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TUGAS AKHIR

PERENCANAAN ULANG STRUKTUR RAMP RSUP DR SARDJITO YOGYAKARTA

693 Set
1



Disusun Oleh :

EVAN SETIAWAN 99 511 004

JURUSAN TEKNIK SIPIL
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
UNIVERSITAS ISLAM INDONESIA
YOGYAKARTA
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Sarjana Teknik Sipil

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Lembar Pengesahan

Tugas Akhir

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Sarjana (S1) Teknik Sipil

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KATA PENGANTAR

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

Assalamu'alaikum Wr.Wb

Puji syukur kehadirat Allah SWT, atas segala rahmat, petunjuk, bimbingan dan karunia-Nya, serta shalawat dan salam tetaplah atas Rosullah SAW. Sehingga penulis dapat menyelesaikan Laporan Tugas Akhir ini dan semoga Allah Selalu memberikan hamba-Nya petunjuk jalan kemudahan.

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1. Perencanaan atap

a : Jumlah sagrod dalam satu bentang

A : Luas profil baja

Ag : Luasan bruto profil

Anetto : Luasan bersih profil

Aeffektif : Luasan netto efektif

B : Lebar pelat kuda-kuda

bf : Lebar sayap

b : Lebar sayap

C_1 : Gaya angin tekan

C_2 : Gaya angin hisap

Cc : Perbandingan kelangsingan yang menjadi batas antara tekuk elastis dan tekuk inelastic

D : Diameter

E : Modulus elastisitas baja

Fa : Tegangan ijin pada luas bruto dalam kondisi beban bekerja

fa : Tegangan tarik yang terjadi

fbx : Tegangan lentur arah x

fby : Tegangan lentur arah y

f'c : Kuat desak beton

Fs : Faktor keamanan

Fu : Kuat tarik baja

fy : Tegangan leleh baja

Ix : Inersia arah X

Iy : Inersia arah Y

K : Koefisien kelangsingan

l : Panjang batang yang ditinjau

L : Panjang pelat kuda-kuda

Lb : Jarak antar gording

M⊥ : Momen tegak lurus sumbu batang

M// : Momen sejajar sumbu batang

n : Jumlah baut

P : Gaya tekan yang bekerja

P// : Gaya tekan sejajar sumbu batang

q⊥ : Beban merata tegak lurus sumbu batang

q// : Beban merata sejajar sumbu batang

r : Jari-jari inersia = i

Ss : Jarak beban sagrod

Sx : Modulus elastis tampang arah sumbu x

Sy : Modulus elastis tampang arah sumbu y

T : Gaya tarik yang bekerja

tw : Tebal badan profil

tp : Tebal pelat

W : Berat profil

A : Sudut kemiringan atap

$\delta\perp$: Lendutan tegak lurus sumbu batang

$\delta//$: Lendutan sejajar sumbu batang

δ : Resultante lendutan

μ : Faktor reduksi luas netto

2. Perencanaan pelat lantai

As : Luas tulangan

a : Tinggi blok tegangan persegi ekivalen

b : Panjang memanjang pelat

clx : Koefisien momen lapangan arah x

ctx : Koefisien momen tumpuan arah x

cly : Koefisien momen lapangan arah y

cty : Koefisien momen tumpuan arah y

d : Jarak dari sisi tekan terluar ke pusat tulangan tarik

f'c : Kuat desak beton

fy : Tegangan leleh baja

h : Tinggi pelat

ly : Panjang plat arah panjang

lx : Panjang plat arah pendek

m : Perbandingan isi dari tulangan memanjang dari bentuk tertutup

Mulx : Momen ultimit arah lapangan x

Mutx : Momen ultimit arah tumpuan x

Muly : Momen ultimit arah lapangan y

Muty : Momen ultimit arah tumpuan y

Mu : Momen ultimit

Mn : Momen nominal

qD : Beban mati merata

qL : Beban hidup merata

qU : Beban merata rencana

Rn : Koefisien tahanan untuk perencanaan kuat

ρ : Rasio tulangan

ρb : Rasio tulangan pada keadaan seimbang

Φ : Koefisien reduksi kekuatan

3. Perencanaan balok

As : Luas tulangan tarik

As' : Luas tulangan desak

b : Lebar balok

d : Jarak dari sisi tekan terluar ke pusat tulangan tarik

d' : Jarak dari sisi tekan terluar ke pusat tulangan desak

E : Modulus elastisitas beton

f'c : Kuat desak beton

fy : Tegangan leleh baja

h : Tinggi balok

I : Momen inersia balok

L : Panjang penampang

m : Perbandingan isi dari tulangan memanjang dari bentuk tertutup

Mn : Momen nominal balok

Mu : Momen ultimit balok

P_D : Beban mati terpusat

P_L : Beban hidup terpusat

P_u : Beban ultimit terpusat

Rn : Koefisien tahanan untuk perencanaan kuat

Vu : Gaya geser rencana

Vc : Kuat geser beton

Vs : Tegangan geser nominal yang disebabkan oleh tulangan

β_1 : Konstanta yang berdasarkan mutu beton

ρ : Rasio tulangan tarik

ρ' : Rasio tulangan tekan

Φ : Faktor reduksi kekuatan

4. Perencanaan kolom

a : Tinggi blok tegangan persegi ekivalen

As : Luas tulangan tarik

As' : Luas tulangan desak

Ast : Luas tulangan total

Ag : Luas bruto penampang

b : Lebar penampang kolom

Cc : Gaya tekan pada beton

Cs : Gaya pada tulangan tekan

Cm : Faktor untuk perbesaran momen

d : Jarak dari sisi tekan terluar ke pusat tulangan tarik

d' : Jarak dari sisi tekan terluar ke pusat tulangan desak

e : Eksentrisitas aktual

eb : Eksentrisitas pada keadaan seimbang

Ec : Modulus elastisitas beton

Eg : Modulus elastisitas balok

Es : Modulus elastisitas baja tulangan

f'c : Kuat desak beton

fs : Tegangan tulangan tarik

fs' : Tegangan tulangan tekan

fy : Tegangan leleh baja

h : Tinggi penampang kolom

hn : Panjang bersih kolom

Ic : Momen inersia kolom

Icr : Momen inersia balok

Ig : Momen inersia dari penampang bruto balok

k : Faktor panjang efektif

L : Panjang balok

ln : Panjang bersih balok

m : Perbandingan isi dari tulangan memanjang dari bentuk tertutup

M_b : Momen akibat beban tetap

M_{1b} : Momen faktor terbesar pada ujung komponen akibat beban tetap

M_{2b} : Momen faktor terbesar pada ujung komponen akibat beban sementara

M_D : Momen akibat beban mati

M_E : Momen akibat beban gempa

M_L : Momen akibat beban hidup

Mn : Momen nominal

M_{nx} : Momen nominal yang bekerja pada sumbu x

M_{ny} : Momen nominal yang bekerja pada sumbu y

M_S : Momen akibat beban sementara

Mu : Momen ultimit kolom

Mu,kx : Momen ultimit kolom arah x

Mu,ky : Momen ultimit kolom arah y

P_c : Beban tekuk euler

P_D : Gaya tekan akibat beban mati

P_E : Gaya tekan akibat beban gempa

P_L : Gaya tekan akibat beban hidup

Pn : Gaya tekan nominal

Pu,k : Gaya tekan ultimit kolom

r : Jari-jari girasi penampang

Ts : Gaya pada tulangan tarik

δb : Faktor pembesaran momen untuk rangka yang ditahan terhadap goyangan kesamping

δs : Faktor pembesaran momen untuk rangka yang tidak ditahan terhadap goyangan kesamping

ρ : Rasio tulangan

β_1 : Faktor tinggi blok tekanan ekivalen

β_d : Nilai perbandingan momen beban mati rencana terhadap momen total rencana yang besarnya kurang atau sama dengan satu.

ψ : Faktor kekangan ujung

$\emptyset$: Faktor reduksi kekuatan

$\sum Pc$: Penjumlahan beban tekuk euler pada kolom satu tingkat/lantai

$\sum Pu$: Penjumlahan beban tekuk ultimit pada kolom satu tingkat/lantai

6. Perencanaan pondasi

fb : Tahanan ujung tiang

qc : Tahanan kerucut

Ab : Luas ujung tiang bor

Qb : Tahanan ujung ultimit tiang

fs : Tahanan gesek pada kulit tiang

As : Luas permukaan selimut tiang

Qs : Tahanan gesek ultimit tiang

Qu : Kapasitas ultimit tiang bor

Qa : Kapasitas ijin tiang bor

qc1 : Nilai rata-rata qc dari ujung tiang sampai 8d diatas ujung tiang

qc2 : Nilai rata-rata qc dari ujung tiang sampai 4d dibawah ujung tiang

R : Tegangan tanah lateral ijin

L : Panajang penunjangan

Mo : Momen luar akibat beban kerja pada ujung atas tiang

Ho : Beban horizontal akibat beban kerja pada ujung atas tiang

E : Perbandingan Mo/Ro

γ : Berat volume tanah

Ø : Sudut gesekan dalam

Kp : Koefisien tekanan pasif

P : Gaya tekan yang bekerja

D : Diameter tiang atau sumuran

Pn : Gaya tekan nominal

ρ : Rasio tulangan

ρb : Rasio tulangan dalam keadaan seimbang

β_1 : Rasio antara sisi panjang terhadap sisi pendek pondasi

βc : Rasio sisi panjang terhadap sisi pendek dari beban terpusat

BAB I

PENDAHULUAN

1.1 Latar Belakang

Penguasaan ilmu pengetahuan dan informasi adalah suatu yang mutlak dan merupakan elemen penting yang tak bisa ditawar lagi dalam kompetisi pada masa mendatang. Seiring pesatnya pembangunan konstruksi di Indonesia menuntut para lulusan sarjana agar mampu mengaplikasikan ilmu secara langsung dilapangan dan bukan hanya kemampuan teoritis saja. Untuk itulah penulis mengambil tugas akhir perancangan ulang Ramp RSUP Dr. Sardjito sebagai obyek penerapan ilmu yang telah didapat dibangku kuliah.

Adapun dipilihnya Ramp RSUP Dr Sardjito sebagai obyek dalam tugas akhir ini, dikarenakan penulis pernah kerja praktek pada pembangunan gedung tersebut selama kurang lebih tiga bulan, sehingga penulis lebih memahami gedung tersebut dibandingkan dengan gedung-gedung yang lainnya. Selain itu penulis juga tertarik pada keunikan struktur pelat lantai yang berupa bidang miring.

Tugas akhir ini diajukan sebagai syarat dalam menyelesaikan jenjang S1. dan dengan menyelesaikan tugas akhir ini diharapkan penulis dapat menerapakan ilmunya dalam perencanaan suatu gedung dan dapat menjadi bekal bagi penulis dalam menghadapi persaingan pada dunia kerja yang semakin ketat.

1.2 Maksud dan Tujuan

Perencanaan ulang/*redesign* Pembangunan Gedung Ramp COT RSUP Dr.Sardjito Yogyakarta ini dimaksudkan untuk mendapatkan alternatif lain desain yang efektif dan efisien dengan tingkat keamanan sesuai dengan yang telah disyaratkan, sedangkan tujuan dari perencanaan ulang ini adalah untuk menerapakan ilmu ketekniksipilan yang telah diperoleh di bangku kuliah dengan cara menentukan beban dari hasil analisis struktur dan mengeplotkannya kedalam persamaan yang telah ditentukan. Sehubungan dengan maksud dan tujuan yang telah disebutkan diatas maka penulis bermaksud untuk mengambil perencanaan ulang Pembanguanan Ramp COT RSUP Dr. Sardjito Yogyakarta, sebagai topik bahasan dalam penyususunan tugas akhir ini.

