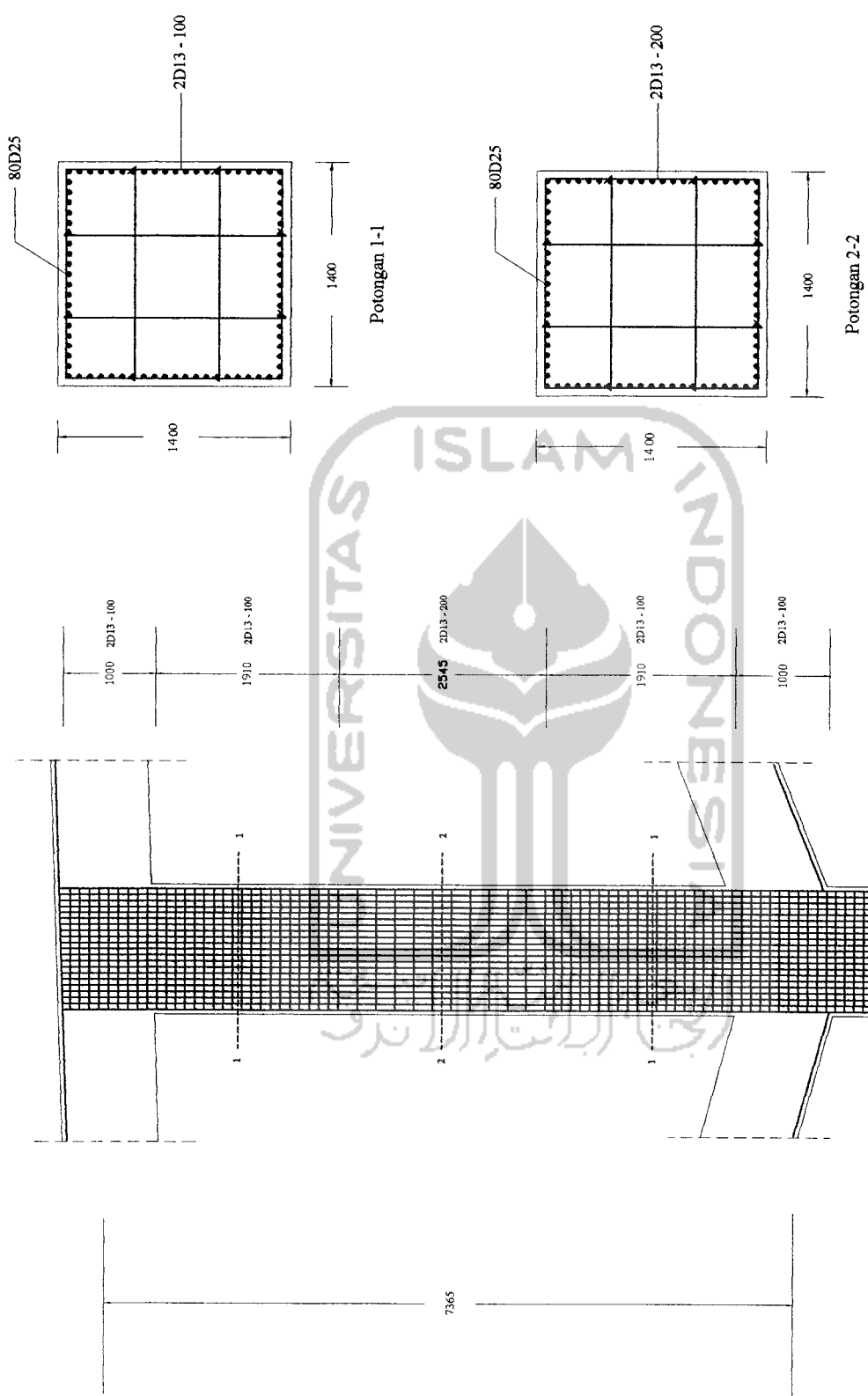
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 3				



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 4				

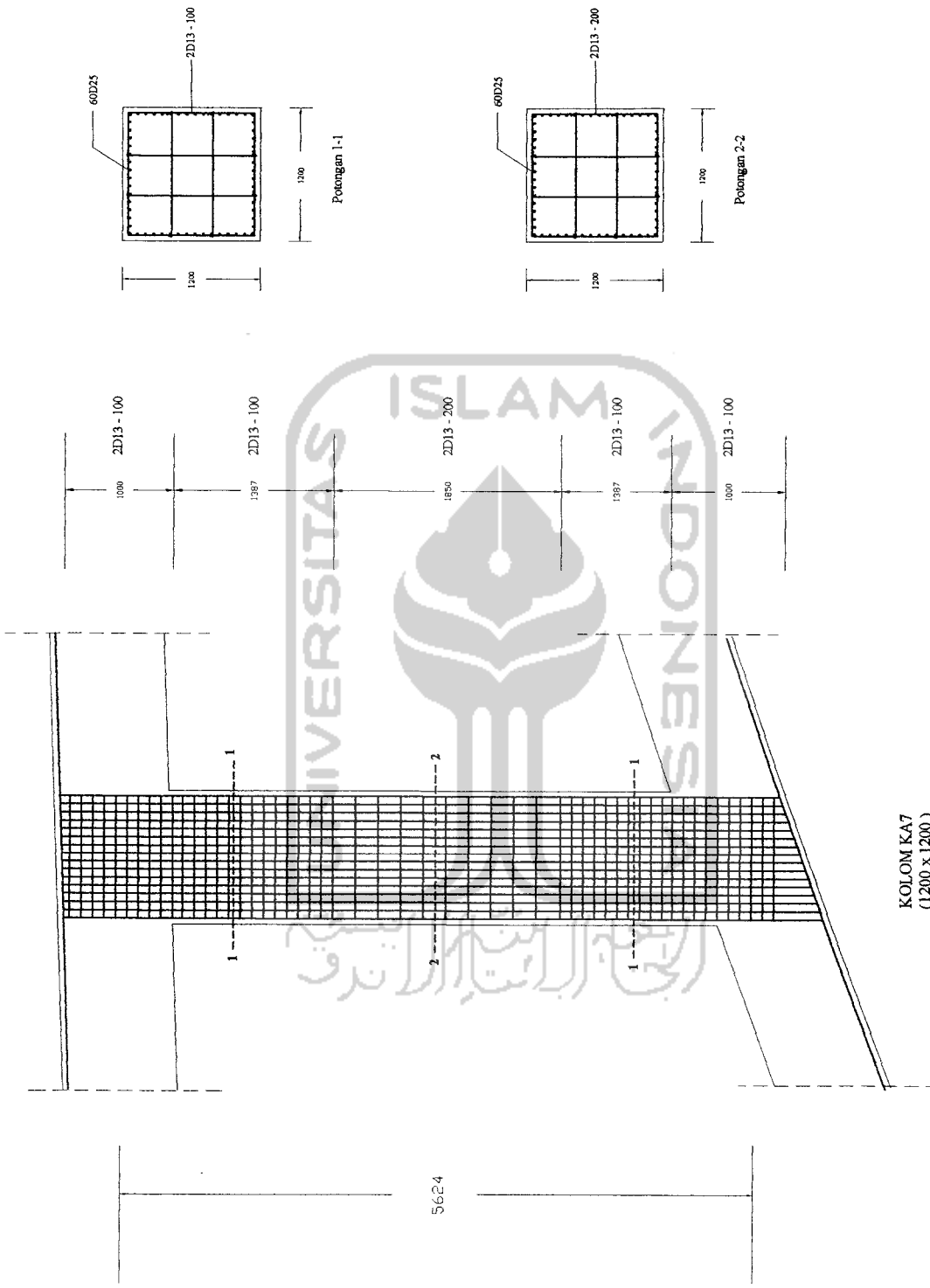


PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 5				

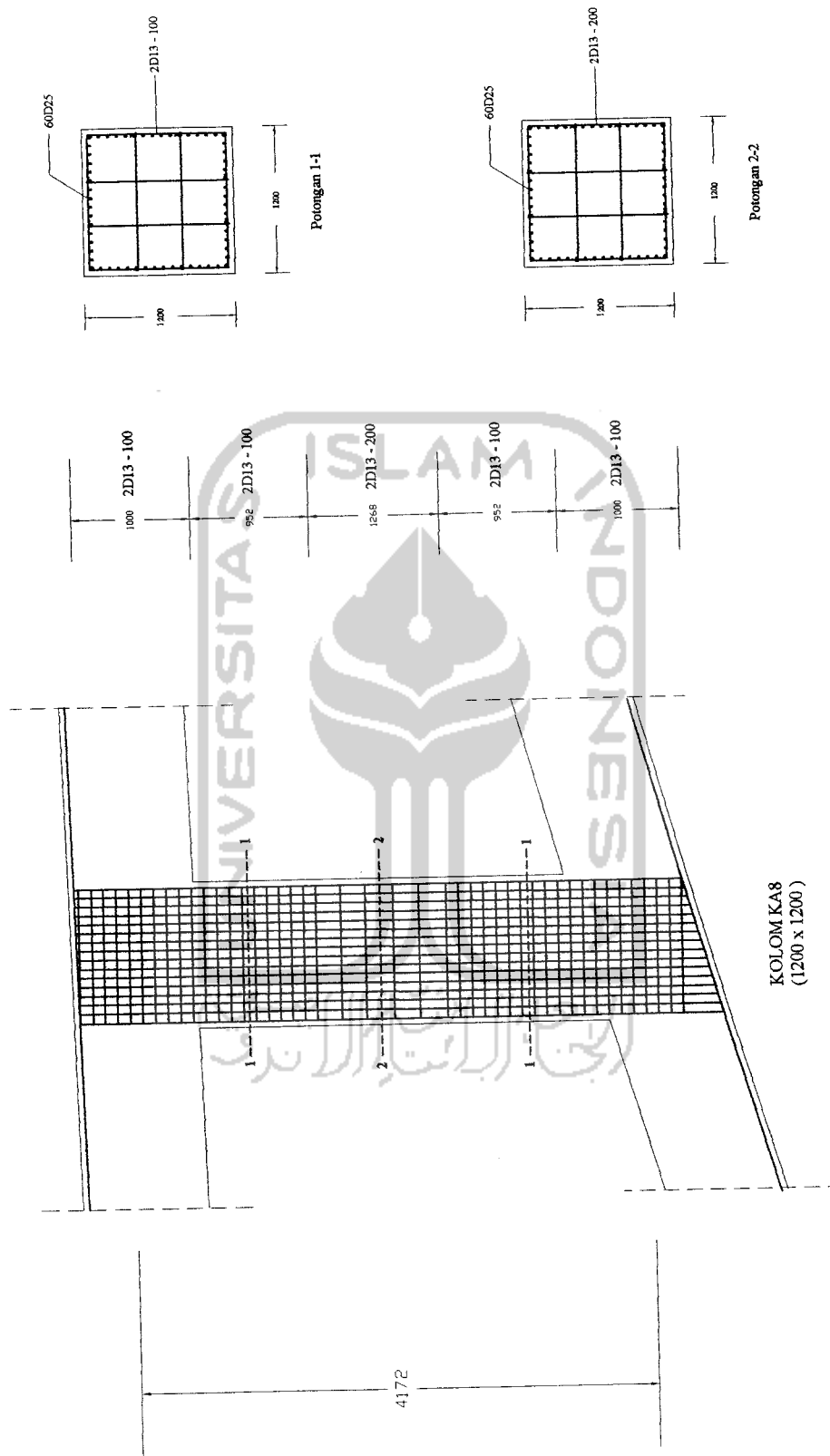


KOLOM KA6
(1400 x 1400)

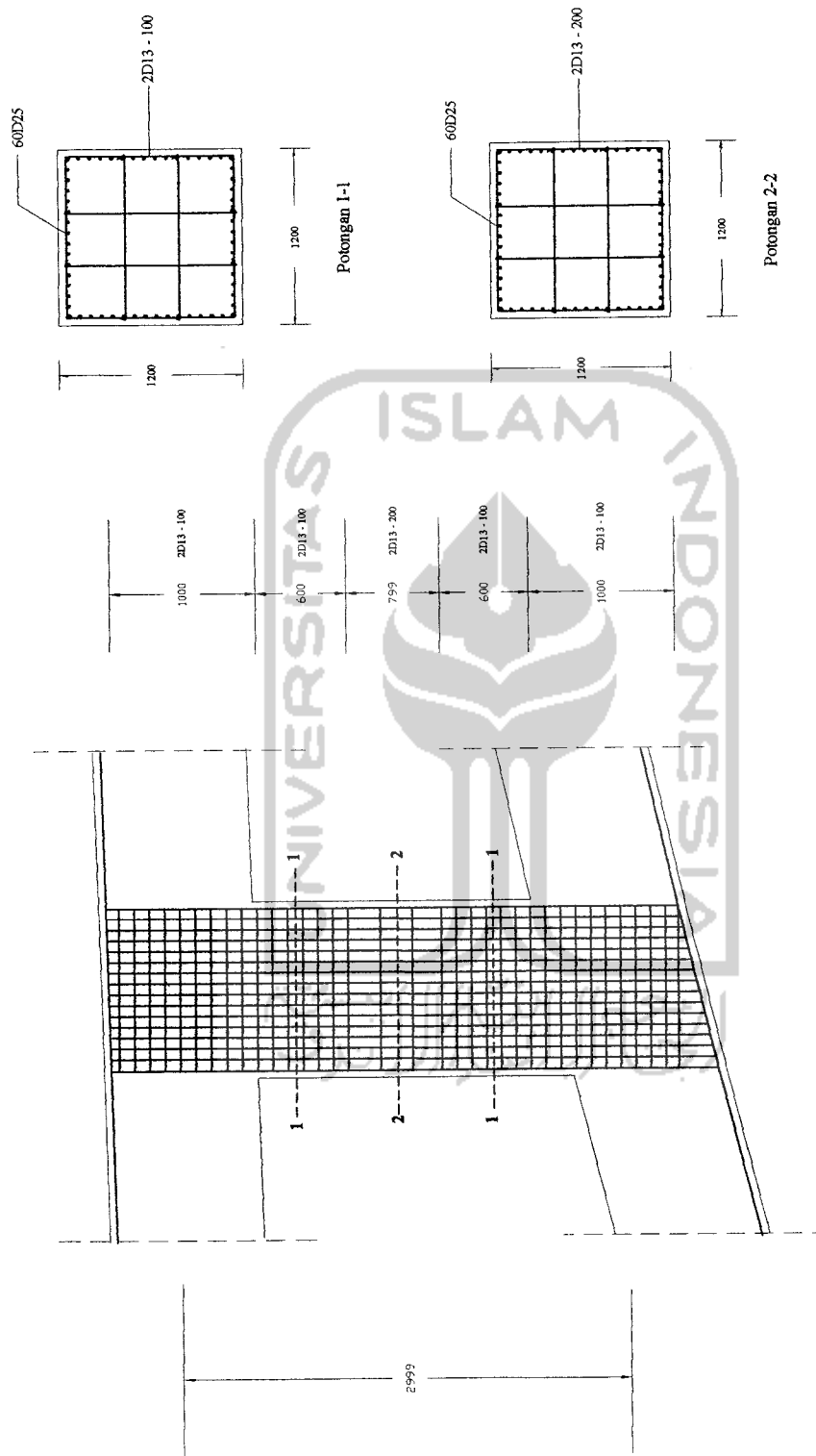
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 6				



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML, LBR
	DETIL PENULANGAN KOLOM KA 7				

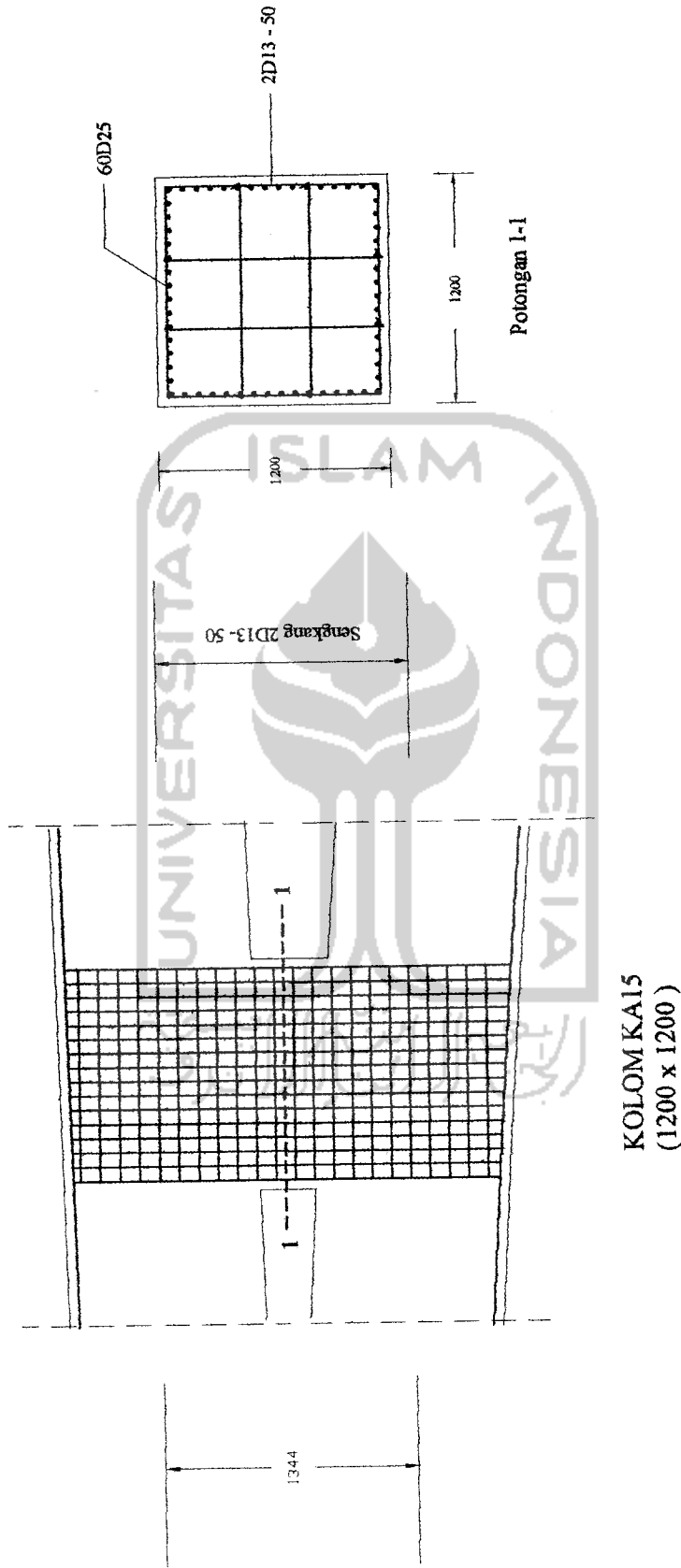


PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 4				



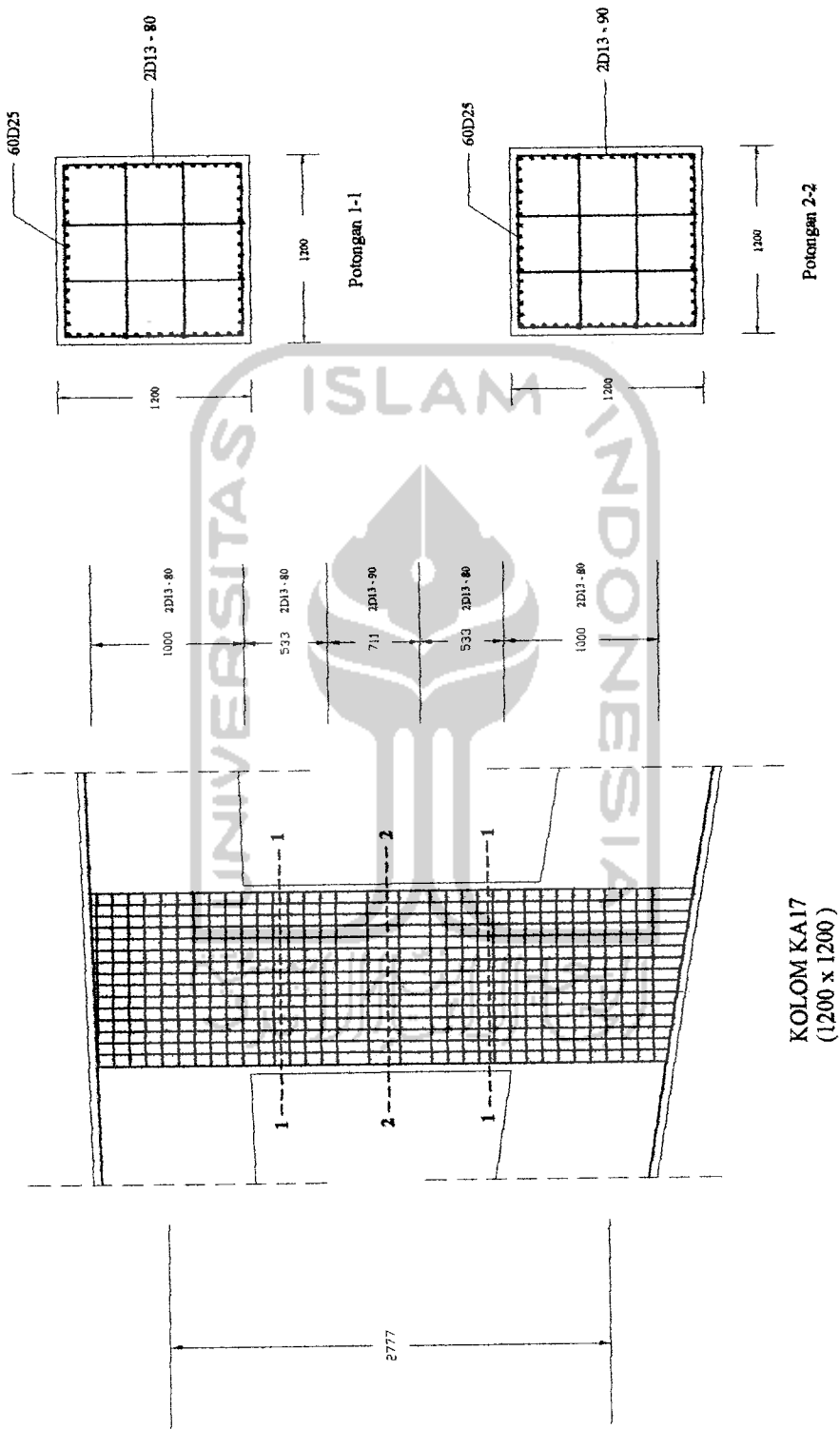
KOLOM KA9
(1200 x 1200)

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 9				

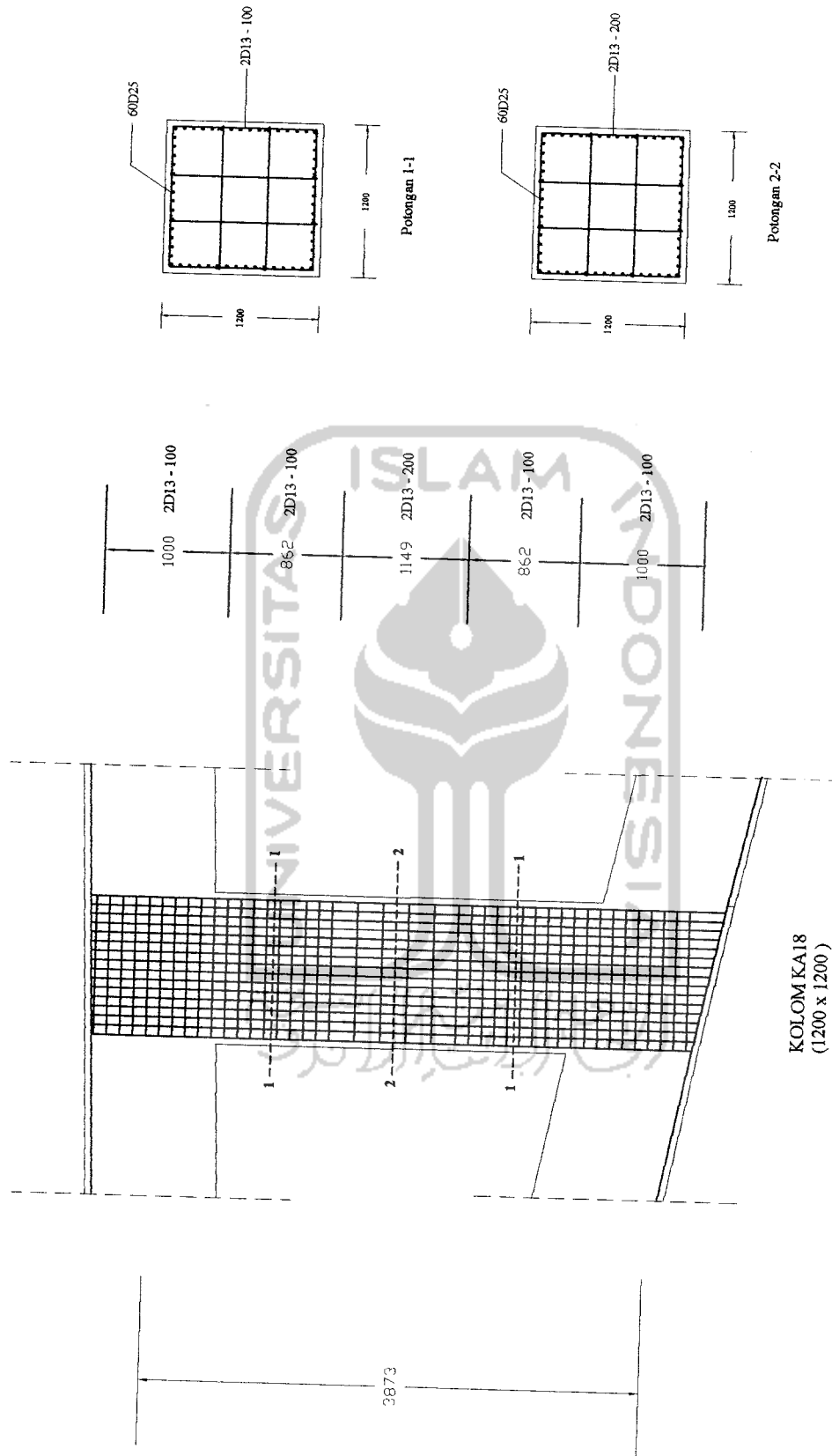


KOLOM KA15
(1200 x 1200)

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 15				



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KAI17				



PERENCANAAN JEMBATAN BETON BERTULANG
 TYPE GELAGAR LENGKUNG (ARCH BRIDGE)
 DI ATAS SUNGAI KRETEK BANTUL

JUDUL GAMBAR

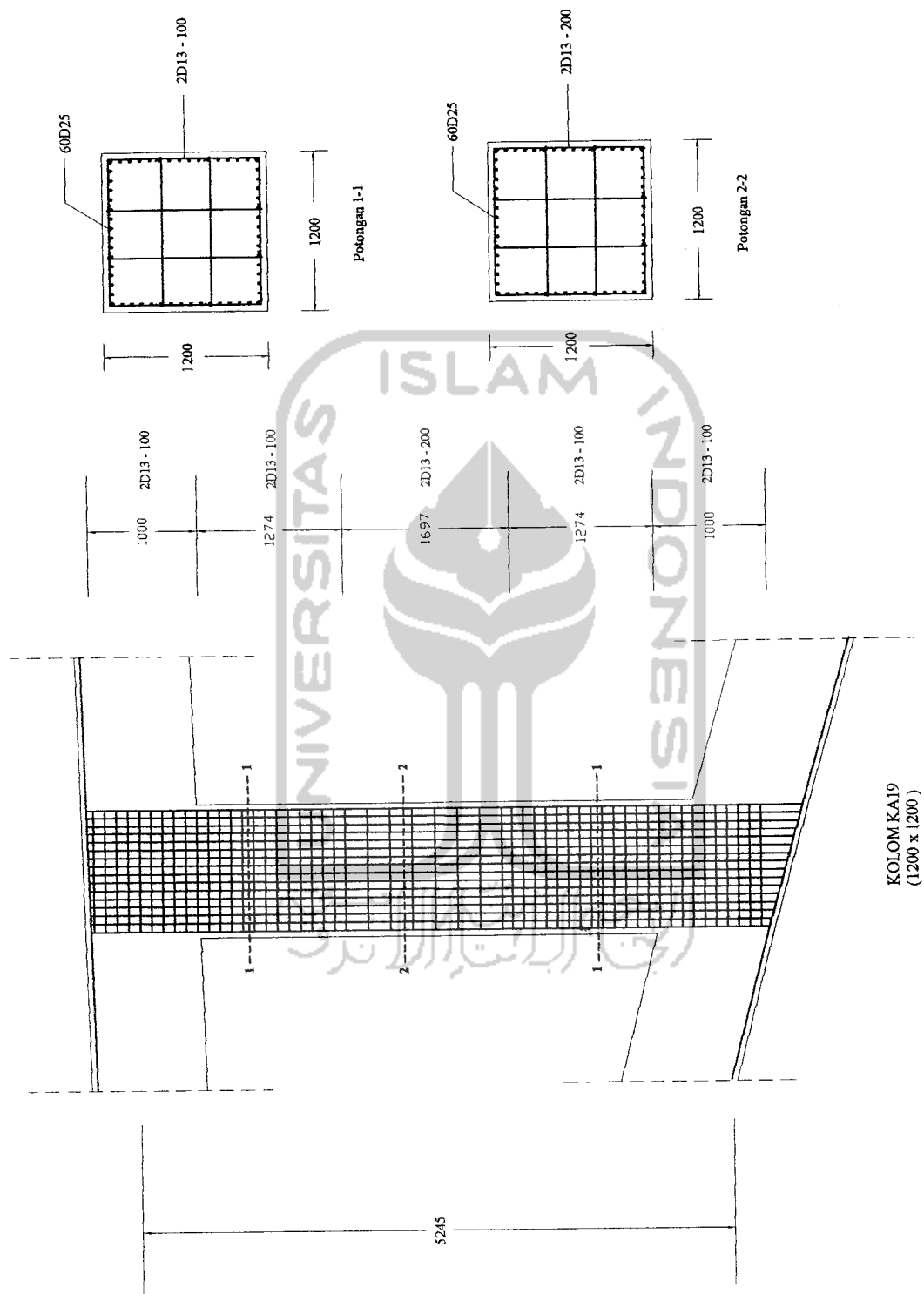
DETIL PENULANGAN
 KOLOM KA 18

SKALA

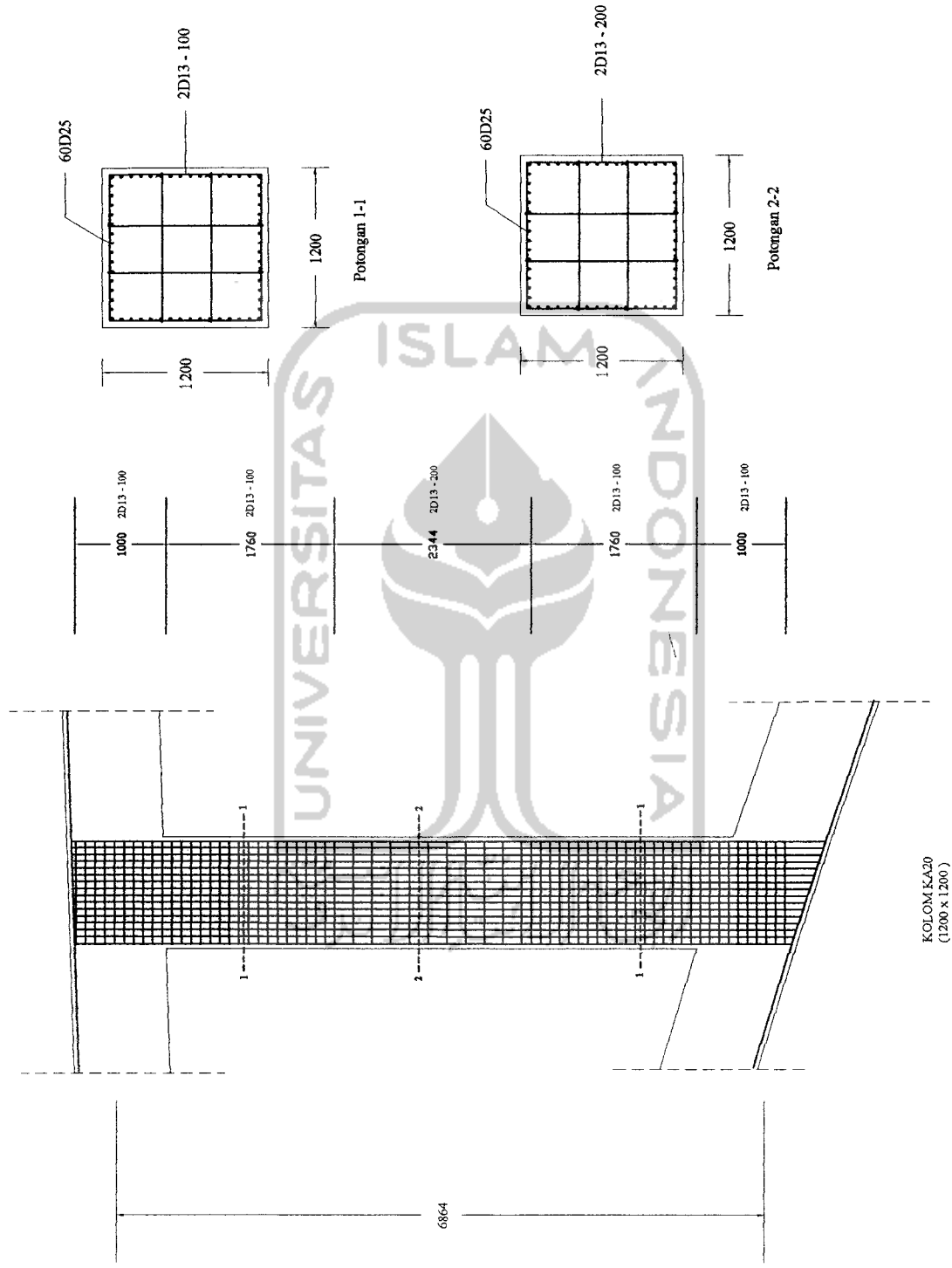
KODE

NO

JML. LBR



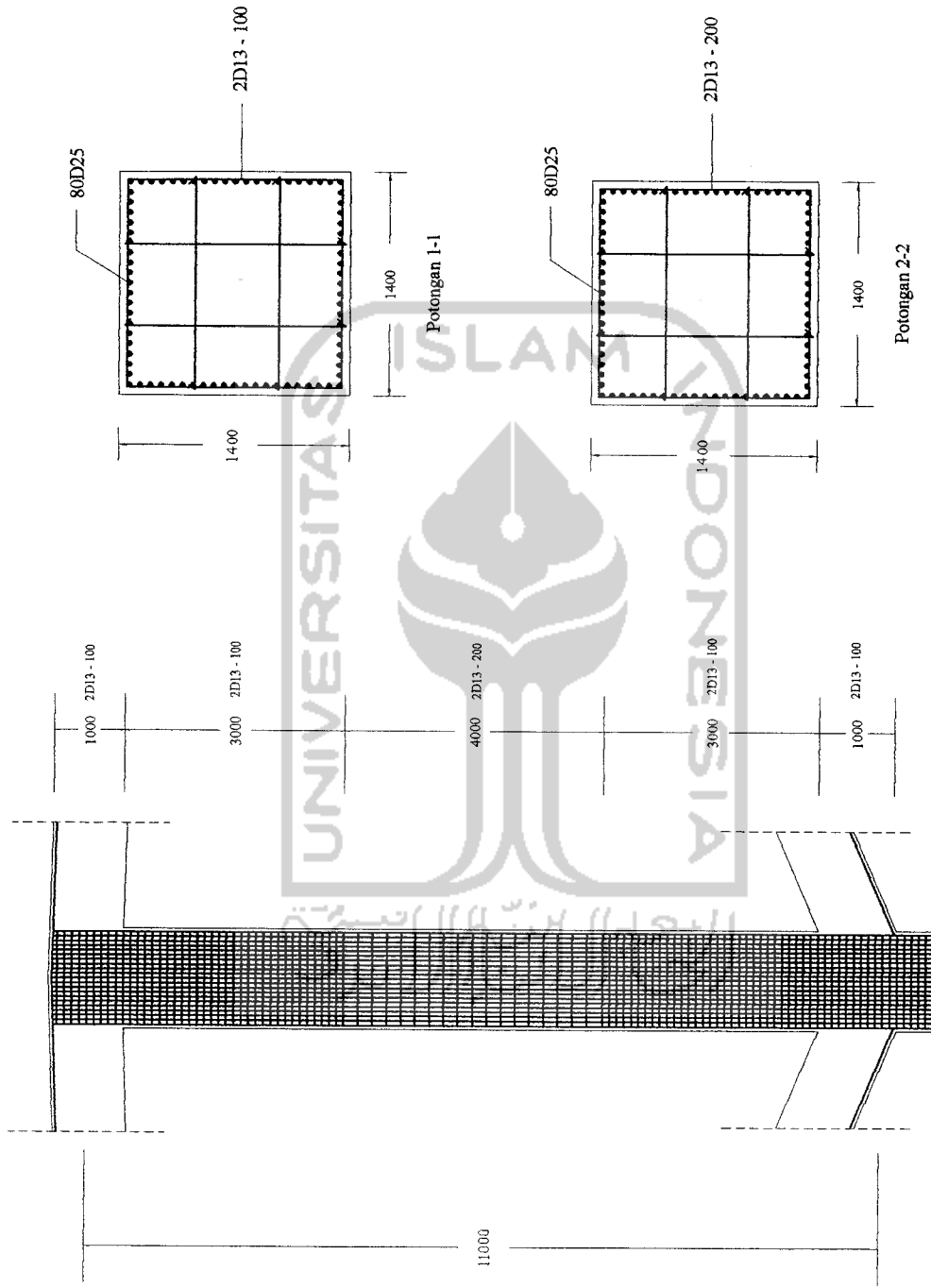
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KA 19				



KOLOM KA20
(1200 x 1200)

PERENCANAAN JEMBATAN BETON BERTULANG
TIPE GELAGAR LINGKUNG (*ARCH BRIDGE*)
DI ATAS SUNGAI KRETEK BANTUL

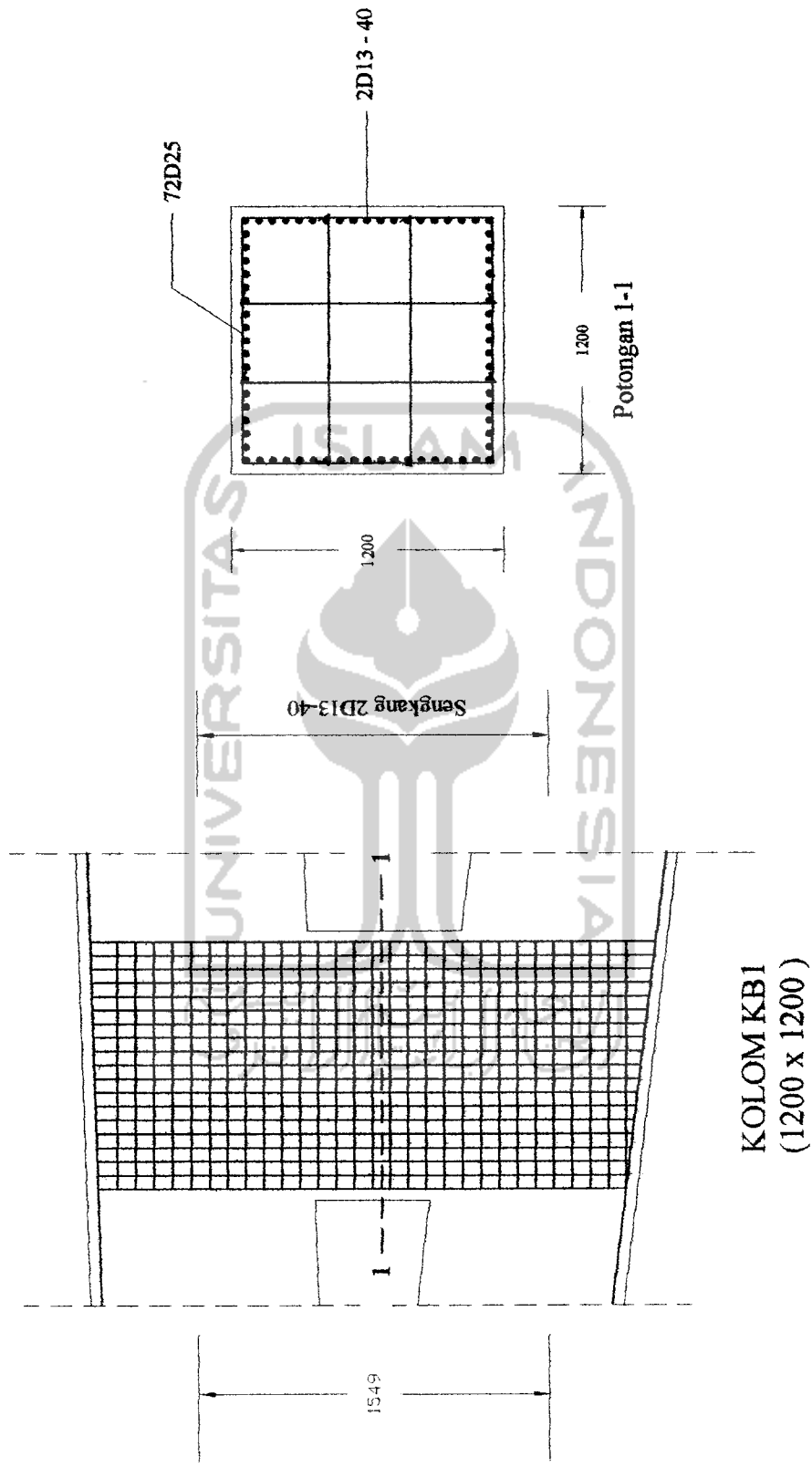
JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
DETIL PENULANGAN KOLOM KA 20				



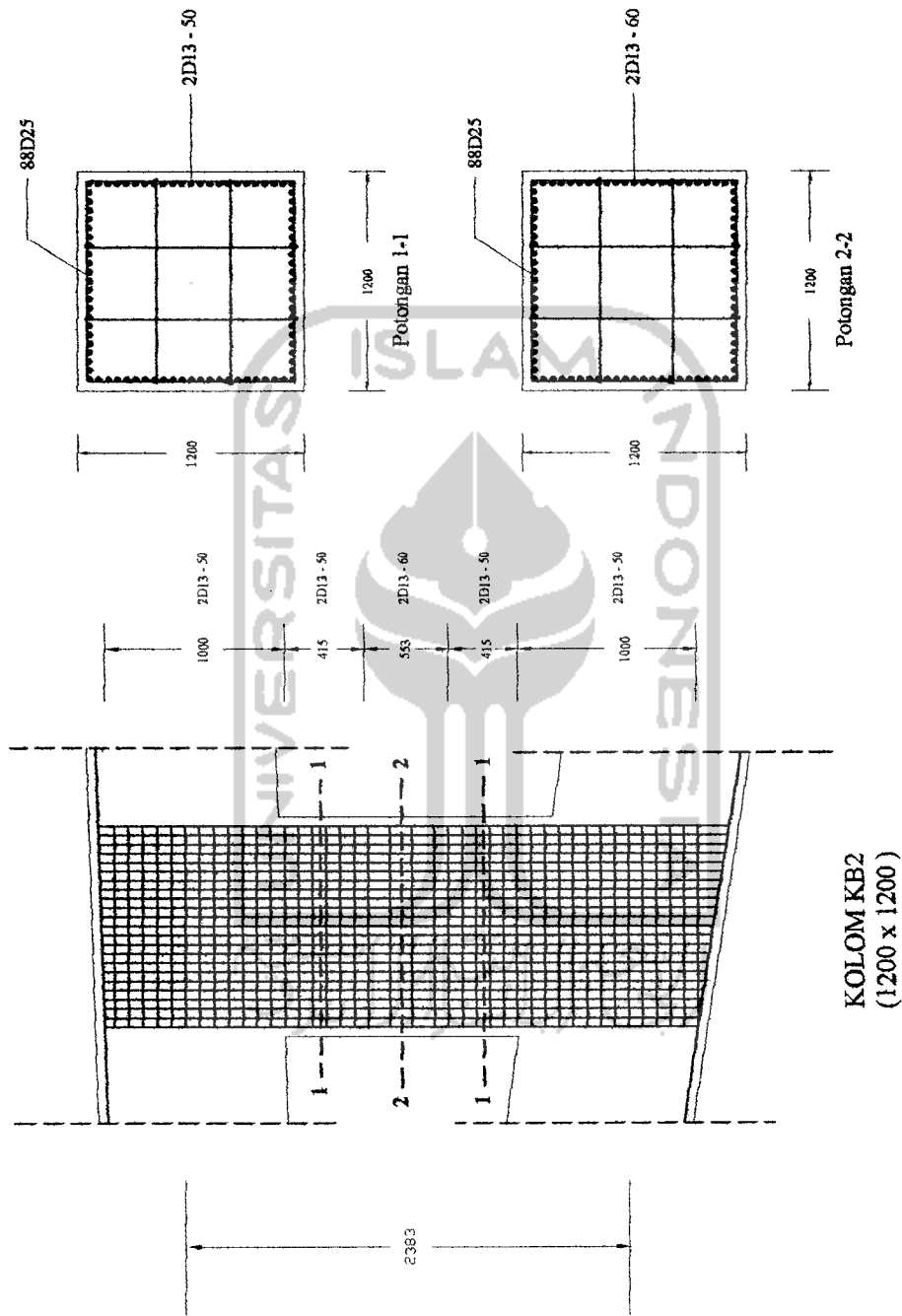
KOLOM KA22
(1400 x 1400)