1.3 Batasan Perencanaan

Sebagai batasan ruang lingkup dalam *redesign*/perencanaan ulang Pembangunan Gedung Ramp RSUP Dr.Sardjito Yogyakarta pada Laporan Tugas Akhir ini, adalah:

1. Obyek perencanaan ulang adalah Gedung Ramp RSUP Dr.Sardjito Yogyakarta, meliputi :
    a. Perencanaan atap
    b. Perencanaan pelat lantai
    c. Perencanaan balok
    d. Perencanaan kolom
    e. Perencanaan pondasi.

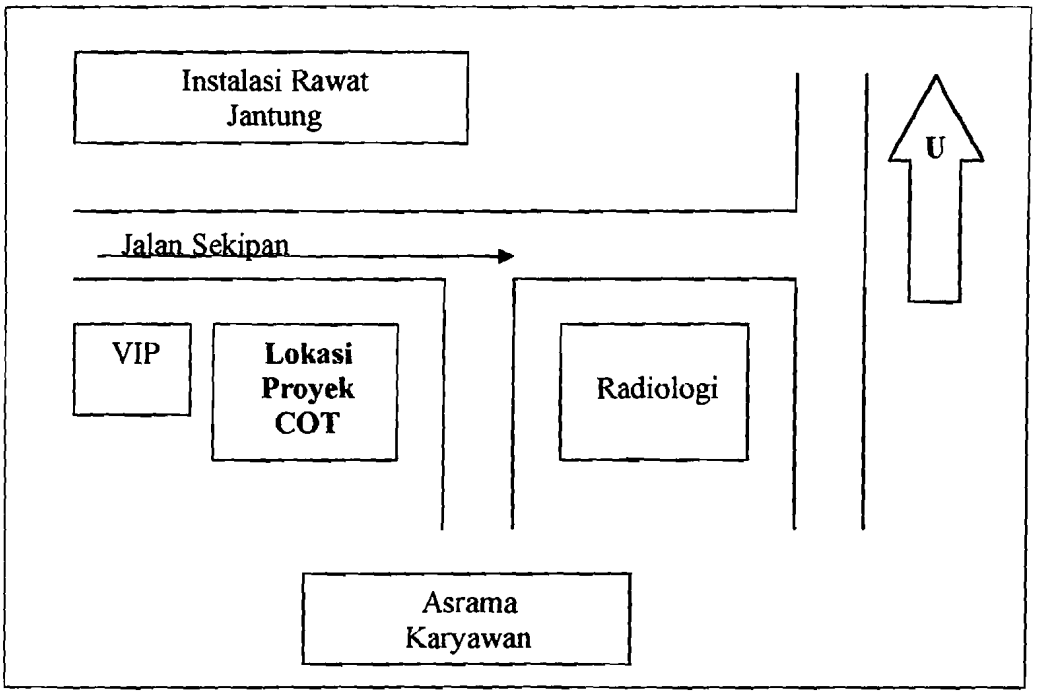
2. Perencanaan ulang ini meliputi perhitungan struktur bangunan dari atas sampai bawah, tidak termasuk Rencana Anggaran Biaya (RAB).
3. Perencanaan atap menggunakan profil *Double Angle* dan gording *Light Lip Channel* dengan tegangan leleh (fy) = 2400 Kg/cm^2 dan Fu = 3700 Kg/cm^2, atap genteng, usuk dan reng dari kayu.
4. Perencanaan pelat lantai, pelat atap, balok dan kolom menggunakan mutu beton dengan kuat desak rencana (fc') = 25 Mpa dengan kombinasi pembebanan disesuaikan dengan fungsi struktur.
5. Perencanaan pelat lantai, pelat atap, balok dan kolom menggunakan baja tulangan polos (BJTP) untuk Ø $\leq$ 12 mm dengan tegangan leleh (fy) = 240 Mpa sedangkan baja tulangan ulir (BJTD) untuk Ø $\geq$ 12 mm dengan tegangan leleh (fy) = 400 Mpa.
6. Perencanaan pondasi diperhitungkan berdasarkan data karakteristik tanah yang ada dengan menggunakan jenis pondasi sumuran/*bored file*. Baja tulngan polos (BJTP) untuk Ø$\leq$ 12 mm dengan tegangan leleh (fy) = 240 Mpa sedangkan baja tulangan ulir (BJTD) untuk Ø $\geq$ 12 mm dengan tegangan leleh (fy) = 400 Mpa.
7. Analisa mekanika struktur dengan program SAP2000 3D versi 7.42.
8. Kombinasi beban yang diperhitungkan adalah beban mati dan hidup, tanpa memperhitungkan beban gempa karena geometri struktur gedung yang tidak stabil (terlalu langsing).
9. Perencanaan konstruksi baja berdasarkan metode *allowable stress design* dari AISC.

1.4 Lokasi Proyek

Lokasi proyek pembangunan *Ramp* COT (*Central Operating Theatre*) terletak dalam kawasan RSUP dr. Sardjito di jalan Kesehatan, Sekip, Yogyakarta.

Batas lokasi proyek pembangunan gedung COT adalah sebagai berikut (lihat gambar 1.1):

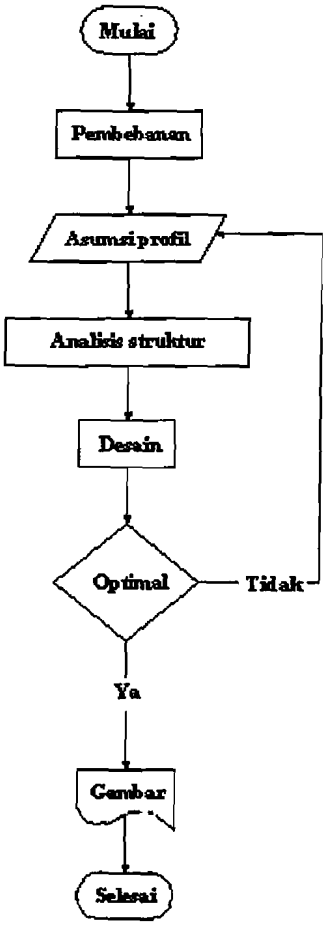
1. Sebelah barat : Gedung perawatan VIP
2. Sebelah timur : Gedung Radiologi
3. Sebelah selatan : Gedung Karyawan
4. Sebelah utara : Gedung Rawat Jantung



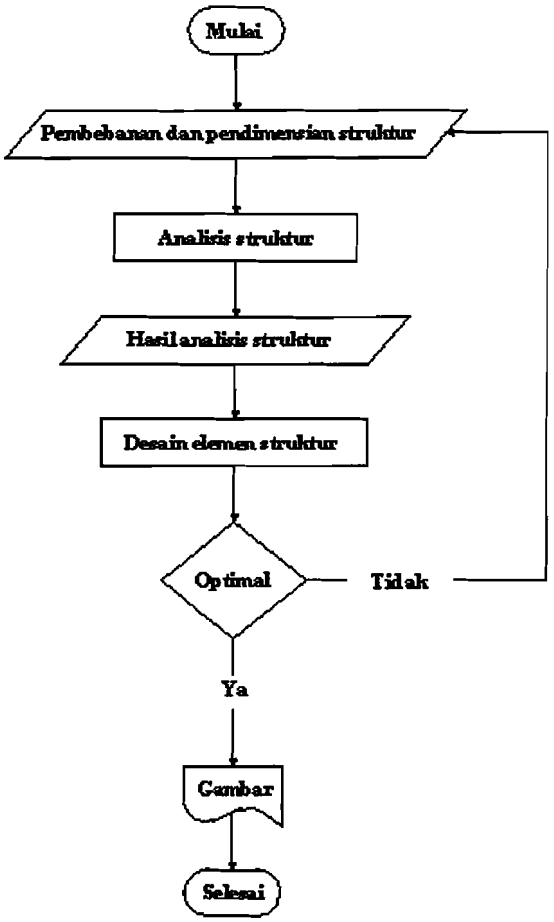
Gambar1.1 Denah Lokasi Proyek

1.5 Metode perencanaan

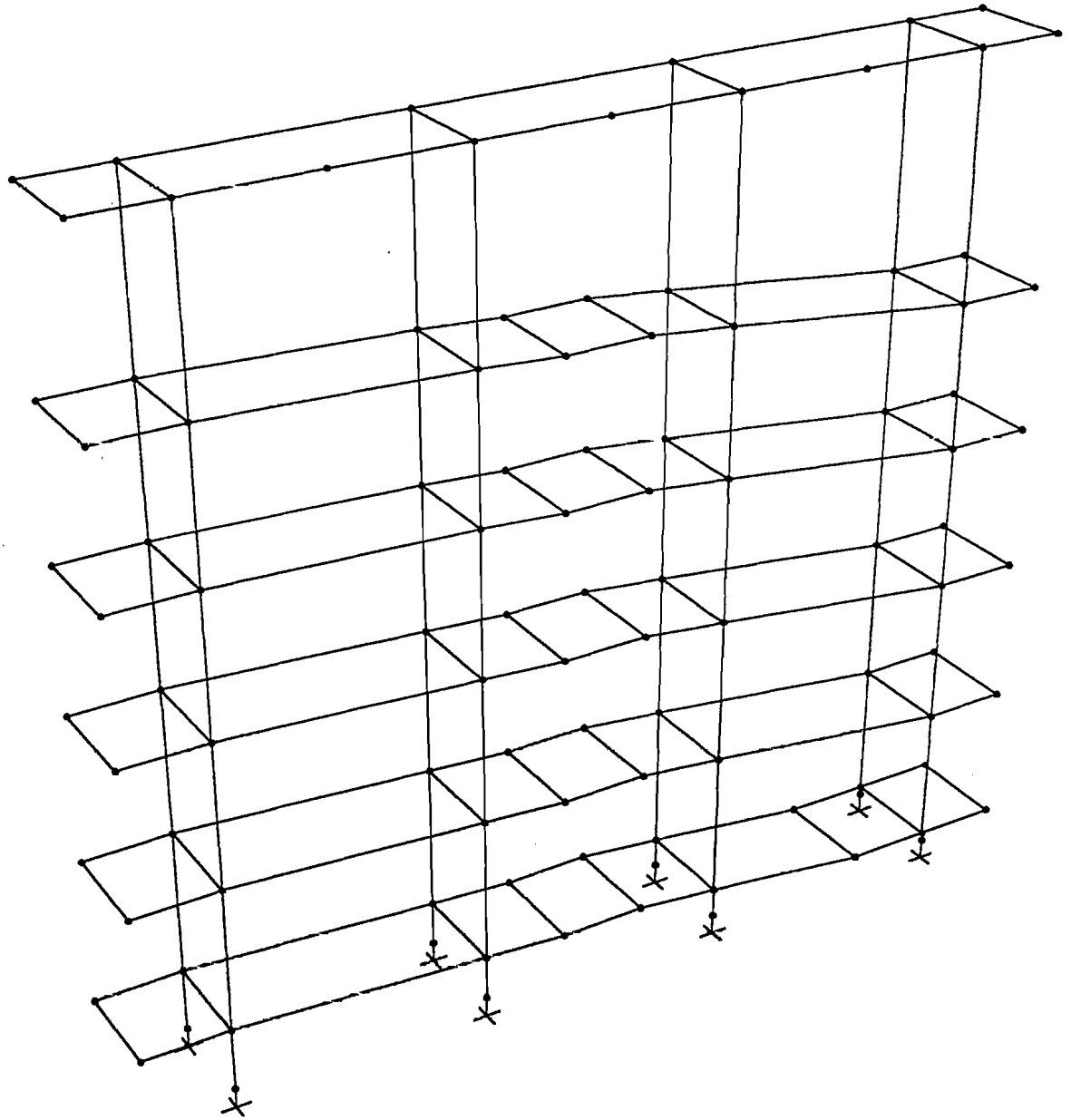
Dalam perencanaan gedung Ramp RSUP Dr. Sardjito ini dapat dibuat menjadi bebarapa langkah sesuai dengan *flow chart* sebagai berikut:



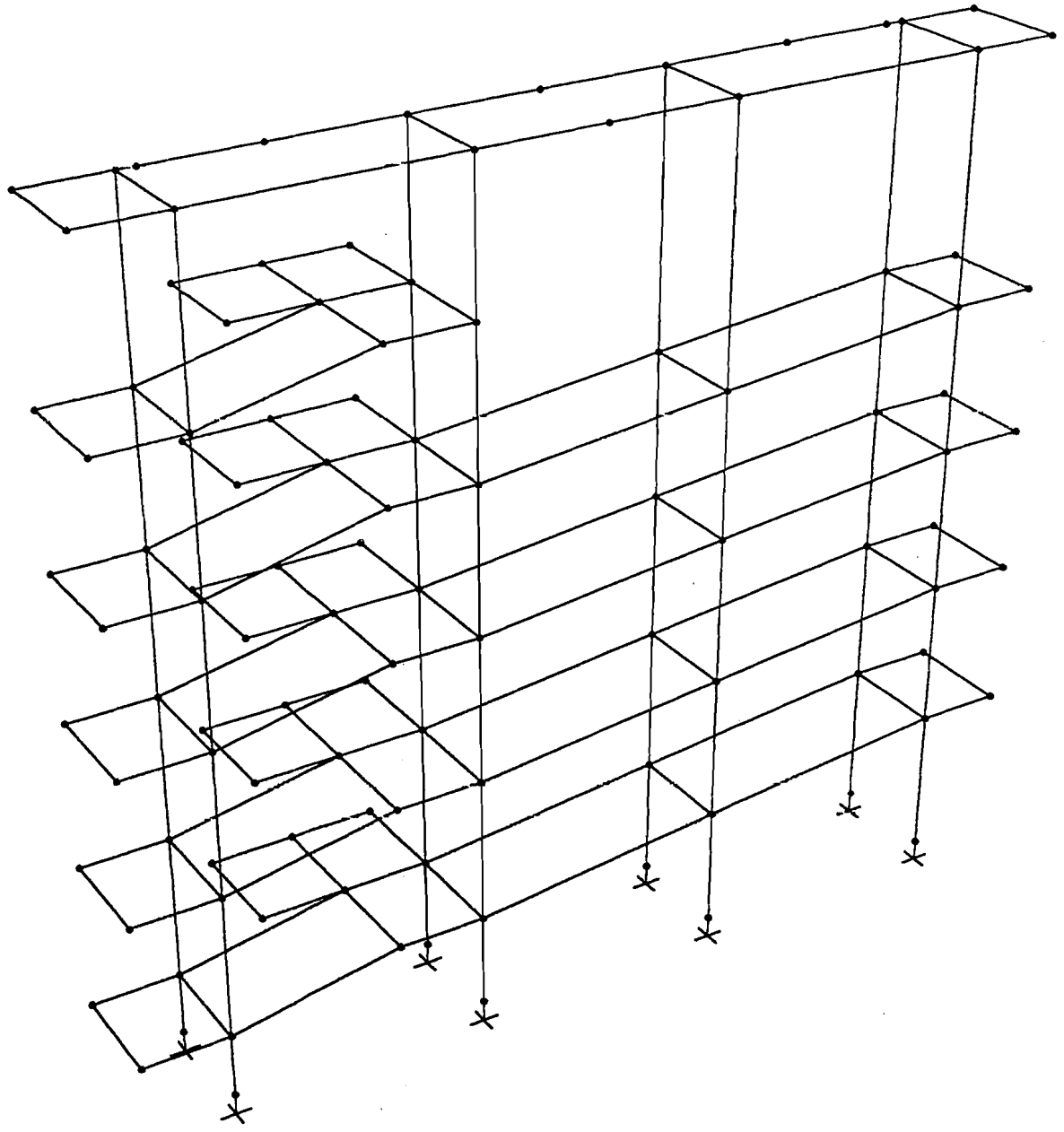
Gambar 1.2 *Flow Chart* Perencanaan Rangka Atap



Gambar 1.3 *Flow Chart* Perencanaan Struktur Gedung



SAP2000 v7.40 - File:portal kiri - 3-D View - Kgf-m Units



SAP2000 v7.40 - File:PORTAL 1-2 - 3-D View - Kgf-m Units

BAB II

TINJAUAN PUSTAKA

2.1 Pendahuluan

Pekerjaan struktur secara umum dilaksanakan melalui 3 (tiga) tahap *(Senol, Utku, Charles,John Benson,1997)*, yaitu:

1. **Tahap Perencanaan *(Planning Phase)***

   Meliputi pertimbangan terhadap hal-hal yang dibutuhkan dan faktor-faktor yang mempengaruhi rancangan umum serta dimensi struktur yang nantinya menjadi dasar pemilihan satu atau beberapa alternatif dari jenis struktur. Pertimbangan utama adalah fungsi dari struktur itu nantinya. Pertimbangan kedua yang biasanya disertakan adalah aspek eknomi, sosial lingkungan, keuangan, dan faktor lainnya.

2. **Tahap Disain *(Design Phase)***

   Meliputi pertimbangan secara detail terhadap alternatif struktur yang direncanakan pada tahap perencanaan yang nantinya menjadi dasar penentuan ukuran yang tepat serta detail elemen struktur termasuk didalamnya sambungan struktur. Biasanya, sebelum tahap disain mencapai tahap akhir, telah didapatkan suatu bentuk perencanaan akhir yang akan dilaksanakan. Terkadang, pemilihan tipe maupun material akan tergantung pada faktor ekonomi dan pembangunan yang terkadang tidak dapat diperkirakan secar tepat

3. Tahap Pembangunan *(Construction Phase)*

Meliputi pengadaan material, peralatan, dan tenaga kerja. Pekerjaan bengkel serta transportasi ke lokasi proyek. Selama pelaksanaan tahap ini, perencanaan ulang akan dibutuhkan jika terdapat masalah seperti material yang sulit untuk didapatkan atau berbagai alasan lain.

Desain struktur merupakan salah satu bagian dari proses perencanaan bangunan. Proses desain tersebut merupakan gabungan antara unsur seni dan sains yang membutuhakan kealhlian dalam mengolahnya. Proses ini dibedakan dalam dua bagian. Pertama, desain umum yang merupakan peninjaun umum secara garis besar keputusan-keputusan desain. Tipe struktur dipilih dari berbagai alternatif yang mungkin. Tata letak struktur, geometri atau bentuk bangunan , jarak antar kolom, tinggi lantai, dan material bangunan telah ditetapkan dengan pasti dalam tahap ini. Tahap kedua, desain terinci yang antara lain meninjau tentang penentuan besar penampang lintang balok, kolom, tebal pelat, dan elemen struktur lainnya.

2.2 Struktur Bawah

Struktur bawah *(sub strucutre)* adalah bagian bangunan yang berada dibawah permukaan tanah. Dalam proses perencanaan ulang Gedung Ramp COT Dr. Sardjito Yogyakarta ini adalah pondasi.

Pondasi umumnya berlaku sebagai komponen struktur pendukung bangunan yang terbawah, dan telapak pondasi berfungsi sebagai elemen terakhir

yang meneruskan beban ke tanah,oleh karena itu tahap pondasi harus memenuhi persyaratan sehingga mampu dengan aman menyebarkan beban-beban yang diteruskannya sedemikian rupa sehingga kapasitas atau daya dukung tanah tidak terlampaui *(Istimawan, 1994)*.

Pondasi ialah bagian dari suatu sistem rekayasa yang meneruskan beban yang ditopang oleh pondasi dan beratnya sendiri kepada dan ke dalam tanah dan batuan yang terletak dibawahnya *(Bowles, 1991)*.

Pondasi adalah suatu bangunan yang berfungsi untuk memindahkan beban-beban struktur atas ke tanah. Fungsi ini dapat berlaku secara baik bila kestabilan pondasi terhadap efek guling, geser, penurunan dan daya dukung tanah terpenuhi *(L.Wahyudi dan Syahril, 1997)*.

Pondasi merupakan elemen yang sangat vital dari suatu bangunan, karena mendukung seluruh beban-beban diatasnya dan kemudian meneruskan ke tanah di bawahnya. Pemilihan jenis pondasi yang digunakan harus disesuaikan dengan daya dukung ijin tanah yang ada, sehingga dimensi pondasi tersebut benar-benar efektif dan efisien dalam menjaga kestabilan struktur bangunan.

2.3 Struktur Atas

Struktur atas *(upper structure)* adalah elemen bangunan yang berada diatas permukaan tanah. Dalam proses perencanaan ulang Gedung Ramp COT RSUP Dr. Sardjito Yogyakarta meliputi atap, pelat, balok dan kolom.

2.3.1 Atap

Atap adalah elemen struktur yang berfungsi melindungi bangunan beserta apa yang ada didalamnya dari pengaruh panas dan hujan. Bentuk atap tergantung dari bebarap faktor misalnya: iklim, arsitektur, utilitas bangunan dan sabagainya, serta menyerasikannya dengan rangka bangunan atau bentuk denah agar dapat menambah keindahan dan nilai dari harga bangunan itu.

2.3.2 Pelat

Pelat adalah elemen bidang tipis yang menahan beban transfersal yang melalui aksi lentur ke masing-masing tumpuan *(L.Wahyudi dan Syahril,1999)*, pelat merupakan struktur bidang permukaan yang lurus (datar dan tidak melengkung) yang mendukung beban mati dan beban hidup,. Tebalnya jauh lebih kecil dibandingkan dengan dimensi yang lain. Geometri suatu pelat dibatasi oleh garis lurus/garis lengkung. Ditinjau dari statika kondisi tepi pelat bisa bebas, bertumpuan sederhana, jepit, termasuk tumpuan elastis dan jepit elastis atau bisa berupa tumpuan titik/terpusat *(Sziland, Rudolph,1989)*.

Pelat merupakan panel-panel beton bertulang yang mungkin tulangannya dua arah atau satu arah saja, tergantung sistem strukturnya. Kontinuitas penulangan pelat diteruskan kedalam kolom. Dengan demikian, sistem pelat secara keseluruhan menjadi satu kesatuan membentuk rangka struktur bangunan kaku stasis tak tentu yang sangat kompleks, sehingga mengakibatakan timbulnya momen, gaya geser, dan lendutan *(Istimawan, 1994)*.

2.3.2.1 Pelat Satu Arah

Pelat satu arah adalah pelat yang didukung pada dua tepi yang berhadapan saja, sehingga lendutan yang timbul hanya satu arah saja yaitu pada arah yang tegak lurus terhadap arah dukungan tepi. Atau degnan kata lain pelat satu arah adalah pelat yang mempunyai perbandingan antara sisi panjang terhadap sisi pendek yang saling tegak lurus lebih besar dari dua, dengan lendutan pada sisi yang lebih pendek *(Istimawan,1994)*.

2.3.2.2 Pelat dua arah

Pelat dua arah adalah pelat yang didukung sepanjang keempat sisimya dengan lendutan yang akan timbul pada dua arah yang saling tegak lurus, atau perbandingan antara sisi panjang dan sisi pendek yang saling tegak lurus kurang dari dua *(Istimawan,1994)*.

2.3.3 Kolom

Definisi kolom menurut SNI-T15-1992-03 adalah komponen struktur bangunan yang tugas utamanya menyangga beban aksial desak vertikal dengan bagian tinggi yang tidak ditopang paling tidak tiga kali dimensi lateral terkecil.

Kolom adalah batang tekan vertikal dari rangka *(frame)* struktur yang memikul beban dari balok induk, maupun balok anak. Kolom, meneruskan beban dari elevasi atas ke elevasi bawah hingga akhirnya sampai ke tanah melalui pondasi *(Sudarmoko,1996)*.