PERENCANAAN JEMBATAN BETON BERTULANG
TIPE GELAGAR LENGKUNG (*ARCH BRIDGE*)
DI ATAS SUNGAI KRETEK BANTUL

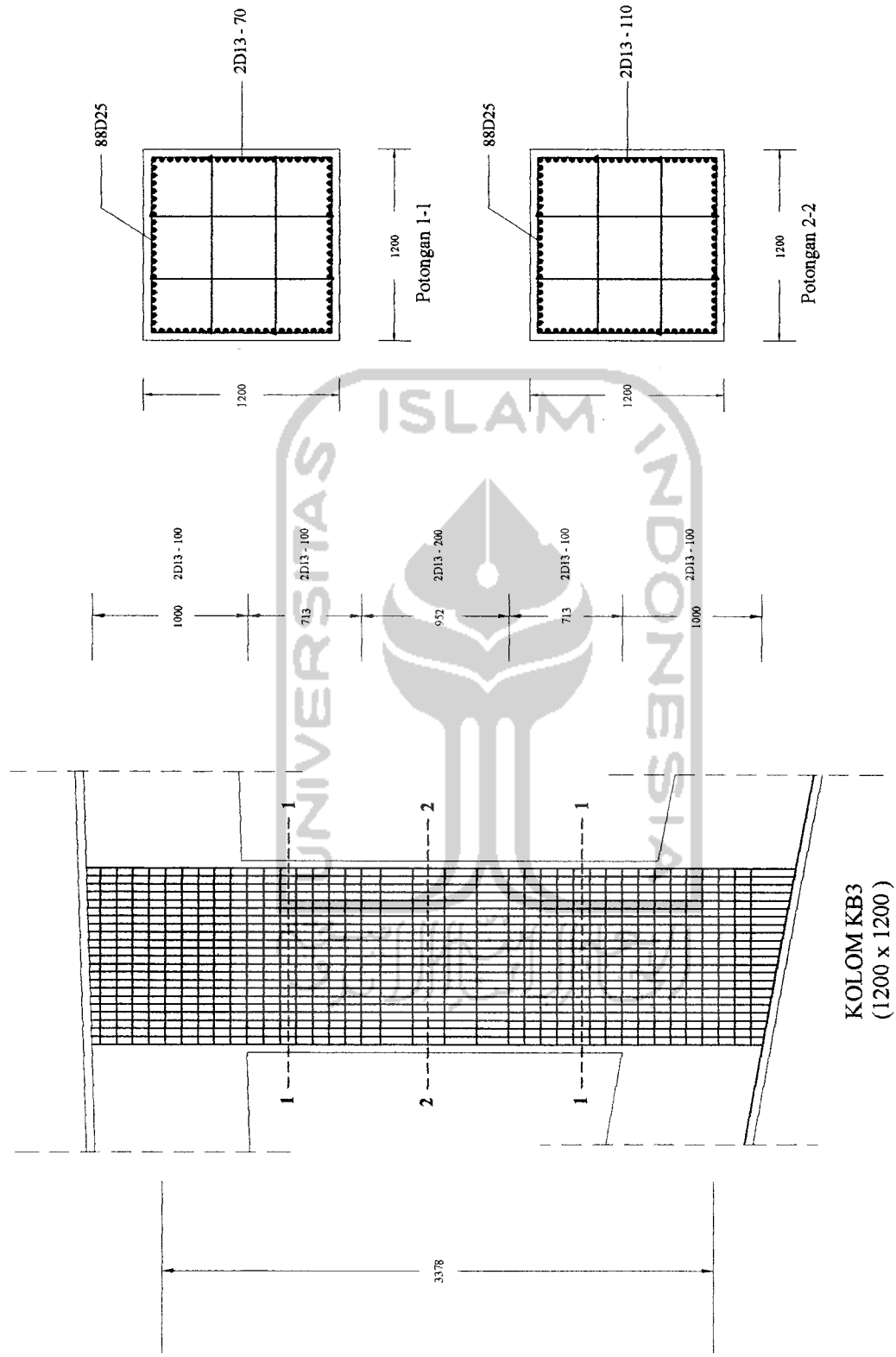
JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
DETIL PENULANGAN KOLOM KA 22				



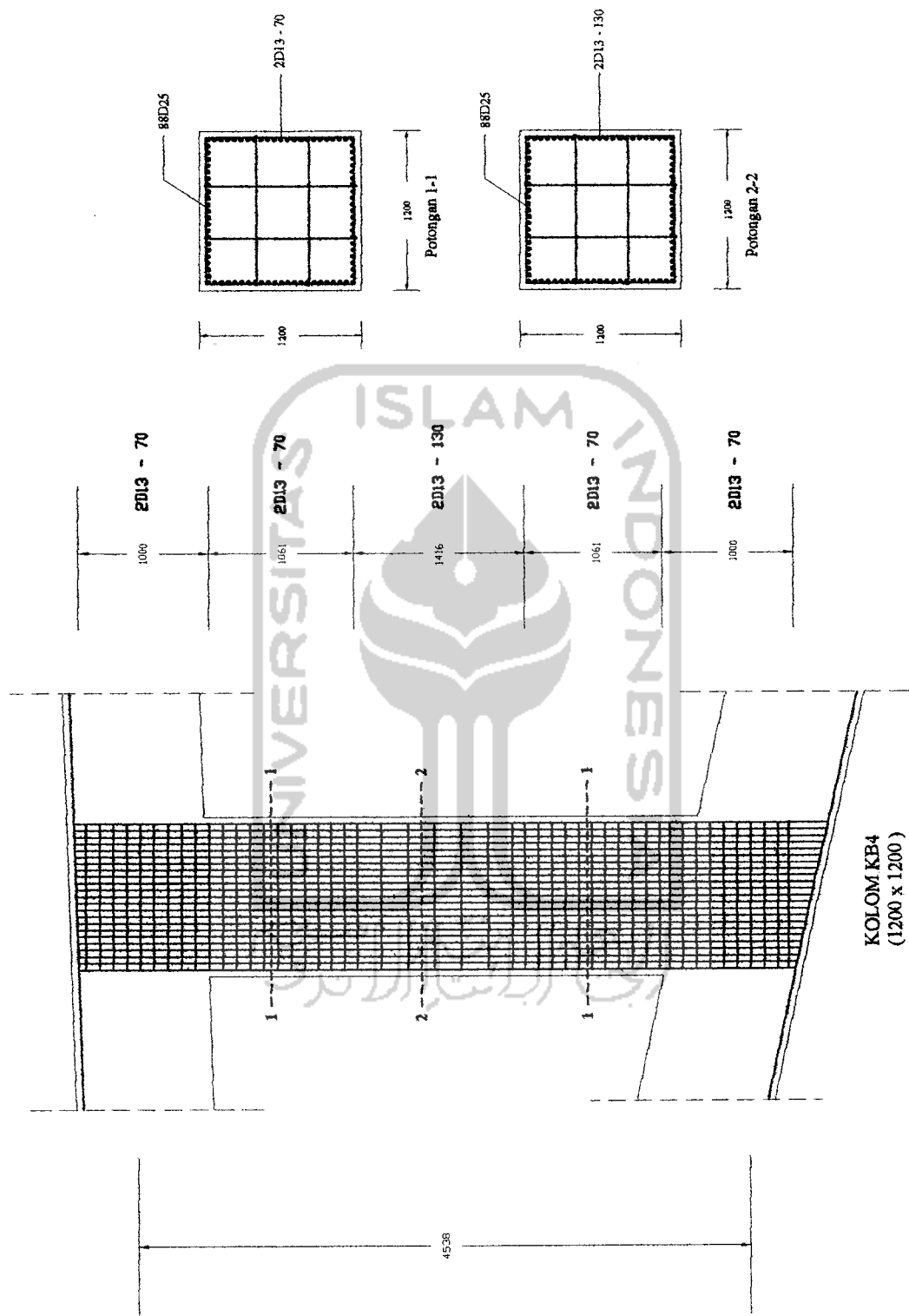
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 1				



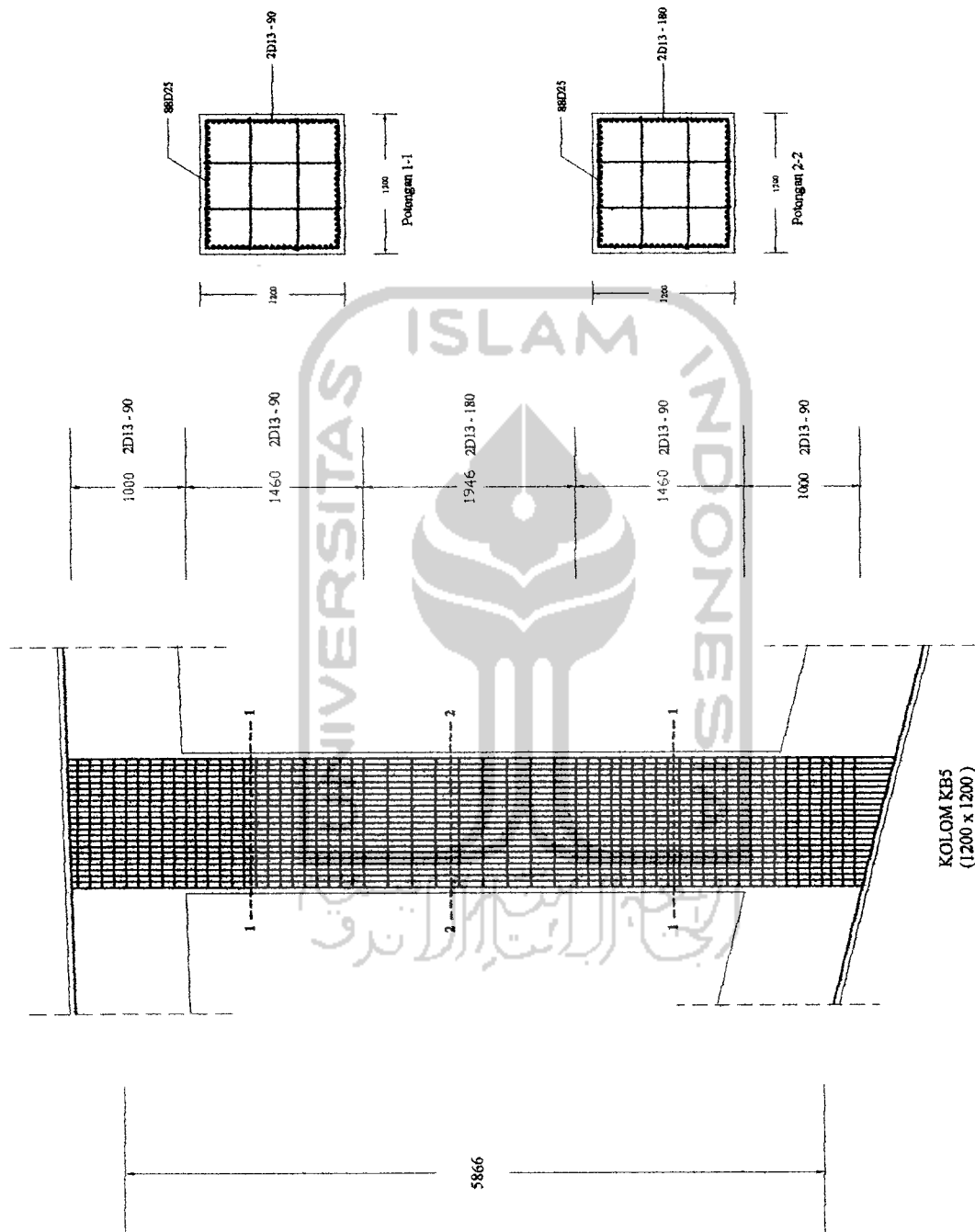
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 2				



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 3				

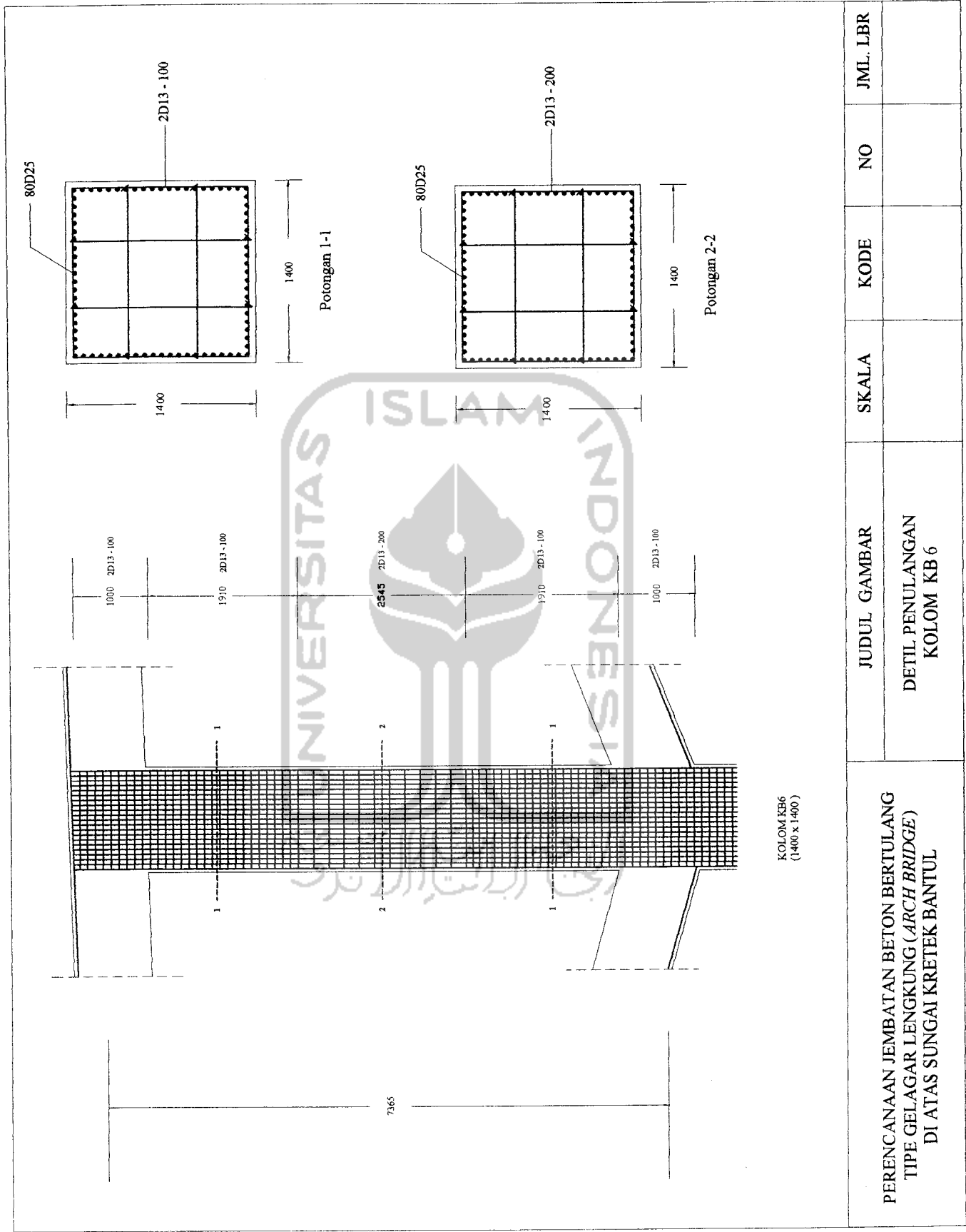


PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 4				

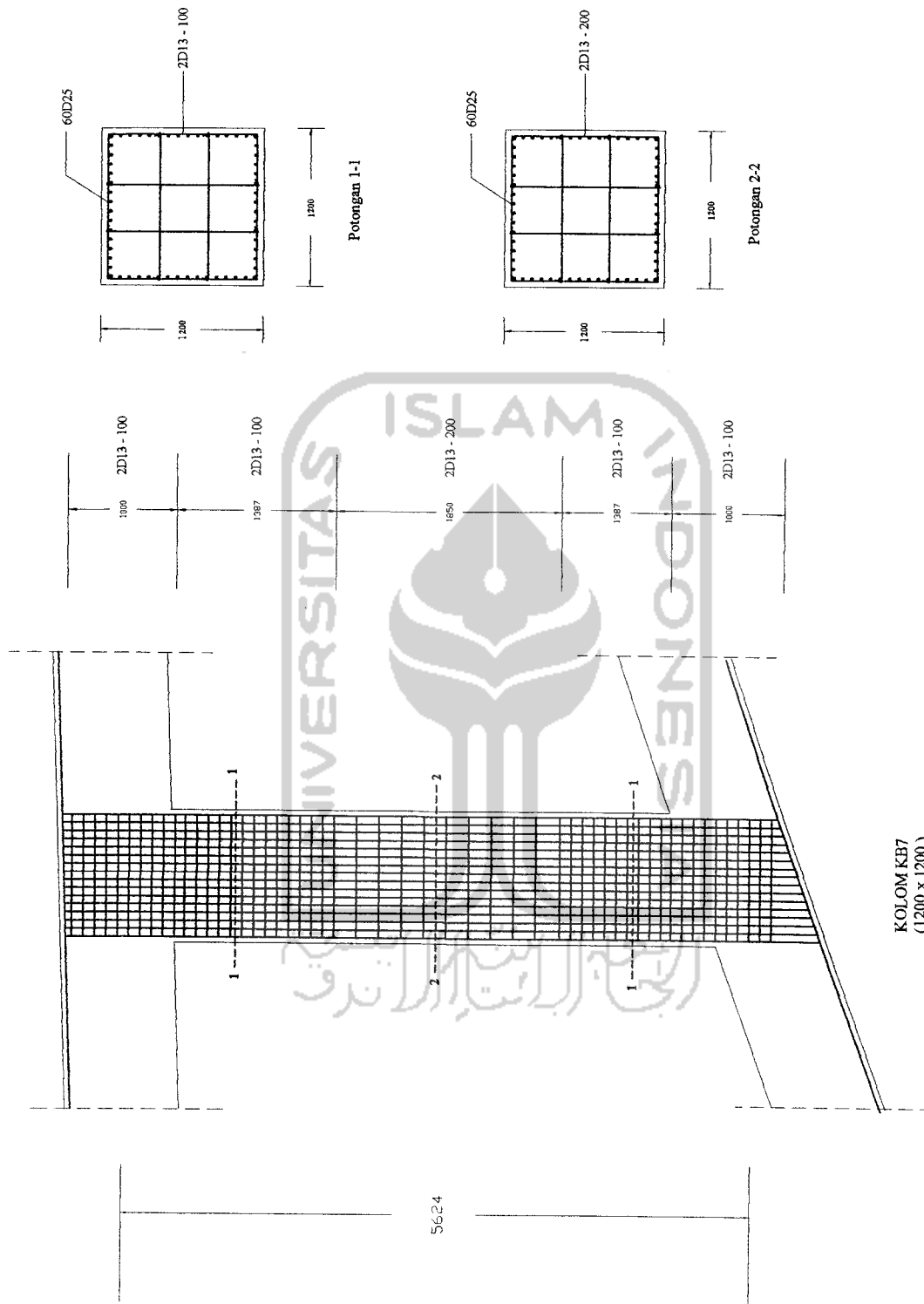


KOLOM KB5
(1200 x 1200)

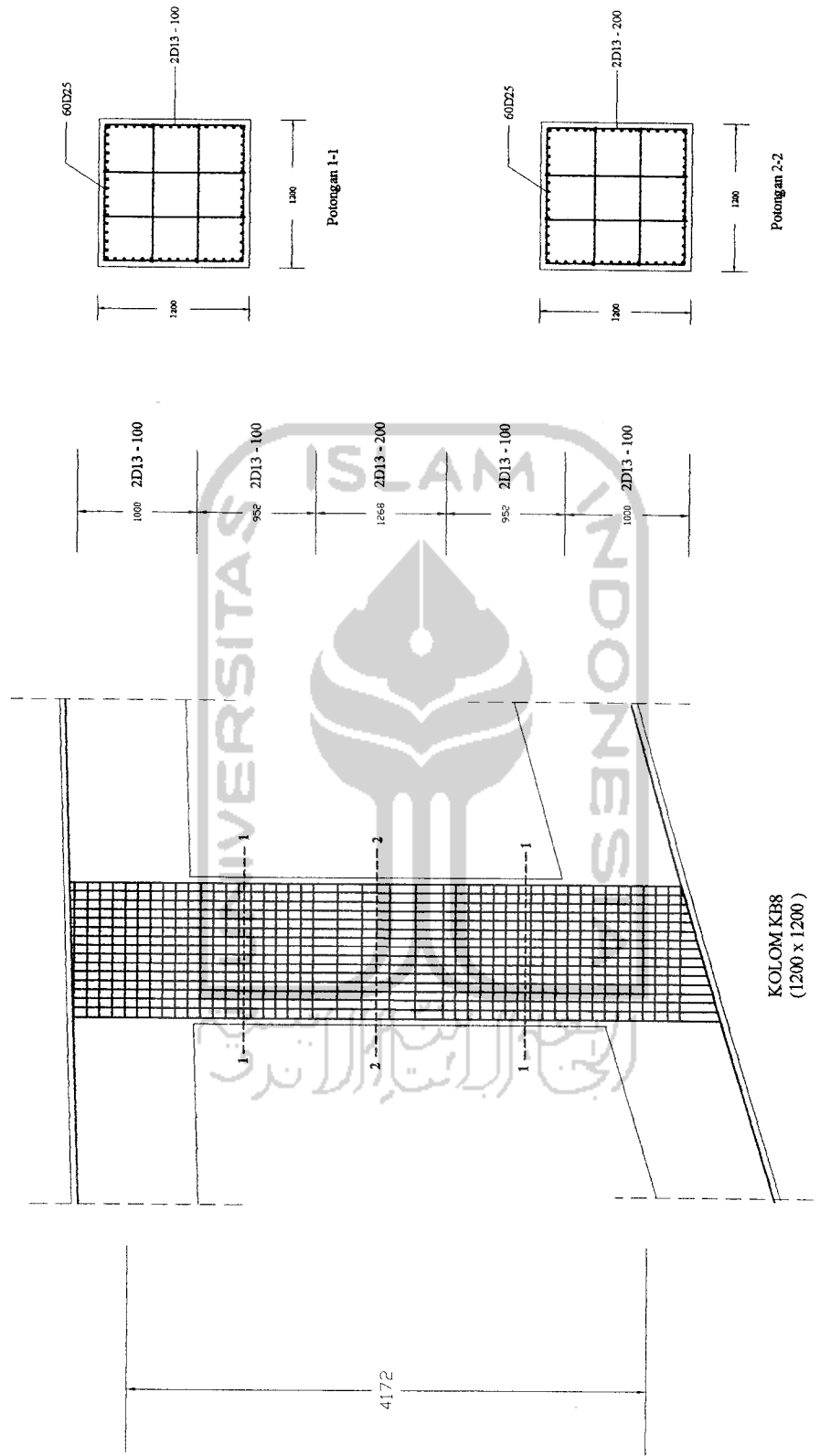
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 5				



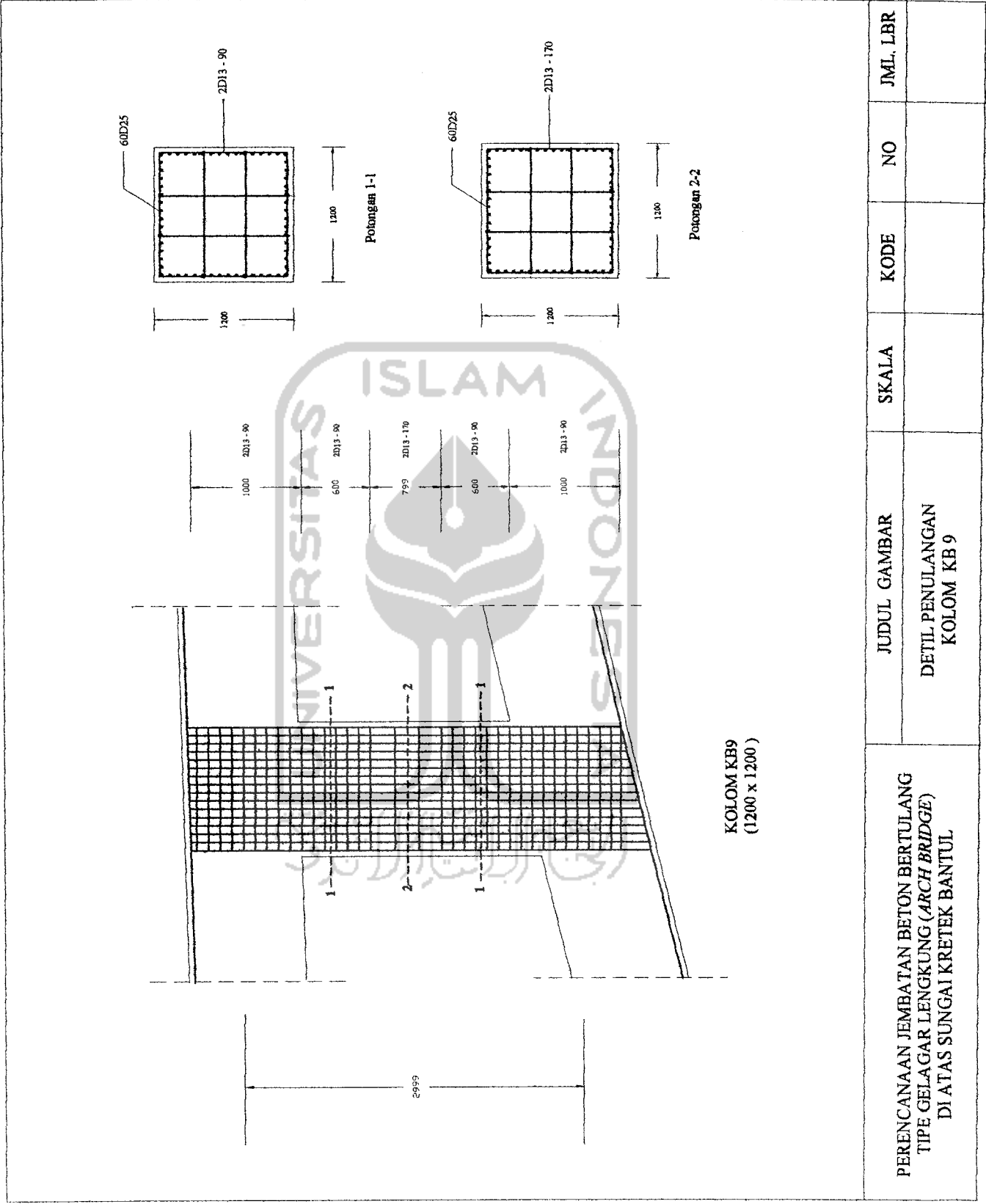
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 6				



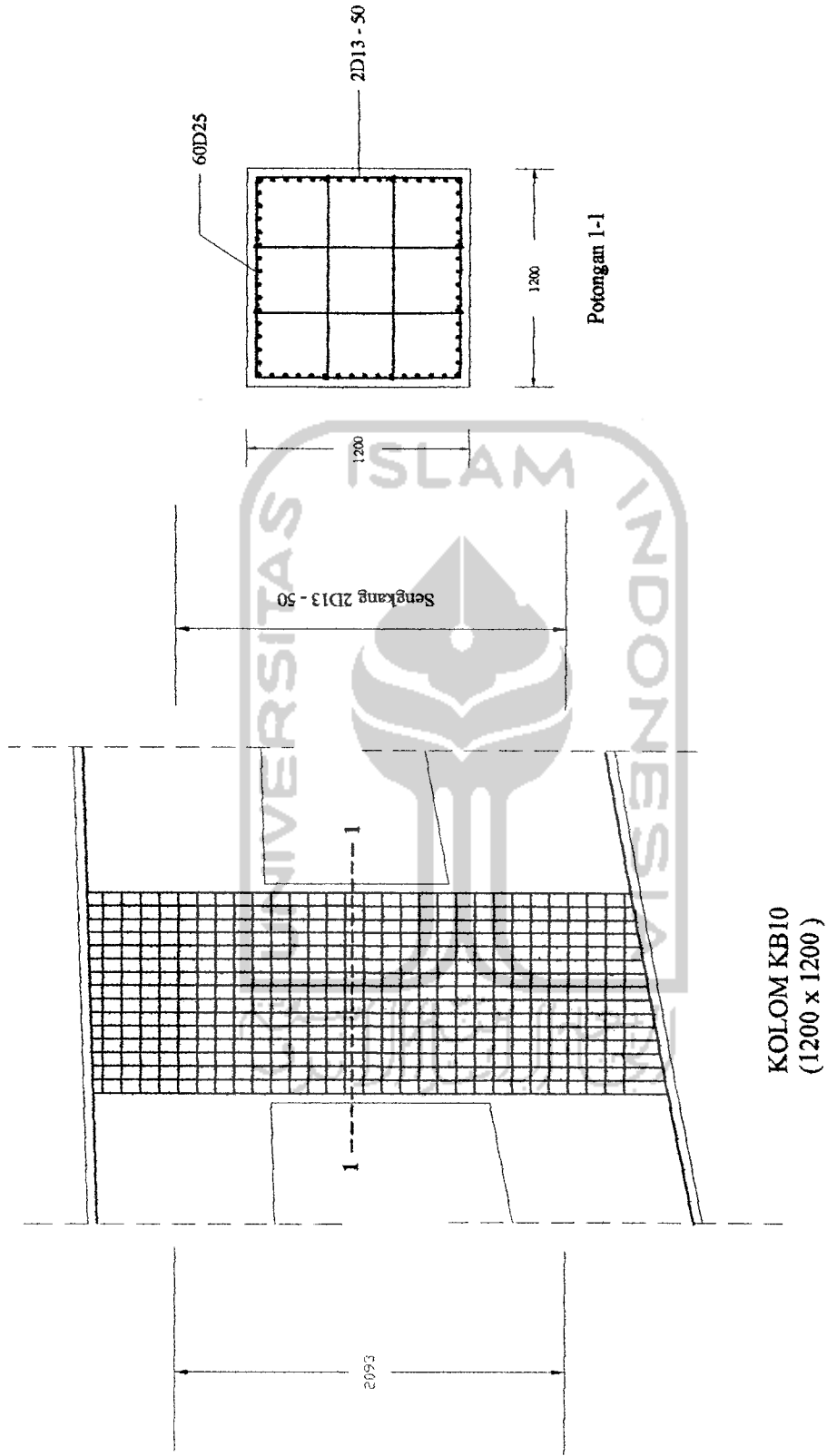
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLAM KB 7				



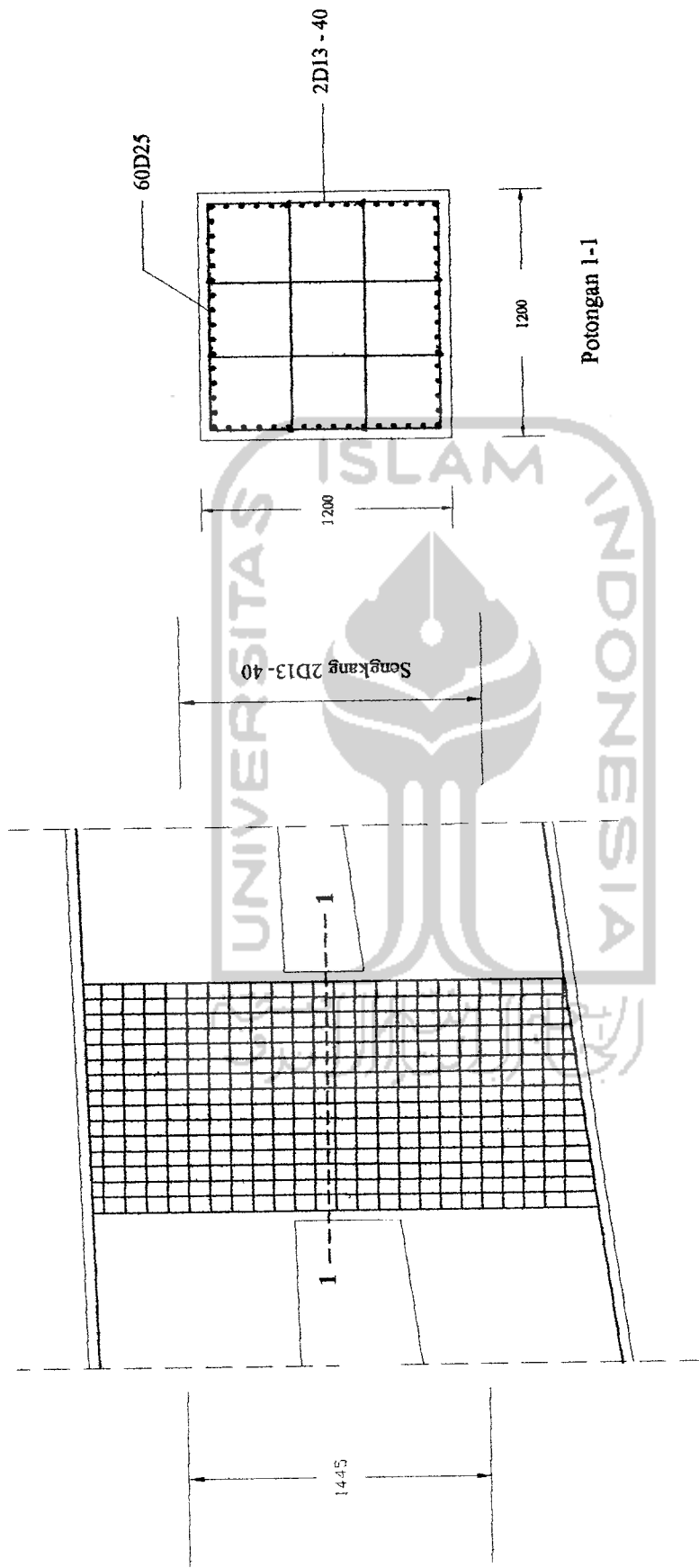
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 8				



PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 9				

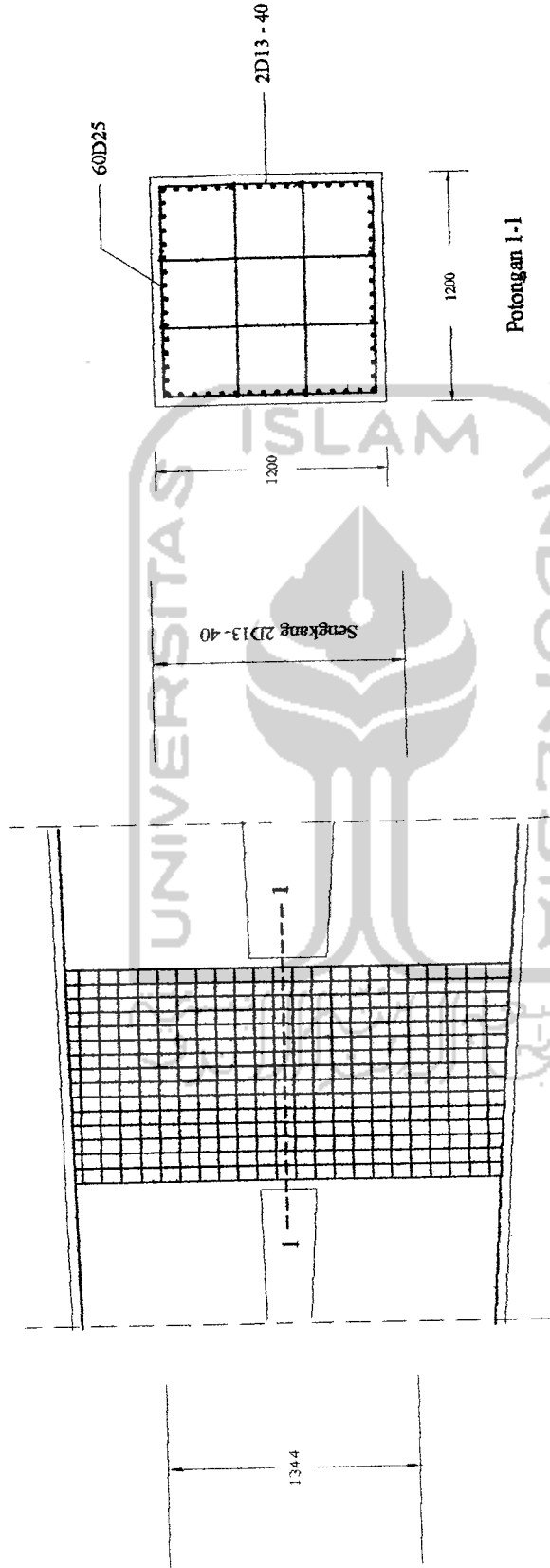


PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 10				



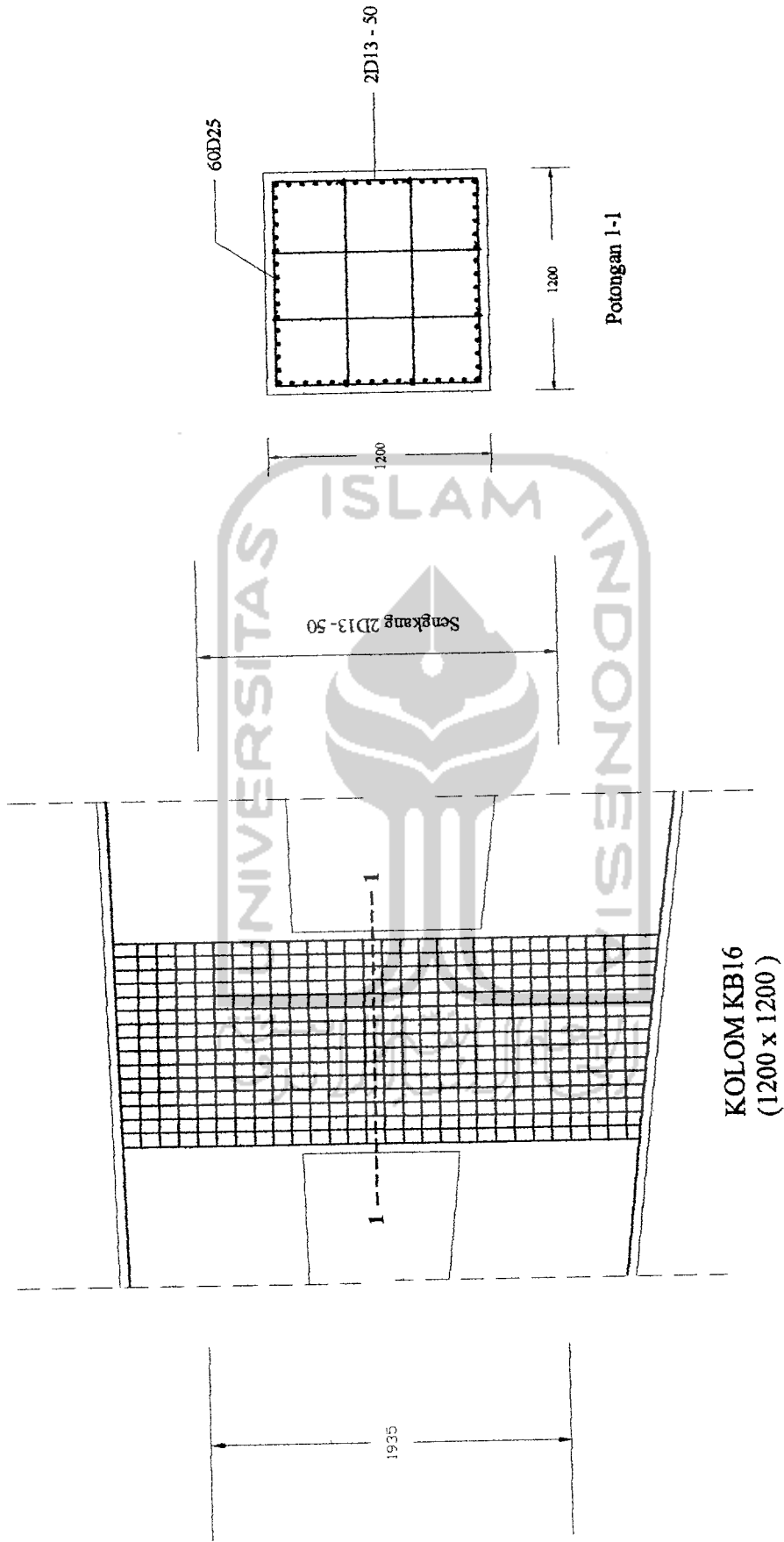
KOLOM KB11
(1200 x 1200)

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 11				

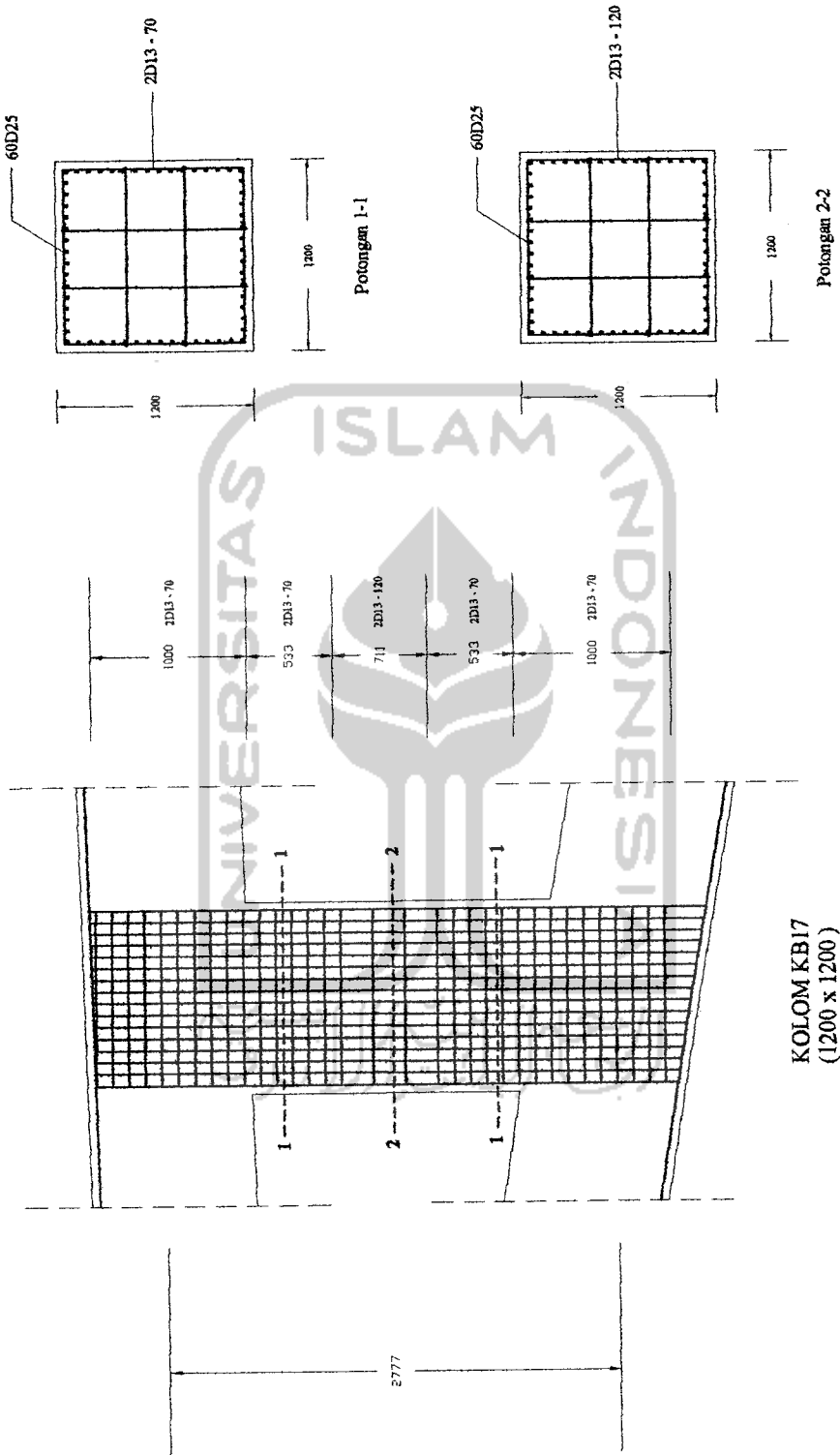


KOLOM KB15
(1200 x 1200)