Kolom merupakan elemen vertikal yang memikul sistem lantai strukutral. Elemen ini merupakan elemen yang mengalami tekan dan pada umumnya disertai dengn momen lentur *(Edward G.Nawy,1985).*

Keruntuhan pada suatu kolom merupakan lokasi kritis yang dapat menyebabkan runtuhnya *(collapse)* lantai yang bersangkutan dan juga runtuh total *(total collapse)* seluruh struktur. Kolom adalah struktur yang mendukung beban dari atap, balok dan berat sendiri yang diteruskan ke pondasi. Secara struktur kolom menerima beban vertikal yang besar, selain itu harus mampu menahan beban horizontal, bahkan momen atau puntir/torsi akibat pengaruh terjadinya eksentrisitas pembebanan. Untuk menentukan dimensi penampang kolom yang diperlukan,hal yang perlu diperhatikan adalah tinggi kolom perencanaan, beban rencana yang digunakan, mutu beton dan baja yang digunakan, dan eksentrisitas pembebanan yan terjadi.

2.3.4 Balok

Balok adalah bagian struktur yang berfungsi sebagai pendukung beban vertikal dan horizontal. Beban vertikal berupa beban mati dan beban hidup yang diterima pelat lantai, berat sendiri balok dan berat dinding penyekat yang ada diatasnya. Sedangkan beban horizontal berupa beban angin dan gempa.

Balok merupakan bagian struktural bangunan yang penting bertujuan untuk memikul beban transversal yang dapat berupa beban lentur, geser, maupun torsi. Oleh karena itu perencanaan balok yang efisien, ekonomis, cepat, dan aman sangat penting *(Sudarmoko,1996).*

Balok adalah batang struktural yang hanya menerima beban-beban tegak saja, dan biasanya bisa dianalisa dengan lengkap bila diagram geser dan diagram momennya talah didapatkan *(Istimawan, 1994)*.

Dari beberapa definisi diatas, balok dibagi menjadi balok induk dan balok anak. Balok induk adalah balok yang menumpu pada kolom, sedangkan balok anak adalah balok yang menumpu pada balok induk.

2.3.5 Portal

Portal adalah suatu rangka struktur pada bangunan yang harus mampu menahan beban-beban yang bekerja, baik beban mati, beban hidup, maupun beban sementara. Portal merupakan suatu sistem struktur kerangka yang terdiri dari rakitan elemen struktur yang berupa beton bertulang, elemen balok, kolom, atau dinding geser.

1. **Portal Tak Bergoyang *(Unbraced Frame)***

   Portal tak bergoyang didefinisikan sebagai portal dimana tekuk goyangan dicegah oleh elemen-elemen topangan struktur tersebut dan bukan oleh portal itu sendiri *(Salmon & Jhonson,1996)*.

   Portal tak bergoyang mempunyai sifat:

   a. portal tersebut simetris dan bekerja beban simetris,
   b. portal yang mempunyai kaitan dengan konstruksi lain yang tidak dapat bergoyang.

2. Portal Bergoyang *(Braced Frame)*

Suatu portal dikatakan bergoyang bila :

a. beban yang tidak simetris yang bekerja pada portal yang simetris maupun tidak simetris,

b. beban simetris yang bekerja pada portal yang tidak semetris.

2.4 Pembebanan

2.4.1 Macam-macam pembebanan

Beban-beban yang bekerja pada struktur umumnya dapat digolongkan menjadi lima macam (PBI,1983) :

1. Beban Mati

Beban mati ialah berat semua bagian dari suatu gedung yang bersifat tetap, termasuk segala unsur tambahan, penyelesaian-penyelesaian, mesin-mesin serta peralatan tetap yang merupakan bagian yang tak terpisah dari gedung itu.

2. Beban Hidup

Beban hidup adalah semua beban yang terjadi akibat penghunian/penggunaan suatu gedung, dan termasuk didalamnya beban-beban pada lantai yang berasal sari barang yang dapat berpindah, mesin-mesin serta peralatan yang tidak merupakan bagian yang tidak terpisahkan dari gedung dan dapat diganti semamasa hidup dari gedung, sehingga mengakibatkan perubahan dalam pembebanan lantai dan atap tersebut. Khusus pada atap beban hidup dapat berupa beban air hujan, baik akibat

genangan maupun akibat tekanan jatuh butiran air. Dalam beban hidup tidak termasuk beban angin, beban gempa, dan beban khusus.

3. Beban Angin

Beban angin adalah semua beban yang bekerja pada gedung atau bagian gedung yang disebabkan oleh selisih dalam tekanan udara.

4. Beban gempa

Beban gempa adalah semua beban statik ekuivalen yang bekerja pada gedung atau bagian gedung yang menirukan pengaruh dari gerakan tanah akibat gempa itu, pengaruh gempa pada struktur gedung ditentukan berdasarkan suatu analisa dinamik, maka yang diartikan beban gempa disisi adalah gaya-gaya di dalam struktur tersebut yang terjadi oleh gerakan tanah alibat gempa itu.

5. Beban khusus

Beban khusus adalah semua beban yang bekerja pada gedung atau bagian gedung yang terjadi akibat seleisih suhu, pengangkatan dan pemasangan, penurunnan pondasi, susut, gaya-gaya tambahan yang berasal dari beban hidup seperti gaya rem yang berasal dari kren, gaya sentrifugal dan gaya dinamis yang berasal dari mesin-mesin serta pengaruh-pengaruh khusus lainnya.

2.4.2 Kombinasi pembebanan

Provisi keamanan yang diisyaratkan dalam SNI-T-15-1991-03 dapat dibagi dalam dua bagian yaitu, provisis faktor beban dan frovisi faktor reduksi

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kekuatan. Kuat perlu (U) dari suatu struktur harus dihitung dengan beberapa kombinasi beban yang bekerja pada struktur tersebut (Pasal 3.2.2 SNI-T—1991-03).

1. Untuk kondisi beban mati (D) dan beban hidup (H),

   U =1,2D + 1,6L.....(2.1)

2. Bila beban angin (W) turut diperhitungkan, maka pengaruh kombinasi beban mati (D), hidup (L) dan angin (W), berikut ini harus dipilih untuk menentukan nilai kuat perlu (U) terbesar.

   U = 0,75 (1,2D + 1,6L + 1,6W) .....(2.2)

   Dengan beban hidup (L) yang kosong, turut pula diperhitungkan untuk mengantisipasi kondisi yang bahaya.

2.4.3 Faktor reduksi kekuatan (Φ)

Ketidakpastian kekuatan beban terhadap pembebanan dianggap sebagai faktor reduksi kekuatan (Φ). Menurut SKSNI-T-15-1991-03, faktor reduksi (Φ) ditentukan sebagai berikut :

	Gaya yang bekerja	Φ
1	Lentur tanpa beban aksial	0,8
2.	Aksial tarik, dan aksial tarik dengan lentur	0,8
3.	Aksial tekan, dan aksial tekan dengan lentur : tulangan spiral tulangan sengkang ikat	 0,7 0,65
4.	Geser dan torsi	0,6
5.	Tumpuan pada beton	0,7

2.5 Dasar-dasar Perencanaaan

Peraturan-peraturan/standarisasi yang digunakan dalam perencanaan ulang Ramp COT RSUP dr. Sardjito Yogyakarta, adalah :

1. Peraturan Perencanaan Tahan Gempa Indonesia Untuk Gedung (PPTIUG),1983.
2. Peraturan Pembebanan Indonesia Untuk Gedung (PBIUG),1987.
3. SK SNI-T-15-1991-03
4. Peraturan Beton Bertulang Indonesia (PBBI),1971 NI-2.
5. AISC
6. Pedoman Perencanaan Untuk Struktur Beton Bertulang Biasa dan Struktur Bertulang Untuk Gedung, 1983.

BAB III

LANDASAN TEORI

3.1 Perencanaan Atap

Untuk perencanaan atap pada perencanaan Ramp COT Dr Sardjito Yogyakarta ini menggunakan metode perencanaan tegangan kerja *(working stress design)* dari AISC. Pada metode ini, elemen struktural harus direncanakan sedemikian rupa sehingga tegangan yang dihitung akibat beban kerja tidak melampaui tegangan ijin yang telah ditetapkan. Tegangan ijin ini ditentukan untuk mendapatkan faktor keamanan terhadap tercapainya tegangan batas. Teganan yang dihitung harus berada dalam keadaan elastis yaitu tegangan sebanding dengan regangan, *(Salmon dan Johnson, 1986)*. Perencanaan ini meliputi:

3.1.1 Perencanaan gording

Dalam perencanaan gording harus memenuhi syarat-syarat antara lain:

- **Tegangan**

$$\frac{fbx}{0{,}66Fy} + \frac{fby}{0{,}66Fy} \leq 1{,}0 \quad \text{.....(3.1)}$$

$$fbx = \frac{M \perp max}{Sx} \quad \text{.....(3.2)}$$

$$fby = \frac{M // max}{Sy} \quad \text{.....(3.3)}$$

Dimana:

fbx = tegangan lentur arah sumbu x (ksi)

fby = tegangan lentur arah sumbu y (ksi)

Fy = tegangan leleh baja (ksi)

Sx = modulus elastisitas tampang arah sumbu x (in^3)

Sy = modulus elastisitas tampang arah sumbu y (in^3)

M⊥ = modulus tegak lurus sumbu batang (k in)

M// = modulus sejajar sumbu batang (k in)

- **Lendutan**

$$\delta \perp = \frac{5}{384} \frac{q \perp .L^4}{E.Ix} \leq \frac{L}{360} \quad \text{.....(3.4)}$$

$$\delta // = \frac{5}{384} \frac{q //. \left(\frac{L}{(a+1)} \right)^4}{E.Iy} \leq \frac{L}{360} \quad \text{.....(3.5)}$$

$$\delta = \sqrt{\delta \perp^2 + \delta //^2} \quad \text{.....(3.6)}$$

Dimana:

δ = resultan lendutan (mm)

δ⊥ = lendutan tegak lurus sumbu batang (mm)

δ// = lendutan searah sumbu batang (mm)

E = modulus elastisitas baja (200000MPa)

Ix = inersia arah sumbu x (mm^4)

Iy = inersia arah sumbu y (mm^4)

3.1.2 Perencanaan Sagrod

Perencanaan sagrod ini bertujuan untuk menentukan diameter kabel yang akan dipakai P = 0.33.Fu.Asagrod.....(3.7)

Beban yang digunakan adalah beban arah sejajar sumbu (P//):

$$P// = P.\ \sin \alpha.Ss \quad \textbf{(3.8)}$$

Sehingga luas tampang sagrod :

$$Asagrod = \frac{P//}{0{,}33.Fu} = \frac{1}{4}.\pi.D^2 sagrod \quad \textbf{(3.9)}$$

$$Dsagrod = \sqrt{\frac{P//.4}{0{,}33.Fu.\pi}} \quad \textbf{(3.10)}$$

$$Dpakai = Dsagrod + 3\ mm \quad \textbf{(3.11)}$$

Dimana:

P = gaya yang bekerja (kips)

P// = gaya sejajar sumbu batang (kips)

Fu = kuat tarik baja (ksi)

Ss = jarak beban sagrod (in)

D = diameter baja (in)

A = luas penampang (in^2)

3.1.3 Perencanaan Tierod

Gaya batang:

$$T = P//.\cos\ \alpha \quad \textbf{(3.12)}$$

$$T = 0{,}33.Fu.Atierod \quad \textbf{(3.13)}$$

Sehingga :

$$Atierod = \frac{T}{0{,}33.Fu} = \frac{1}{4}.\pi.D^2 tierod \quad \textbf{(3.14)}$$

$$Dtierod = \sqrt{\frac{4.T}{0{,}33.Fu.\pi}} \quad \text{.....(3.15)}$$

$$Dpakai = Dtierod + 3mm \quad \text{.....(3.16)}$$

Dimana:

T = tegangan yang bekerja (kips)

Fu = kuat tarik baja (ksi)

D = diameter baja (in)

A = luas penampang baja (in^2)

3.1.4 Perencanaan Batang Tarik

Perencanaan batang tarik merupakan salah satu masalah teknik yang paling sederhana dan bersifat langsung. Karana stabilitas bukan merupakan hal yang utama, perencanaan batang tarik pada hakekatnya menentukan luas penampang lintang batang yang cukup untuk menahan beban yang bekerja dengan faktor keamanan yang memadai terhadap keruntuhan.