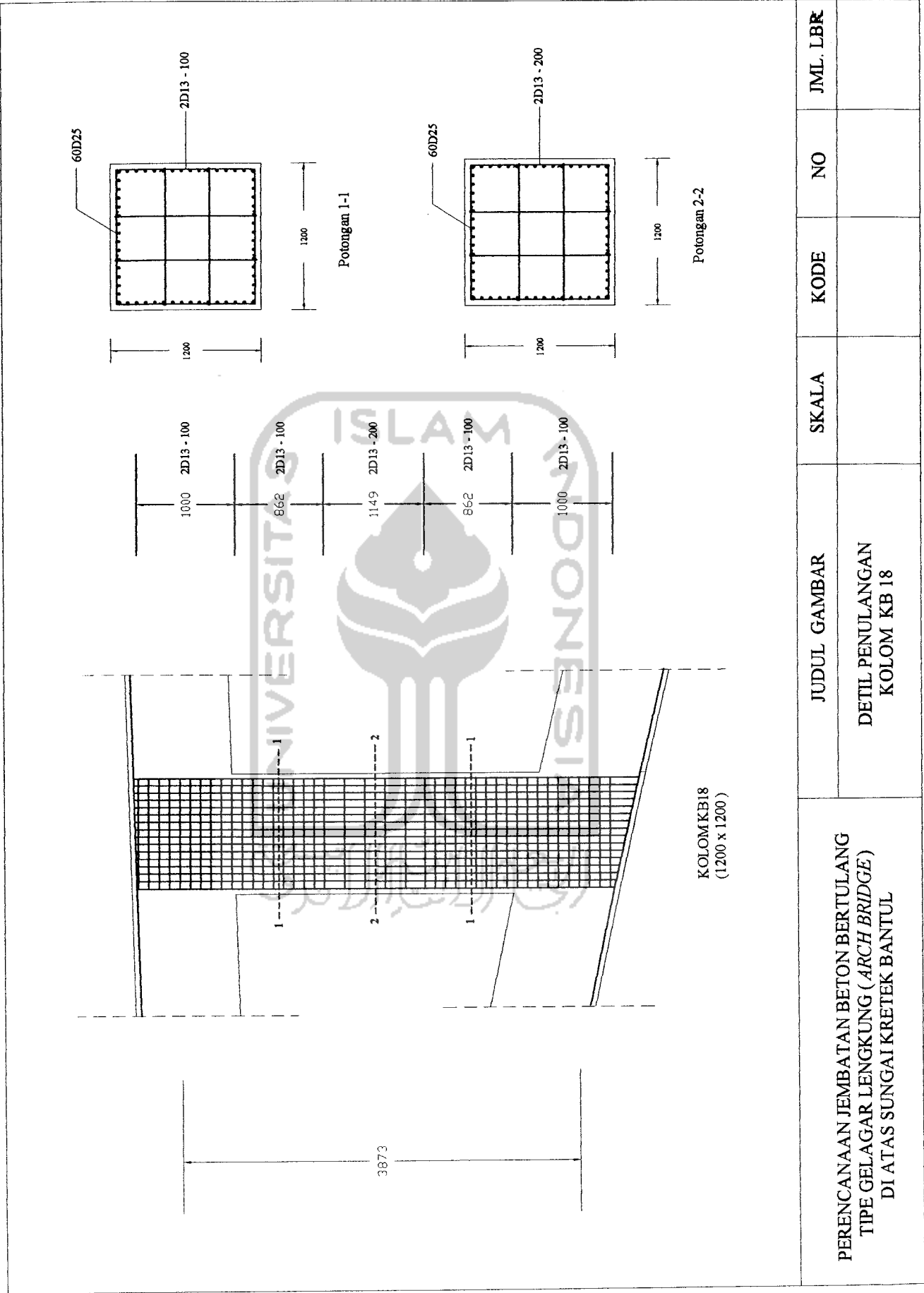
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 15				



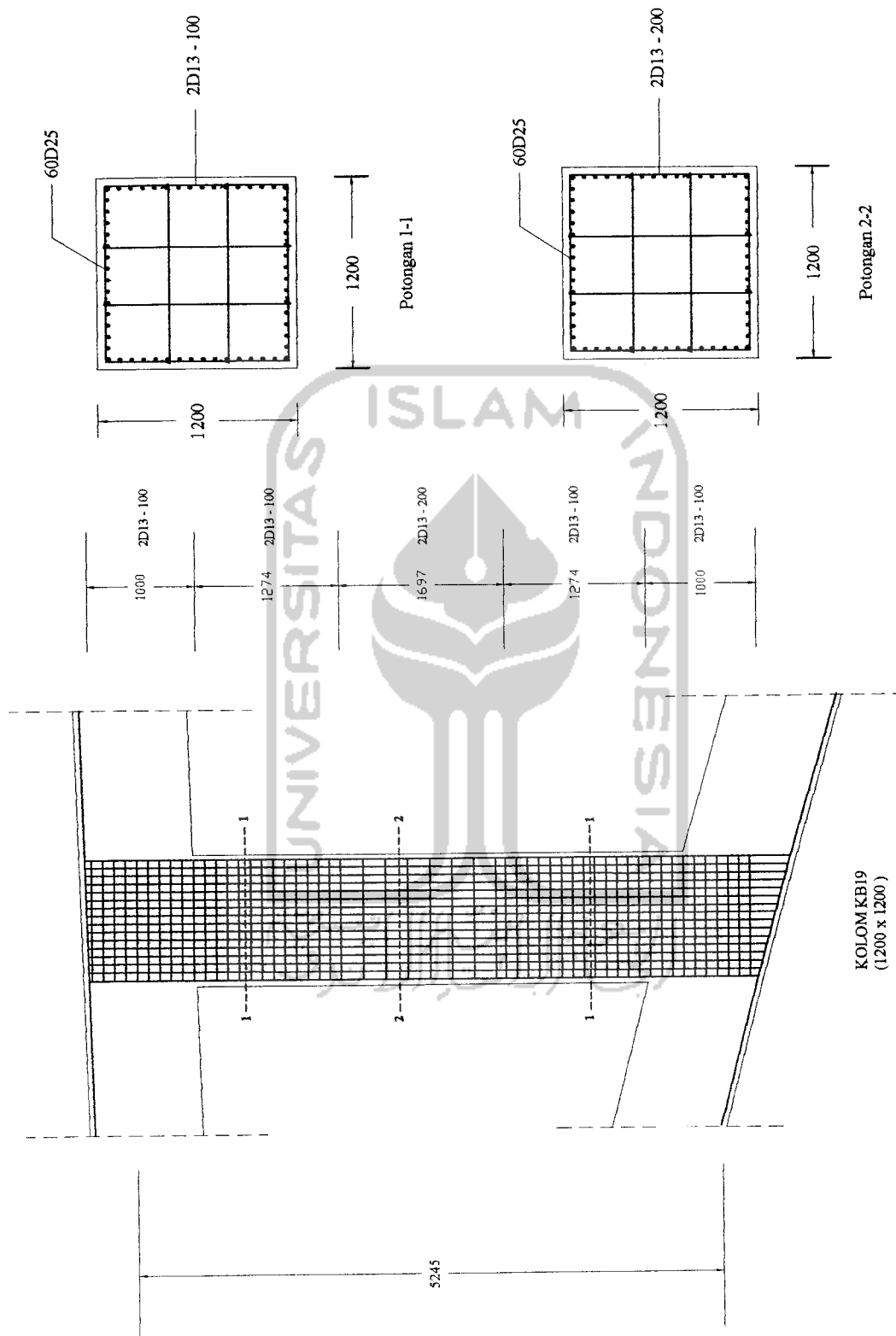
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	DETIL PENULANGAN KOLOM KB 16				



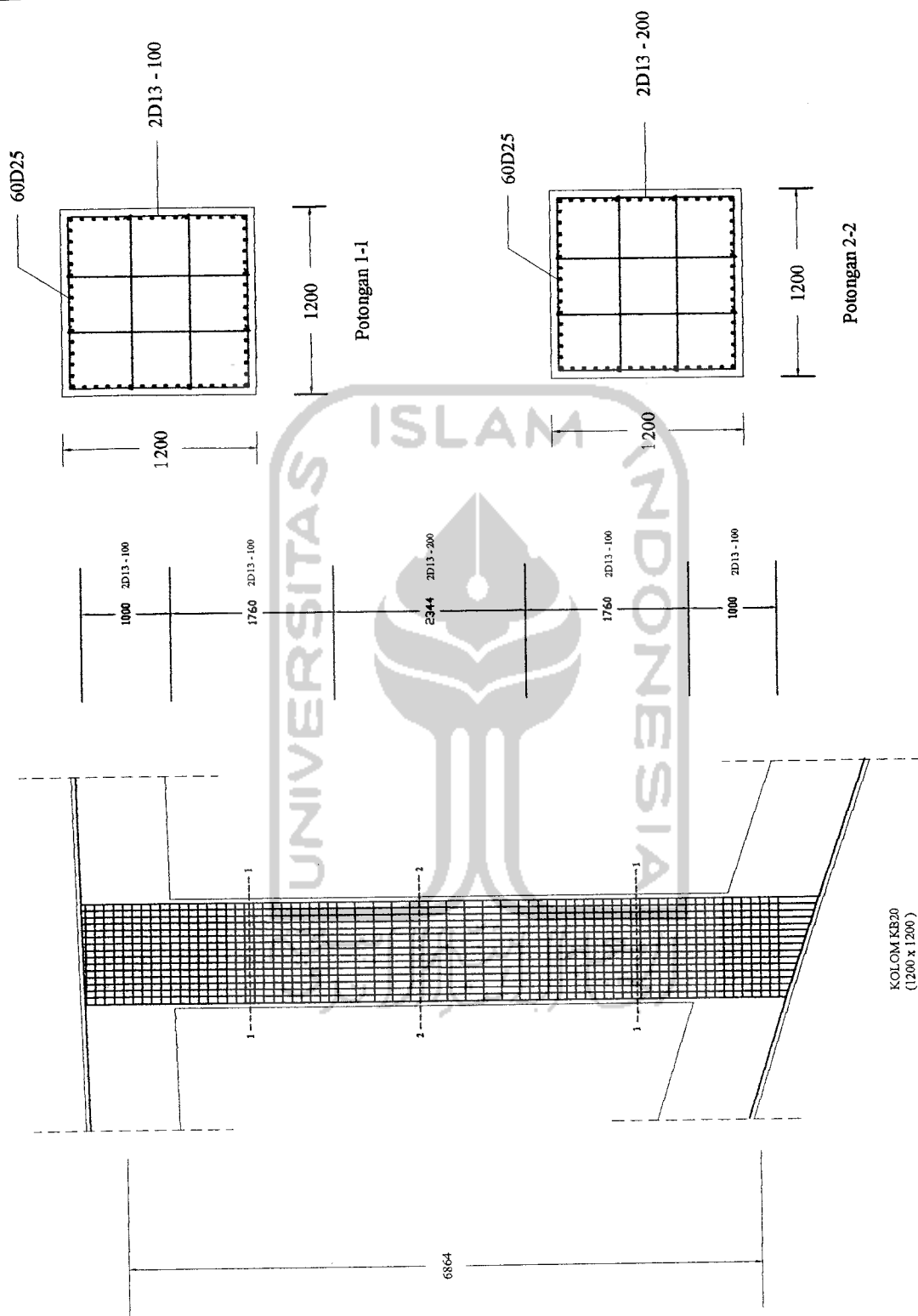
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB17				



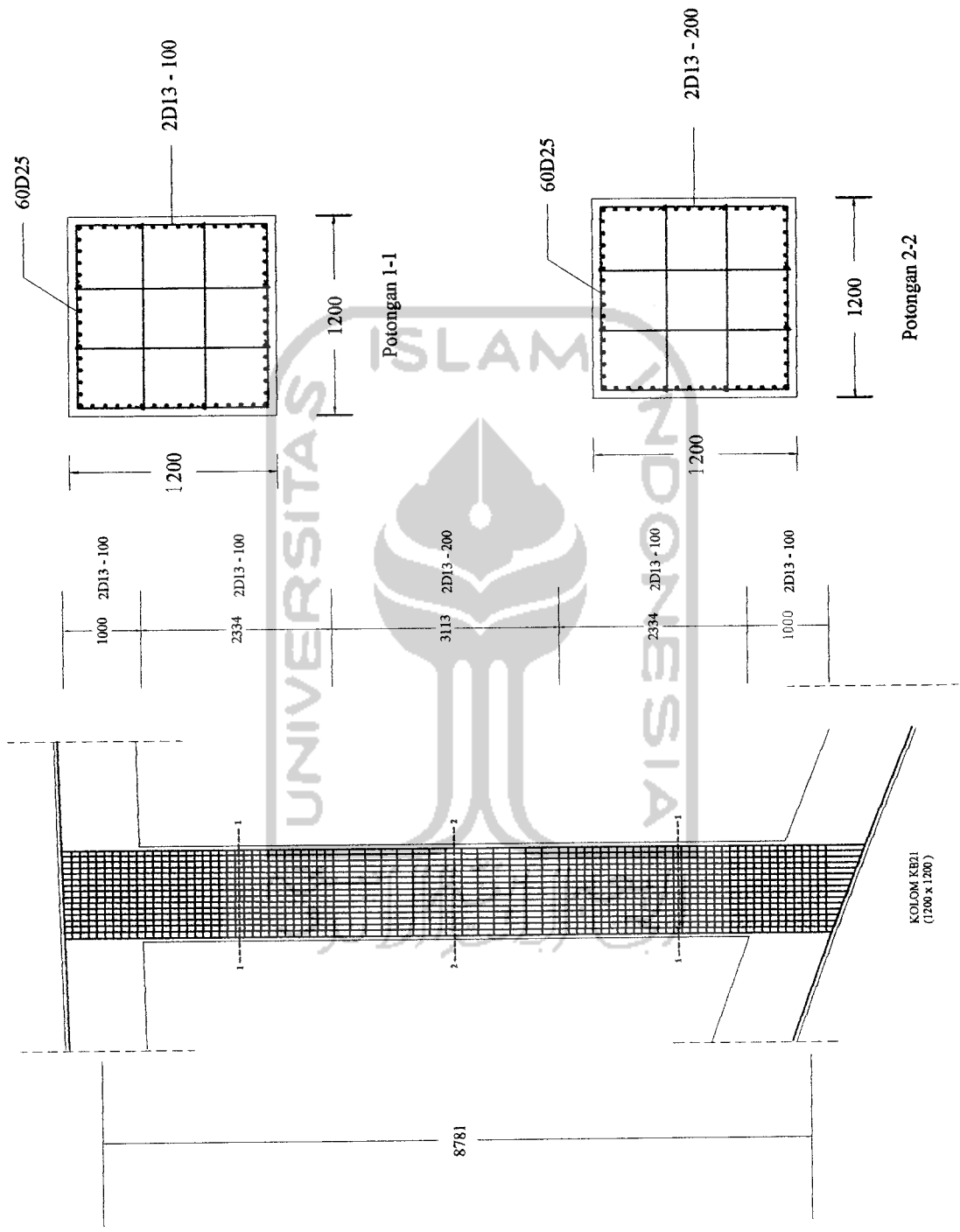
PERENCANAAN JEMBATAN BETON BERTULANG TYPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 18				



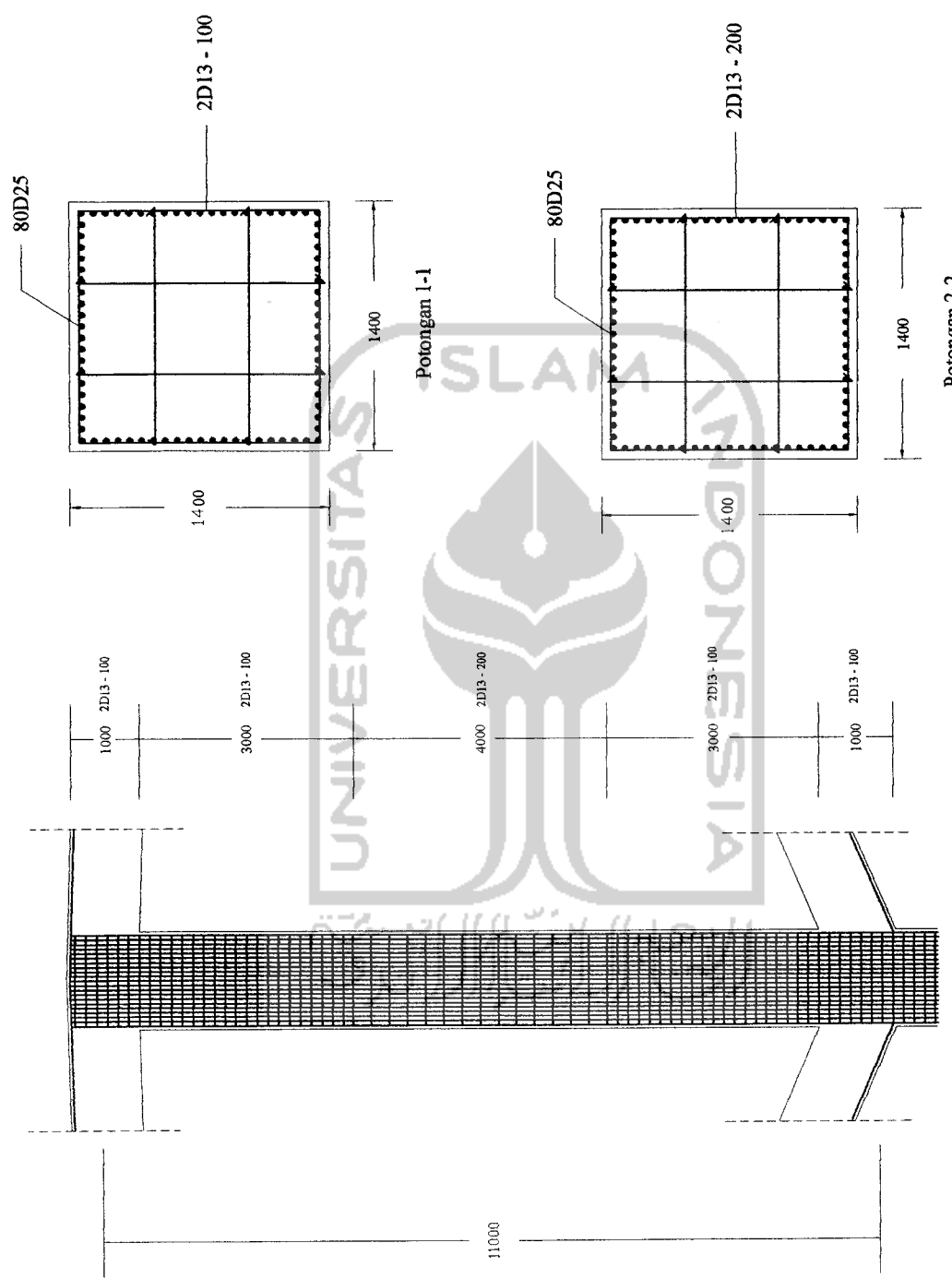
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 7				



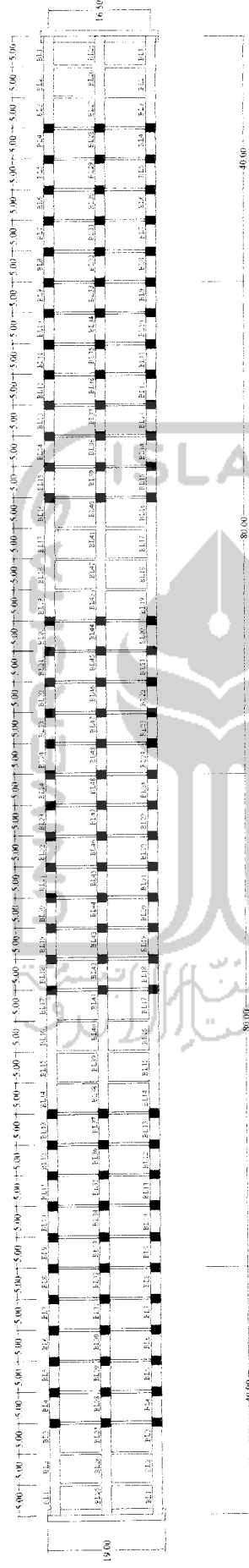
JUDUL GAMBAR		SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul					
DETIL PENULANGAN KOLOM KB 20					



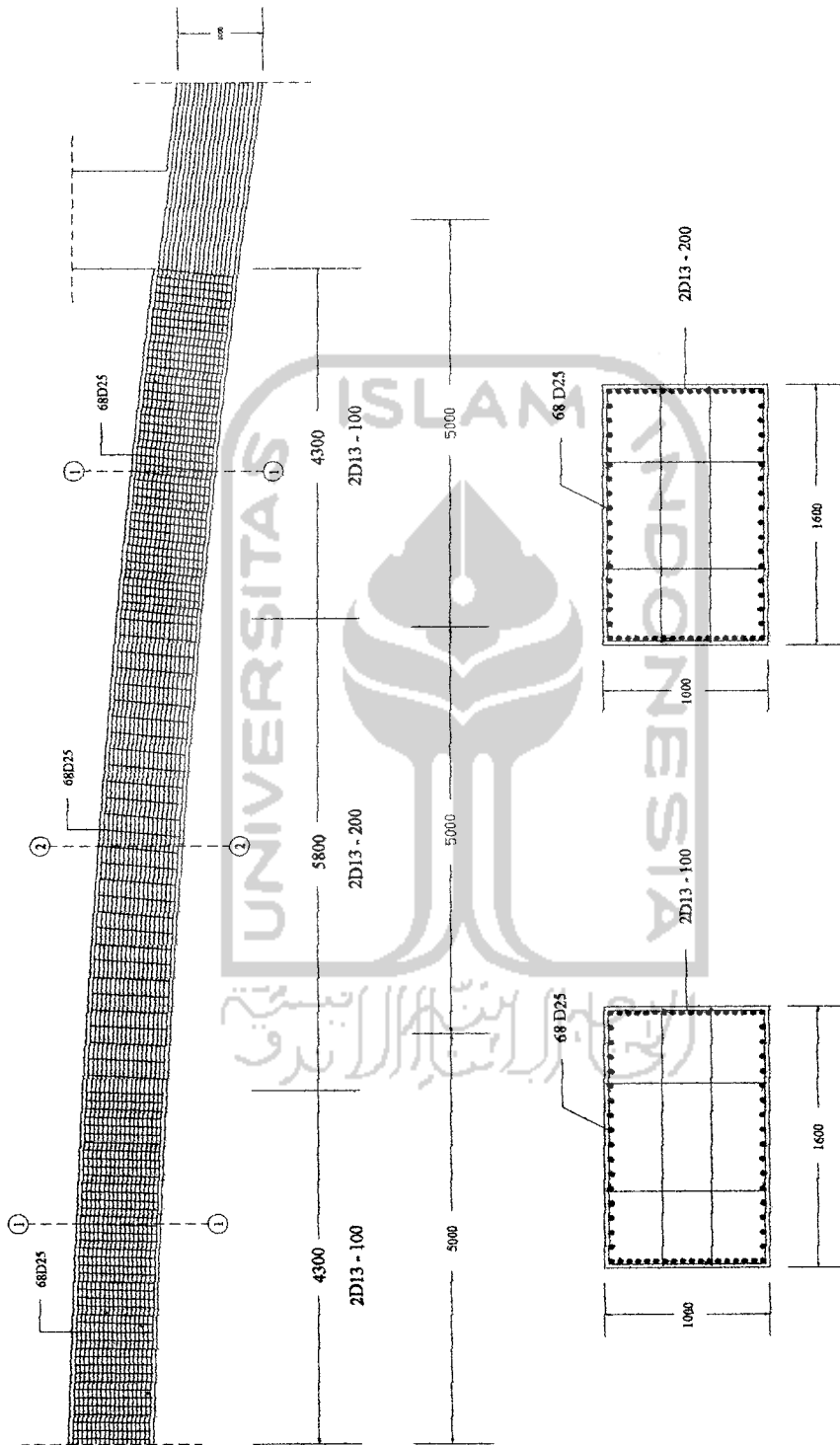
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 21				



PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN KOLOM KB 22				



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
		RENCANA BALOK LENGKUNG				

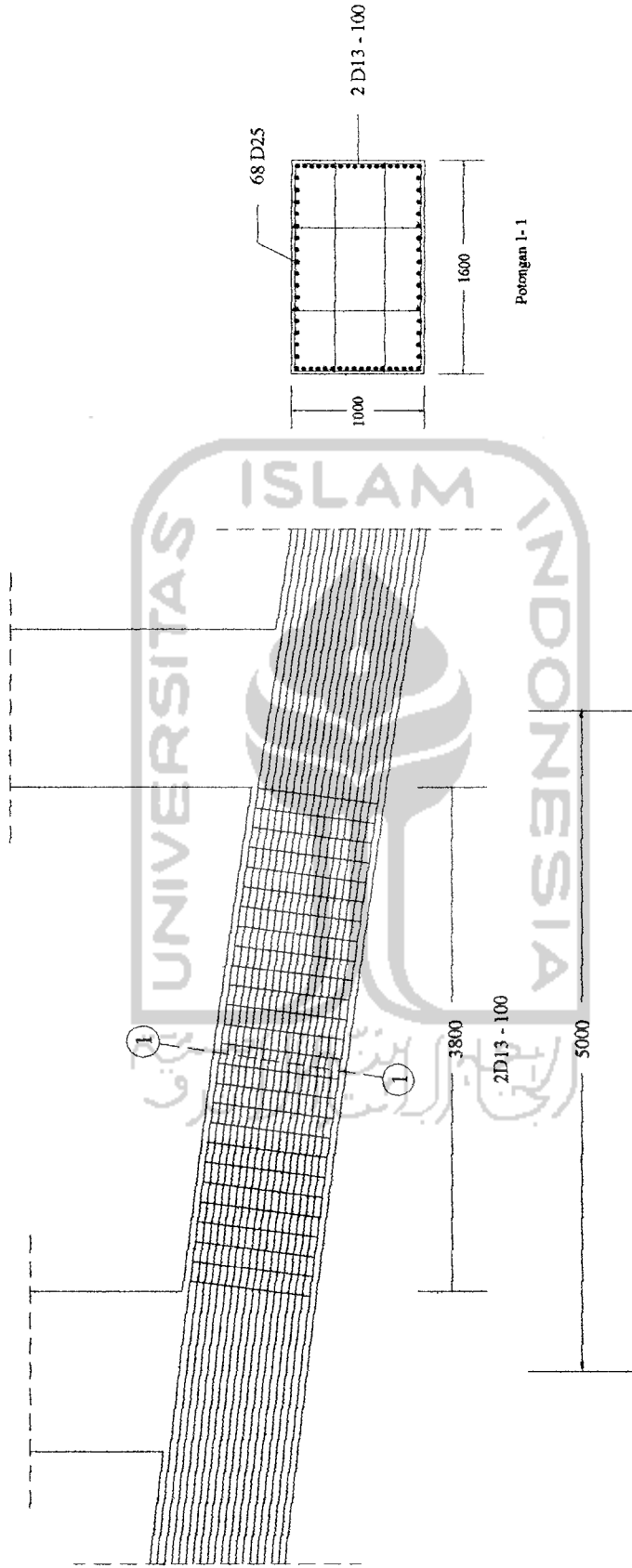


Potongan 1-1

Potongan 2-2

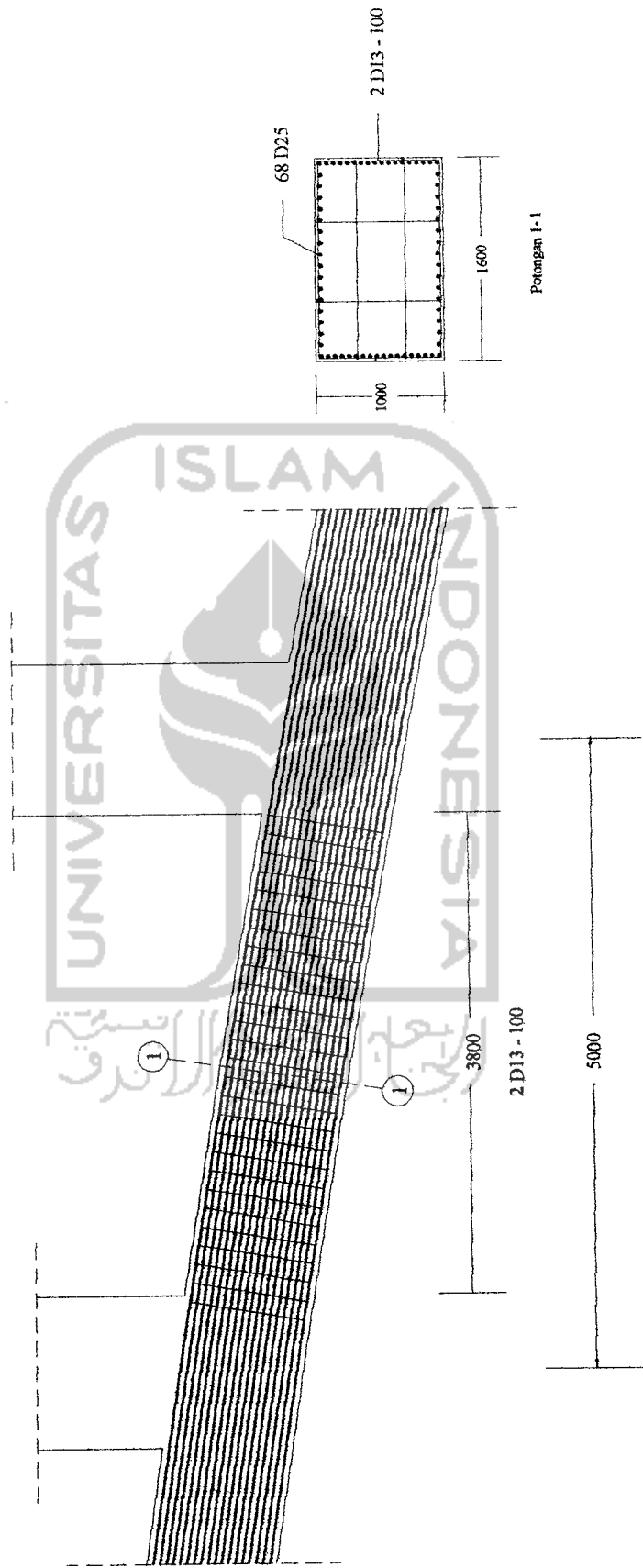
DETIL BALOK LINGKUNG (BL1, BL2, BL3)

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN BALOK LINGKUNG BL1, BL2, BL3				



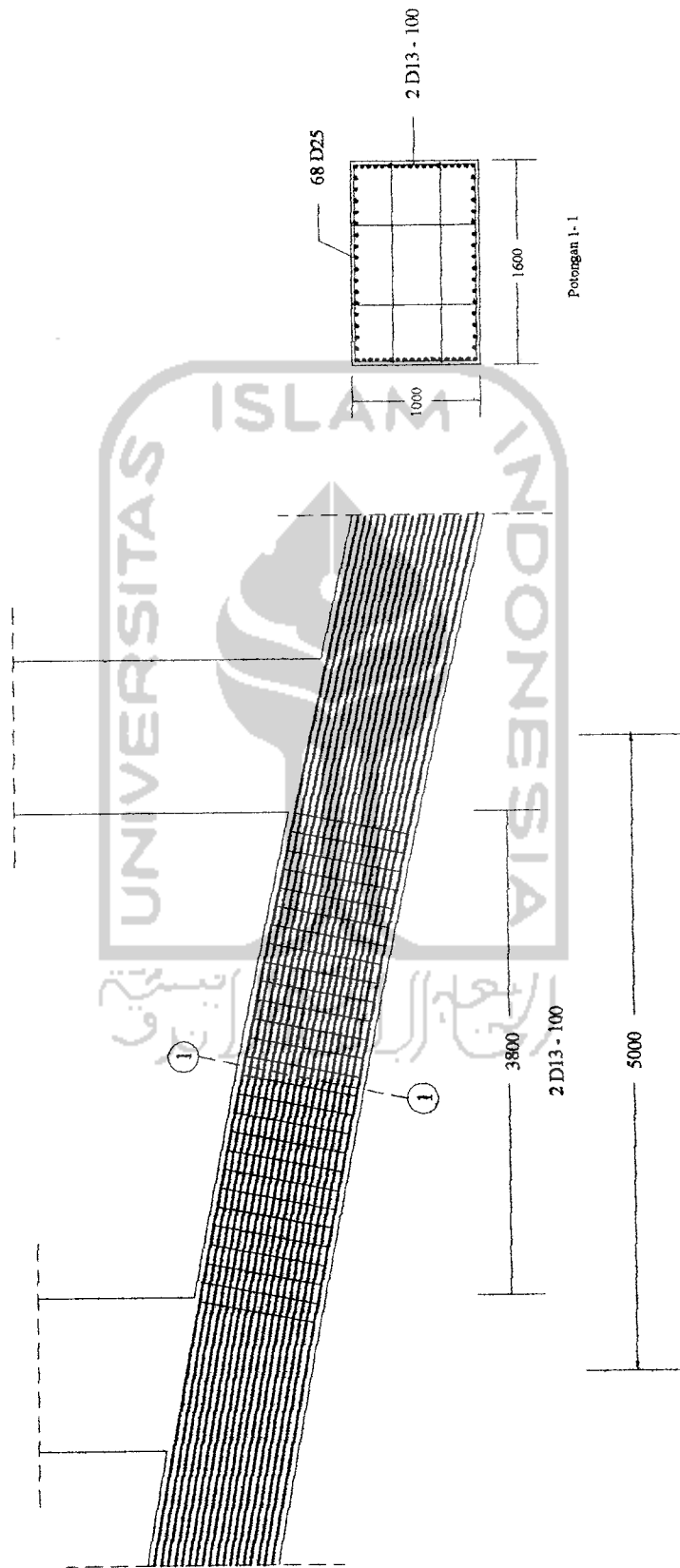
DETIL BALOK LENGKUNG BL4

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL4				



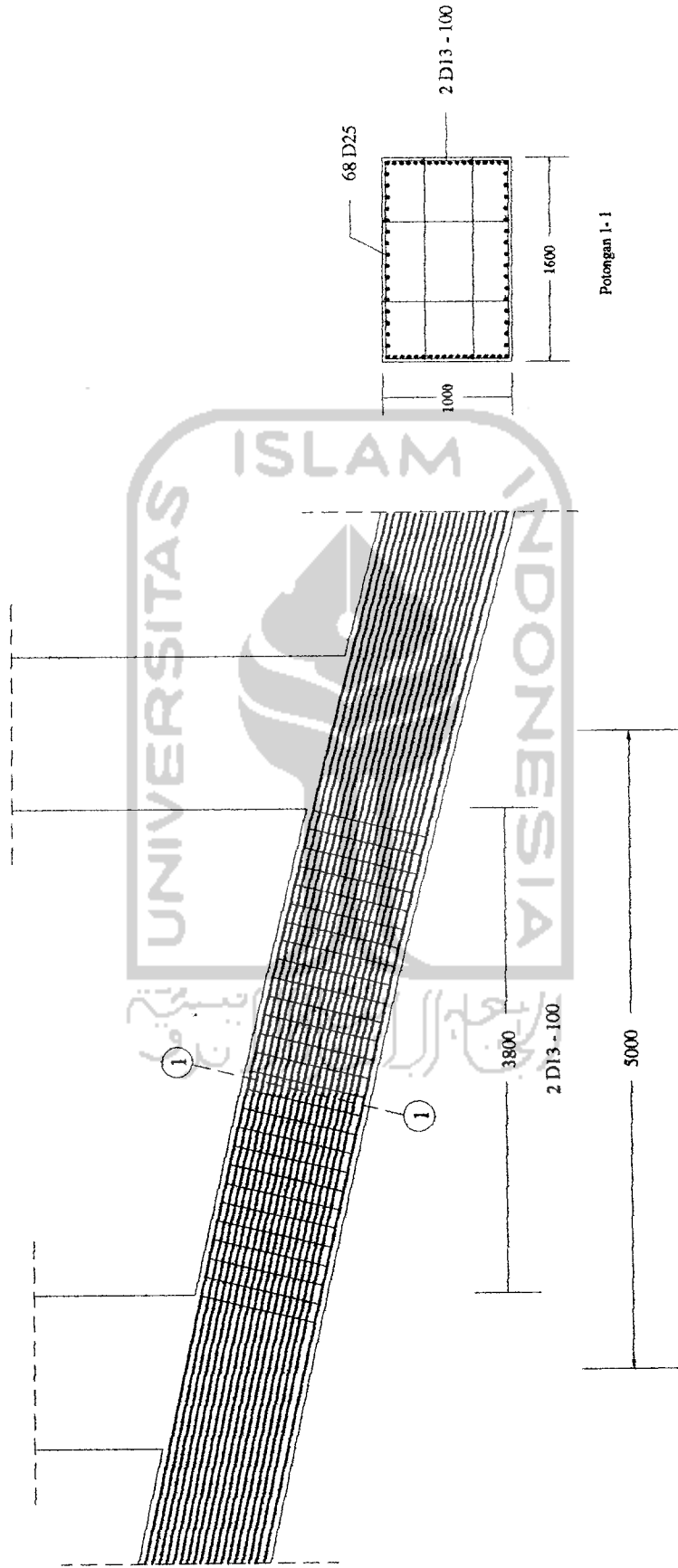
DETIL BALOK LENGKUNG BL5

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL5				



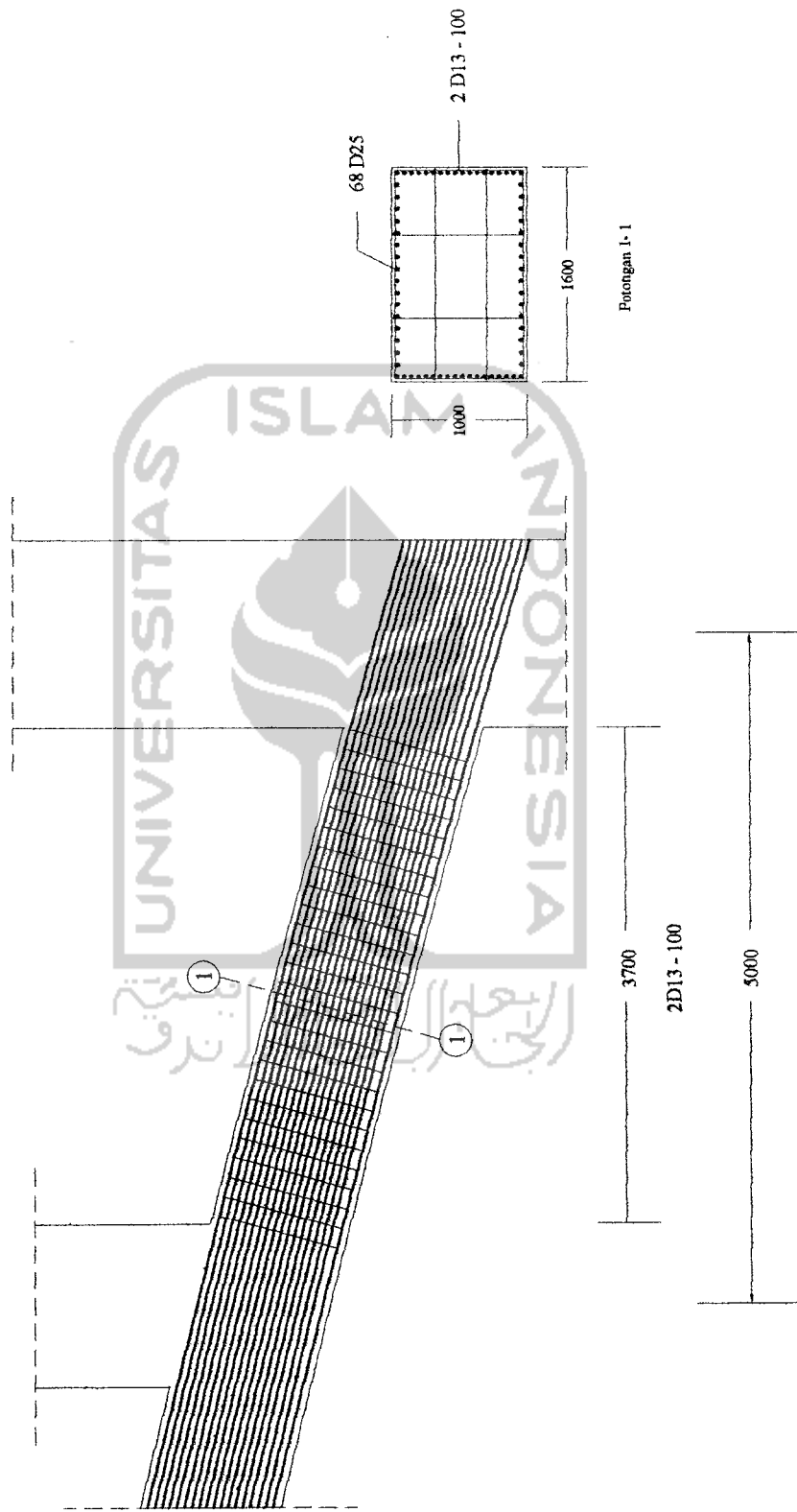
DETIL BALOK LENGKUNG BL6

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL6				



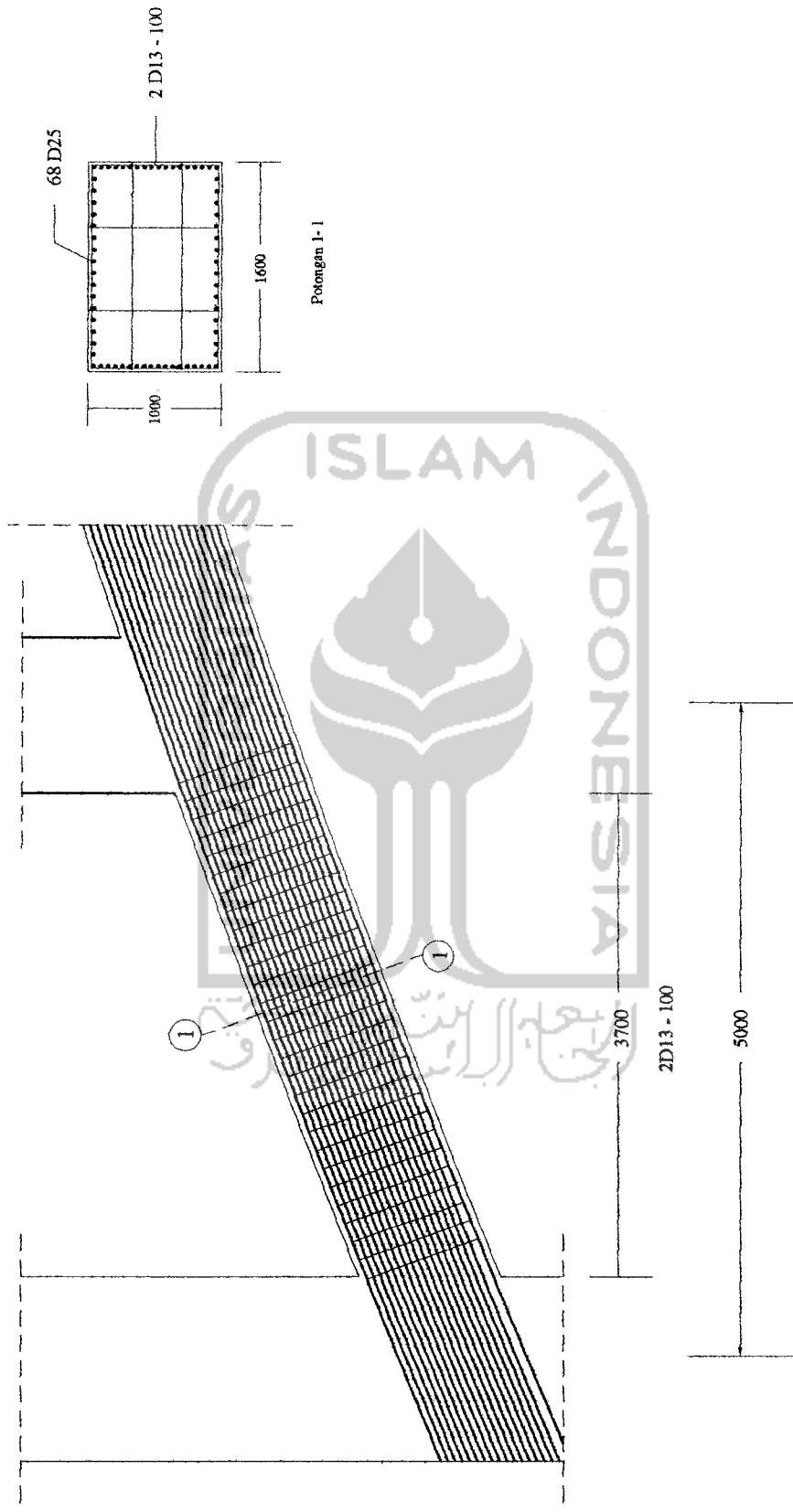
DETIL BALOK LENGKUNG BL7

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL7				



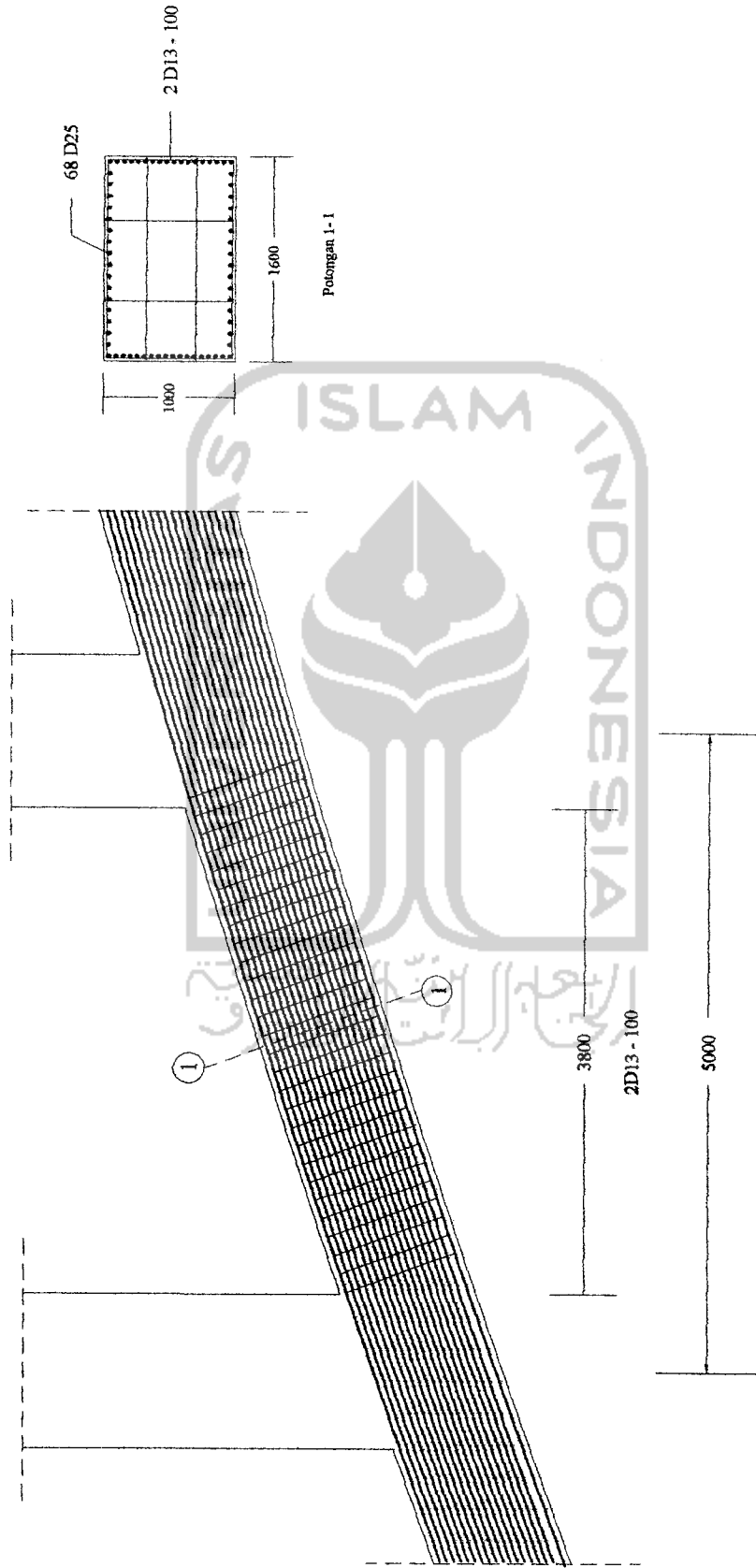
DETIL BALOK LENGKUNG BL8

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL8				



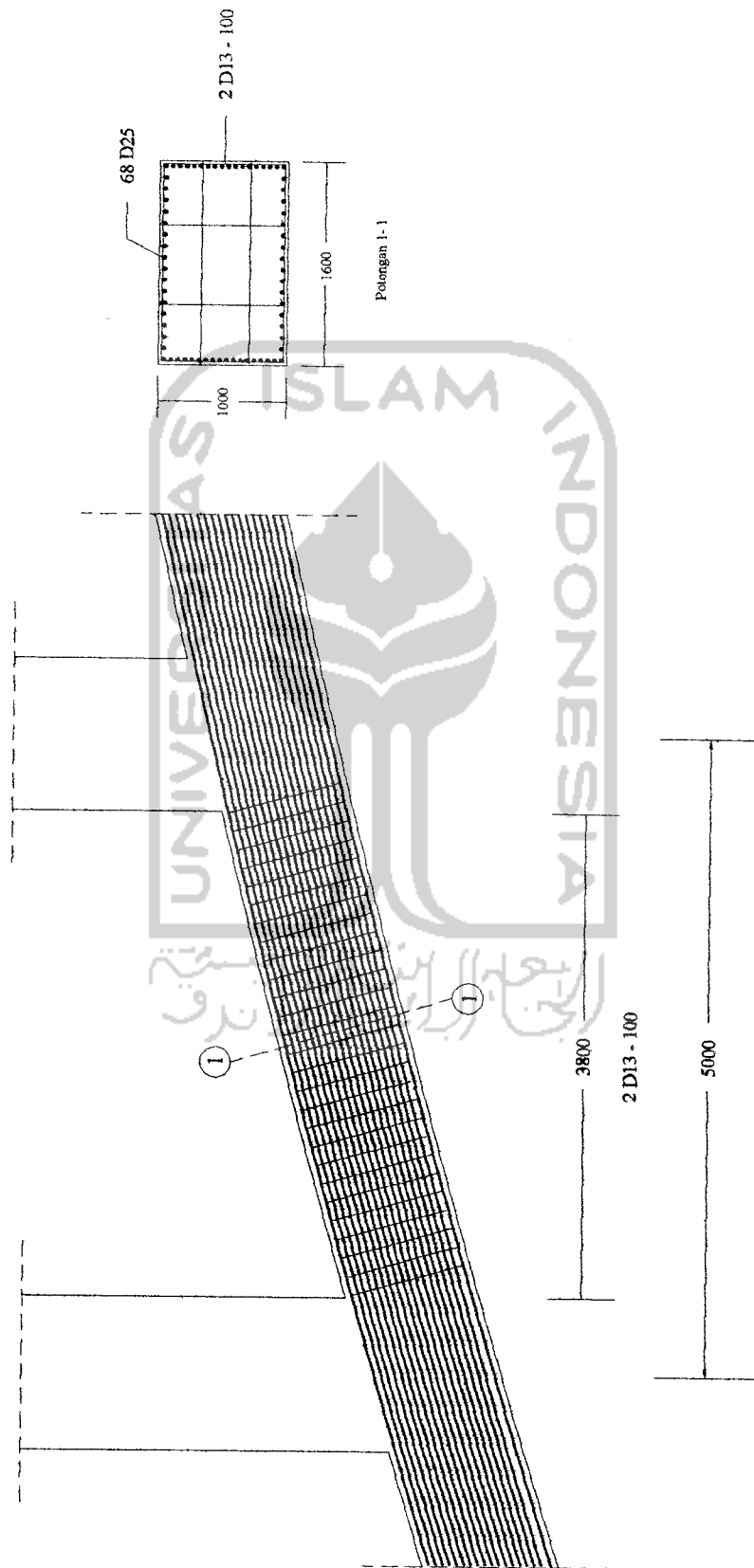
DETIL BALOK LENGKUNG BL9

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL9				



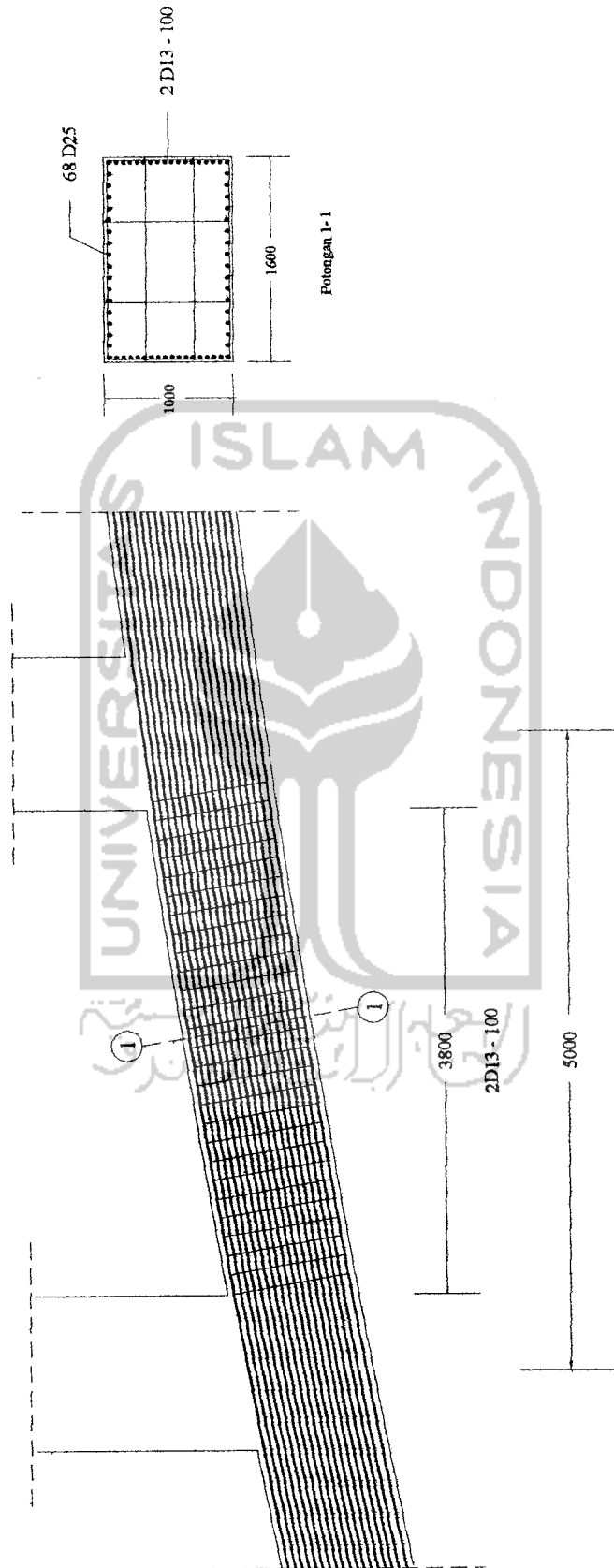
DETIL BALOK LENGKUNG BL10

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL10				



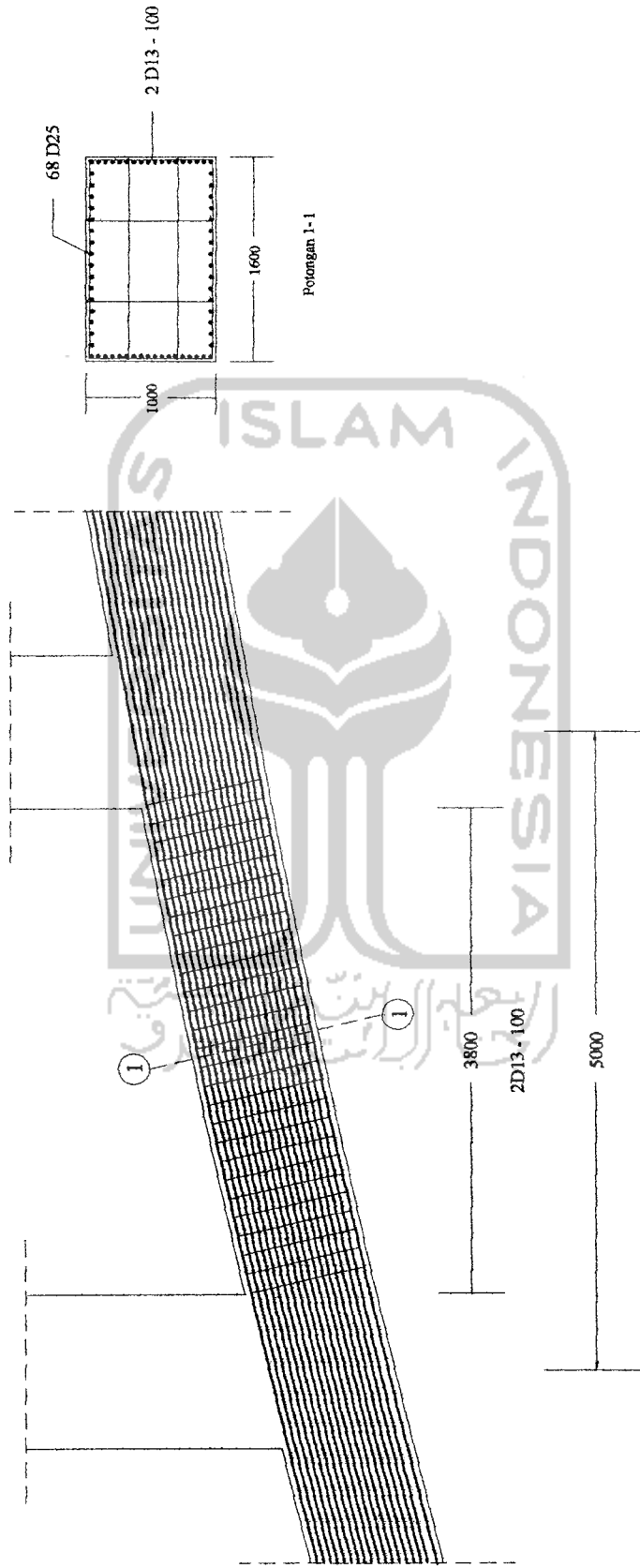
DETIL BALOK LENGKUNG BL11

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL11				



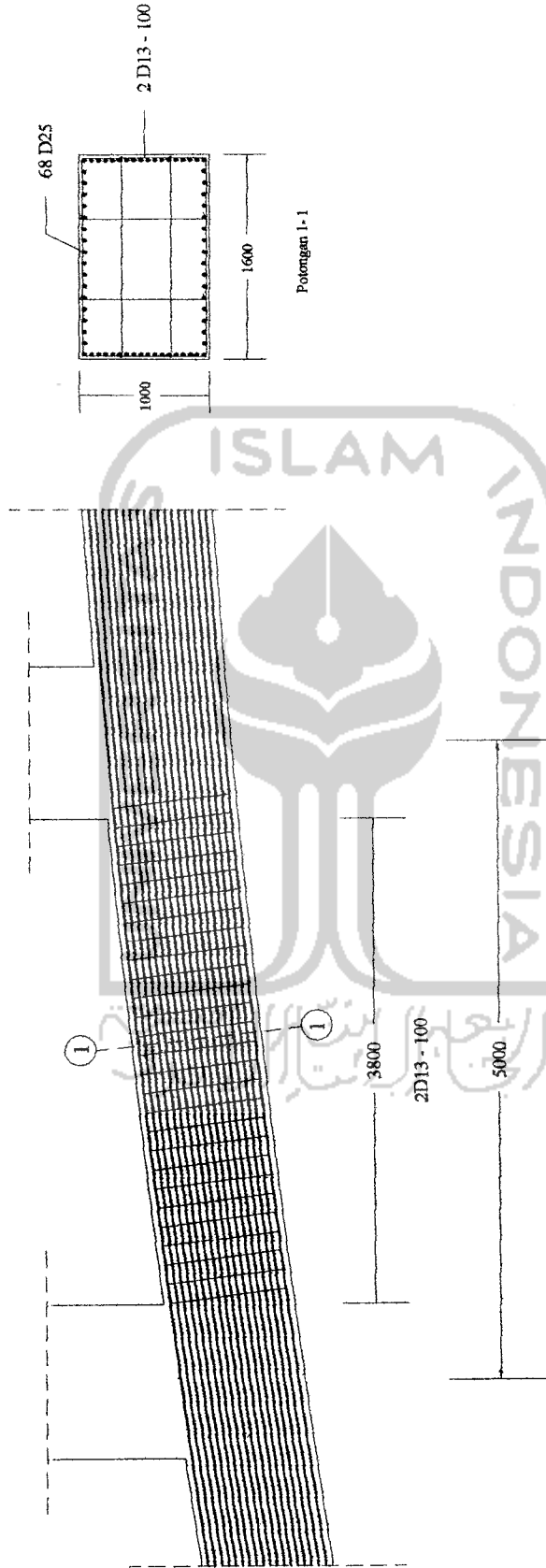
DETIL BALOK LENGKUNG BL13

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL13				



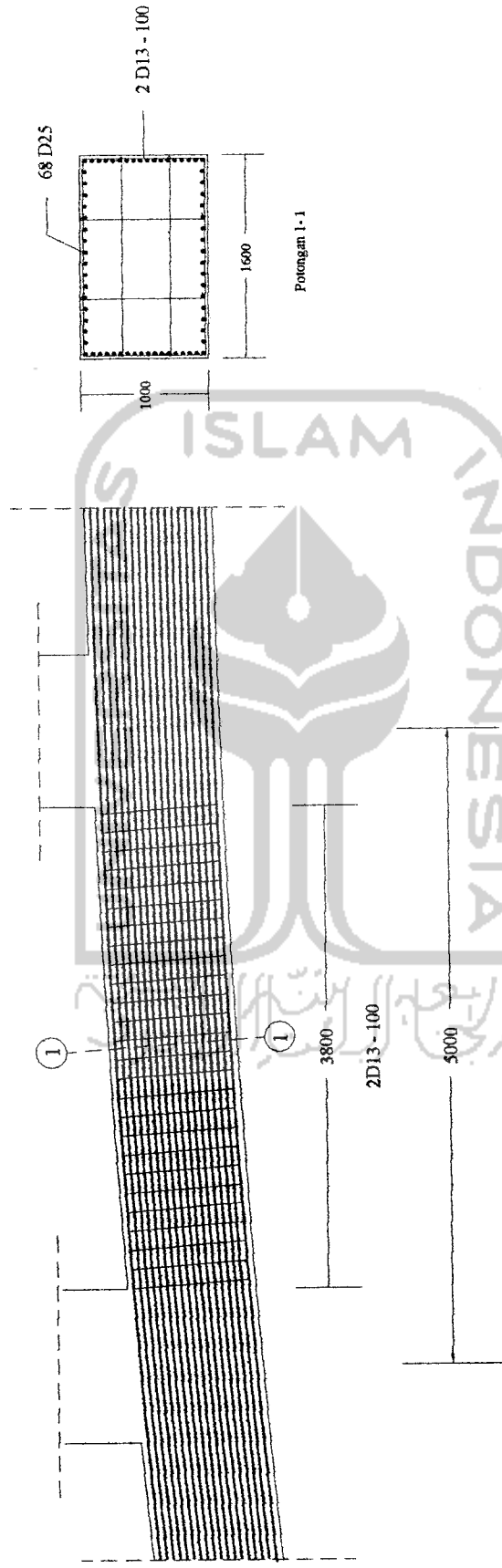
DETIL BALOK LENGKUNG BL12

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL12				



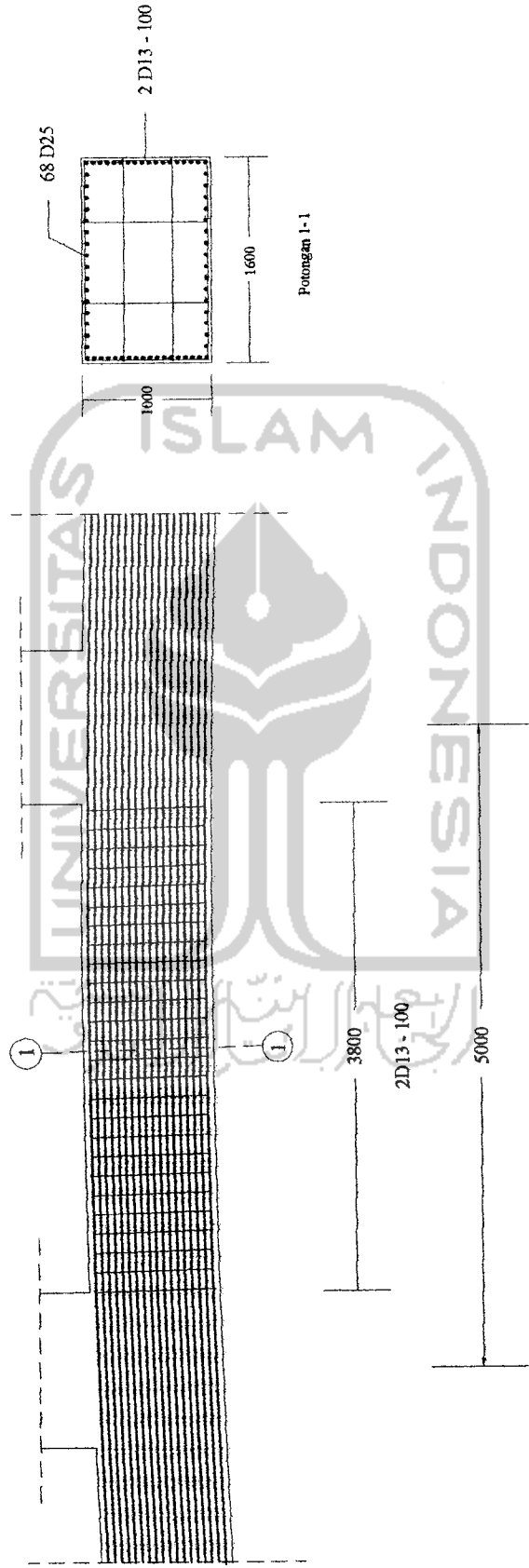
DETIL BALOK LENGKUNG BL14

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL14				



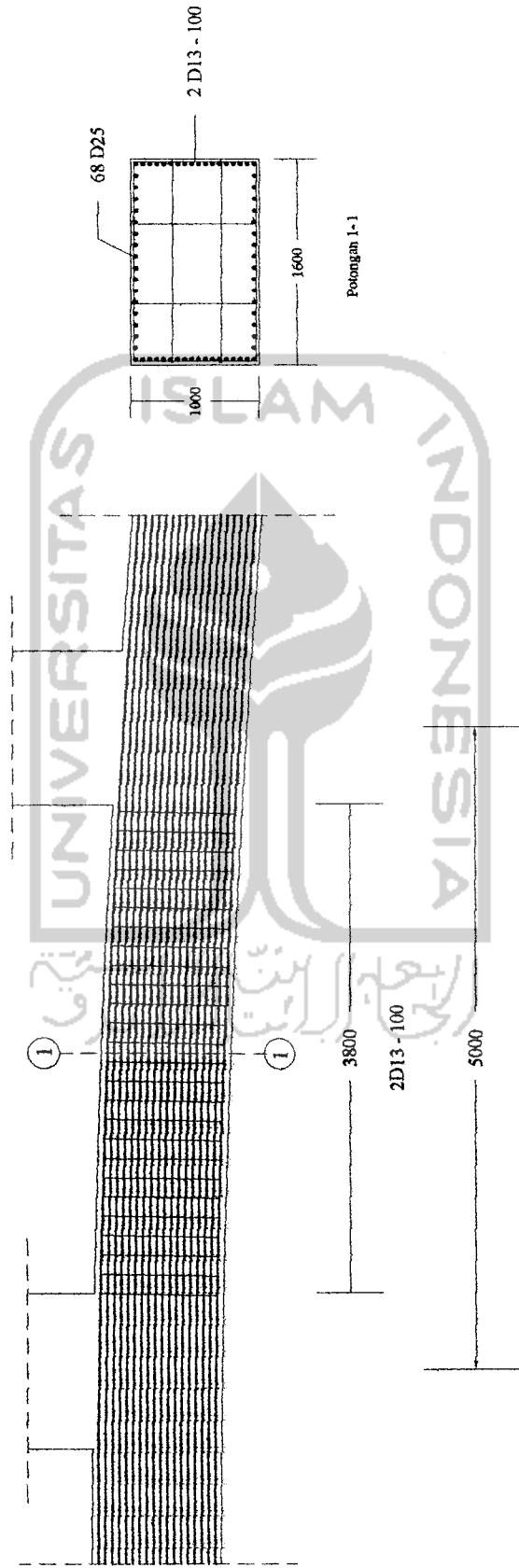
DETIL BALOK LENGKUNG BL15

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR DETIL PENULANGAN LENGKUNG BL15	SKALA	KODE	NO	JML. LBR



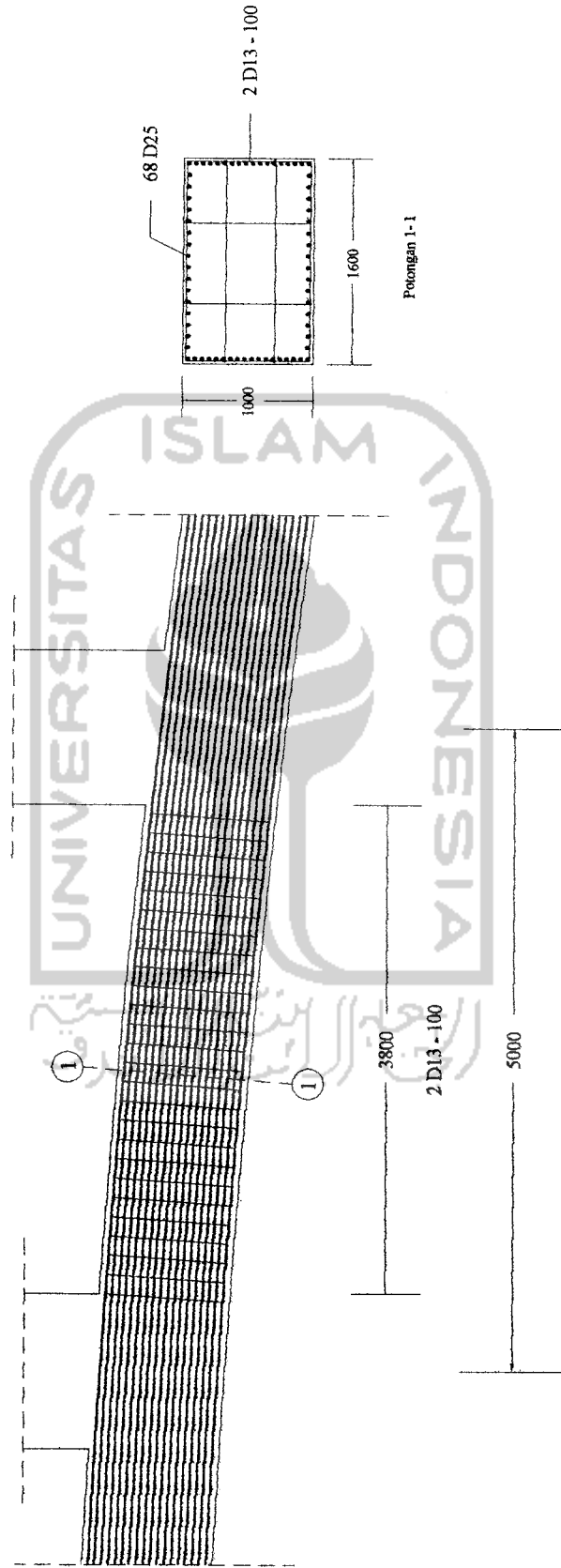
DETIL BALOK LENGKUNG BL16

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL16				



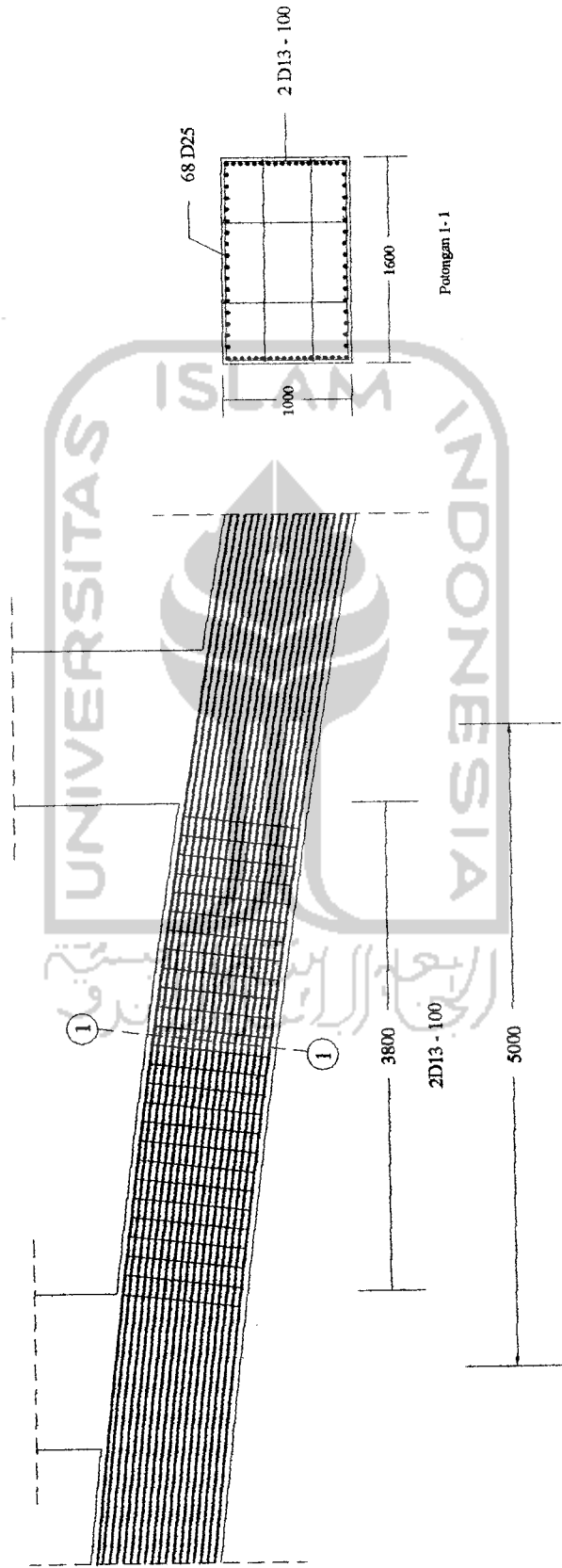
DETIL BALOK LENGKUNG BL17

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL17				



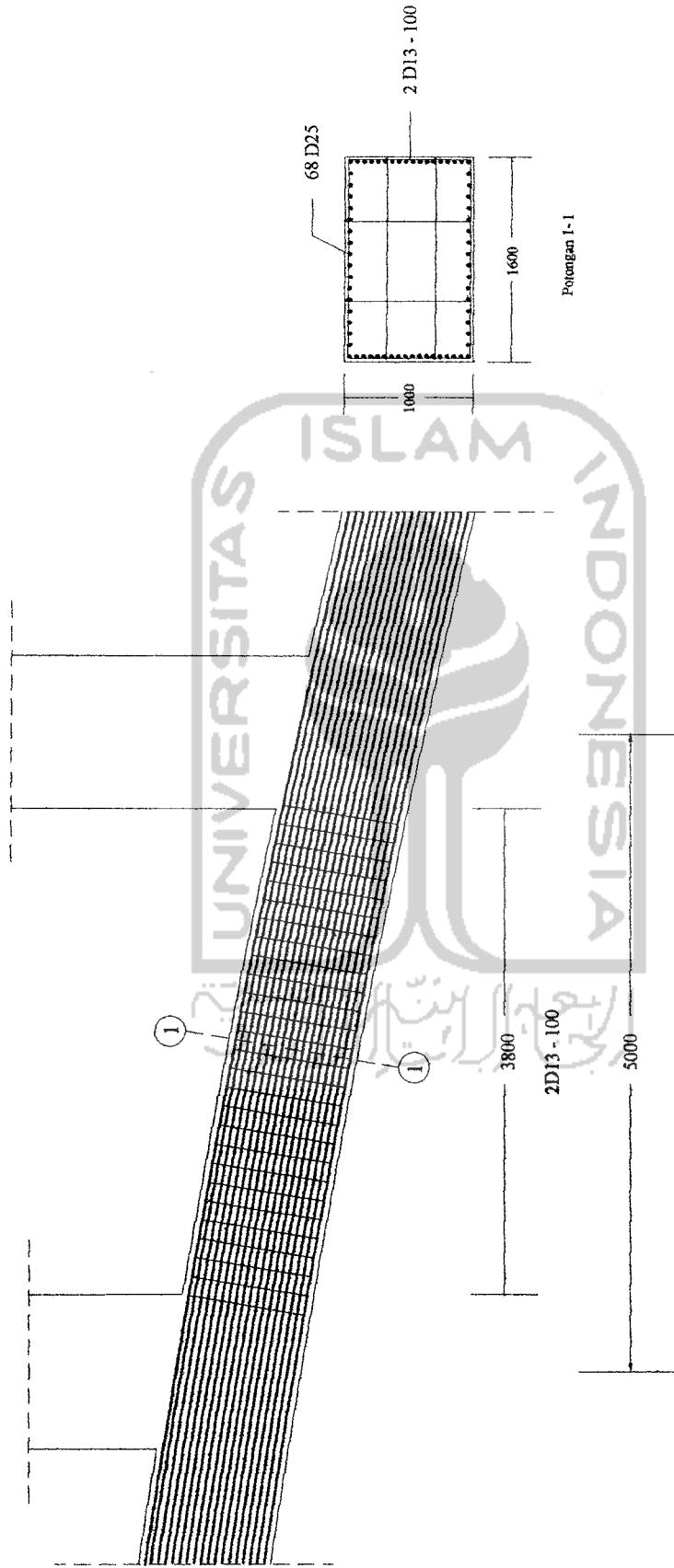
DETIL BALOK LENGKUNG BL18

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL18				



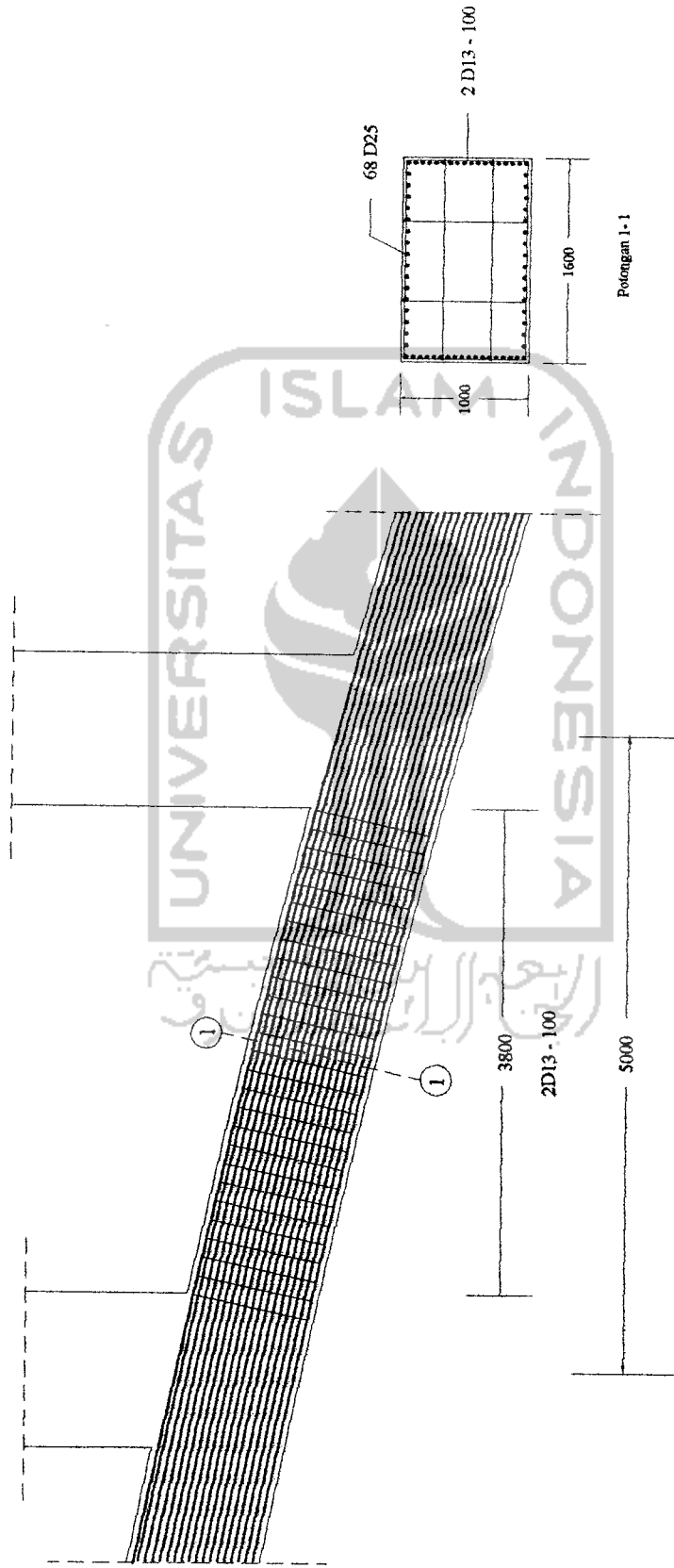
DETIL BALOK LENGKUNG BL19

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL19				



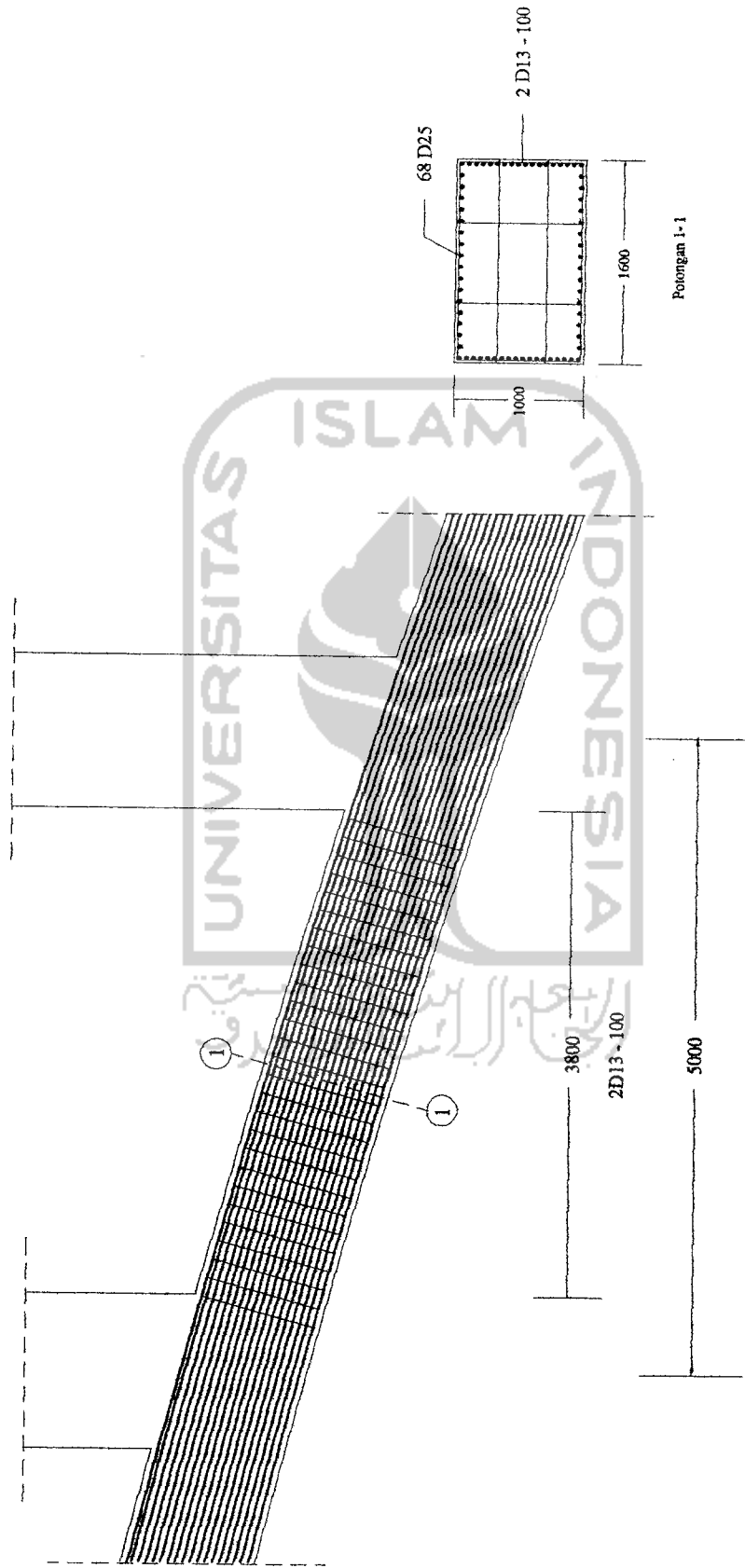
DETIL BALOK LENGKUNG BL20

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML, LBR
	DETIL PENULANGAN LENGKUNG BL20				