Untuk batang yang berlubang akibat paku keling atau baut, atau untuk batang berulir, luas penampang lintang yang direduksir (yang disebut luas netto) digunakan dalam perhitungan. Lubang atau ulir pada batang menimbulkan konsentrasi tegangan yang tidak merata, misalnya lubang pada pelat akan menaikkan distribusi tegangan pada beban kerja. Teori elastisitas menunjukkan bahwa tegangan tarik didekat lubang akan sekitar tiga kali tegangan tarik pada luass netto. Namun ketika setiap serat mencapai tegangan leleh (Fy) tegangannya menjadi konstan, tetapi deformasi berlanjut terus bila beban meningkat hingga

akhirnya semua serat mencapai atau melampaui regangan leleh *(Salmon dan Johnson,1996)*.

Langkah-langkah perencanaan batang tarik:

1. **Menentukan angka kelangsingan (λ=L/r) maksimum:**

   Angka kelangsingan (λ=L/r) maksimum yang dapat diterima untuk batang tarik adalah sebagai berikut:

Untuk elemen/batang utama	$\lambda = L/r \leq 240$
Untuk elemen/batang sekunder/*bracing*	$\lambda = L/r \leq 300$

   Sehingga untuk batang utama diperoleh:

$$r_{min} = \frac{L}{240} \quad \text{.....(3.17)}$$

2. **Menentukan luas bruto (A_g), luas netto (A_n) dan luas efektif (A_{ef}).**

$$Ag_{1perlu} = \frac{T}{0{,}6.Fy} \quad \text{.....(3.18)}$$

$$Ag_{2perlu} = \frac{T}{0{,}5.Fu.\mu} + A_{lubang} \quad \text{.....(3.19)}$$

$$A_{lubang} = \left(\frac{1''}{8} + \text{obaut}\right).tp.n \quad \text{.....(3.20)}$$

   dipakai profil yang luasnya (A) lebih besar dari nilai Ag_{perlu} terpakai.

$$A_{netto} = A_{brutto} - A_{lubang} \quad \text{.....(3.21)}$$

$$A_{effektif} = A_{netto}.\mu \quad \text{.....(3.22)}$$

   Dimana:

L = panjang batang (in)

T = gaya tarik (kips)

r = jari-jari inersia terkecil profil (in)

A_{netto} = luas bersih penampang (in^2)

A_g = luas kotor penampang (in^2)

n = jumlah batang

∅ = diameter (in)

μ = faktor reduksi luas netto, dengan kriteria:

- Lebar sayap ≥ 2/3 x kedalaman,sambungan pada sayap-sayap minimal 3 ikatan pergaris dalam garis tekanan μ = 0,9
- Minimum 3 ikatan perbaris tekanan yang tidak sama dengan kriteria diatas μ = 0,85
- 2 ikatan pergaris tekanan μ = 0,75

(tabel AISC 1.14.2.2 dan 1.14.2.3)

3. Kontrol kelangsingan

$$\alpha_{ada} = \frac{k.L}{r_{ada}} \leq 240 \quad \text{.....(3.23)}$$

Dimana: kL/r = angka kelangsingan elemen tarik.

4. Kontrol tegangan tarik yang terjadi

Tampang tanpa lubang: $fa = \frac{T}{A_{profil}} \leq 0{,}6.Fy$ **.....(3.24)**

Tampang ada lubang: $fa = \frac{T}{A_{effektif}} \leq 0{,}5.Fu$ **.....(3.25)**

Dimana: fa = tegangan tarik yang terjadi (ksi).

3.1.5 Perencanaan Batang Desak

Batang desak merupakan elemen struktur suatu bangunan yang memikul gaya tekan aksial. Tetapi pada hakekatnya jarang sekali batang mengalami tekanan aksial saja kecuali pada struktur rangka atap baja. Namun bila pembebanan ditata sedemikian rupa sehingga pengekangan rotasi ujung dapat diabaikan atau beban dari batang-batang yang bertemu diujung batang bersifat simetris dan pengaruh lentur sangat kecil dibandingkan tekanan langsung, maka batang tekan dapat direncanakan dengan aman. Keruntuhan batang desak dapat diklasifikasikan:

1. Keruntuhan akibat tegangan leleh bahan terlampaui, yang terjadi pada batang tekan pendek.
2. Keruntuhan akibat tekuk, yang terjadi pada batang tekan langsing.

Langkah-langkah perencanaan batang desak:

1. **Menentukan profil**

   Dalam menentukan profil baja untuk batang desak, dapat dilakukan dengan proses yang sama dengan proses penentuan profil batang tarik.

2. **Kontrol terhadap kelangsingan dan tekuk**

   Setelah profil baja didapat, maka terlebih dahulu dilakukan pemeriksaan tekuk setempat *(local buckling)*:

$$\frac{bf}{tw} \leq \frac{76}{\sqrt{Fy}} \text{ (ksi)} \quad \text{.....(3.26)}$$

dan kontrol kelangsingan

$$\frac{kL}{r} \le Cc = \sqrt{\frac{2.\pi^2.E}{Fy}} = \frac{755}{\sqrt{Fy}} \text{(Fy dalam ksi)} \quad \textbf{(3.27)}$$

$$\le Cc = \frac{6400}{\sqrt{Fy}} \text{(Fy dalam Kg/cm}^2\text{)} \quad \textbf{(3.28)}$$

$$\le Cc = \frac{1987}{\sqrt{Fy}} \text{(Fy dalam Mpa)} \quad \textbf{(3.29)}$$

$$FS = \frac{5}{3} + \frac{3}{8} \cdot \frac{kL/r}{Cc} - \frac{1}{8} \cdot \frac{(kL/r)^3}{Cc^3} \quad \textbf{(3.30)}$$

$$Fa = \frac{Fy}{FS}\left(1 - 0{,}5\left(\frac{kL/r}{Cc}\right)^2\right) \quad \textbf{(3.31)}$$

tetapi jika $\frac{kL}{r} > Cc$, maka:

$$Fa = \frac{12}{23} \cdot \frac{\pi^2.E}{(kL/r)^2} \quad \textbf{(3.32)}$$

Dimana:

Fa – tegangan ijin pada luas bruto dalam kondisi beban kerja (ksi)

kL/r = angka kelangsingan elemen desak

Fs = faktor keamanan

3. Kontrol beban

Sehingga setelah nilai Fa didapat dengan ketentuan-ketentuan diatas, maka diadakan kontrol terhadap beban yang terjadi dengan beban ijin.

$$T = Fa.A \ge P_{batang} \quad \textbf{(3.33)}$$

Dimana:

T = beban ijin (kips)

P = beban yang terjadi (kips)

3.1.6 Perencanaan Sambungan

Menurut AISC-2.1 tentang perencanaan tegangan kerja *(working stress)* dan AISC-2.1 tentang perencanaan plastis, konstruksi baja dibedakan atas tiga kategori sesuai dengan jenis sambungan yang dipakai, antara lain:

1. *Sambungan portal kaku*, yang memiliki kontinuitas penuh sehingga sudut pertemuan antara batang-batang tidak berubah, yaitu pengekangan *(restrain)* rotasi sekitar 90% atau lebih dari yang diperlukan untuk mencegah perubahan sudut.
2. *Sambungan kerangka sederhana (simple framing)*, dimana pengekangan rotasinya di ujung-ujung batang dibuat sekecil mungkin. Suatu kerangka dapat dianggap sederhana jika sudut semula antara batang-batang yang berpotongan dapat berubah sampai 80% dari besarnya perubahan teoritis yang diperoleh dengan menggunakan sambungan sendi tanpa gesekan *(frictionless)*.
3. Sambungan kerangaka semi-kaku, yaitu pengekangan rotasinya berkisar antara 20 dan 90 persen dari yang diperlukan untuk mencegah perubahan sudut. Alternatifnya kita dapat menganggap momen yang disalurkan pada sambungan kerangka semi kaku tidak sama dengan nol (atau kecil sekali) seperti pada sambungan kerangka sederhana,

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dan juga tidak memberikan kontinuitas momen penuh sepertin anggapan yang dipakai pada analisis elastis potal kaku.

Menghitung Kekuataan 1 Baut

$$P_{tumpuan} = tp.D_{baut}.1,2.fu_{plat}.n \quad \text{.....(3.35)}$$

$$D_{baut} = \frac{P_{tumpuan}}{1,2.Fu.N.tp} \quad \text{..... (3.36)}$$

$$D_{geser} = A_{baut}.Fv.2N = \frac{1}{4}\pi.D^2{}_{baut}.Fv.2N \quad \text{.....(3.37)}$$

$$D_{baut} = \sqrt{\frac{4.P_{geser}}{2.\pi.Fv.N}} \quad \text{.....(3.38)}$$

$Fv = 0,22.Fu_{baut}$, untuk baut *Non Full Drat*

$Fv = 0,17.Fu_{baut}$, untuk baut *Full Drat*

Menghitung Jumlah Baut

$$N = \frac{P_{batang}}{Pt_{baut}} \quad \text{.....(3.39)}$$

3.2 Perencanaan Pelat Dua Arah

1. Menentukan tebal minimum pelat (h)

- Tegangan leleh baja (fy) : dalam satuan Mpa
- Kuat desak beton rencana (f'c) : dalam satuan Mpa

Pada SK SNI T-15-1991-03 pasal 3.2.5 butir 3.3 memberikan pendekatan empiris mengenai batasan defleksi dengan tebal pelat minimum sebagai berikut:

$$h \geq \frac{Ln.(0,8 + fy/1500)}{36 + 5.\beta.(\alpha_m - 0,12(1 + 1/\beta))} \quad \text{.....(3.40)}$$

tetapi tidak boleh kurang dari:

$$h \geq \frac{ln.(0,8 + fy/1500)}{36 + 9\beta} \quad \text{.....(3.41)}$$

dan tidak perlu lebih dari:

$$h \leq \frac{ln.(0,8 + fy/1500)}{36} \quad \text{.....(3.42)}$$

Dalam segala hal, tebal minimum pelat tidak boleh kurang dari harga berikut:

- Untuk α_m kurang dari (<) 2,0 digunakan nilai h minimal 120 mm.
- Untuk α_m lebih dari (≥) 2,0 digunakan nilai h minimal 90 mm.3

Dimana:

Ln = bentang bersih terkecil pada pelat dihitung dari muka kolom (mm)

α_m = rasio kekakuan balok terhadap pelat

β = rasio panjang terhadap lebar bentang pelat

2. Menentukan momen lentur terjadi

Perencanaan dan analisis pelat dua arah untuk beban gravitasi dilakukan dengan menggunakan metode koefisien momen. Besar momen lentur dalam arah bentang panjang:

$Mtx = -0{,}001.qu.Lx^2.ctx$ ..... **(3.43)**

$Mlx = 0{,}001.qu.Lx^2.clx$ ..... **(3.44)**

$Mty = -0{,}001.qu.Lx^2.cty$ ..... **(3.45)**

$Mly = 0{,}001.qu.Lx^2.cly$ ..... **(3.46)**

Dimana:

qu = beban merata

Lx = panjang bentang pendek

ctx = koefisien momen tumpuan arah x

clx = koefisien momen lapangan arah x

cty = koefisien momen tumpuan arah y

cly = koefisien momen lapangan arah y

Nilai koefisien momen (c) diambil dari tabel 13.3.2 PBBI 1971.

3. Menentukan tinggi manfaat (d) arah x dan y

$$\rho b = \frac{0{,}85.f'c.}{fy} \cdot \beta_1 \cdot \left(\frac{600}{600+fy}\right) \text{.....} \textbf{(3.47)}$$

$$\rho maks = 0{,}75.\rho b \text{.....} \textbf{(3.48)}$$

$$\rho min = \frac{1{,}4}{fy} \text{.....} \textbf{(3.49)}$$

Pada pelat dua arah, tulangan momen positif untuk kedua arah dipasang saling tegak lurus. Karena momen positif arah bentang pendek (x) lebih besar dari bentang panjang (y), maka tulangan bentang pendek diletakkan pada lapis bawah agar memberikan d (tinggi manfaat) yang besar.