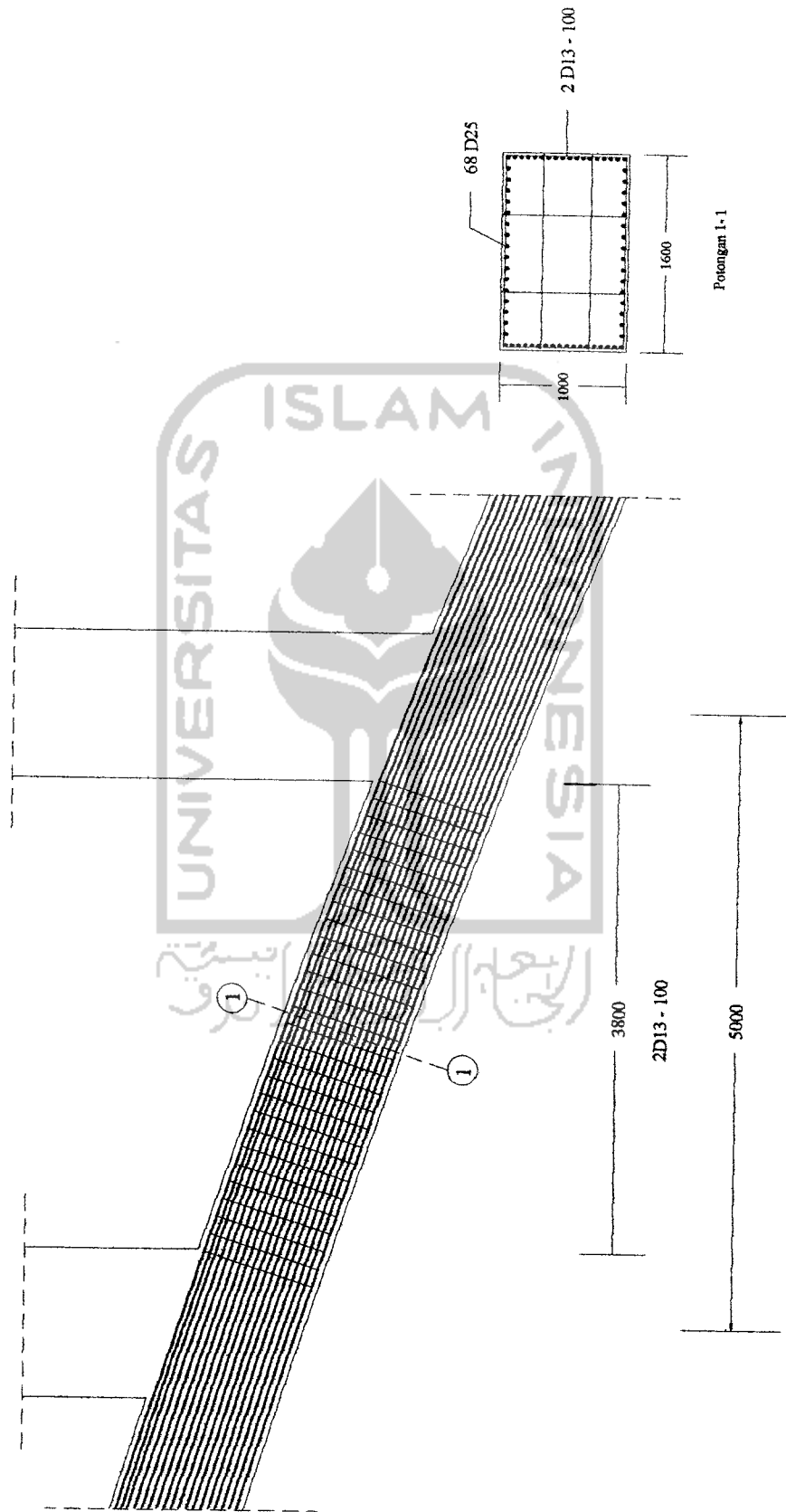
DETIL BALOK LENGKUNG BL21

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL21				



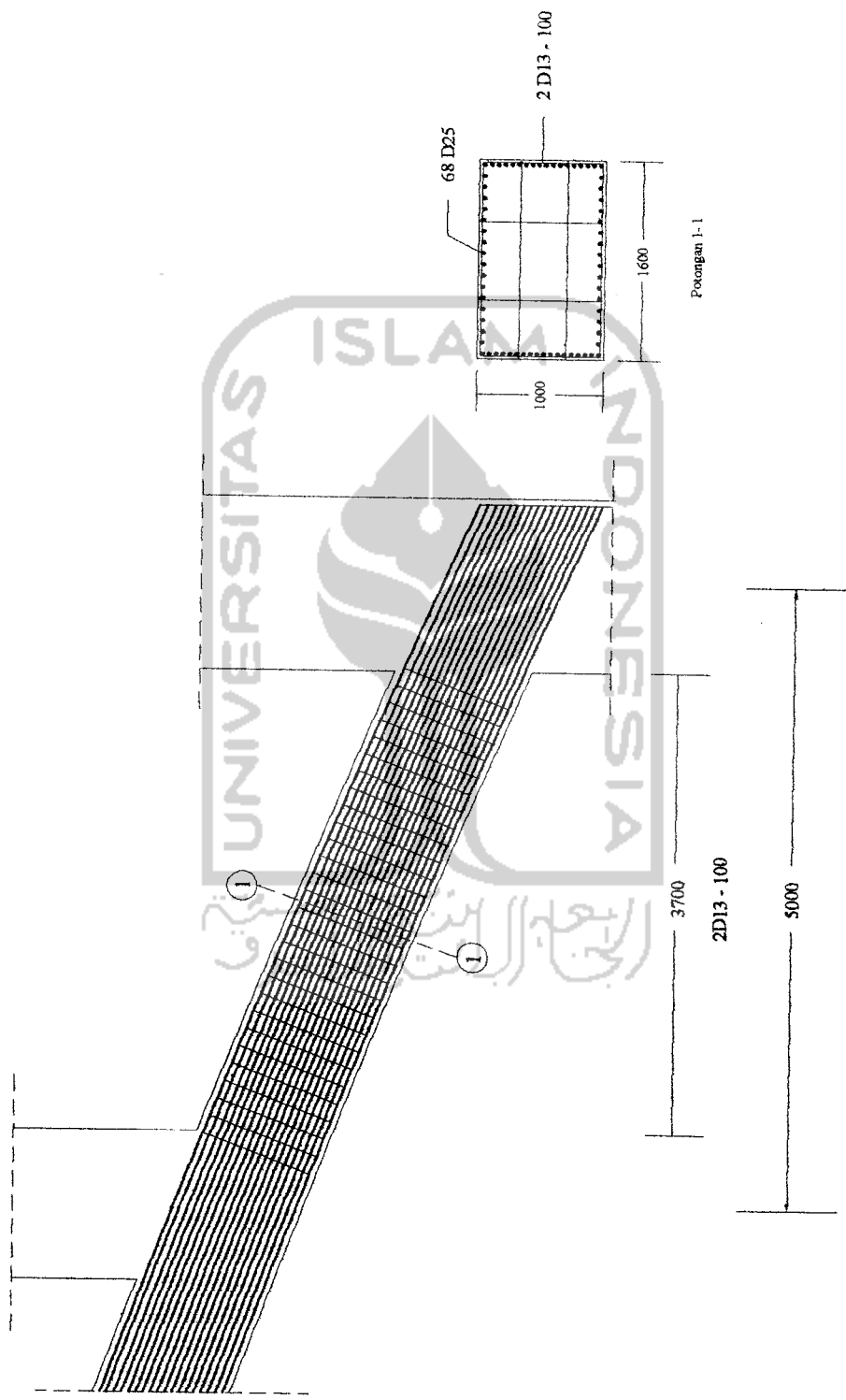
DETIL BALOK LENGKUNG BL22

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL22				



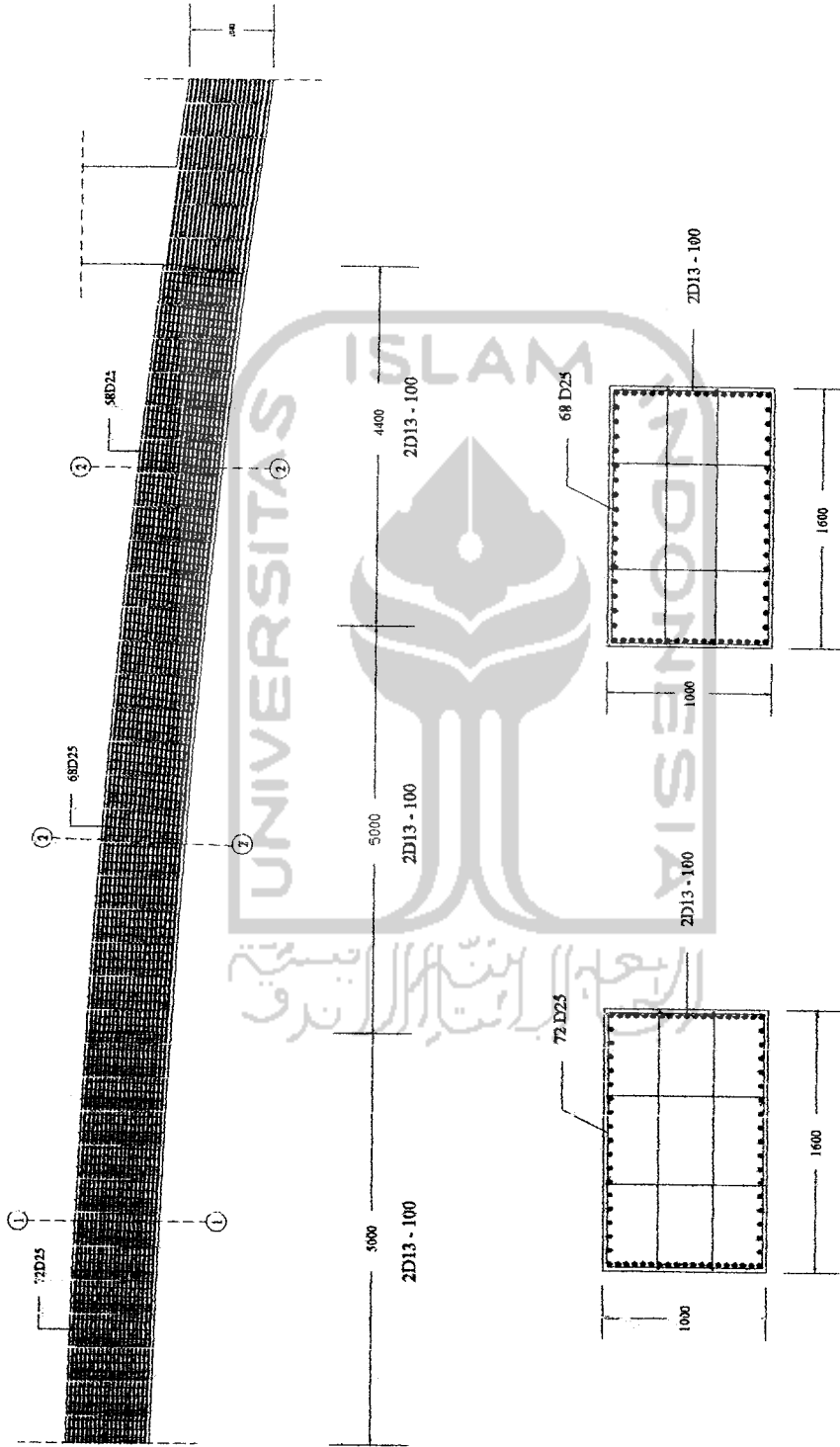
DETIL BALOK LENGKUNG BL23

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL23				



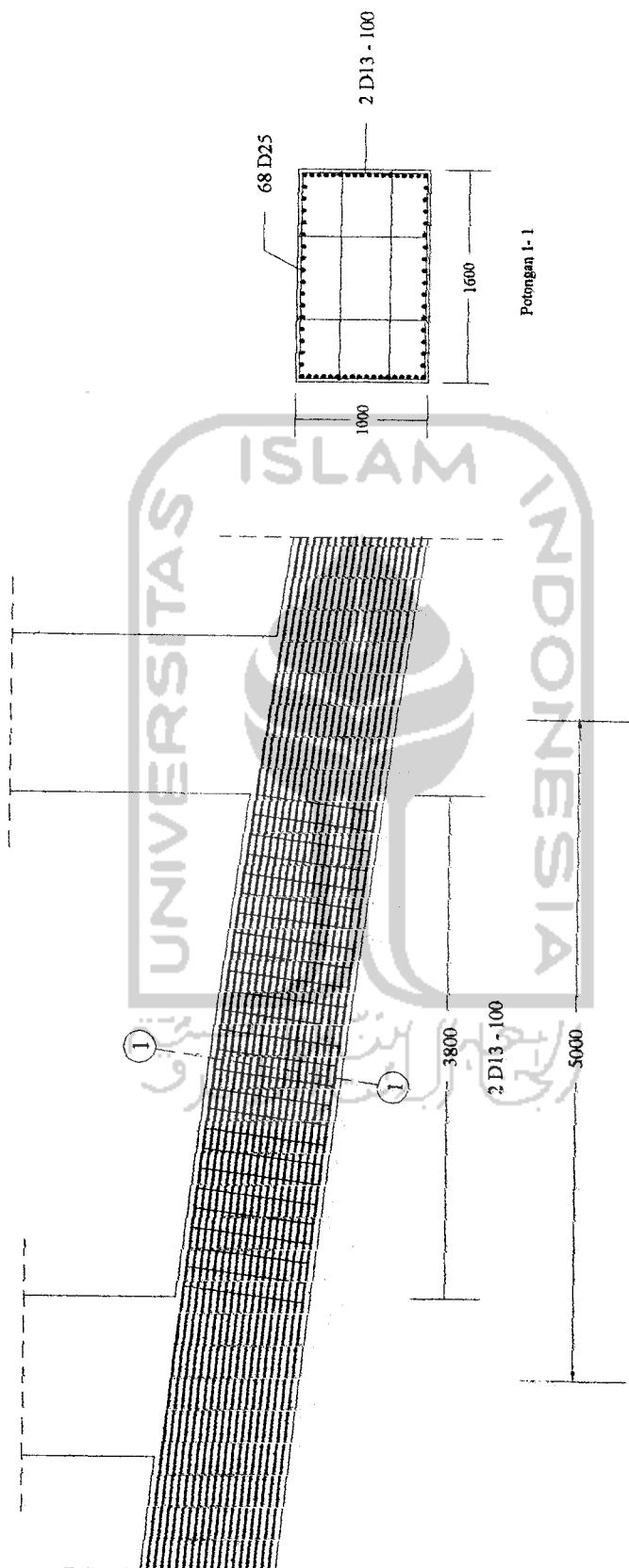
DETIL BALOK LENGKUNG BL.24

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN BALOK LENGKUNG BL.24				



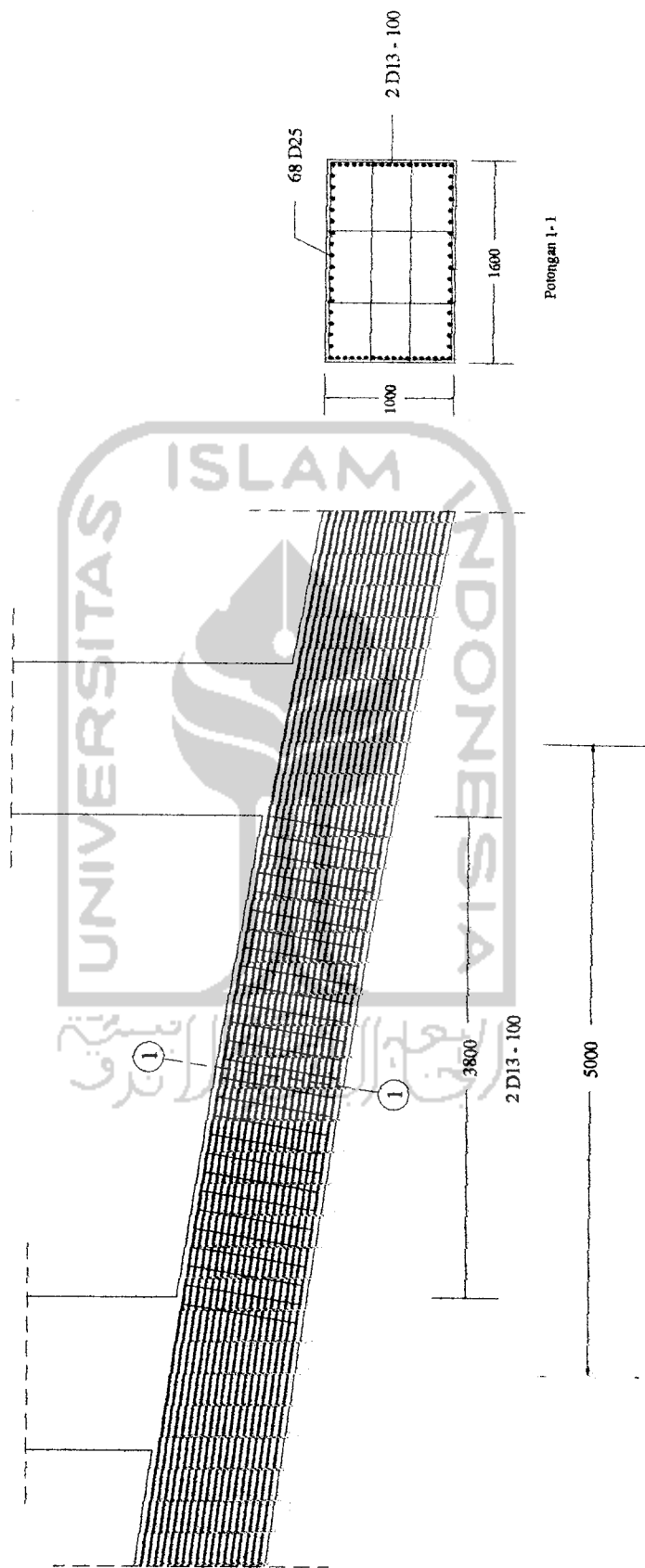
DETAIL BALOK LINGKUNG (BL25, BL26, BL27)

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETAIL PENULANGAN BALOK LINGKUNG BL25, BL26, BL27				



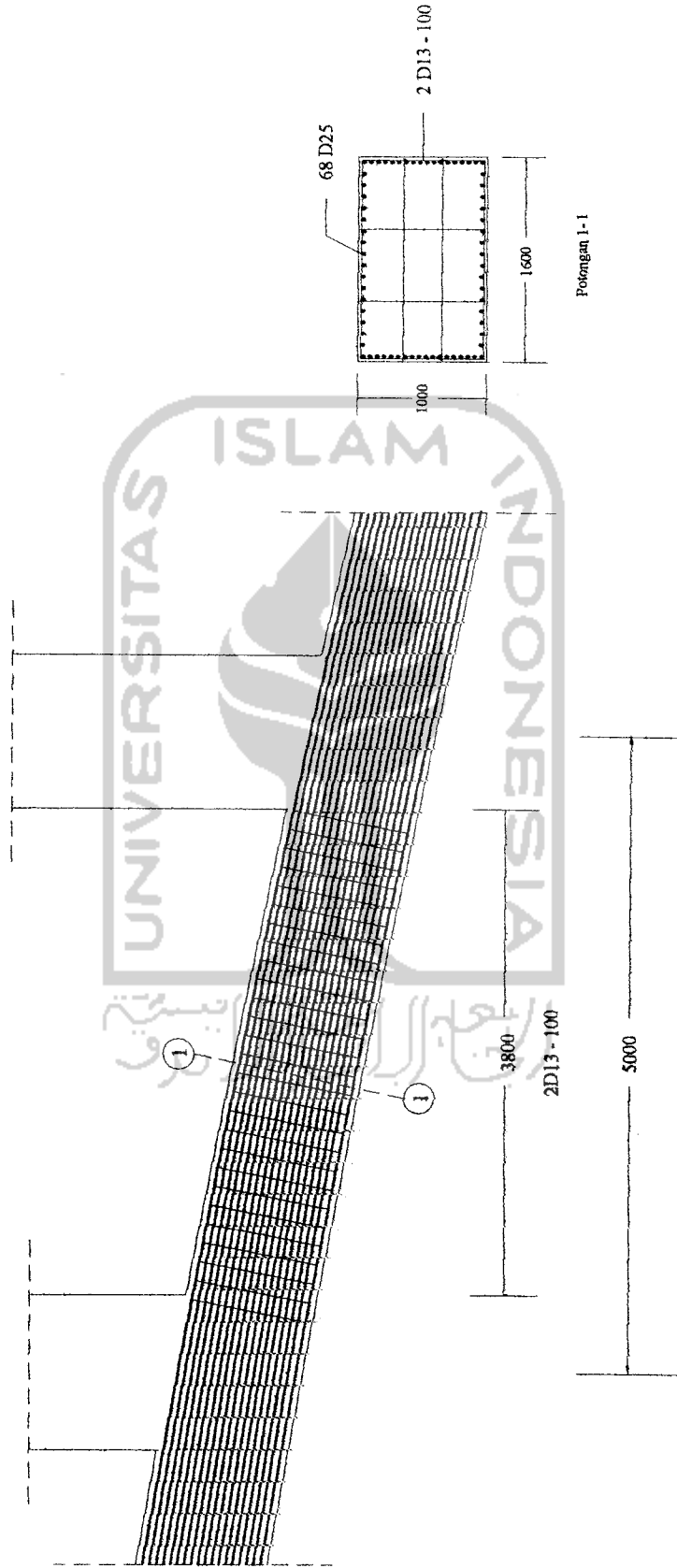
DETIL BALOK LENGKUNG BL28

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
		DETIL PENULANGAN LENGKUNG BL28				



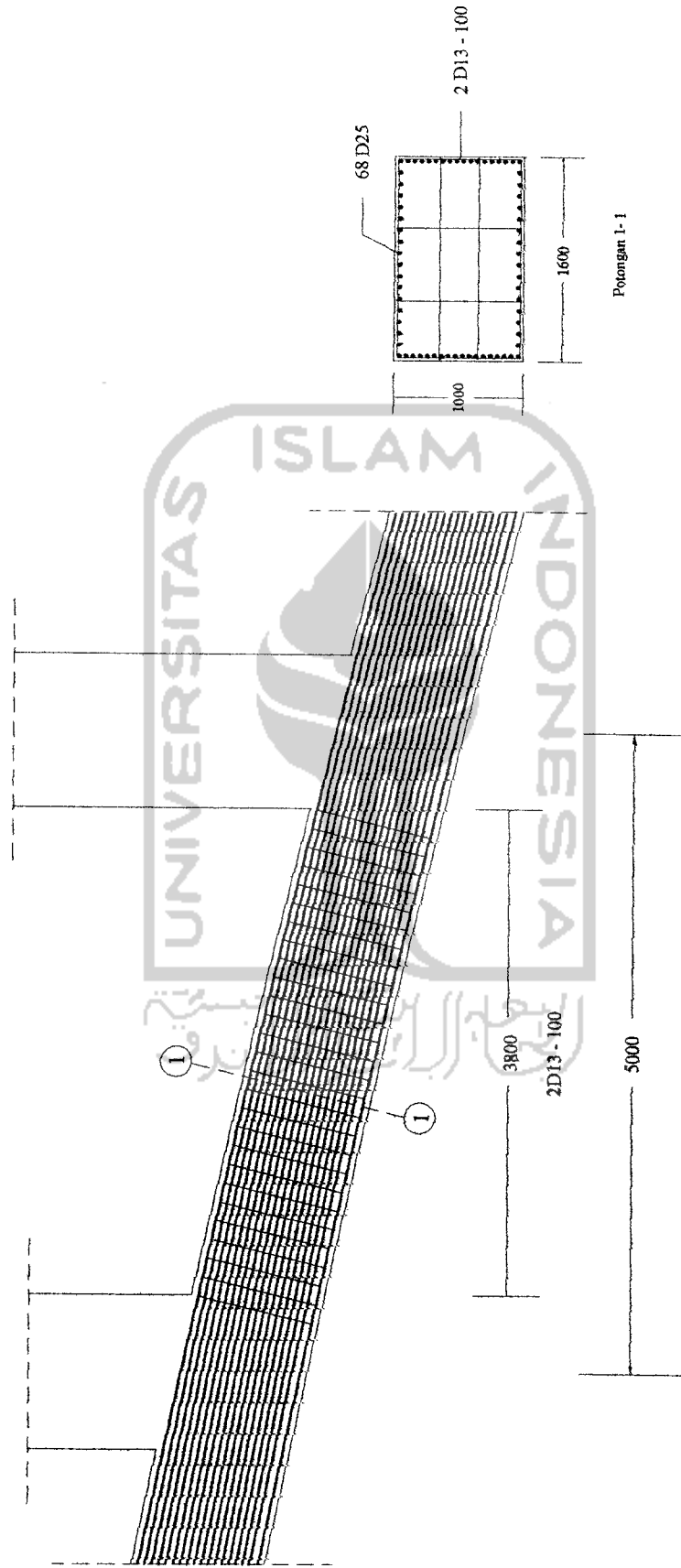
DETIL BALOK LENGKUNG BL29

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL29				



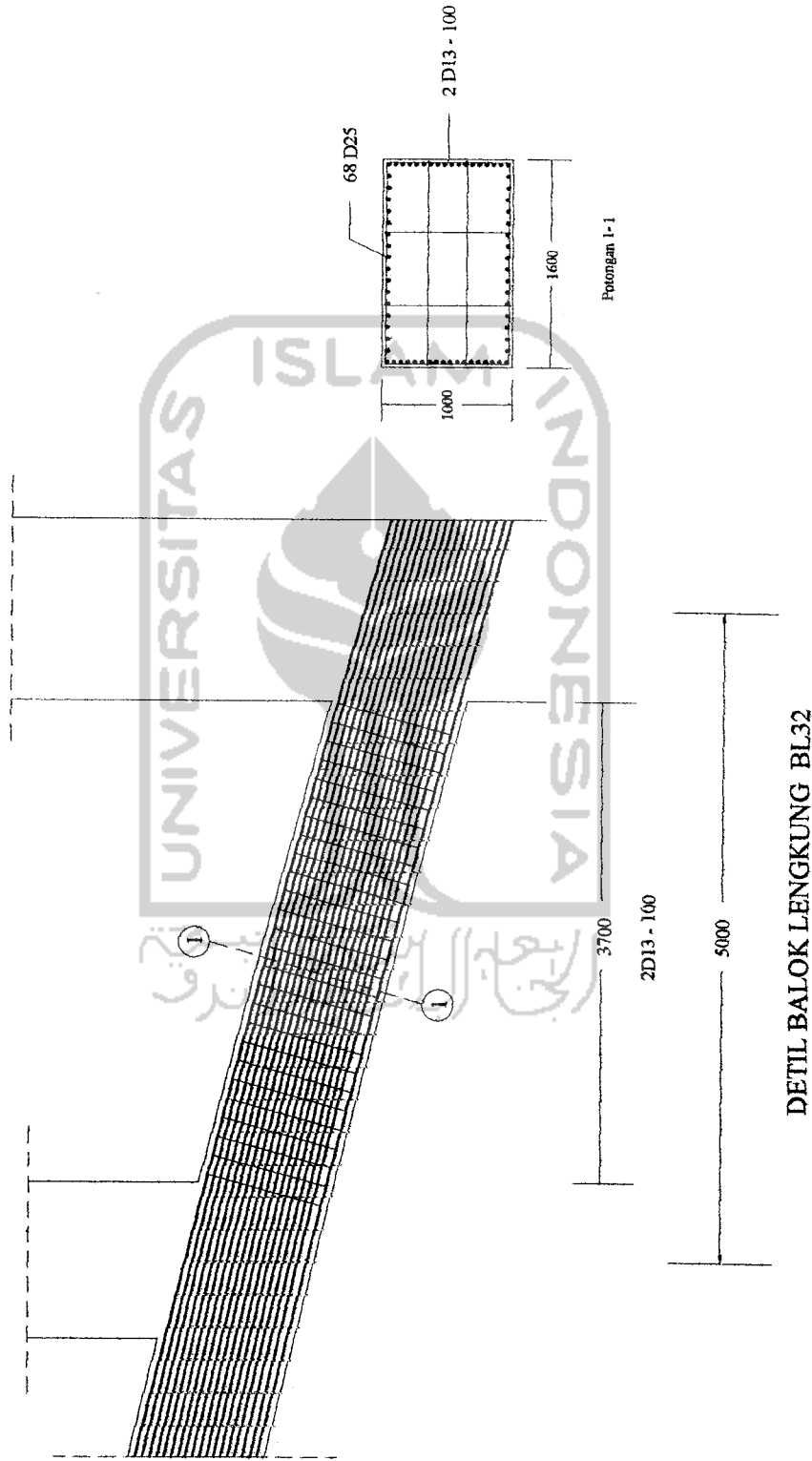
DETIL BALOK LENGKUNG BL30

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL30				

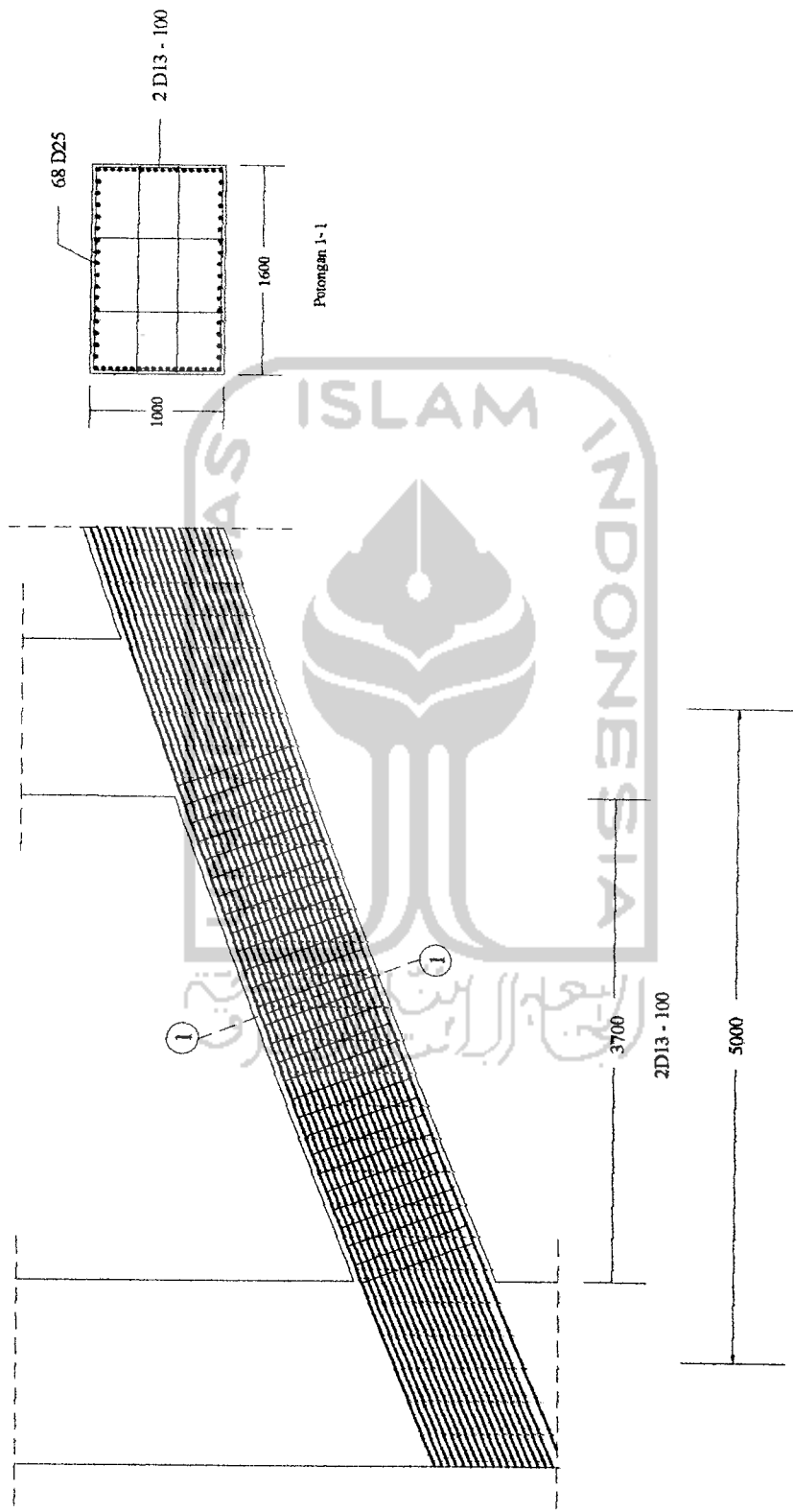


DETIL BALOK LENGKUNG BL31

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL31				

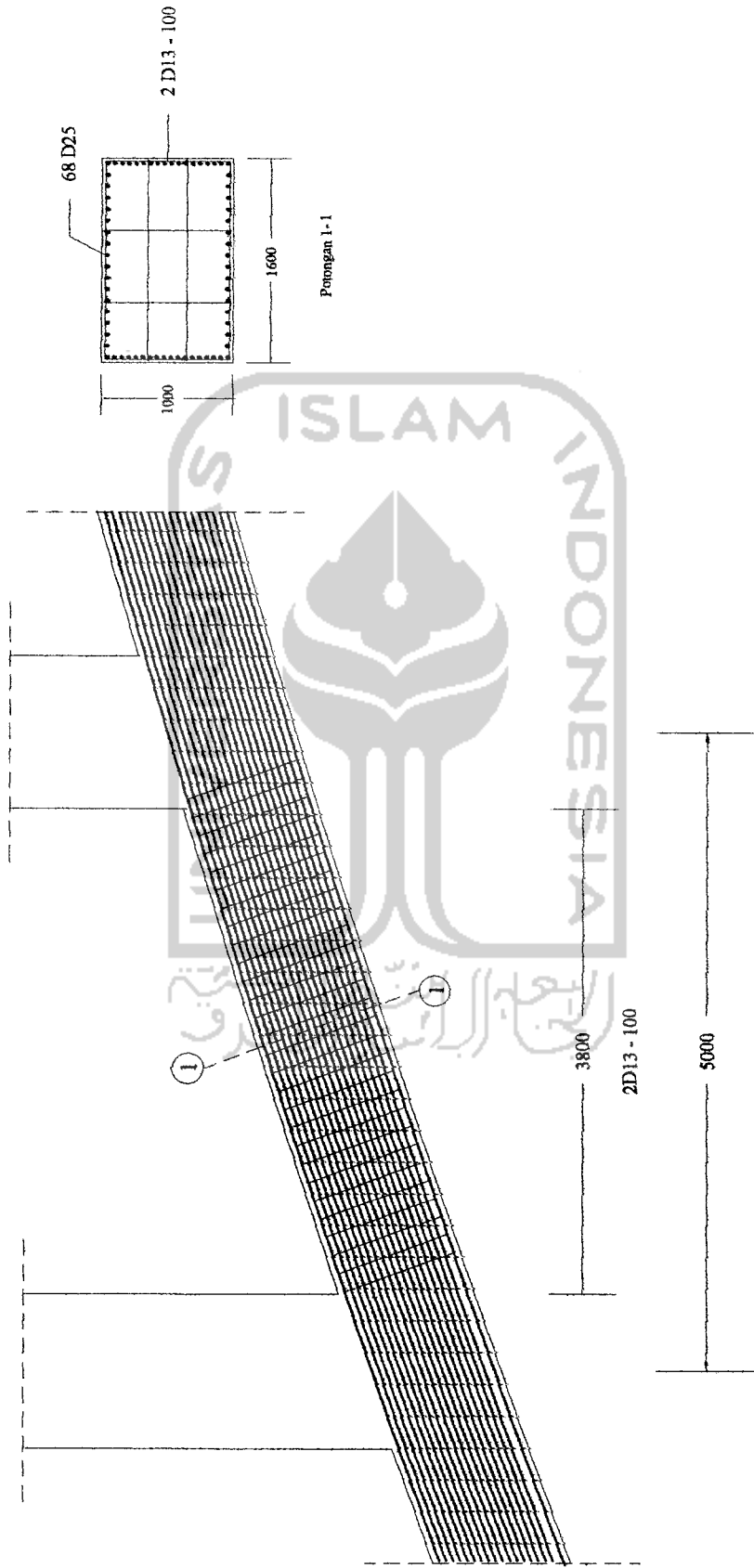


PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LINGKUNG BL32				



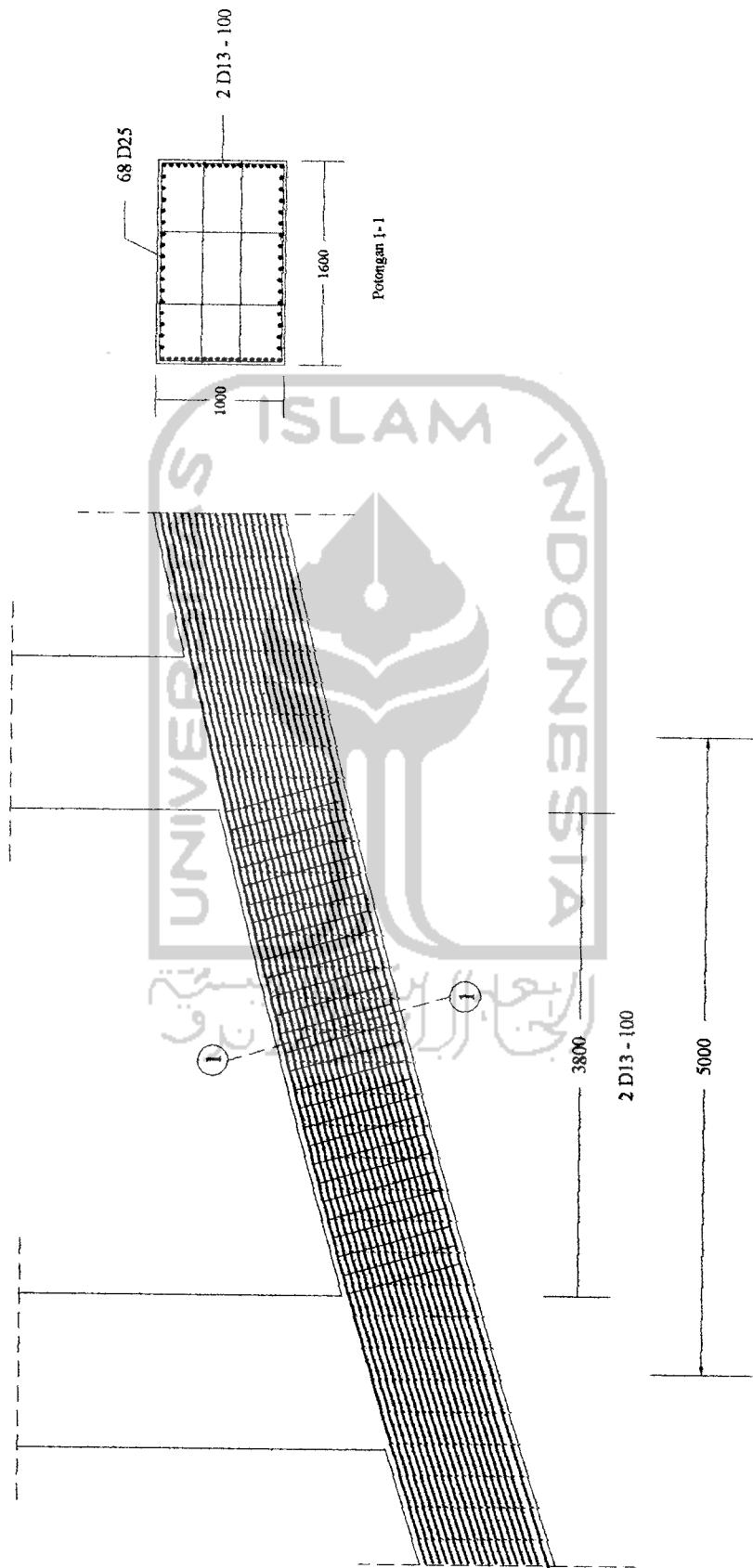
DETIL BALOK LENGKUNG BL33

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL33				



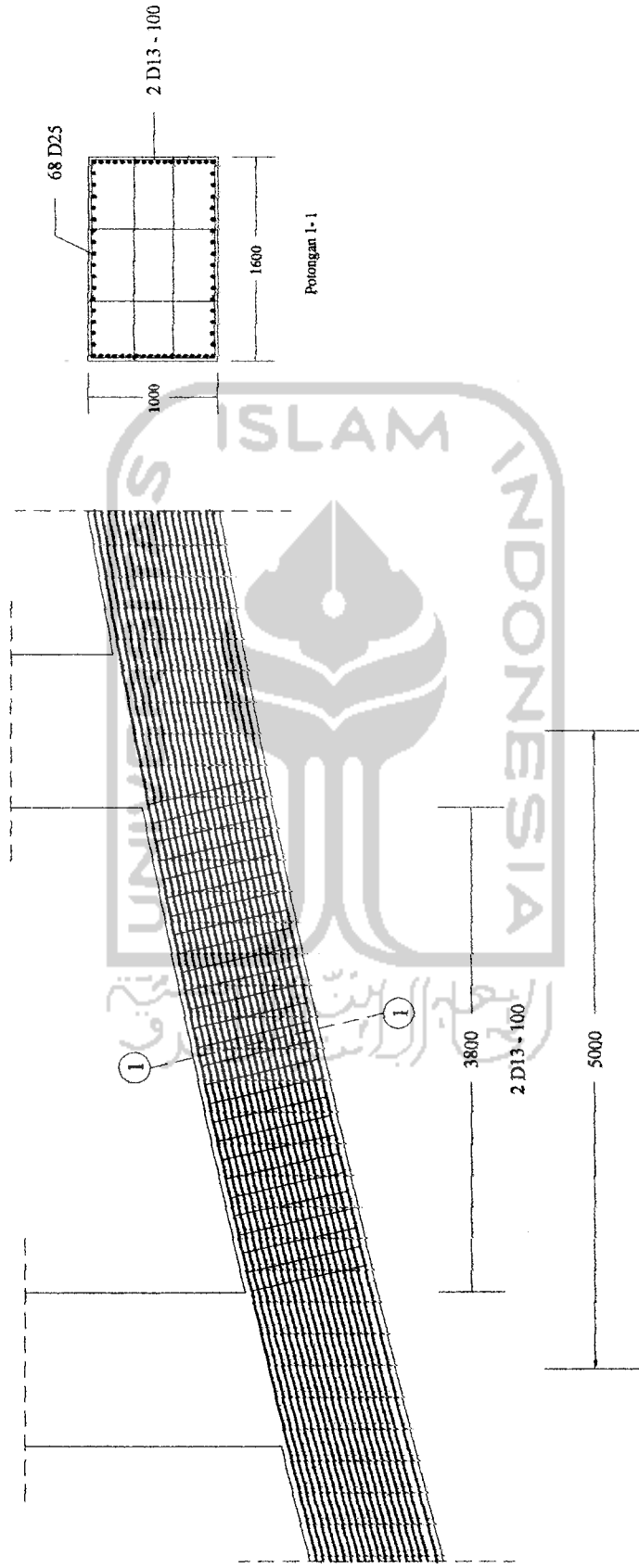
DETIL BALOK LENGKUNG BL34

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL34				



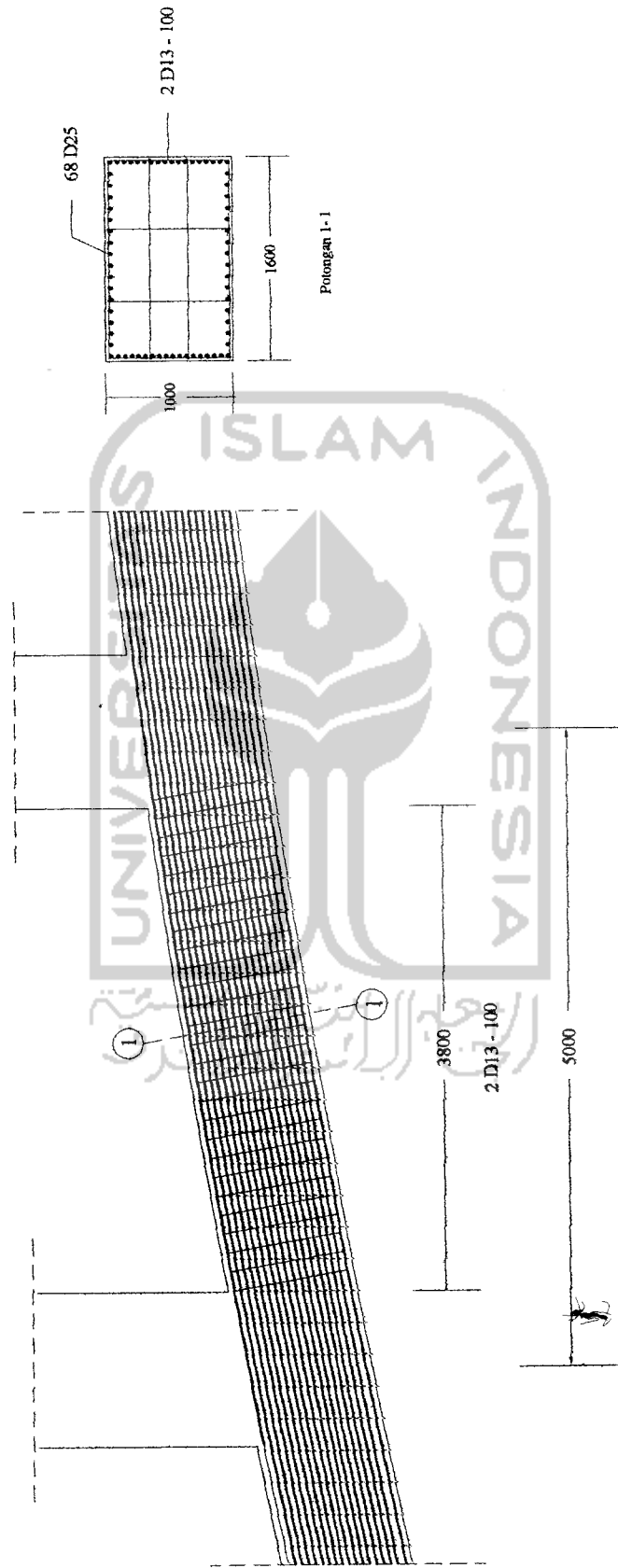
DETIL BALOK LENGKUNG BL35

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL35				



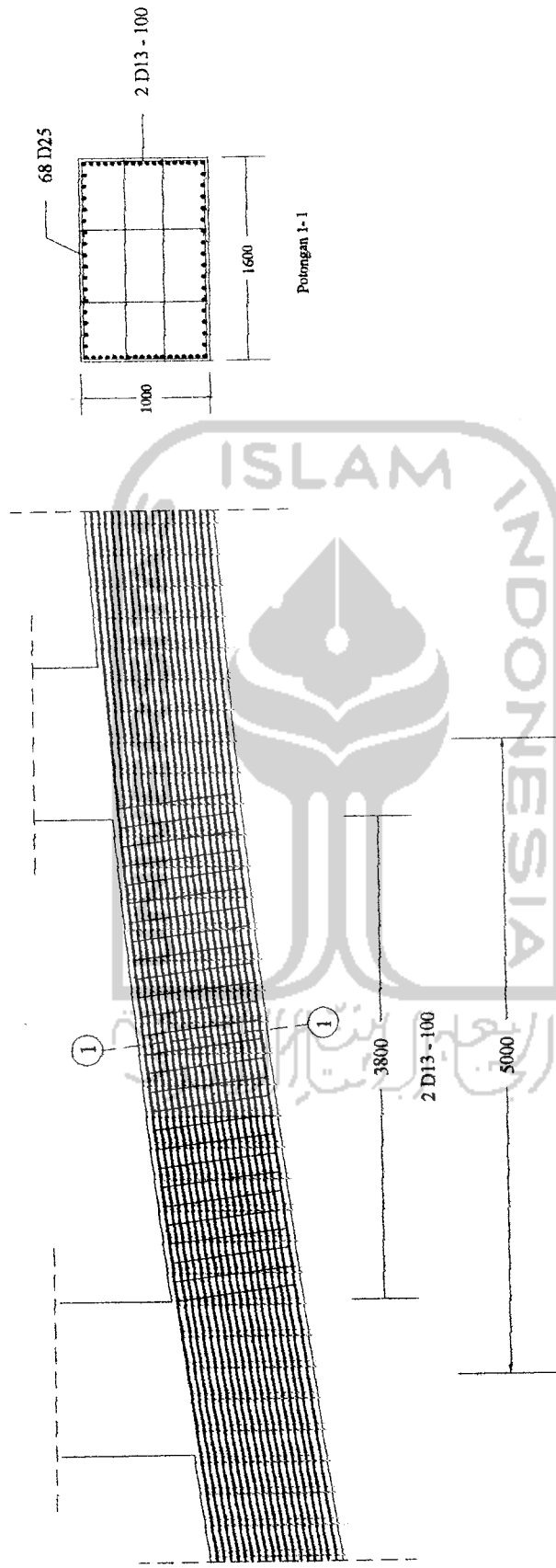
DETIL BALOK LENGKUNG BL36

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL36				



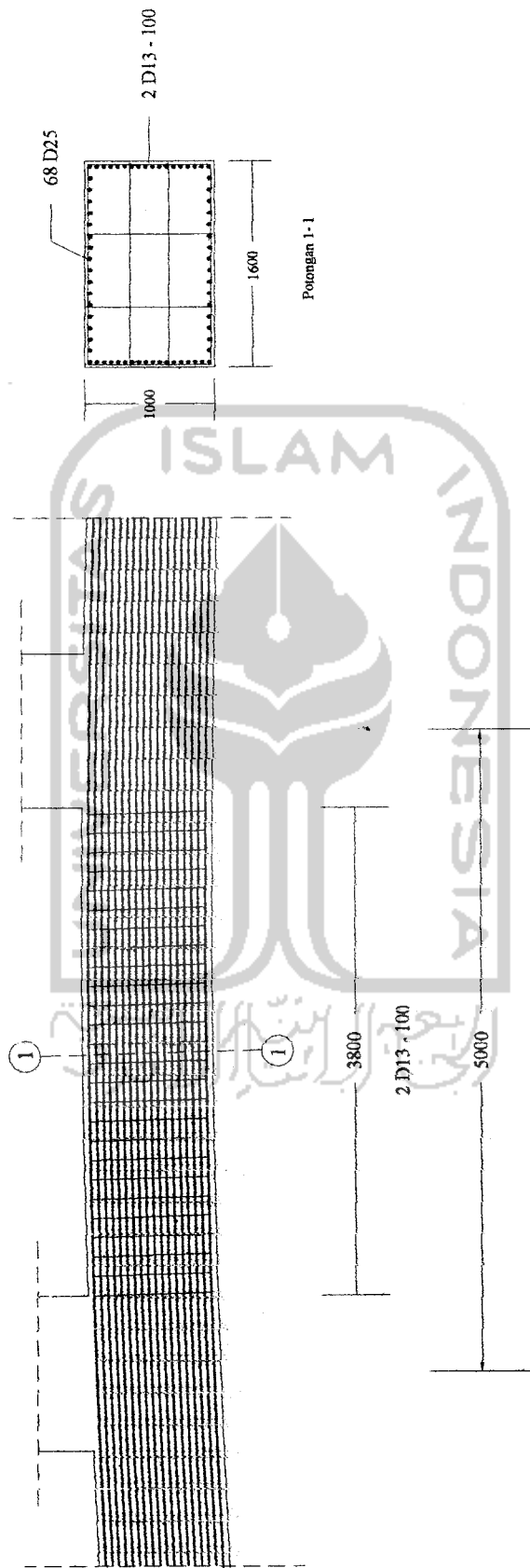
DETIL BALOK LENGKUNG BL37

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL37				



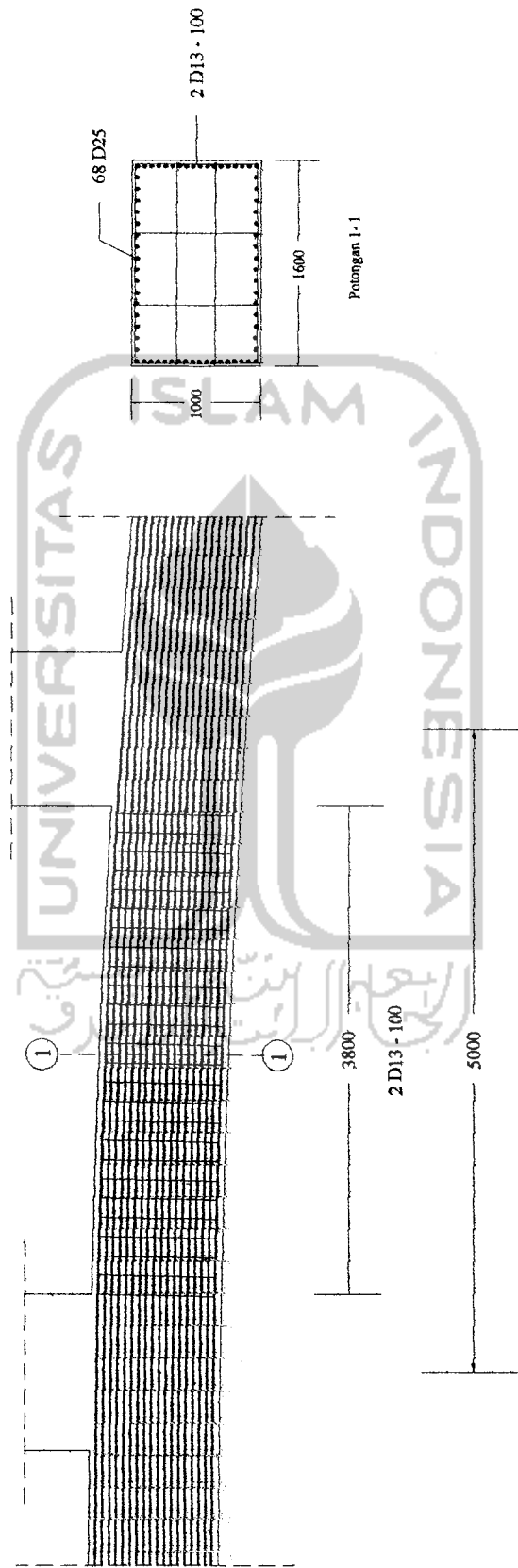
DETIL BALOK LENGKUNG BL38

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL38				



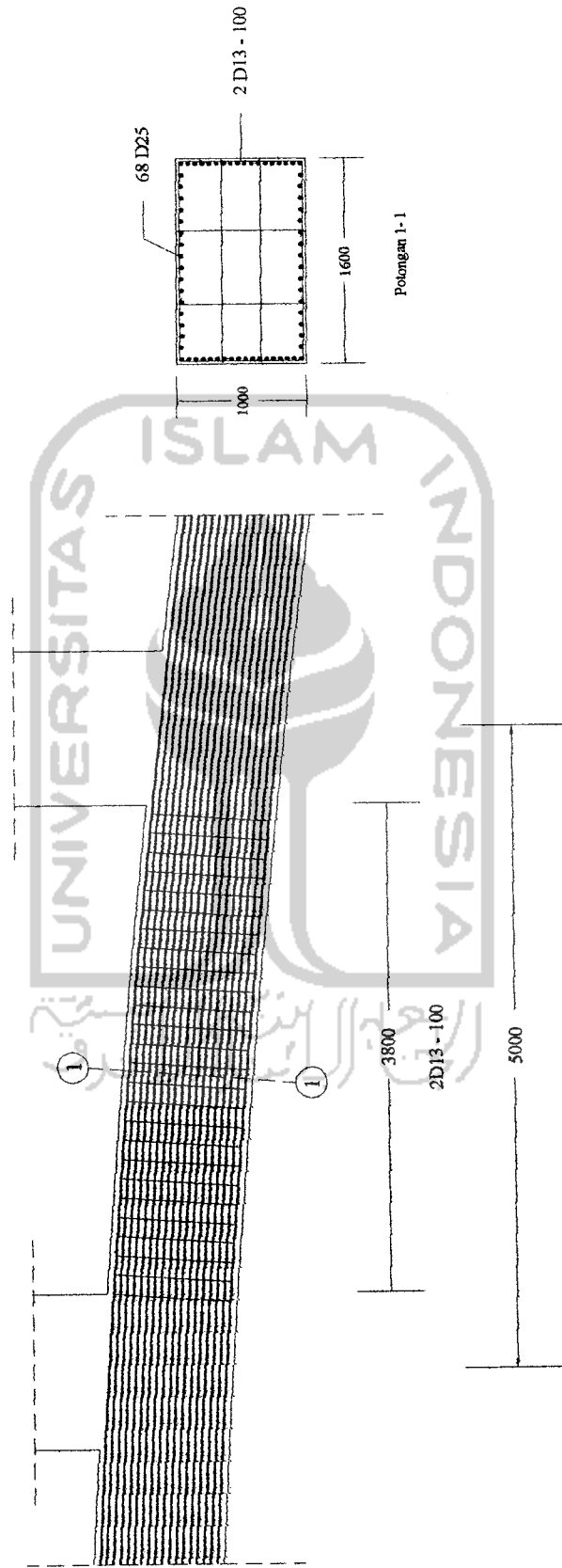
DETIL BALOK LENGKUNG BL40

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL40				



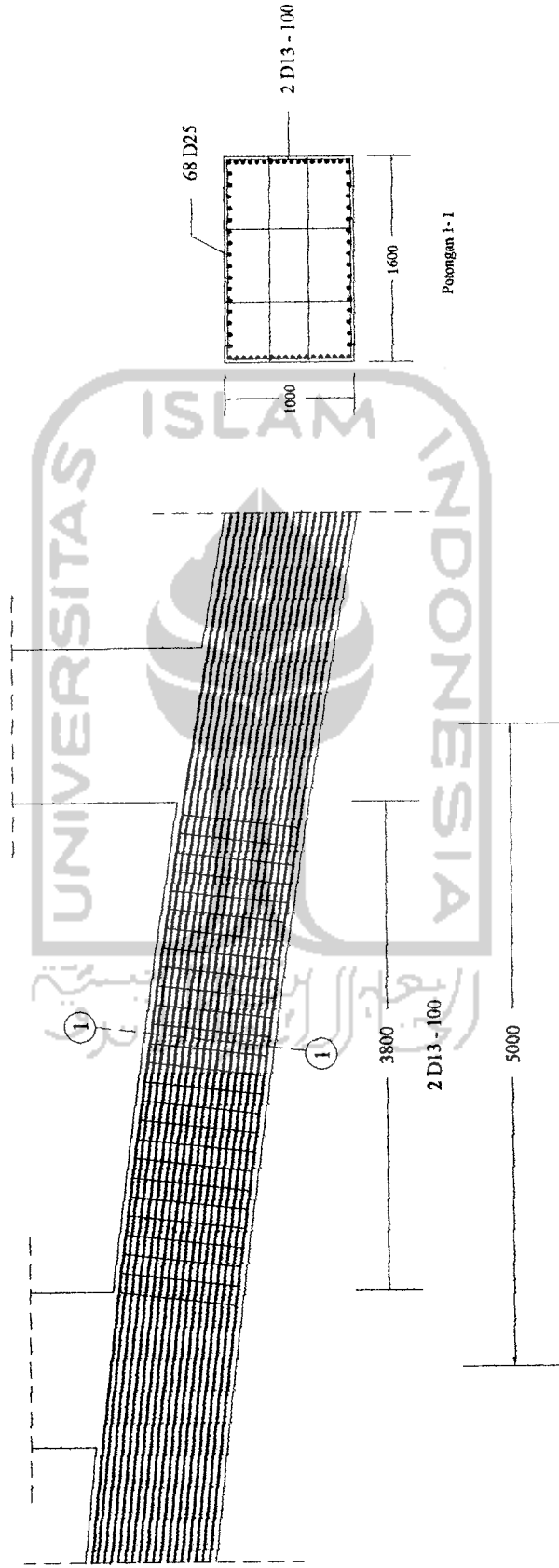
DETIL BALOK LENGKUNG BL41

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL41				



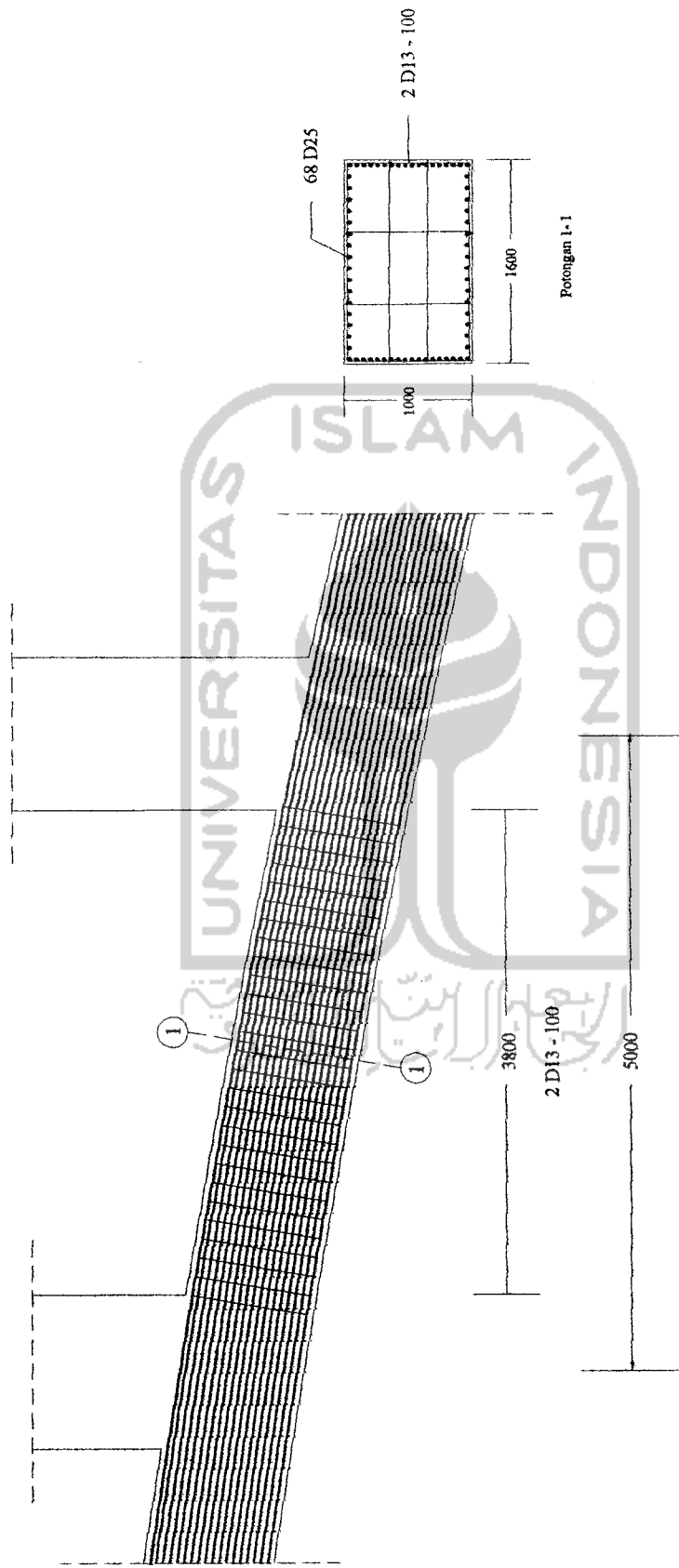
DETIL BALOK LENGKUNG BL42

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL42				



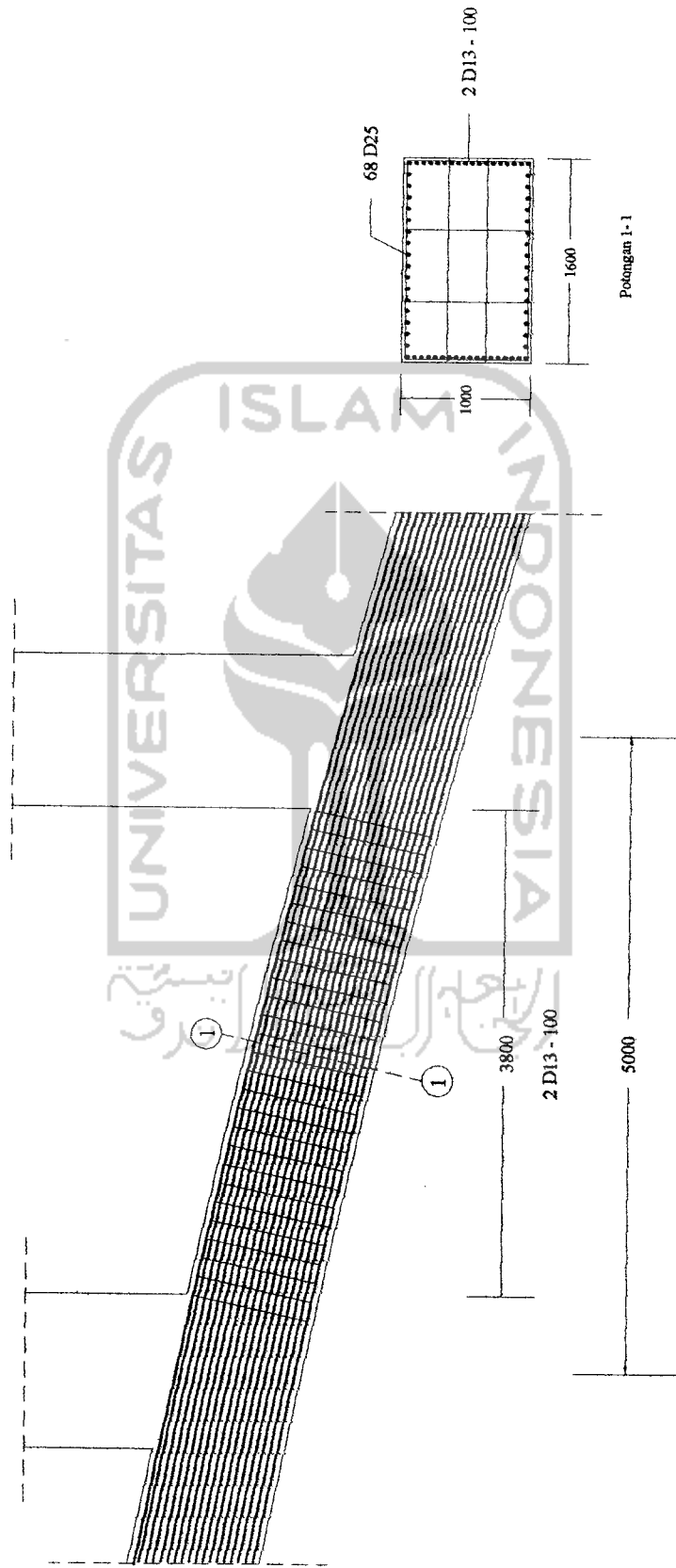
DETIL BALOK LENGKUNG BL43

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL43				



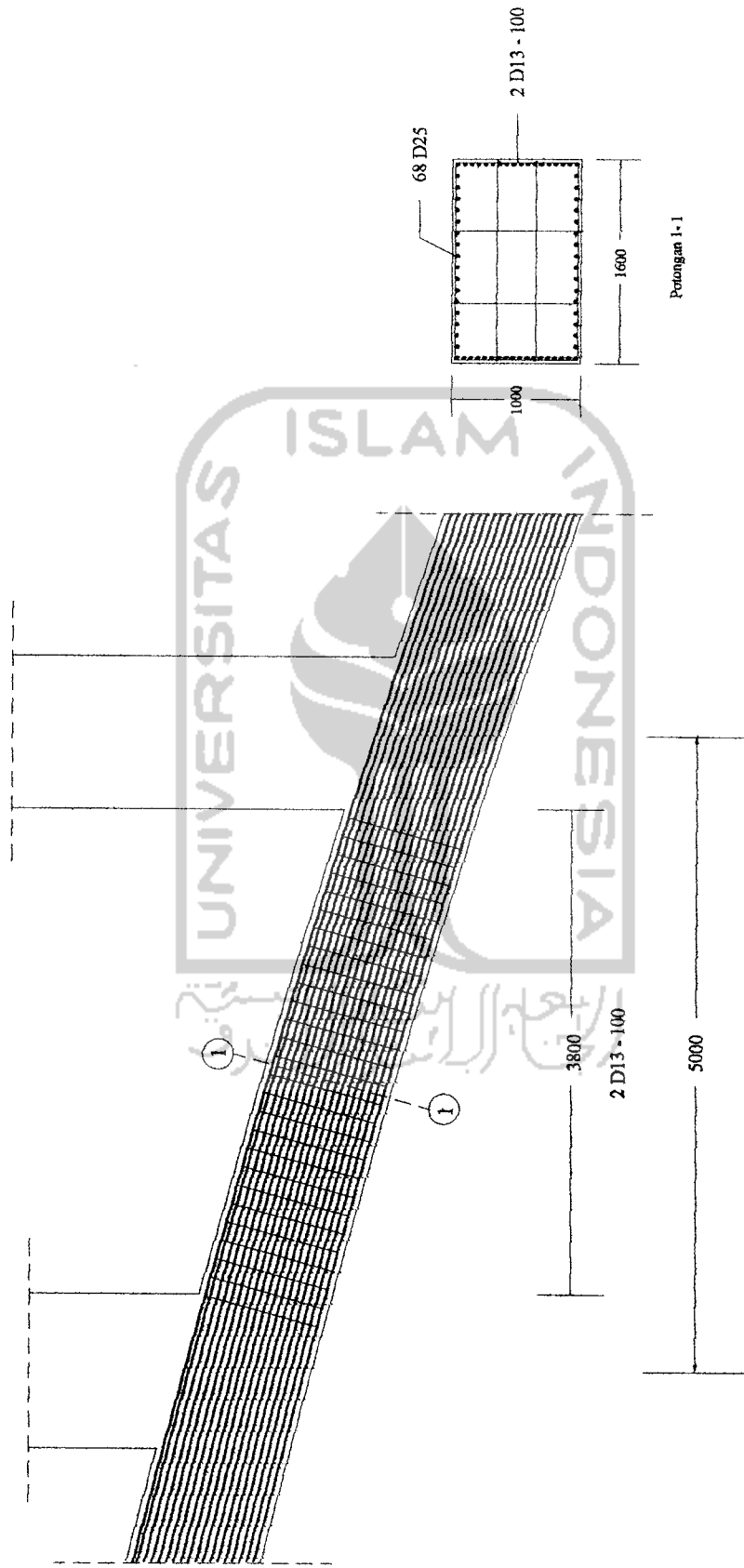
DETIL BALOK LENGKUNG BL44

PERENCANAAN JEMBATAN BETON BERTULANG TYPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL44				



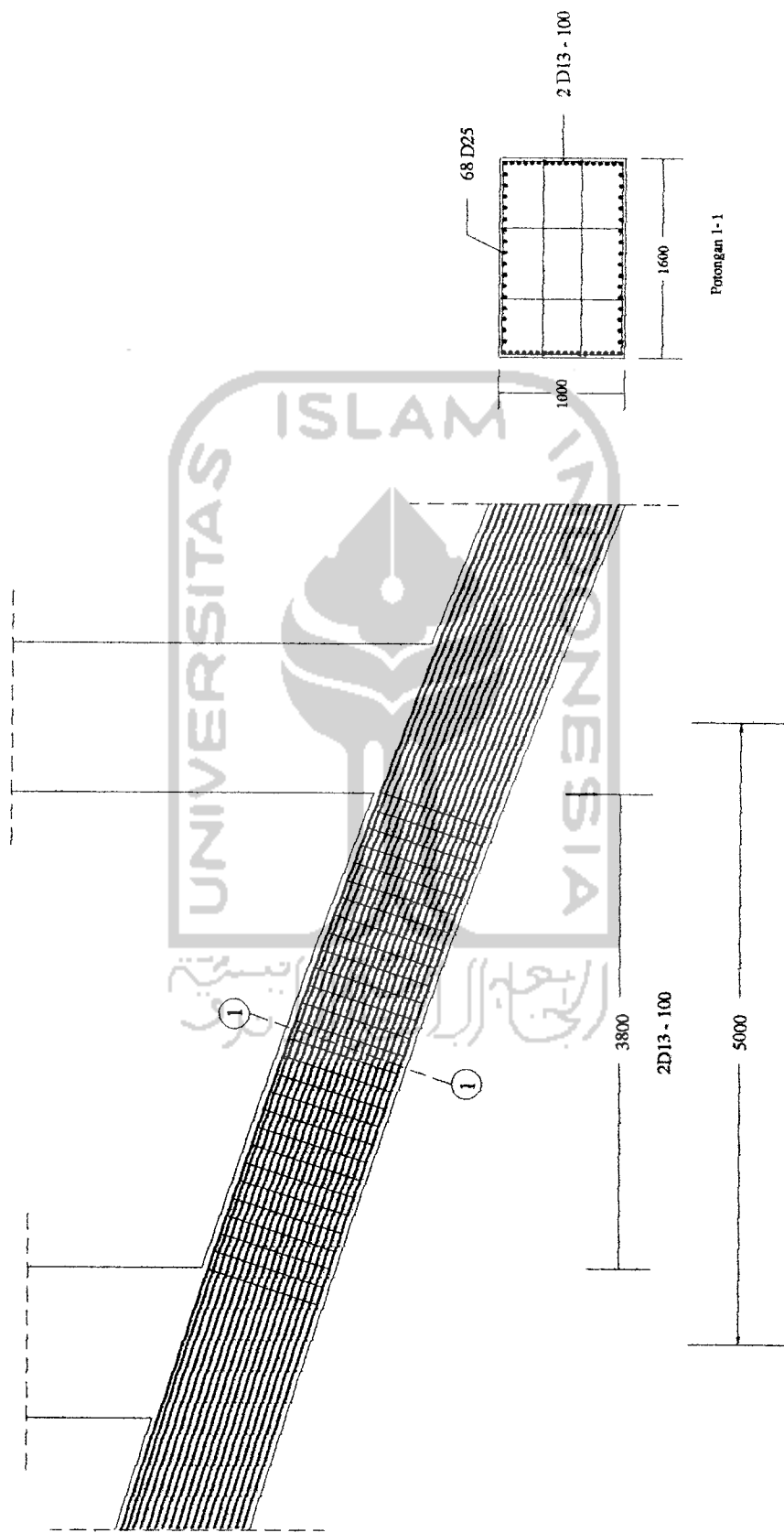
DETIL BALOK LENGKUNG BL45

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL45				



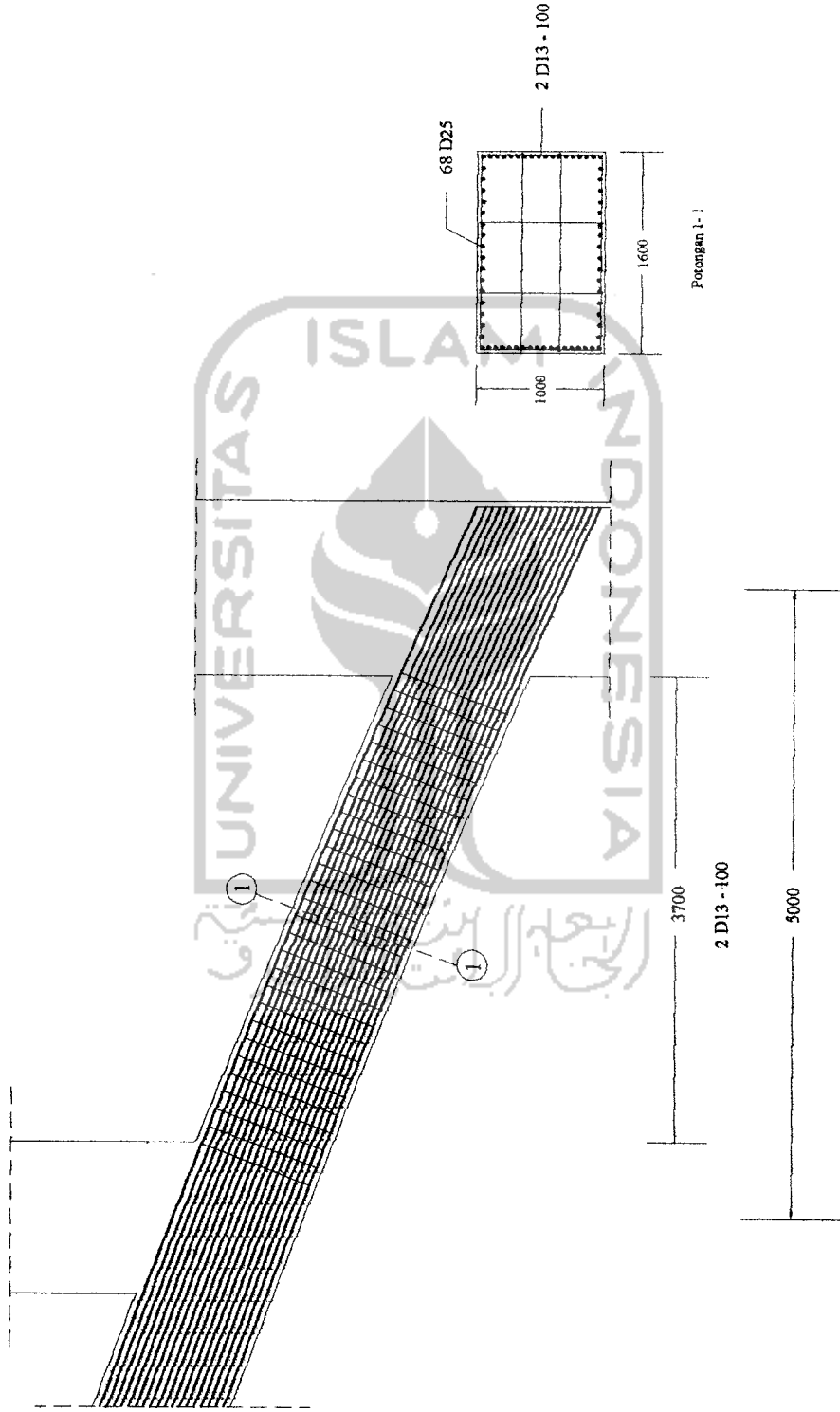
DETIL BALOK LENGKUNG BL46

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN LENGKUNG BL46				



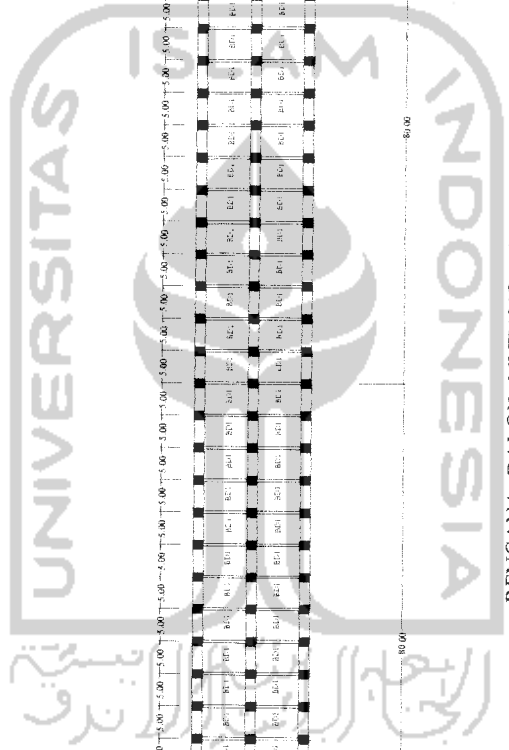
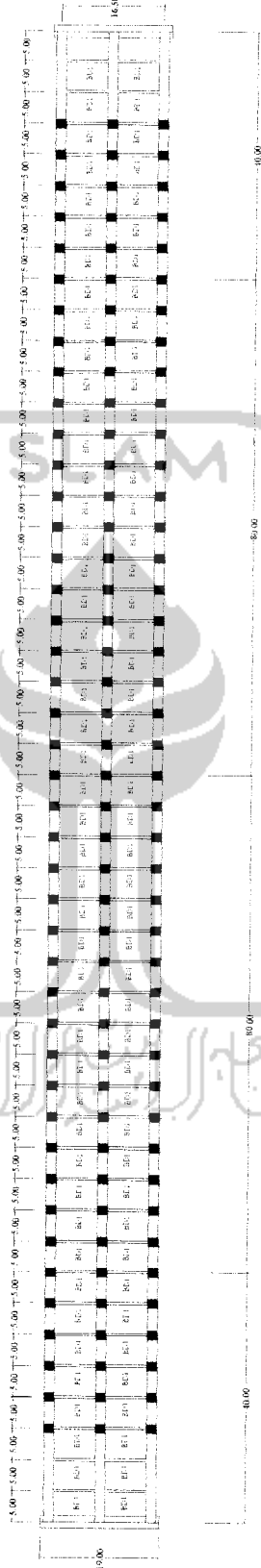
DETIL BALOK LINGKUNG BL47

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
		DETIL PENULANGAN LINGKUNG BL47				



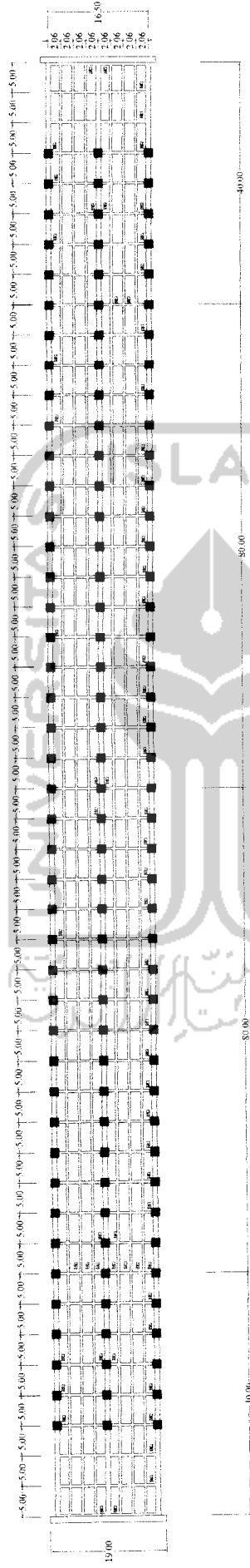
DETIL BALOK LENGKUNG BL48

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN BALOK LENGKUNG BL 48				



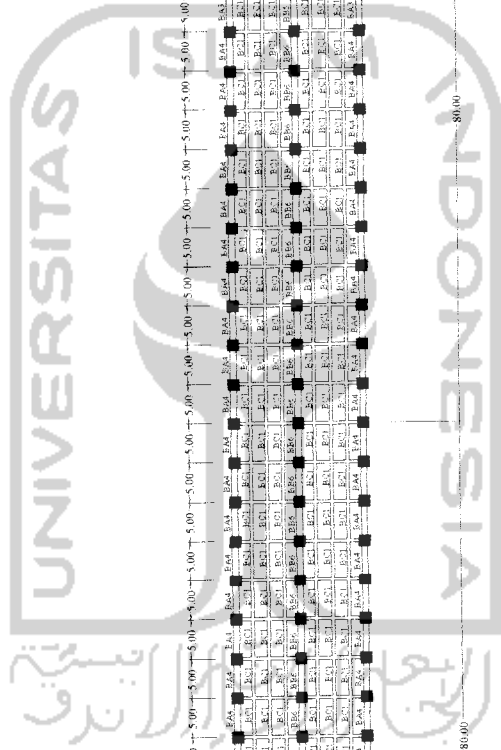
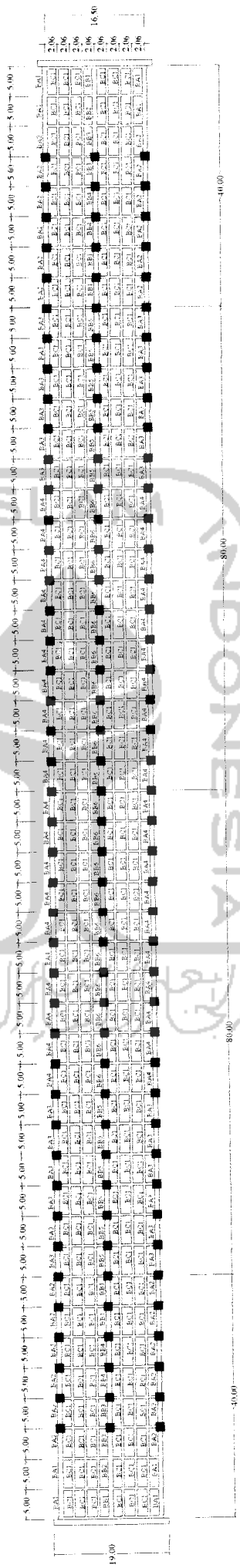
RENCANA BALOK LINTANG BAWAH

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
	RENCANA BALOK LINTANG BAWAH				