$dx = h\text{-}pb\text{-}{}^1/_2.\varnothing tulx$ ..... **(3.50)**

$dy = h\text{-}pb\text{-}\varnothing tulx\text{-}{}^1/_2.\varnothing tuly$ ..... **(3.51)**

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dy untuk tulangan tumpuan arah y (ty) sama dengan dx

4. Menentukan luas tulangan (As) arah x dan y

$$Rn = \frac{Mu/\Phi}{b.d^2} \quad \text{.....(3.52)}$$

$$m = \frac{fy}{0{,}85.f'c} \quad \text{.....(3.53)}$$

$$\rho_{ada} = \frac{1}{m}\cdot\left(1-\sqrt{1-\frac{2.m.Rn}{fy}}\right) \quad \text{.....(3.54)}$$

- Jika $\rho_{ada} > \rho_{maks}$ tebal minimum (h) harus diperbesar
- Jika $\rho_{min} < \rho_{ada} < \rho_{maks}$ dipakai nilai $\rho_{pakai} = \rho_{ada}$
- Jika $\rho_{ada} < \rho_{min}$, maka:
  1. $1{,}33.\ \rho_{ada} > \rho_{min}$ dipakai nilai $\rho_{perlu} = \rho_{min}$
  2. $1{,}33.\ \rho_{ada} < \rho_{min}$ dipakai nilai $\rho_{perlu} = 1{,}33.\rho_{ada}$

Setelah didapatkan nilai ρ_{perlu}, maka:

$$As_{perlu} = \rho_{perlu}.b.d \geq As_{tul\ bagi/susut} = 0{,}002.b.h \quad \text{.....(3.55)}$$

Nilai lebar pelat (b), diambil tiap 1 meter (1000 mm).

Jarak antar tulangan:

$$s \leq \frac{A_1.b}{As_{perlu}} \quad \text{.....(3.56)}$$

$$s \leq 2h \quad \text{.....(3.57)}$$

$$s \leq 250mm \quad \text{.....(3.58)}$$

Diambil nilai jarak antar tulangan (s) yang terkecil, sehingga didapatkan nilai As_{ada}.

$$As_{ada} \leq \frac{A_{1\varnothing}.b}{s} \quad \text{.....(3.59)}$$

5. Kontrol Kapasitas lentur pelat yang terjadi

$$a \leq \frac{As_{ada}.fy}{0{,}85.f'c.b} \quad \text{.....(3.60)}$$

$$Mn = Asada.fy.(d - {}^{a}/_{2}) \geq {}^{Mu}/_{\Phi} \quad \text{.....(3.61)}$$

bila $\rho_{perlu} = 1{,}33.\rho_{ada}$, maka

$$Mn = Asada.fy.(d - {}^{a}/_{2}) \geq 1{,}33.{}^{Mu}/_{\Phi} \quad \text{.....(3.62)}$$

3.3 Perencanaan Balok

Pada perencanaan ini digunakan metode kekuatan batas *(ultimit)* dimana beban kerja dikalikan faktor beban yang disebut beban terfaktor. Dari beban terfaktor ini, dimensi struktur direncanakan sedemikian rupa sehingga didapat kuat penampang yang pada saat runtuk besarnya kira-kira lebih kecil sedikit dari kuat batas runtuh sesungguhnya. Kekuatan pada saat runtuh disebut kuat batas *(ultimit)* dan beban yang bekerja saat runtuh disebut beban *ultimit*. Kuat rencana penampang didapat dari perkalian kuat nominal/teoritis dengan faktor kapasitas.

Langkah-langkah perencanaan elemen balok adalah sebagai berikut:

1. Menentukan mutu beton dan baja tulangan

- Tegangan leleh baja (fy)
- Kuat desak rencanan beton (f'c)

Dari kuat desak rencana beton didapatkan nilai faktor blok tegangan beton (β_1), yaitu: (SK SNI T-15-1991-03 pasal 3.3.2 butir 7.3)

f'c ≤ 30 Mpa, maka $\beta_1 = 0{,}85$

f'c > 30 Mpa, maka $\beta_1 = 0{,}85\text{-}0{,}008(f'c\text{-}30) \geq 0{,}65$ .....**(3.63)**

2. Menentukan nilai rasio tulangan (ρ)

Dalam menentukan nilai ρ, beton dalam keadaan regangan seimbang, yaitu pada saat regangan beton mencapai maksimum $\varepsilon'_{cu} = 0{,}003$ bersamaan dengan regangan baja mencapai leleh $\varepsilon_s = \varepsilon_y = fy/Es$.

$$\rho_b = \frac{0{,}85.f'c}{fy} \cdot \beta_1 \cdot \left(\frac{600}{600 + fy}\right) \quad \text{.....(3.64)}$$

$$\rho_{maks} = 0{,}75.\rho_b \quad \text{.....(3.65)}$$

dalam perencanaan dipakai ρ: $\rho_{pakai} = 0{,}5.\rho_{maks} > \rho_{min}$ .....**(3.66)**

Dimana:

ρ_b = rasio tulangan terhadap luas beton efektif dalam kolom keadaan seimbang

ρ_{maks} = rasio tulangan maksimum

ρ_{pakai} = rasio tulangan yang dipakai dalam perencanaan

ρ_{min} = rasio tulangan minimum

3. Menentukan tinggi efektif (d) dan lebar (b) penampang beton

$$m = \frac{fy}{0{,}85.f'c} \quad \text{.....(3.67)}$$

$$Rn = \rho.fy.(1 - {}^1/_2 .\rho.m) \quad \text{..... (3.68)}$$

$$b.d^2 = \frac{Mu/\theta}{Rn} \quad \text{.....(3.69)}$$

Karenan nilai $\frac{Mu/\theta}{Rn}$ diketahui, maka d_{perlu} dan b penampang beton dapat dicari dengan cara coba-coba *(trial and error)*. Untuk mendapatkan nilai d_{perlu} dan b penampang beton yang proposional digunakan pebandingan b/ d_{perlu} = 1,2-3,0.

Pada beton tulangan sebelah digunakan nilai d_1:

- d_1 = 50-70 mm untuk tulangan tarik 1 lapis
- d_1 = 71-100 mm untuk tulangan tarik 2lapis

Dimana :

M = perbandingan isi dari tulangan memanjang dari bentuk yang tertutup

Rn = koefisien tahanan untuk perencanaan baut

d = tinggi efektif penampang, diukur dari serat atas ke pusat tulangan tarik (mm)

d_c = tebal selimut beton, diukur dari serat bawah ke pusat tulangan tarik (mm)

Mu = momen lentur ultimit akibat beban luar (Nmm)

Φ = faktor reduksi kekuatan, diambil nilai 0,80 (lentur tanpa aksial)

h = tinggi total penampang beton (mm)

Setelah nilai d_{perlu} didapat, maka:

$h = d_{ada} + d$ **.....(3.70)**

Nilai d_c seperti diatas, tergantung dari banyaknya tulangan tarik yang digunakan.

Jika nilai $d_{ada} \geq d_{perlu}$ maka digunakan tulangan sebelah

Jika nilai $d_{ada} \leq d_{perlu}$ maka digunakan tulangan rangkap.

3.3.1 Perencanaan Balok Penampang Persegi Menahan Lentur Tulangan Sebelah

Balok lentur tulangan sebelah direncanakan, jika nilai $d_{ada} \geq d_{perlu}$.

Langkah-langkah perencanaan tulangan sebelah:

1. **Menentukan ρ_{ada} dan Rn_{ada}**

$$Rn_{ada} = \frac{Mu/\phi}{b.d^2_{ada}} \quad \text{.....(3.71)}$$

$$\rho_{ada} = \frac{Rn_{ada}}{Rn} \cdot \rho > \rho_{min} \quad \text{.....(3.72)}$$

2. **Menentukan luas tulangan (As)**

$$As = \rho_{ada}.b.d_{ada} \quad \text{.....(3.73)}$$

$$n = \frac{As}{A_{1\phi}} \text{ ; n bilangan bulat dan} \geq 2 \text{ batang} \quad \text{.....(3.74)}$$

$$As_{ada} = n.A_{1\phi} > As \quad \text{.....(3.75)}$$

Dimana:

As = luas tulangan tarik longitudinal (mm^2)

n = jumlah tulangan yang dipakai (buah)

As_{ada} = luas tulangan tarik longitudinal yang ada (mm^2)

$A_{1\phi}$ = uas tampang 1 buah tulangan (mm^2)

ρ_{ada} = rasio tulangan berdasarkan tampang beton

Rn_{ada} = koefisien tahanan untuk perencanaan kuat

3. Kontrol kapasitas lentur yang terjadi

$$a = \frac{As.fy}{0,85.f'c.b} \quad \text{..... (3.76)}$$

$$Mn = As.fy.(d - a/2) > Mu/\phi \quad \text{.....(3.77)}$$

Dimana:

a = tinggi blok tegangan persegi ekivalen (mm)

Mn = kapasitas lentur nominal yang terjadi (Nmm)

3.3.2 Perencanaan Balok Tampang Persegi Menahan Lentur Tulangan Rangkap

Balok lentur tulangan rangkap direncanakan, jika nilai $d_{ada} < d_{perlu}$.

Langkah-langkah perencanaan balok tulangan rangkap:

1. Menentukan As_1 dan Mn_1

$$As_1 = \rho_1.b.d_{diketahui} \quad \text{.....(3.78)}$$

$$\rho_1 = \rho_{awal} = 0,5.\ \rho_{maks}$$

$$a = \frac{As_1.fy}{0,85.f'c.b} \quad \text{.....(3.79)}$$

$$Mn_1 = As_1.fy.\left(d_{diketahui} - a/2\right) < Mu/\phi \quad \text{.....(3.80)}$$

2. Menentukan Mn_2

$$Mu/\Phi \leq Mn = Mn_1 + Mn_2$$

$$Mn_2 = Mu/\Phi - Mn_1 \quad \text{.....(3.81)}$$

Dimana:

Mn1 kuat momen pas.kopel gaya beton tekan dan tul baja tarik (Nmm)

Mn2 kuat momen pas.kopel tul baja tekan dan tarik tambahan (Nmm)

3. Menentukan As' = As_2 dan As

Tegangan baja desak:

$$fs' = 600.\left(1 - \frac{0{,}85.f'c.\beta_1}{(\rho - \rho').fy} \cdot \frac{d'}{d_{diketahui}}\right) \quad \text{.....(3.82)}$$

jika fs' ≤ fy, maka baja desak sudah leleh, sehingga dipakai fs'=fy

jika fs' > fy, maka baja desak belum leleh, sehingga dipakai fs'=fs'

$$As' = \frac{Mn_2}{fs'.(d_{diketahui} i - d')} \quad \text{.....(3.83)}$$

$$n = \frac{As'}{A_1}\text{; n bilangan bulat dan } n \geq 2 \text{ batang}$$

$$As = As_1 + As'; \; As' = As_2 \quad \text{.....(3.84)}$$

$$n \geq \frac{As}{A_{1\varnothing}}\text{; n bilangan bulat dan } n \geq 2 \text{ batang}$$

Dimana:

ρ_1 = rasio tulangan yang dipakai dalam perencanaan

As_1 = luas penampang tulangan baja tarik (mm^2)

As_2 = luas penampang tulangan baja tarik tambahan (mm^2)

As' = luas penampang tulangan baja tekan (mm^2)

n' = jumlah tulangan desak yang dipakai (buah)

n = jumlah tulangan tarik yang dipakai (buah)

4. Kontrol kapasitas lentur yang terjadi

$$\rho = \frac{As}{b.d_{diketahui}} \quad \text{.....(3.85)}$$

$$\rho' = \frac{As'}{b.d_{diketahui}} \quad \text{.....(3.86)}$$

tegangan baja desak

$$fs' = 600.\left(1 - \frac{0{,}85.f'c.\beta_1}{(\rho - \rho').fy} \cdot \frac{d'}{d_{diketahui}}\right) \leq fy$$

$$a = \frac{As.fy - As'.fs'}{0{,}85.f'c.b} \quad \text{.....(3.87)}$$

$$Mn = Mn_1 + Mn_2$$

$$= (As.fy - As'.fs').(d - a/2) + (As'.fs').(d - d') \quad \text{.....(3.88)}$$

3.3.3 Perencanaan Geser Balok

Langkah-langkah perencanaan tulangan geser pada balok:

1. Menentukan tegangan geser beton (Vc)

Tegangan geser beton biasa dinyatakan dengan fungsi dari $\sqrt{f'c}$ (dalam satuan Mpa) dan kapasitas beton dalam menerima geser menurut SK SNI T-15-1991-03 adalah sebagai berikut:

$$Vc = \left(\frac{1}{6} \cdot \sqrt{f'c}\right).b.d \text{ (Newton)} \quad \text{.....(3.89)}$$

Sedangkan kekuatan minimal tulangan geser vertikal menahan geser dapat dinyatakan dalam:

$s_{min} = \frac{1}{3}.b.d$ (Newton).....**(3.90)**

2. Menentukan jarak sengkang

Berdasarkan SK SNI T-15-1991-03, adalah sebagai berikut:

- Bila $Vu \leq 0,5.\Phi Vc$.....**(3.91)**

  Geser tidak diperhitungkan .