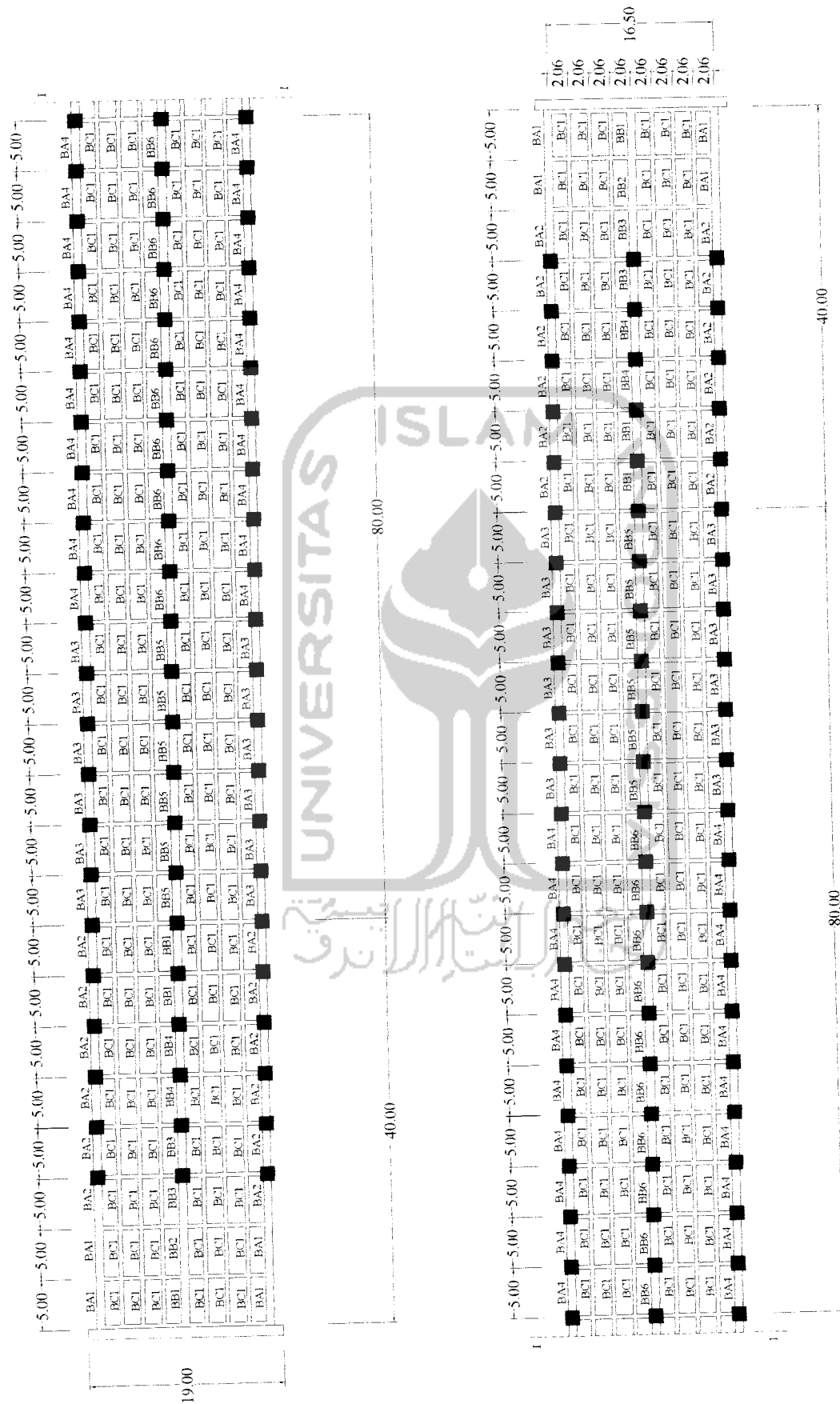
RENCANA BALOK LINTANG ATAS

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL				

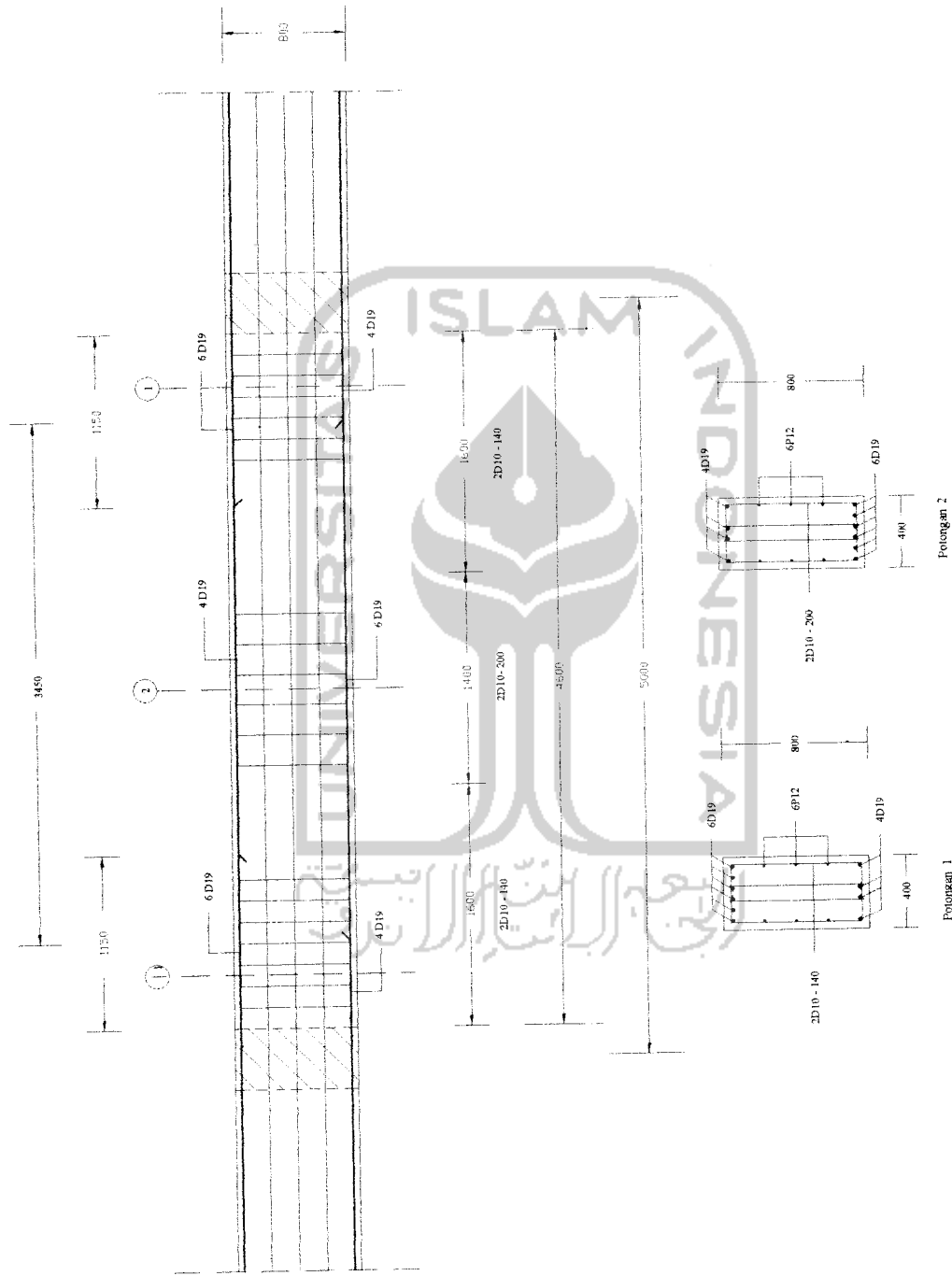


RENCANA BALOK

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
	RENCANA BALOK				

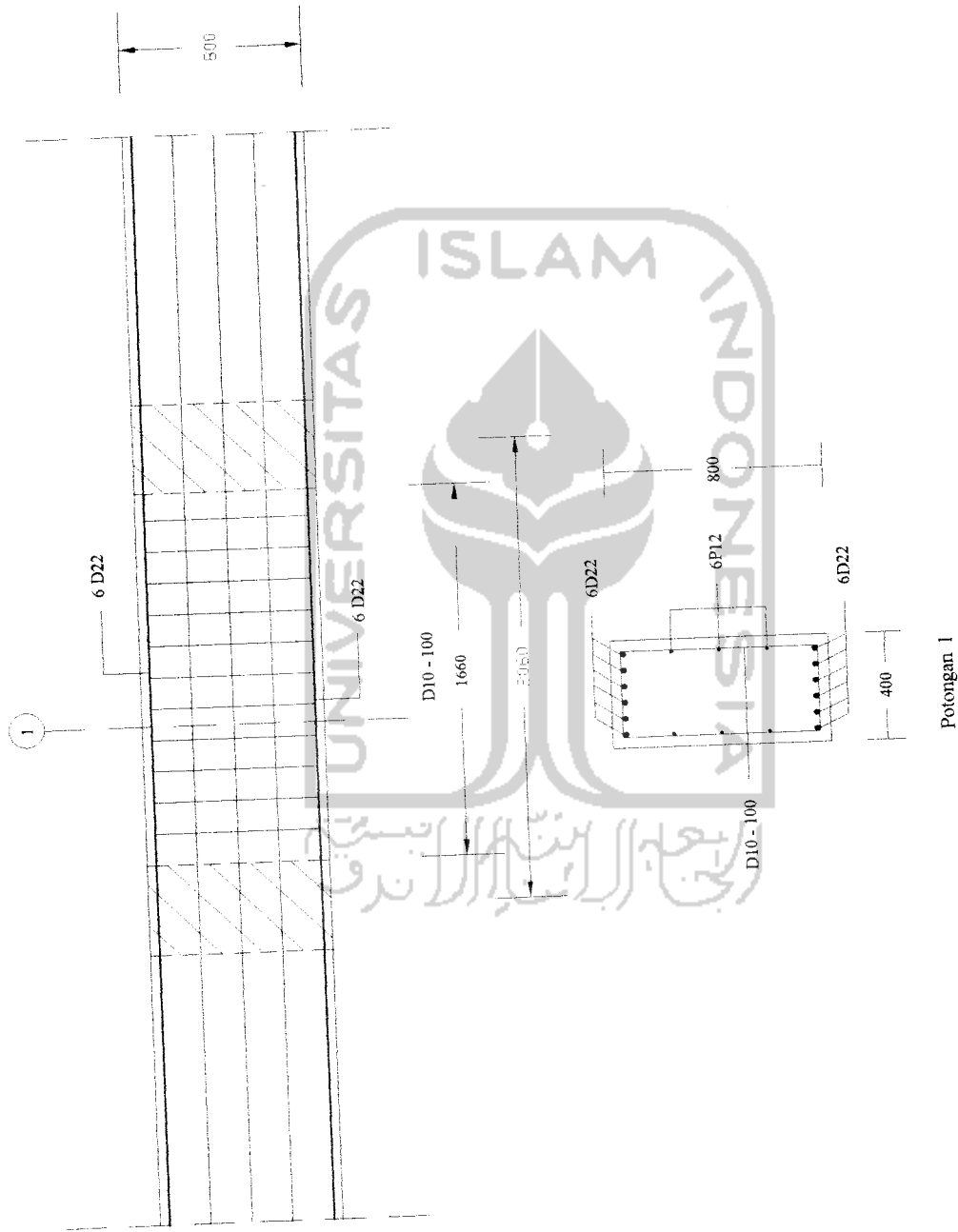


PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
		RENCANA BALOK				



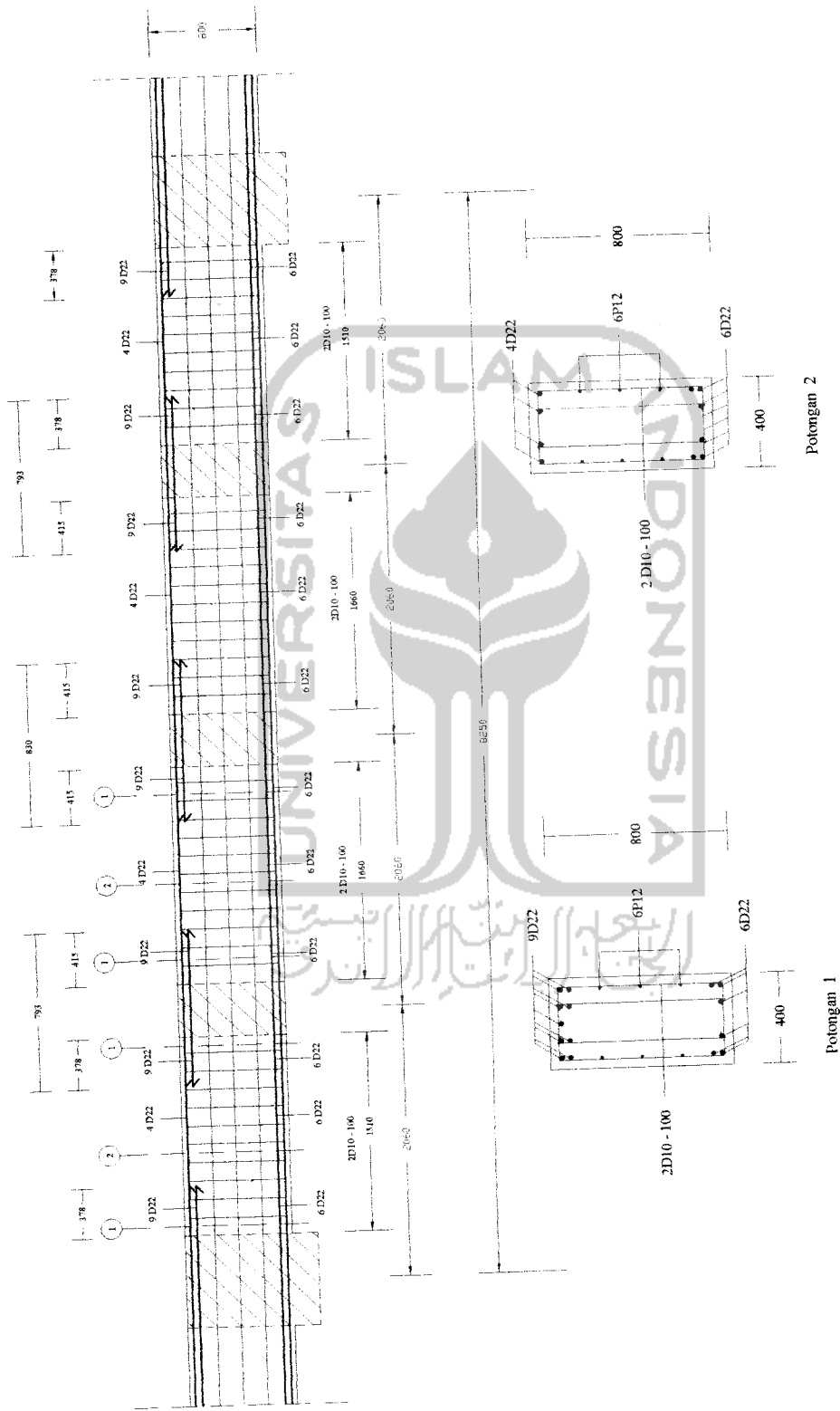
Detail Balok Anak BCI

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul	JUDUL GAMBAR DETIL PENULANGAN BALOK ANAK BCI	SKALA	KODE	NO	JML. LBR



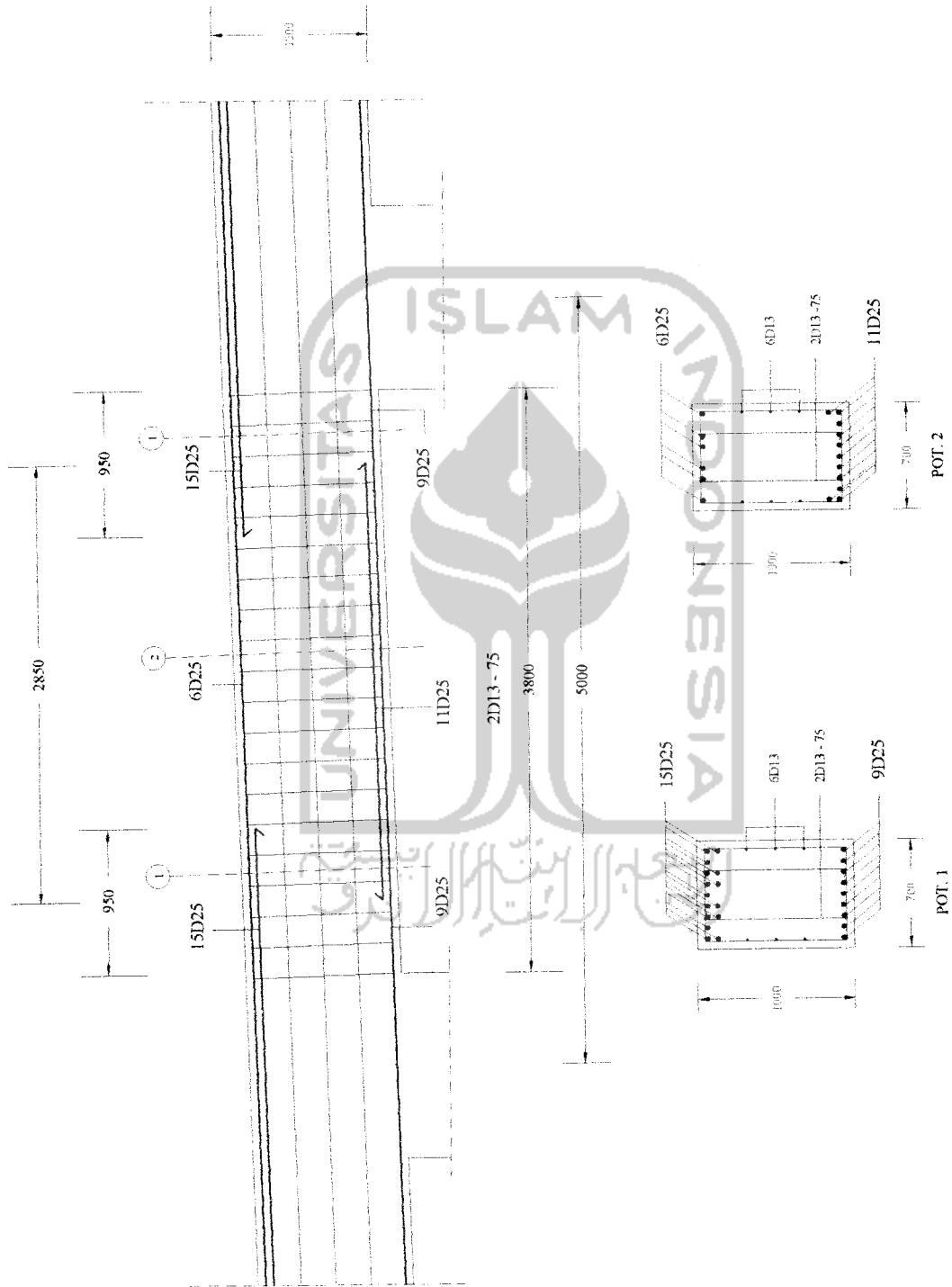
Detail Balok Lintang Bawah

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
DETIL PENULANGAN BALOK LINTANG BAWAH						



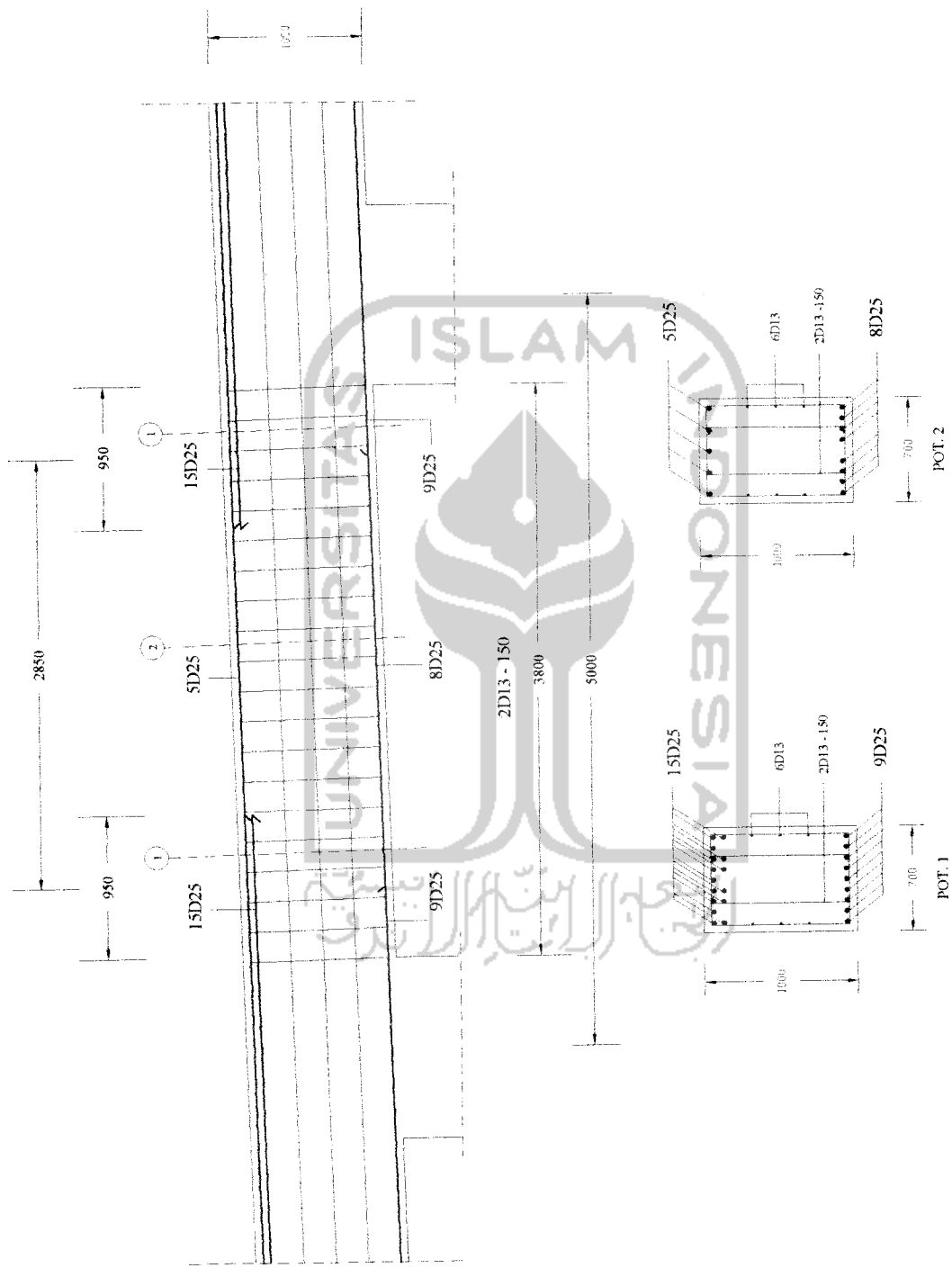
Detail Balok Lintang Atas Jenis 1

PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DETIL PENULANGAN BALOK LINTANG ATAS JENIS 1				



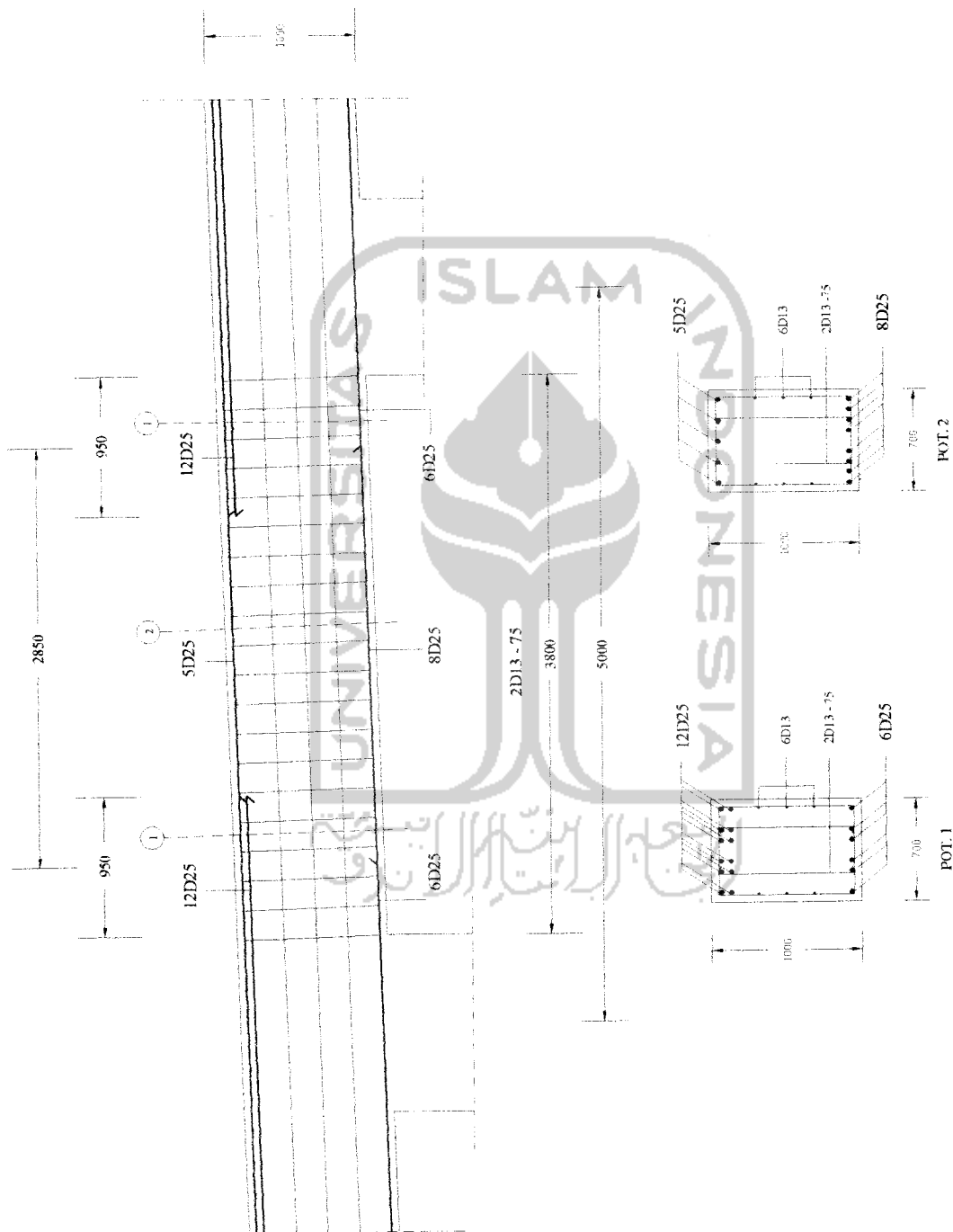
DETIL BALOK INDUK BA1 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
DETIL PENULANGAN BALOK INDUK BA1				
PERENCANAAN JEMBATAN BETON BERTULANG Tipe Gelagar Lengkung (Arch Bridge) di Atas Sungai Kretek Bantul				



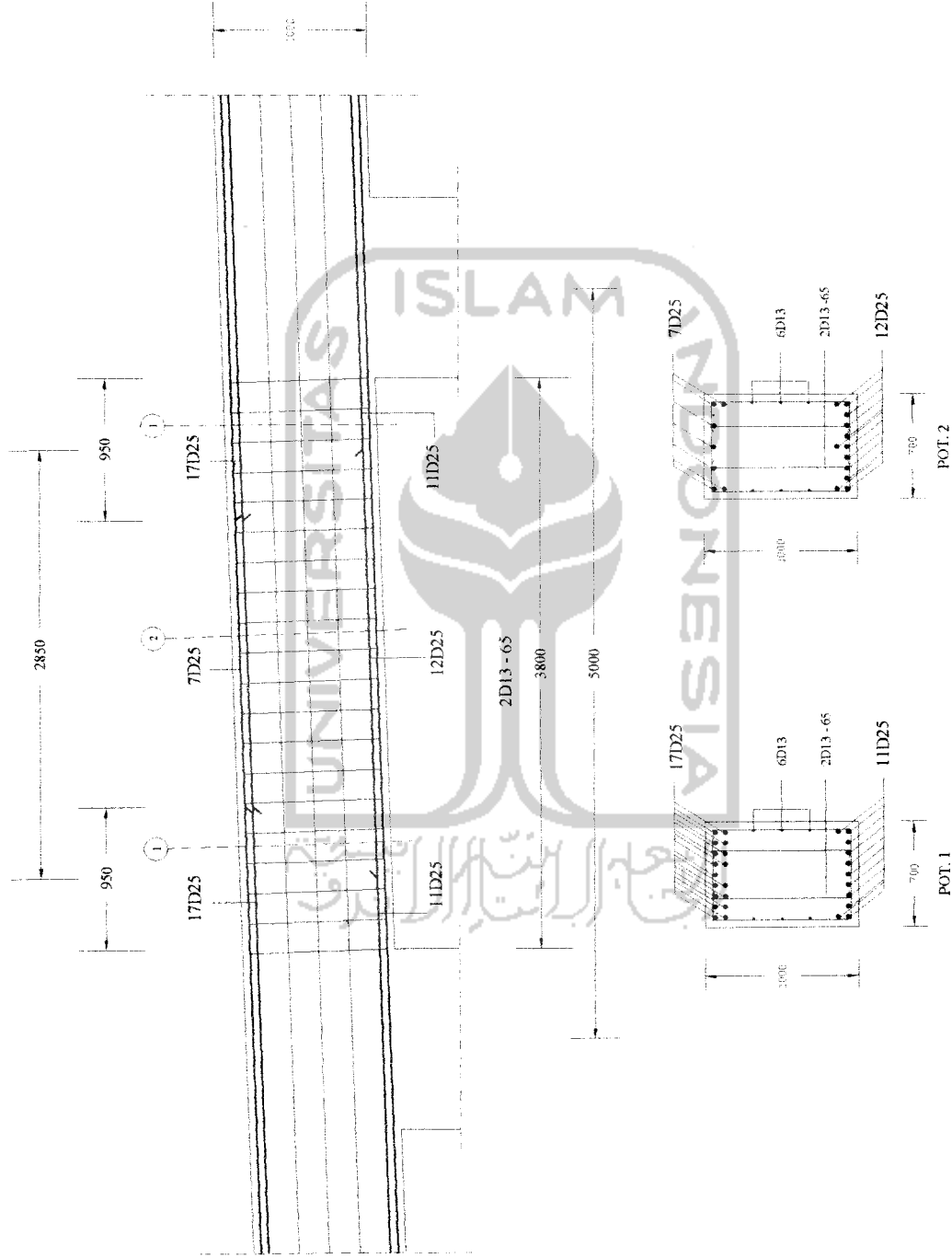
DETIL BALOK INDUK BA2 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BA2				



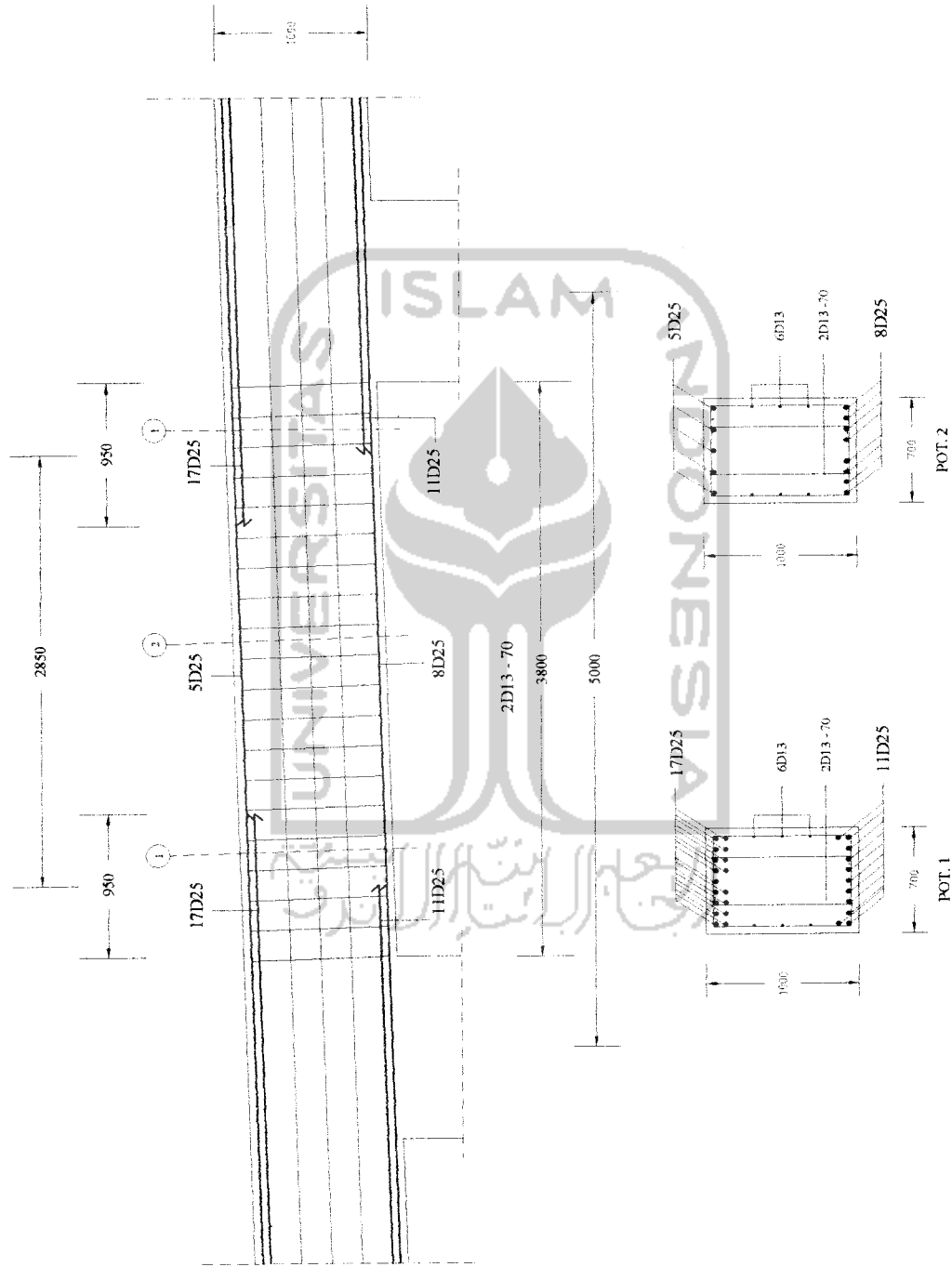
DETIL BALOK INDUK BA3 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BA3				



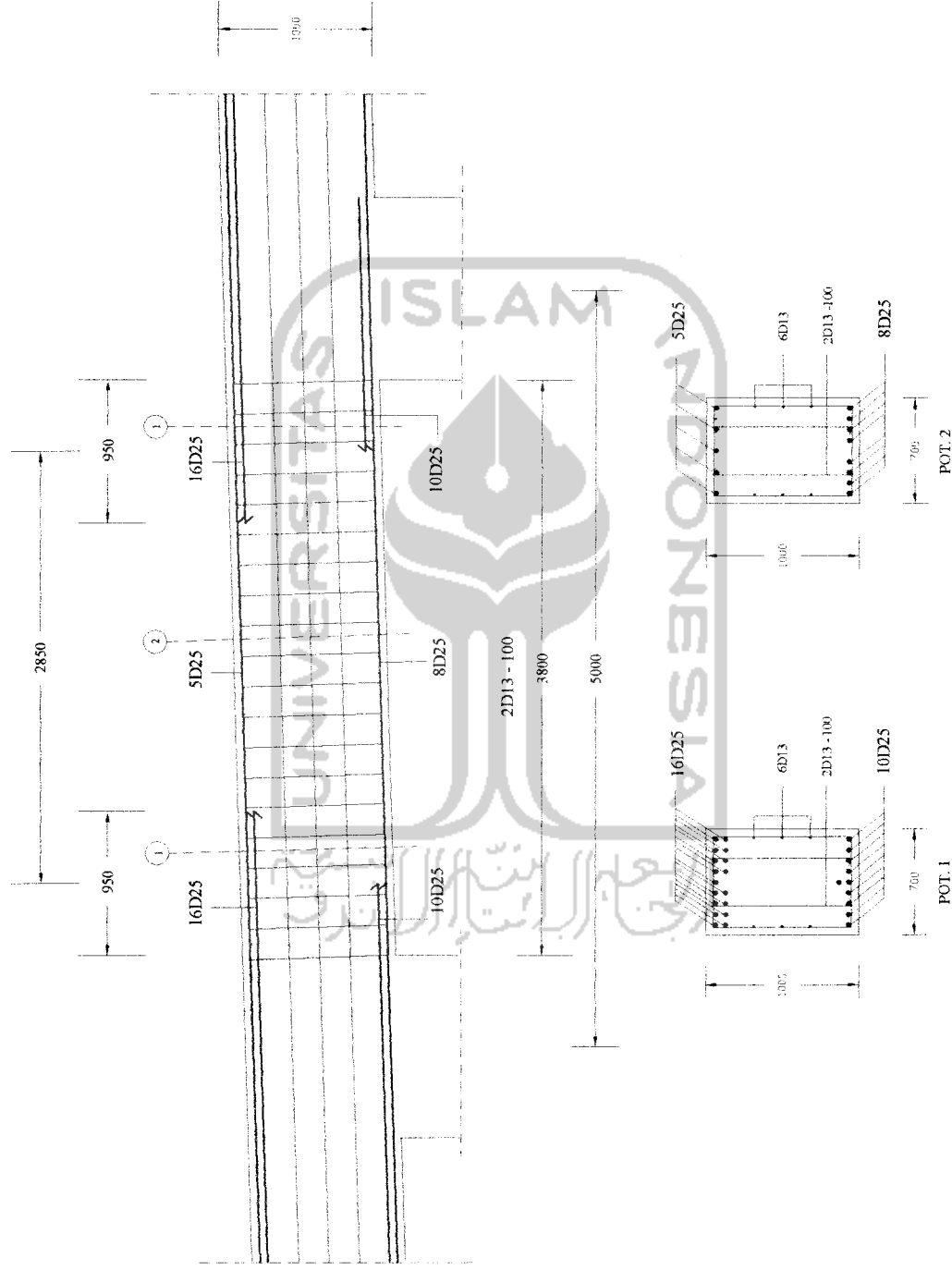
DETIL BALOK INDUK BB1 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BB1				



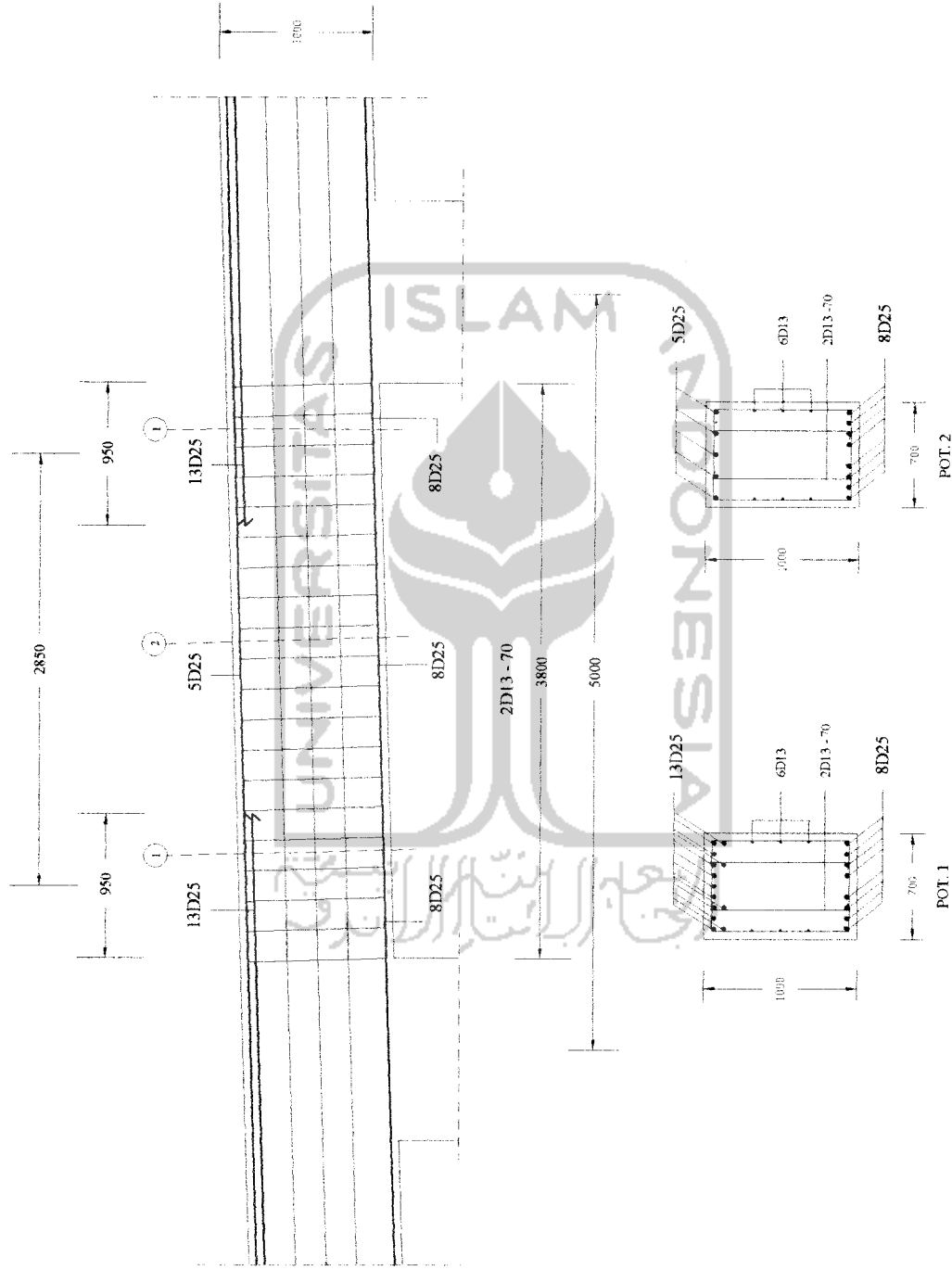
DETIL BALOK INDUK BB4 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BB4				



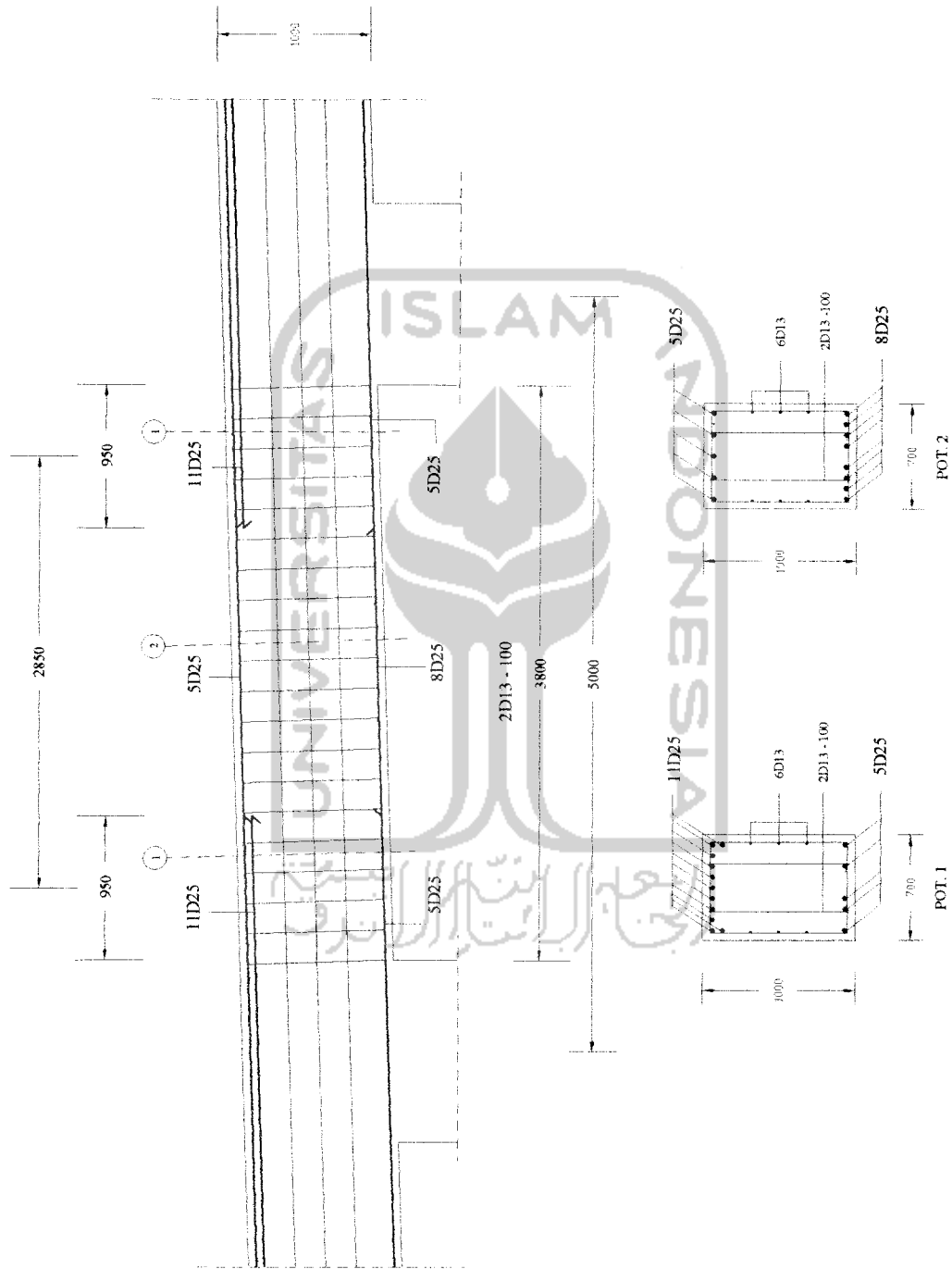
DETIL BALOK INDUK BB3 (1000X700)

JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BB3				



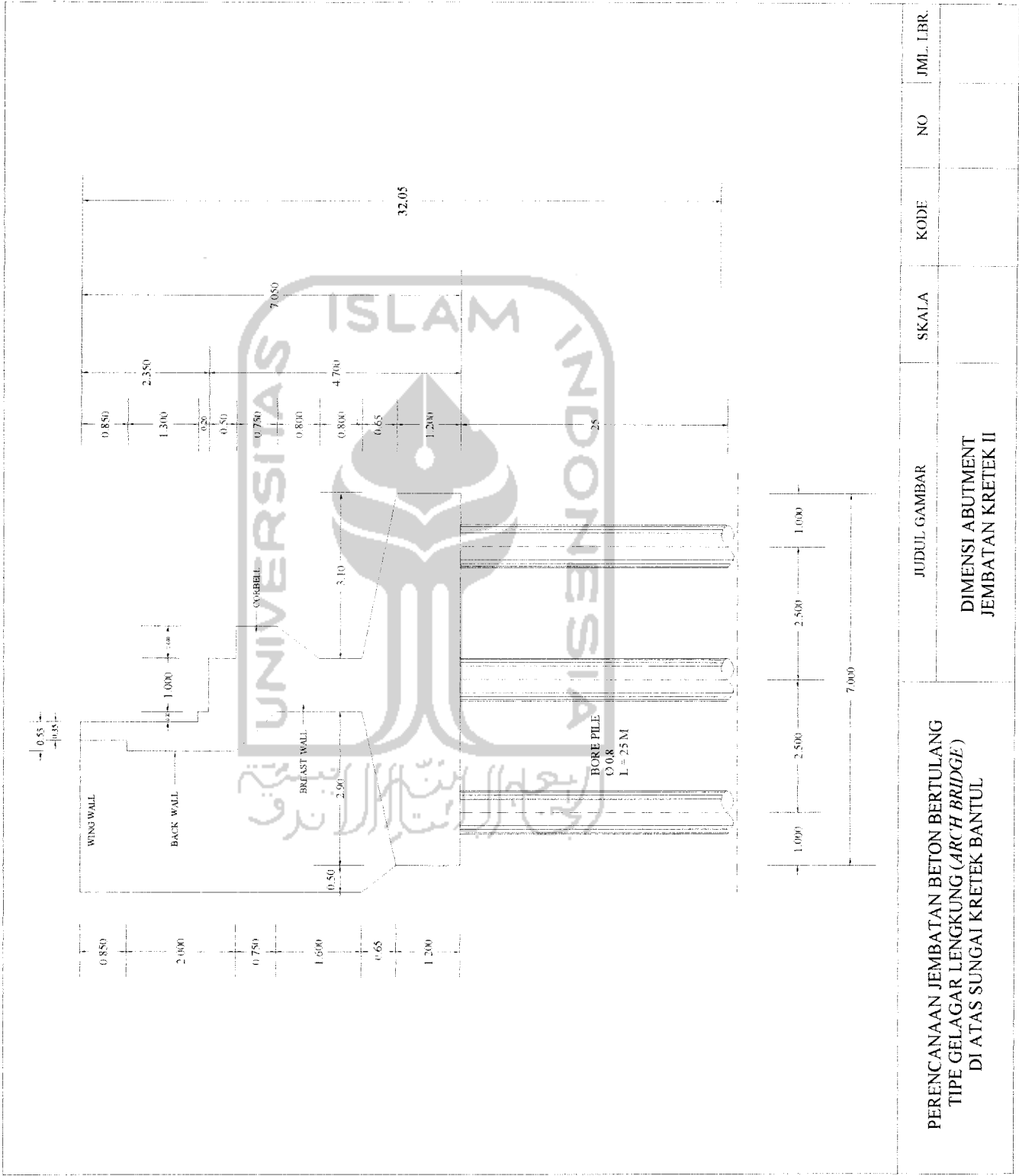
DETIL BALOK INDUK BB5 (1000X700)

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LINGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR DETIL PENULANGAN BALOK INDUK BB5	SKALA	KODE	NO	JML. LBR

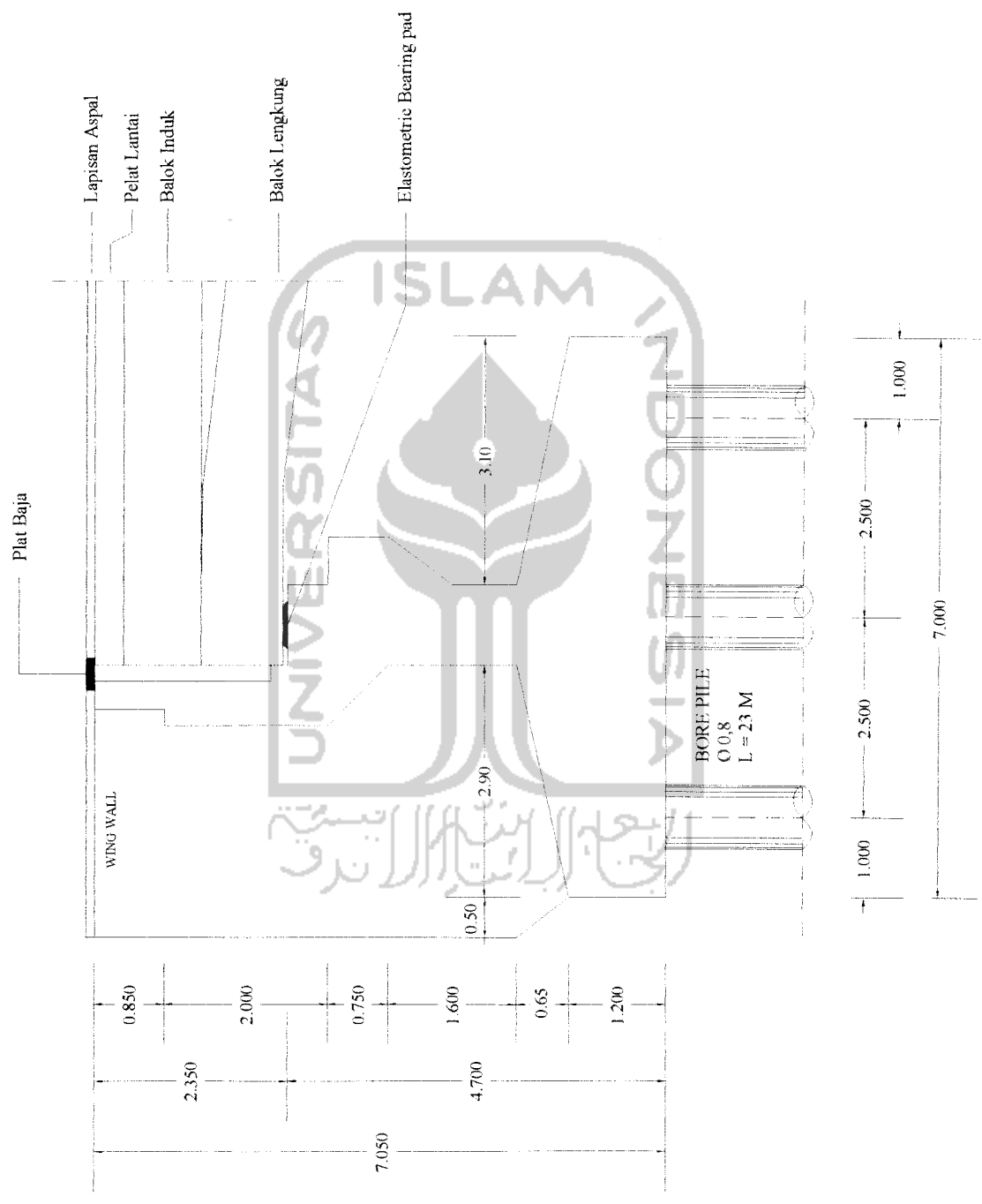


DETIL BALOK INDUK BB6 (1000X700)

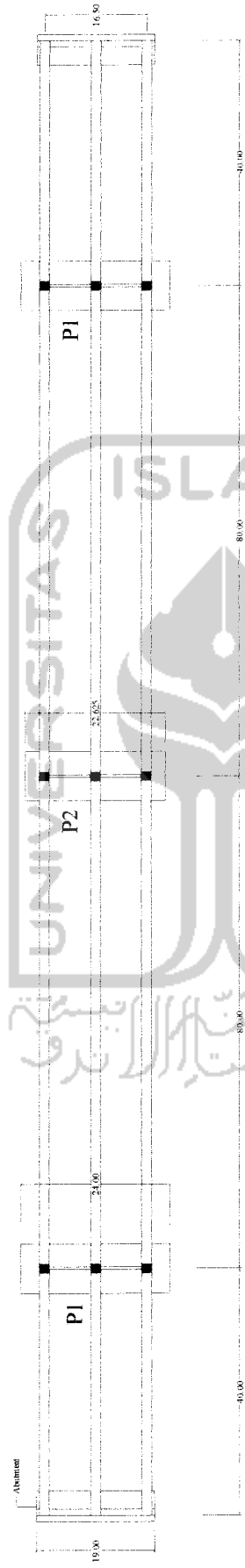
JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL				
DETIL PENULANGAN BALOK INDUK BB6				



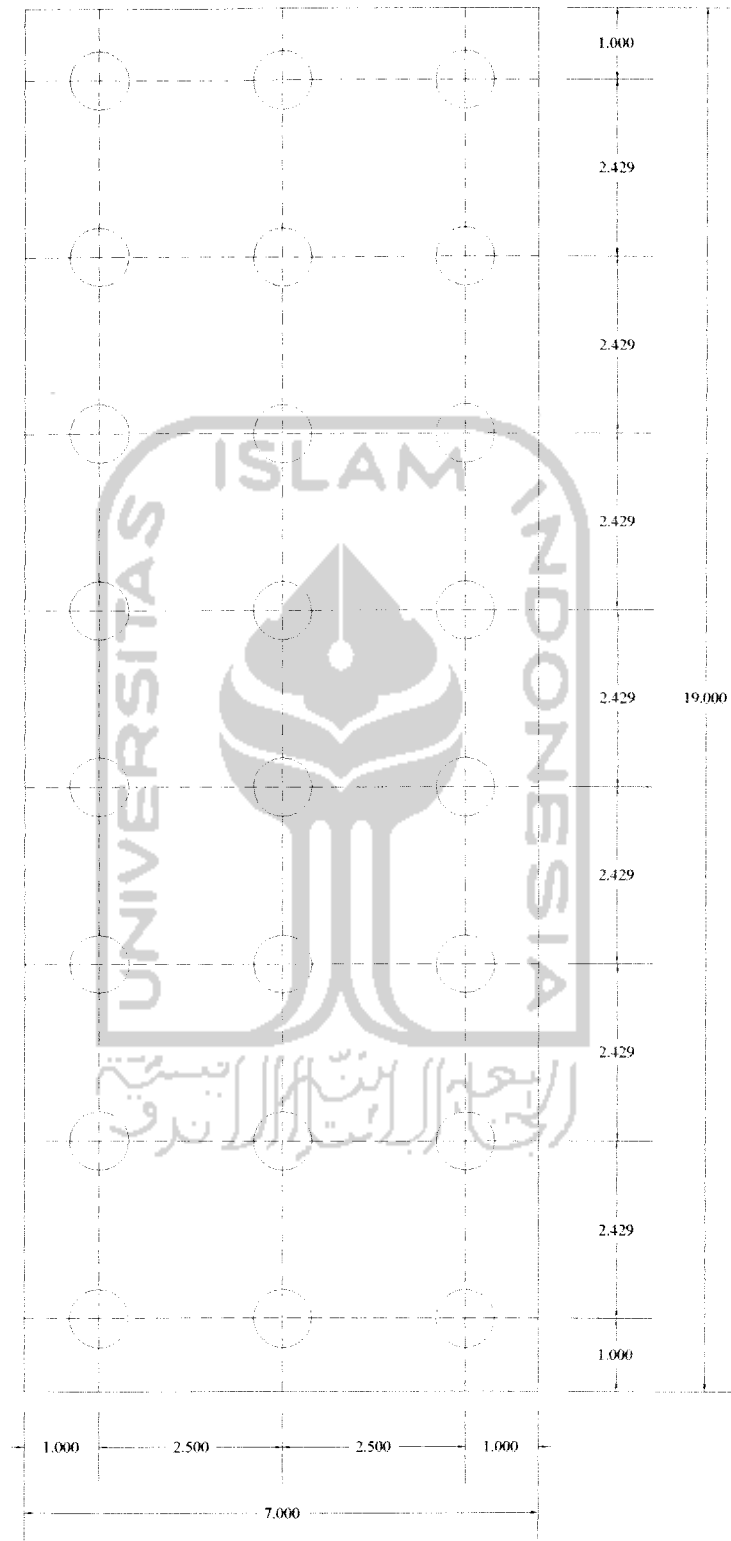
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR DIMENSI ABUTMENT JEMBATAN KRETEK II		SKALA	KODE	NO	JML. LBR.



PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
	ABUTMENT JEMBATAN KRETEK II				



PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
	RENCANA PONDASI				



DENAH FONDASI ABUTMENT

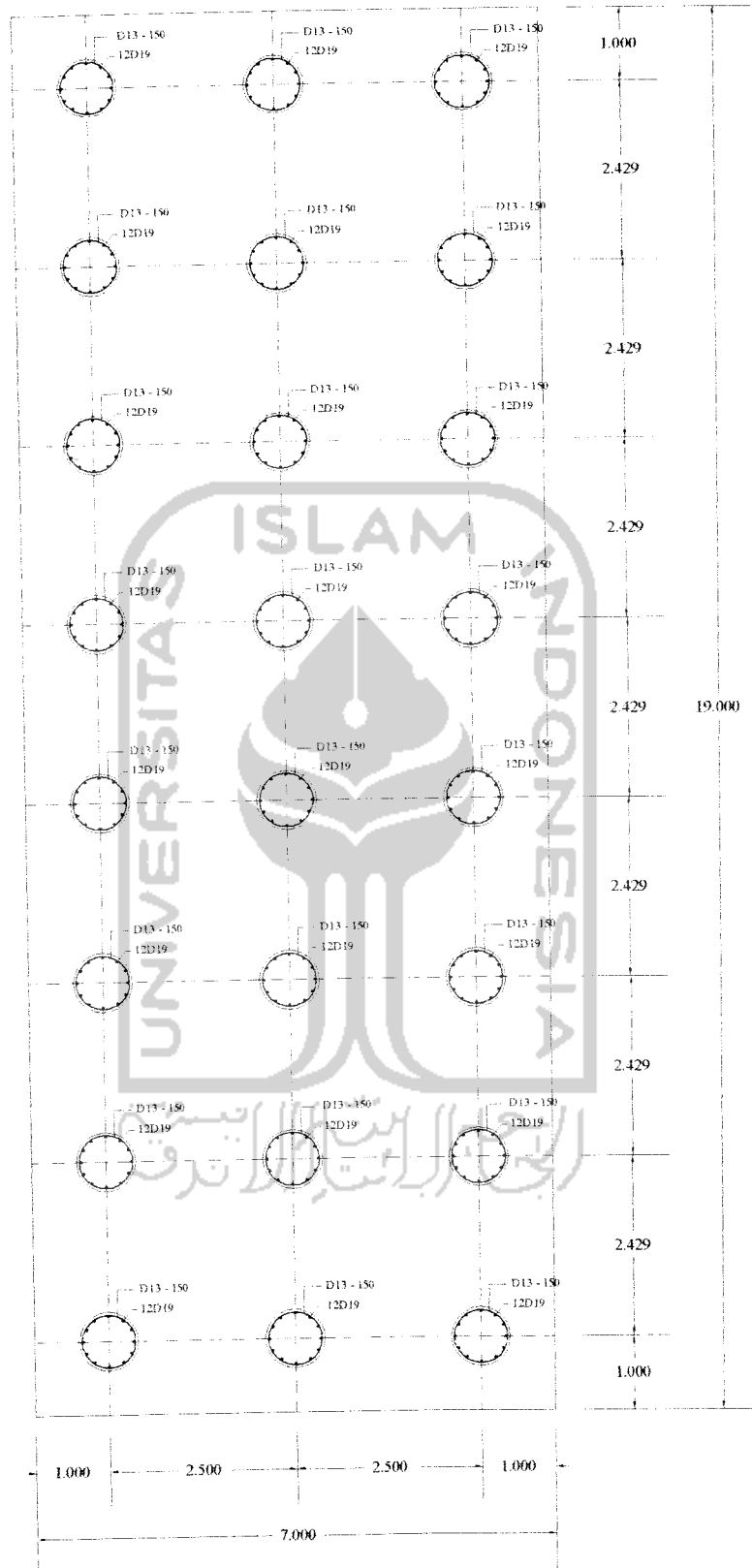
PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR DENAH PONDASI ABUTMENT	SKALA	KODE	NO	JML LBR

WING WA



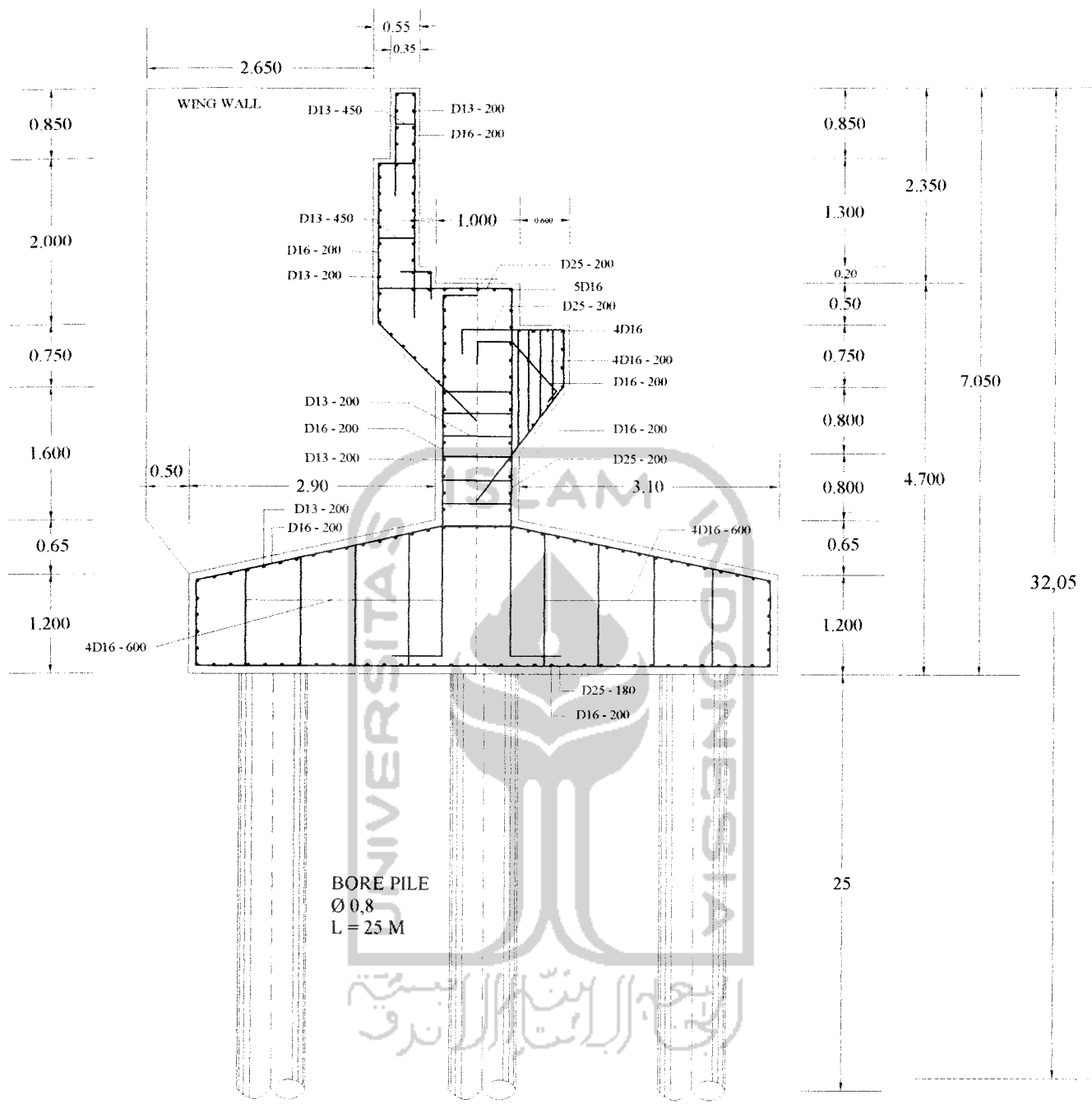
1.000

BATAN B
NGKUNG
GAI KRET



PEMBESIAN BORE PILE ABUTMENT

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR PEMBESIAN BORE PILE ABUTMENT	SKALA	KODE	NO	JML. LBR



PEMBESIAN ABUTMENT

PERENCANAAN JEMBATAN BETON BERTULANG
TIPE GELAGAR LENGKUNG (ARCH BRIDGE)
DI ATAS SUNGAI KRETEK BANTUL

JUDUL GAMBAR

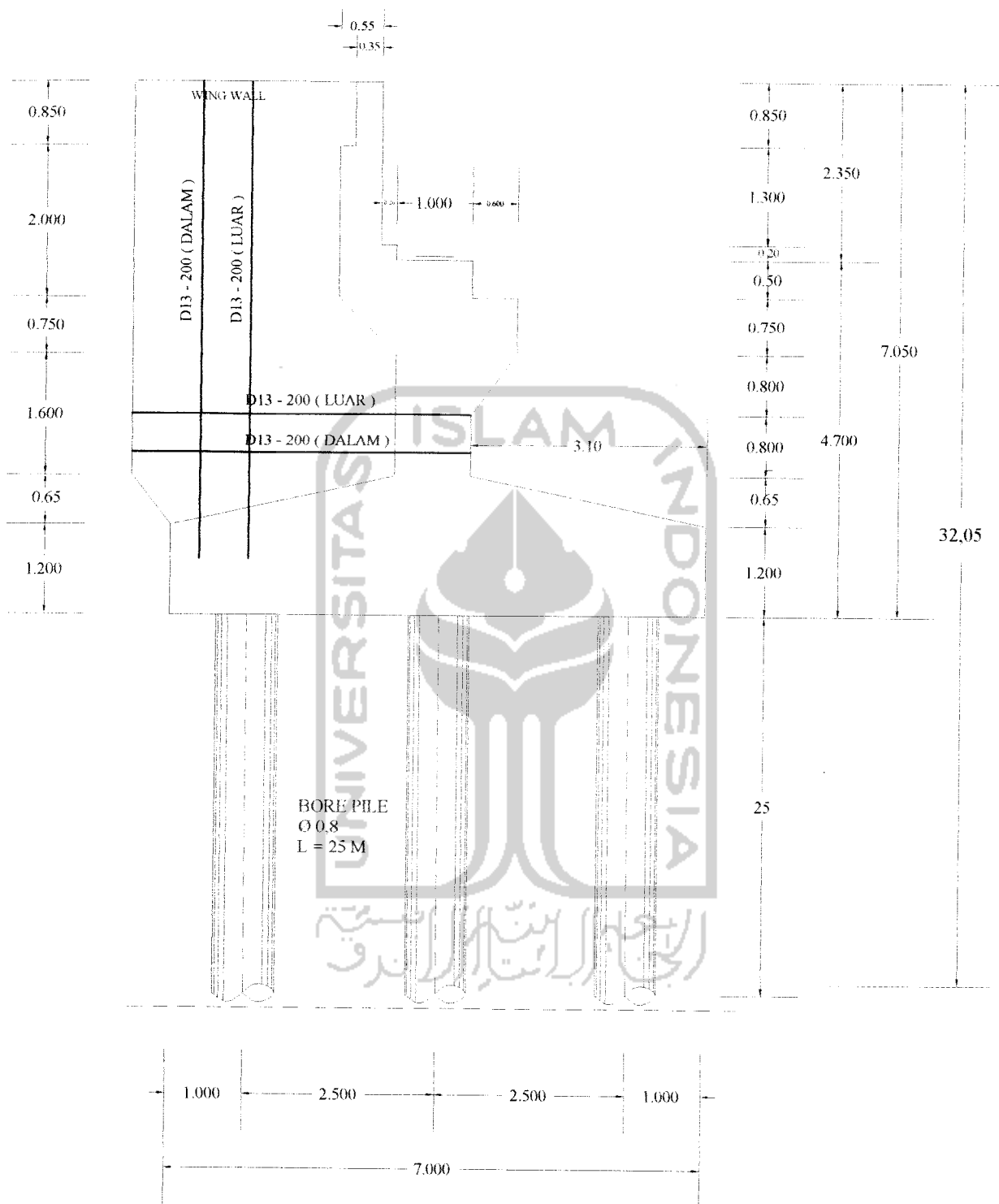
SKALA

KODE

NO

JML. LBR.

PEMBESIAN ABUTMENT



PEMBESIAN WING WALL

PERENCANAAN JEMBATAN BETON BERTULANG
TIPE GELAGAR LENGKUNG (ARCH BRIDGE)
DI ATAS SUNGAI KRETEK BANTUL

JUDUL GAMBAR

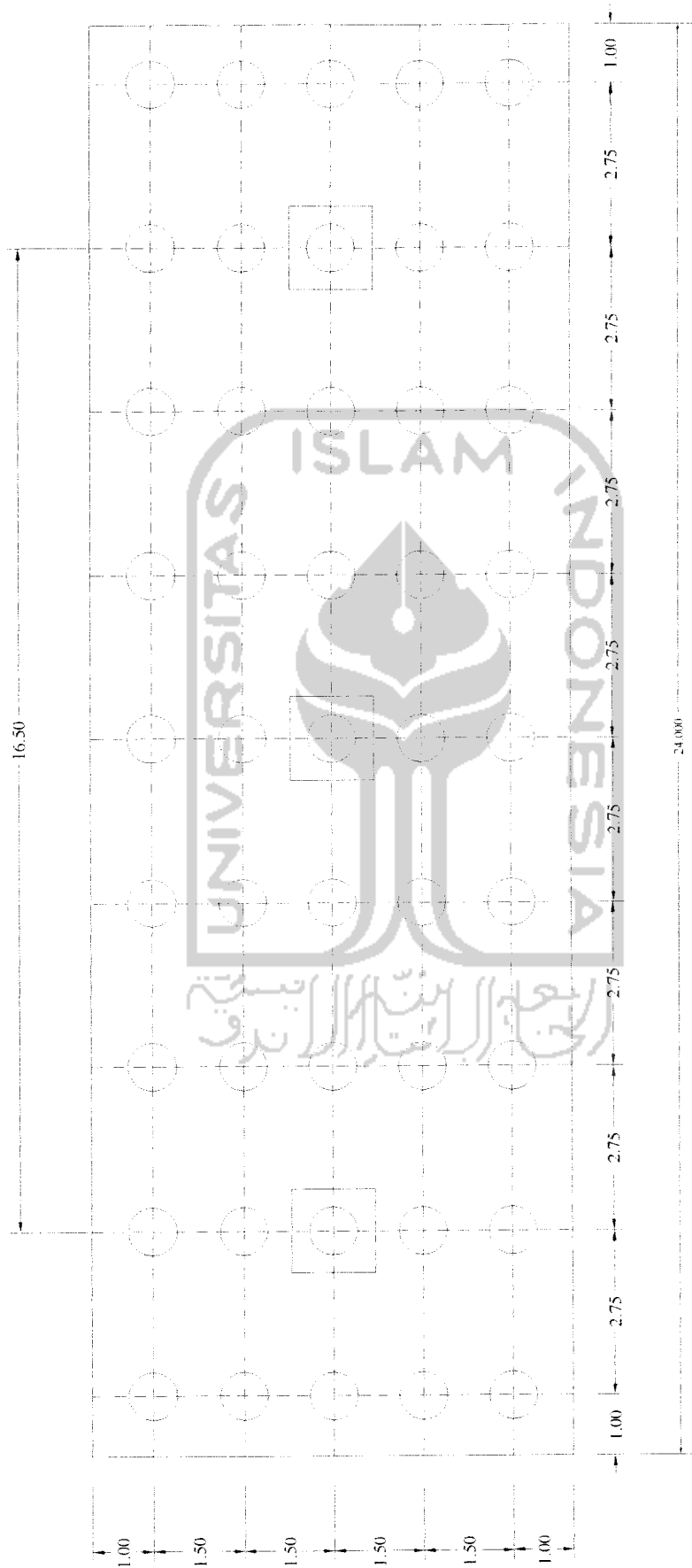
PEMBESIAN WING WALL

SKALA

KODE

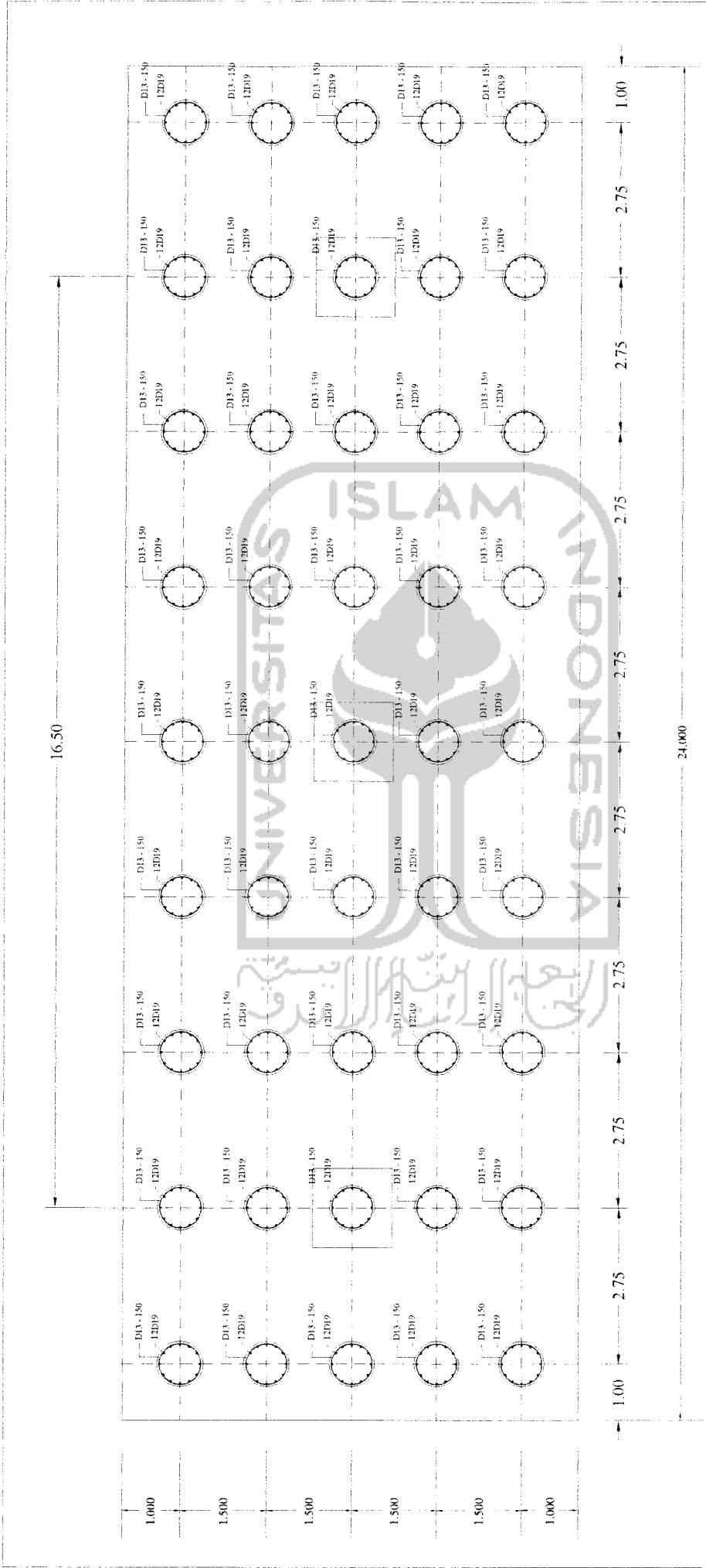
NO

JML. LBR.

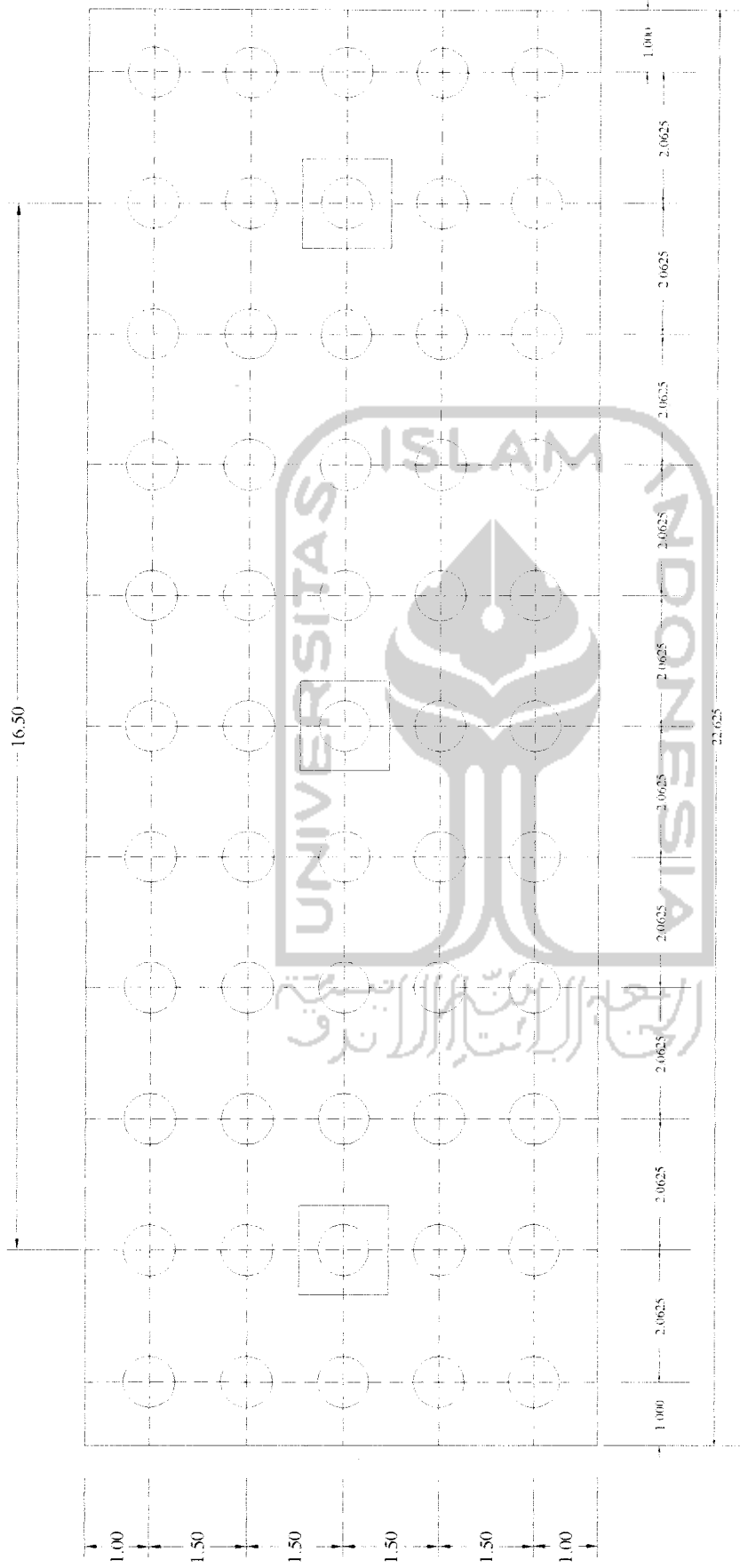


DENAH FONDASI PILAR 1

PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (<i>ARCH BRIDGE</i>) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
	DENAH PONDASI PILAR 1				

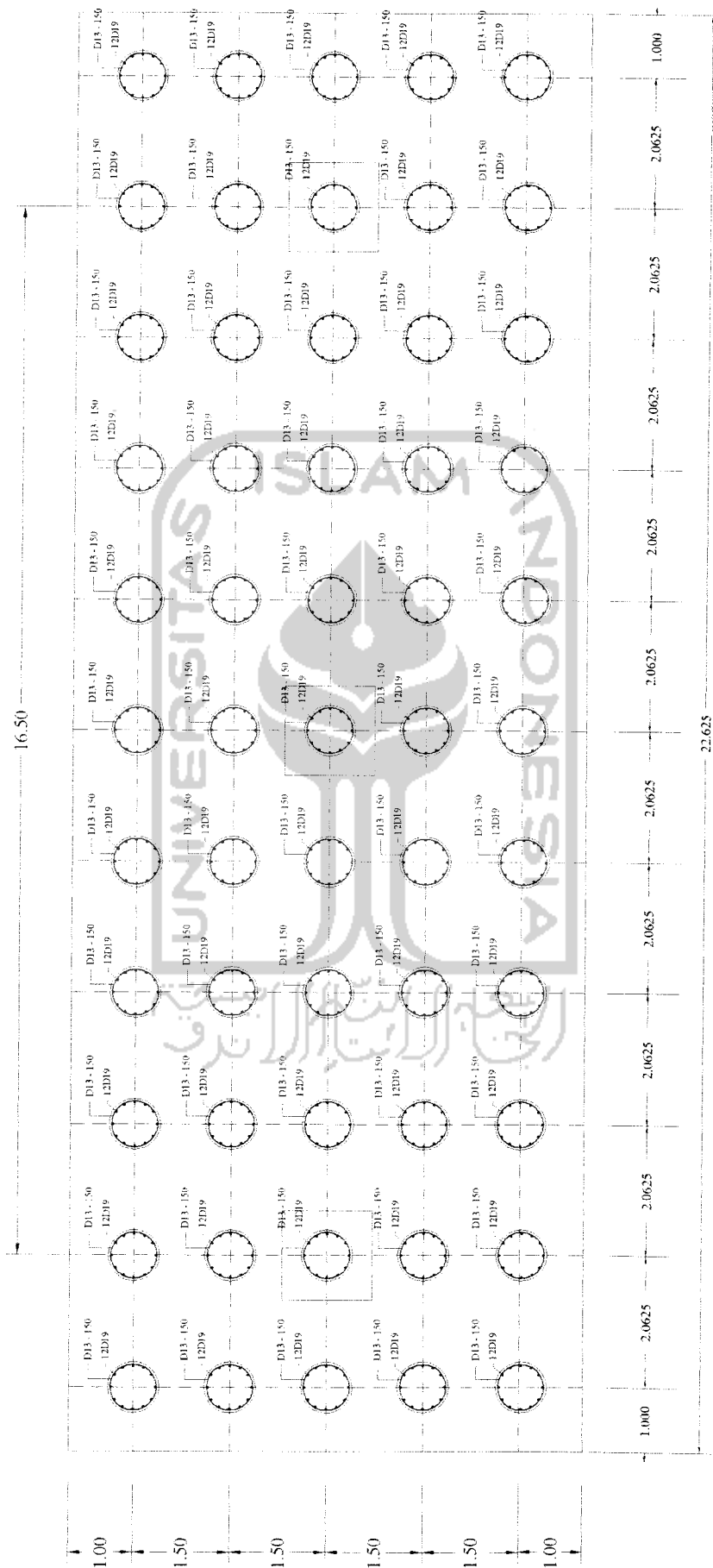


PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
		PEMBESIAN BORE PILE PILAR 1				

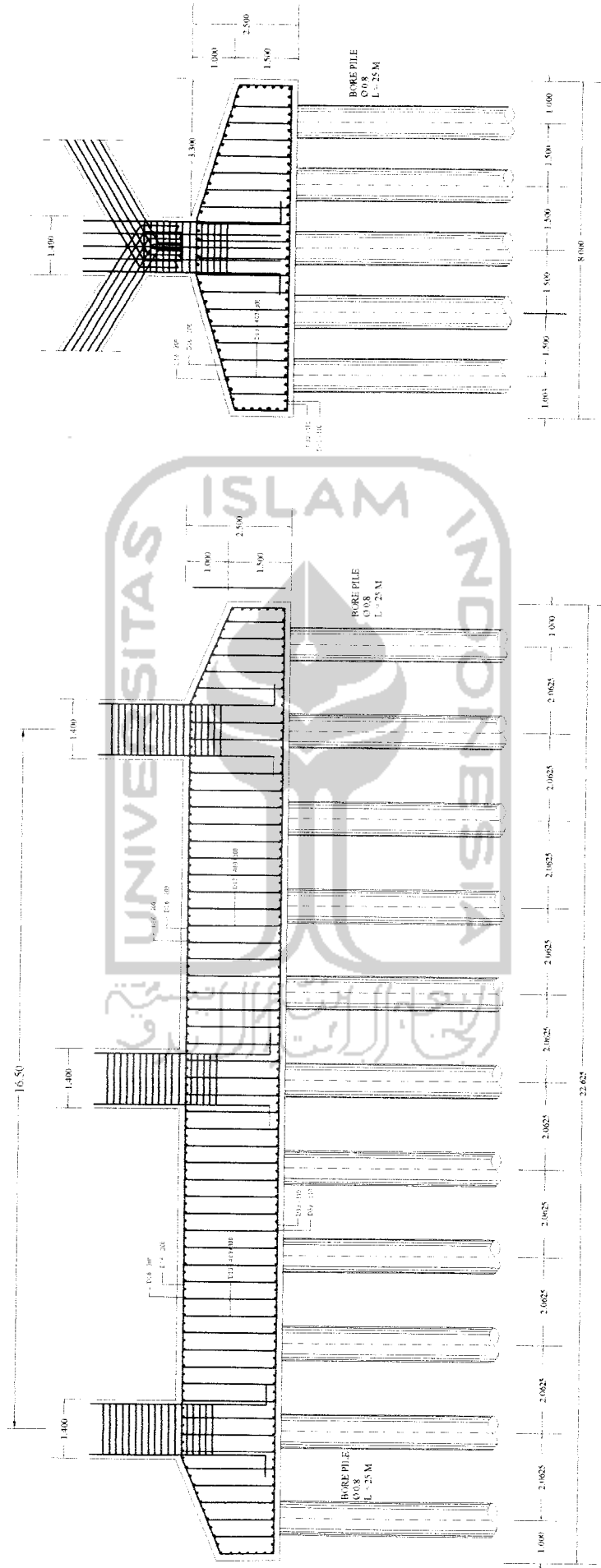


DENAH FONDASI PILAR 2

PERENCANAAN JEMBATAN BETON BERTULANG Tipe GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL	JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR.
DENAH PONDASI PILAR 2					



PERENCANAAN JEMBATAN BETON BERTULANG TIPE GELAGAR LENGKUNG (ARCH BRIDGE) DI ATAS SUNGAI KRETEK BANTUL		JUDUL GAMBAR	SKALA	KODE	NO	JML. LBR
		PEMBESIAN BORE PILE PILAR 2				



PEMBESIAN PILE CAP PILAR 2

PERENCANAAN JEMBATAN BETON BERTULANG
 TIPE GELAGAR LENGKUNG (ARCH BRIDGE)
 DI ATAS SUNGAI KRETEK BANTUL

JUDUL GAMBAR

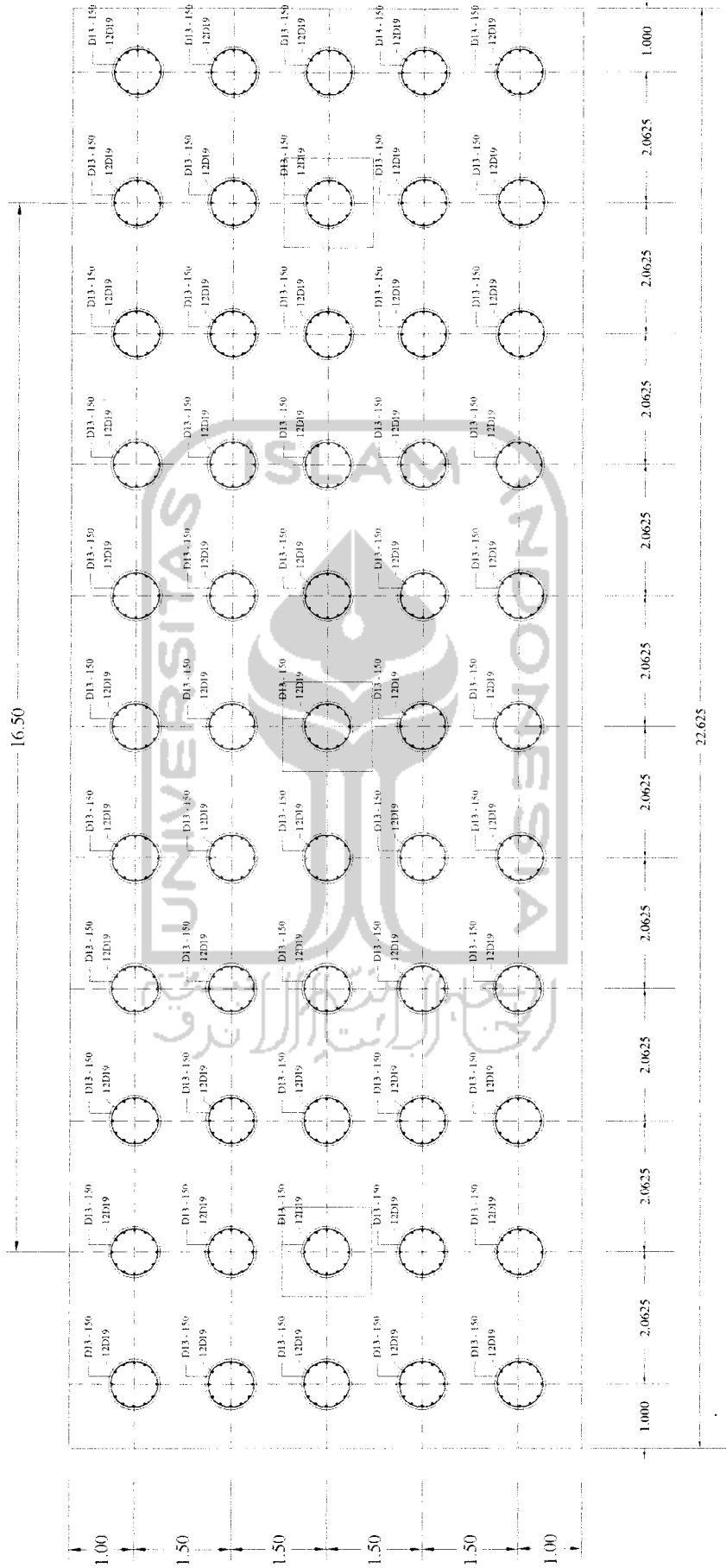
PEMBESIAN PONDASI PILAR 2

SKALA

KODE

NO

JML. LBR.



PERENCANAAN JEMBATAN BETON BERTULANG
 TIPE GELAGAR LENGKUNG (*ARCH BRIDGE*)
 DI ATAS SUNGAI KRETEK BANTUL

JUDUL GAMBAR
 PEMBESIAN BORE PILE PILAR 2

JML. LBR.

NO

KODE

SKALA