- Bila $0,5.Vc \leq \frac{Vu}{\Phi} \leq Vc$.....**(3.92)**

  Perlu tulangan geser kecuali untuk struktur sebagai berikut: struktur pelat (lantai, atap, pondasi),balok dengan $h \leq 25$ cm, atau $h \leq 2,5h_f$.

  Tulangan geser dengan jarak:

  $s \leq \frac{Av.fy.d}{Vs_{min}}$.....**(3.93)**

  $\leq \frac{d}{2}$.....**(3.94)**

  ≤ 600 mm

- Bila $Vc < \frac{Vu}{\Phi} \leq (Vc + Vs_{min})$.....**(3.95)**

  Maka perlu tulangan geser, dengan jarak sengkang:

  $s \leq \frac{Av.fy.d}{Vs_{min}}$

  $\leq \frac{d}{2}$

  ≤ 600 mm

- Bila $(Vc + Vs_{min}) < {Vu}/{\Phi} \leq 3.Vc$ **.....(3.96)**

  $s \leq \dfrac{Av.fy.d}{({Vu}/{\Phi} - Vc)}$ **.....(3.97)**

  $\leq {d}/{2}$

  ≤ 600 mm

- Bila $3.Vc < {Vu}/{\Phi} \leq 5.Vc$ **.....(3.98)**

  $s \leq \dfrac{Av.fy.d}{({Vu}/{\Phi} - Vc)}$ **.....(3.97)**

  $\leq {d}/{4}$

  ≤ 300 mm

- Bila ${Vu}/{\Phi} > 5.Vc$**.....(3.99)**

  Maka ukuran balok diperbesar.

Dimana:

Vs_{min} = kuat geser nominal tulangan geser minimal (N)

Vc = tegangan ijin geser beton (Mpa)

Vu = gaya geser berfaktor akibat beban luar (N)

Φ = faktor reduksi kekuatan, sebesar 0,60

Av = luas penampang tulangan geser (mm)

3.3.4 Perencanaan Geser dan Torsi Balok

Langkah-langkah perencanaan geser dan torsi balok adalah sebagai berikut:

1. Identifikasi jenis torsi

- Untuk struktur statis tertentu: torsi keseimbangan.

  Pengaruh torsi diperhitungkan apabila momen torsi trefaktor:

$$Tu \geq \Phi\left(\frac{1}{20}\cdot\sqrt{f'c.}\cdot\Sigma x^2.y\right) \quad \text{.....(3.100)}$$

- Untuk struktur statis tak tentu torsi kompabilitas

  Pengaruh torsi diperhitungakan apabila momen torsi terfaktor:

$$Tu \geq \Phi\left(\frac{1}{9}\cdot\sqrt{f'c.}\cdot\Sigma x^2.y\right) \quad \text{.....(3.101)}$$

2. Menentukan kuat momen torsi nominal (Tn)

Kontrol kuat momen torsi yang terjadi: $Tu \geq \Phi.Tn$

$$Tn = Tc + Ts \quad \text{.....(3.102)}$$

- Bila puntir murni:

$$Tc = \Phi\left(\frac{1}{15}\cdot\sqrt{f'c.}\cdot\Sigma x^2.y\right) \quad \text{.....(3.103)}$$

- Bila puntir murni + geser:

$$Tc = \frac{\left(\frac{1}{15}\cdot\sqrt{f'c.}\cdot\Sigma x^2.y\right)}{\sqrt{1+\left(\frac{0{,}4.Vu}{Ct.Tu}\right)^2}} \quad \text{.....3.105)}$$

$$Ct = \frac{bw.d}{\Sigma x^2.y} \quad \text{.....(3.106)}$$

$$Vc = \left(\frac{1/6 \cdot \sqrt{f'c}.bw.d}{\sqrt{1+(2,5.Ct.Tu/Vu)^2}} \right) \quad \text{.....(3.106)}$$

- Bila puntir murni + geser + gaya aksial:

$$Tc = \frac{\left(\frac{1}{15} \cdot \sqrt{f'c.} \cdot \Sigma x^2.y\right)}{\sqrt{1+\left(\frac{0,4.Vu}{Ct.Tu}\right)^2}} \cdot (1+0,3.Nu/Ag) \quad \text{.....(3.107)}$$

$$Vc = \left(\frac{1/6 \cdot \sqrt{f'c}.bw.d}{\sqrt{1+(2,5.Ct.Tu/Vu)^2}} \right) \cdot (1+0,3.Nu/Ag) \quad \text{.....(3.108)}$$

Jika $Tu/\Phi \leq$ Tc torsi diabaikan

Jika $Tu/\Phi >$ Tc perlu tulangan torsi

Untuk torsi keseimbangan:Ts $= \frac{Tu}{\Phi} - tc$ **.....(3.109)**

Untuk torsi kompabilitas: Ts $= 1/9 \cdot \sqrt{f'c}\Sigma x^2.y.1/3 - Tc$ **(3.110)**

Jika $Tu/\Phi >$ 4Tc tampang diperbesar.

3. Menghitung perbandingan luas tulangan torsi dan jarak sengkang

$$\frac{At}{s} = \frac{Ts}{\alpha t.x_1.y_1.fy} \quad \text{.....(3.111)}$$

$$\alpha t = 1/3 \cdot \left(2 + y_1/x_1\right) \leq 1,5 \quad \text{.....(3.112)}$$

4. Menentukan tulangan geser + torsi

Bila $Vc < {}^{Vu}/_{\Phi}$,maka diperlukan tulangan geser

$$Vs = {}^{Vu}/_{\Phi} - Vc \quad \text{.....(3.113)}$$

Perbandingan antara luas tulangan geser dan jarak

$$\frac{Av}{s} = \frac{Vs}{fy.d} \quad \text{.....(3.114)}$$

Luas total sengkang (tulangan torsi + geser)

$$\frac{Avt}{s} = \frac{2.At}{s} + \frac{Av}{s} \geq \frac{bw.s}{3.fy} \quad \text{.....(3.115)}$$

x_1 = x-2.penutup beton-2.x.$^1/_2$ diameter sengkang

y_1 = y-2.penutup beton-2.x.$^1/_2$ diameter sengkang

5. Menentukan tulangan torsi memanjang

$$Al_1 = 2.At.\left(\frac{x_1 + y_1}{s}\right) \text{atau} \quad \text{.....(3.116)}$$

$$Al_1 = \left(\frac{2,8.x.s}{fy}\left(\frac{Tu}{Tu + Vu/3Ct}\right) - 2.2t\right)\left(\frac{x_1 + y_1}{s}\right) \quad \text{.....(3.117)}$$

Nilai Al_1 diambil yang terbesar, tetapi nilai Al_1 tidak lebih dari:

$$Al_2 = \left(\frac{2,8.x.s}{fy}\left(\frac{Tu}{Tu + Vu/3Ct}\right) - \frac{bw.s}{3.fy}\right)\left(\frac{x_1 + y_1}{s}\right) \quad \text{.....(3.118)}$$

Dimana:

Av = luas sengkang menahan geser (mm^2)

At = luas sengkang menahan torsi (mm^2)

Al = luas tulangan memanjang tambahan pada torsi (mm^2)

6. Kriteria tulangan geser dan torsi

- Jarak tulangan sengkang: $s \leq \left(\frac{x_1 + y_1}{4}\right)$ .....(3.119)

  ≤ 300 mm

- Tulangan memanjang disebar merata ke semua sisi dengan jarak tulangan memanjang ≤ 300 mm
- $\varnothing$ tulangan memanjang ≥ 12 mm
- fy tulangan torsi ≤ 400 MPa
- tulangan torsi harus ada paling tidak sejauh (b + d) dari titik ujung teoritis torsi yang diperlukan.

3.4 Perencanaan Kolom Tunggal

Sebagai bagian dari kerangka bangunan, kolom menempati posisi penting. Kegagalan kolom akan berakibat langsung pada runtuhnya komponen struktur lain yang berhubungan dengannya, atau bahkan merupakan batas runtuh total dari keseluruhan struktur bangunan. Pada umumnya kegagalan/keruntuhan kolom tidak diawali dengan suatu gejala, melainkan bersifat mendadak. Sehingga dalam perencanaan kolom harus diperhitungkan lebih cermat dengan memberi cadangan kekuatan lebih tinggi dari komponen struktur lainnya.

3.4.1 Langkah-langkah Perencanaan Kolom Terhadap Lentur

Perencanaan kolom pendek diawali dengan penentuan dimensi kolom secara lengkap.

PERPUSTAKAAN YOGYAKARTA

Langkah-langkah perencanaan kolom pendek:

1. **Menentukan propertis penampang kolom**
   - Tegangan leleh baja (fy) dalam satuan Mpa
   - Kuat desak beton rencana (f'c) dalam satuan Mpa
   - Panjang (h) dan lebar (b) kolom disesuaikan dengan bentuk konfigurasi struktur gedung.
2. **Menghitung kapasitas kolom pendek**

   Perencanaan kolom pada hakekatnya menentukan dimensi atau bentuk penampang dan baja tulangan yang diperlukan, termasuk jenis pengikat sengkang atau pengikat spiral. Karena rasio tulangan $0{,}01 < \rho g \leq 0{,}08$, maka persamaan kuat desak aksial digunakan untuk perencanaan.

   $Pn = 0{,}85.fc'.(Ag-Ast)+Ast.fy$ **.....(3.120)**

   - Untuk sengkang biasa

     $\Phi Pno = 0{,}8.\Phi.Po = 0{,}8.\Phi.(0{,}85.fc'.(Ag-Ast) + Ast.fy)$ **(3.121)**

     karena $Pu \leq \Phi.Pn$, maka untuk kolom sehingga diperoleh Ag_{perlu}:

     $$Ag_{perlu} = \frac{Pu}{0{,}85.\Phi.(0{,}85.f'c.(1-\rho g) + fy.\rho g} \text{ .....(3.122)}$$

   - Untuk sengkang spiral

     $\Phi Pno = 0{,}8.\Phi.Po = 0{,}8.\Phi.(0{,}85.fc'.(Ag-Ast) + Ast.fy)$ **(3.123)**

karena Pu ≤ Φ.Pn, maka untuk kolom sehingga diperoleh Ag_{perlu}:

$$Ag_{perlu} = \frac{Pu}{0{,}85.\Phi.(0{,}85.f'c.(1-\rho g) + fy.\rho g} \quad \text{.....(3.124)}$$

Sehingga setelah nilai Ag_{perlu} diperoleh, panjang dan lebar sisi kolom persegi atau diameter kolom bulat dapat ditentukan.

$$Ag = b.h = \tfrac{1}{4} \cdot \pi \cdot D^2 \quad \text{.....(3.125)}$$

$$Ast = n.Ag = As + As' \quad \text{.....(3.126)}$$

$$As' = As = \frac{A_{st}}{2} \quad \text{.....(3.127)}$$

$$Po = 0{,}85.fc'.(Ag\text{-}Ast) + Ast.fy \quad \text{.....(3.128)}$$

$$Pno = 0{,}8.Po \text{ untuk sengkang biasa} \quad \text{.....(3.129)}$$

$$Pno = 0{,}85.Po \text{ untuk sengk spiral} \quad \text{.....(3.130)}$$

Dimana:

Po = kuat desak aksial nominal pada eksentrisitas nol (N)

Pu = gaya desak aksial terfaktro pada eksentrisitas tertentu (N)

Pn = kuat desak aksial pada eksentrisitas tertentu (N)

Ast = luas tulangan total pada kolom (mm^2)

As' = luas tulangan tekan pada kolom (mm^2)

As = luas tulangan tarik pada kolom (mm^2)

3. Kapasitas kolom dengan beban eksentris

$$xb = \frac{600}{600+fy} \cdot d \quad \text{.....(3.131)}$$

$$fs' = \frac{x-d'}{x} \quad \text{.....(3.132)}$$

jika fs' > fy → fs' = fy

$$Cc = 0{,}85.fc'.b(xb.\beta_1) \quad \text{.....(3.133)}$$

$$Cs = As'.(fs'-0{,}85.fc') \quad \text{.....(3.134)}$$

Dengan nilai fs' sebagai berikut:

$$fs' = \frac{xb.d'}{xb} \cdot 600 \quad \text{.....(3.135)}$$

fs' > fy → fs' = fy

< fy → fs' = fs'

$$Tb = As.fy \quad \text{.....(3.136)}$$

$$Pnb = Ccb + Csb \quad \text{.....(3.317)}$$

$$Mnb = Ccb\left(\frac{h}{2}-\frac{a}{2}\right)+Csb\left(\frac{h}{2}-d'\right)+Tb\left(d-\frac{h}{2}\right) \quad \text{.....(3.138)}$$

$$eb = \frac{M_{nb}}{P_{nb}} \quad \text{.....(3.139)}$$

4. Tentukan nilai x yang akan digunakan

Jika x> xb; kolom ditinjau terhadap kegagalan akibat desak

Jika x< xb; kolom ditinjau terhadap kegagalan akibat tarik

Dengan $xb = \frac{600}{600+fy} \cdot d$

Syarat kegagalan:

a. runtuh seimbang

$x = xb$

b. runtuh desak

$Mn < Mnb$; $e < eb$; $Pn > Pnb$

c. runtuh tarik

$Mn < Mnb$; $e > eb$; $Pn < Pnb$

Kemudian dihitung

$a = \beta_1.x$ .....(3.140)

$fs' = \frac{x - d'}{x} \cdot 600$ .....(3.141)

jika $fs' > fy \rightarrow fs' = fy$

$Ccb = 0{,}85.fc'.b.(xb.\beta_1)$ .....(3.142)

$Csb = As'.(fs'-0{,}85.fc')$ .....(3.143)

$Tb = As.fy$ .....(3.144)

$Pnb = Ccb + Csb - Tb$ .....(3.145)

$Mnb = Ccb\left(\frac{h}{2} - \frac{a}{2}\right) + Csb\left(\frac{h}{2} - d'\right) + Tb\left(d - \frac{h}{2}\right)$ .....(3.146)

$eb = \frac{M_{nb}}{p_{nb}}$ .....(3.147)

dimana:

Mnb = Kapasitas lentur kolom dalam keadaan seimbang (Nmm)

Pnb = kuat desak aksial kolom dalam keadaan seimbang (N)

eb = eksentrisitas gaya kolom dalam keadaan seimbang(mm)

fs' = tegangan leleh baja tulangan yang terjadi (MPa)

xb = jarak serat terluar beton ke titik tinjau keadaan seimbang

x = jarak serat terluar ke titik tinjau (mm)

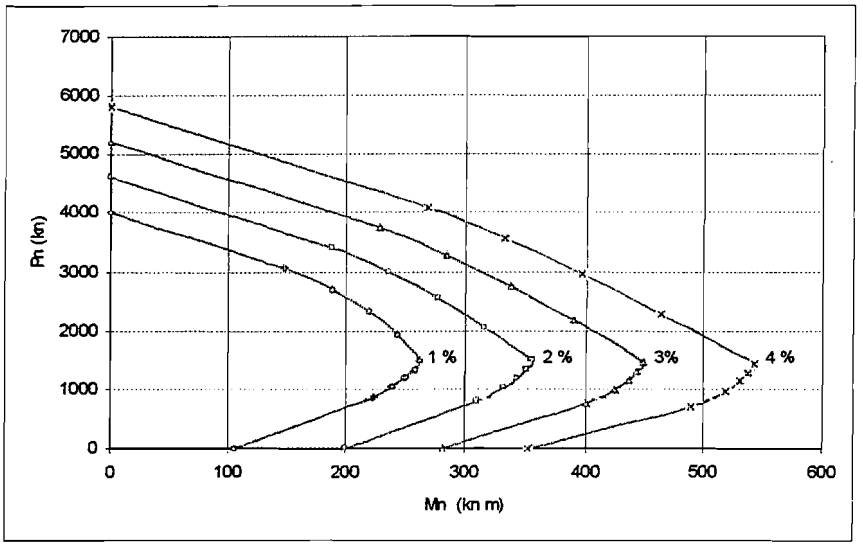
5. **Pada saat Pn = 0; Mn dihitung dengan cara seperti balok bertulangan sebelah.**

$$a = \frac{As.fy}{0,85.fc'.b} \quad \text{.....(3.148)}$$

$$Mn = As.fy.\left(d - \frac{a}{2}\right) \quad \text{.....(3.149)}$$

6. **Gambar diagram momen nominal (Mn) dan gaya desak aksial nominal (Pn) dengan A_{st} = 1%A_g, A_{st} = 2%A_g, A_{st} = 3%A_g, A_{st} = 4%A_g.**

Gambar dibawah adalah diagram interaksi kolom, dimana kuat desak aksial diungkapkan sebagai ΦPn pada sumbu tegak dan kuat momen diungkapkan sebagai ΦPn.e pada sumbu datar. Diagram ini hanya berlaku untuk kolom yang dianalisis saja, dan dapat memberikan gambaran tentang susunnan pasangan kombinasi beban aksial dan kuat momen. Untuk titik-titik yang berada disebelah dalam diagram akan memberikan pasangan beban dan momen ijin, akan tetapi degan menggunakannya perencanaan kolom, menjadi berlebihan *(overdesigned)*. Dan titik-titik yang diluar diagram akan memberikan pasangan beban dan momen yang menghasilkan penulangan yang kurang *(underdesigned)*.



Gambar 3.1 Diagram Momen Nominal-Kuat Desak Aksial Nominal (Mn-Pn)

3.4.2 Kolom Langsing

Suatu kolom digolongkan langsing apabila dimensi atau ukuran penampang lintangnya kecil dibandingkan dengan tinggi bebasnya (tinggi yang tidak ditopang).

Langkah-langkah perencanaan kolom langsing:

1. **Menentukan tingkat kelangsingan kolom**

$$\text{Kelangsingan} = \frac{k.lu}{r} \rightarrow r = \sqrt{\frac{I}{A}}$$

= 0,3.h (untuk kolom tampang persegi)

= 0,25.D (untuk kolom tampang bulat)

Dimana:

k = faktor panjang efektif

lu = panjang bersih kolom

r = radius girasi

I = inersia tampang

A = luas tampang

Nilai kolom ditentukan dengan memperhatikan kondisi kolom:

- Untuk kolom lepas

  Kedua ujung sendi, tidak tergerak lateral k = 1,0

  Kedua ujung sendi k = 0,5

  Satu ujung jepit, lainnya bebas k = 2,0

  Kedua ujung jepit, ada gerak lateral k = 1,0

- Untuk kolom yang merupakan bagian portal

  Sebagai langkah awal adalah menentukan nilai kekakuan relatif (Ψ)

$$\Psi = \frac{\sum\left(EI/l\right)_{kolom}}{\sum\left(EI/l\right)_{balok}} \quad \text{.....(3.150)}$$

  kemudian nilai Ψ diplotkan ke dalam grafik monogram atau grafik *alignment*, sehinga didapat nilai k.

  Batasan- batasan kolom disebut langsing:

$$\frac{kl}{r} \geq 34 - 12.\frac{M_{1b}}{M_{2b}}$$;rangka dengan pengaku lateral

$$\geq 22$$;rangka/portal bergoyang

Dimana: M_{2b} dan M_{2b} adalah momen-momen ujung terfaktor pada kolom yang posisinya berlawanan ($M_{2b} \leq M_{2b}$).

2. Momen rencana

$$M_{rencana} = \delta_b.M_{2b} + \delta s.M_{2s} \quad \text{.....(3.152)}$$

$$\delta_b = \frac{Cm}{1-\frac{P_u}{\Phi P_c}} \geq 1{,}0 \quad \text{.....(3.153)}$$

$$cm = 0{,}6 + 0{,}4.\frac{M_{1b}}{M_{2b}} \geq 0{,}4 \quad \text{.....(3.154)}$$

$$\delta_s = \frac{1}{1-\frac{P_u}{\Phi P_c}} \quad \text{.....(3.155)}$$

$$Pc = \frac{\pi^2.EI}{(kl)^2} (\text{rumus euler}) \quad \text{.....(3.156)}$$

Dalam peraturan SK SNI T-15-1991-03 pasal 3.3.11 ayat 5.2 memberikan ketentuan untuk memperhitungkan EI sebagai berikut:

$$EI = \frac{\frac{1}{5}(E_c.I_g) + E_g.I_{se}}{1+\beta d} \quad \text{.....(3.157)}$$

Bila $A_{st} \leq 3\%.Ag$, maka:

$$EI = \frac{E_c.I_g}{2{,}5.(1+\beta d)} \quad \text{.....(3.158)}$$

Dimana:

δ_b = pembesaran momen dengan pengaku pada pembebanan tetap

δ_s = pembesaran momen tanpa pengaku pada pembebanan sementara

M_{2b} = momen terfaktor terbesar pada ujung komponen tekan akibat pembebanan tetap

M_{2s} = momen terfaktor terbesar disepanjang komponen struktur tekan akibat pembebanan sementara

Pu = beban aksial kolom akibat gaya luar

Φ = 0,65 = faktor reduksi

Pc = beban tekuk

Ec = modulus elastis beton

Es = modulus elastis baja tulangan

Ig = momen inersia beton kotor (penulangan diabaiakan)

Ise = momen inersia terhadap sumbu pusat penampang komponen struktur

$$\beta d = \frac{\text{momen akibat beban mati rencana}}{\text{momen akibat beban total}} \quad \text{.....(3.159)}$$

3. Mencari Mn dan Pn

$$Pn = \frac{Pu}{\Phi} \quad \text{.....(3.160)}$$

$$Mn = \frac{Mu}{\Phi} \quad \text{.....(3.161)}$$

Dari nilai tersebut diatas dimasukkan ke dalam diagram tegangan regangan kolom untuk mendapatkan luas tulangan rencana.

3.5 Pembebanan Portal

3.5.1 Beban mati

Pembebanan mati yang bekerja pada balok lantai terdiri dari:

- **Berat balok sendiri**

  Pada Peraturan Pembebanan Indonesia untuk Gedung 1987 (PBI 1987) menentukan hal-hal sebagai berikut:

  1. Berat sendiri dari bahan-bahan bangunan penting dan dari beberapa komponen gedung yang harus ditinjau di dalam menentukan beban mati dari suatu gedung harus diambil menurut tabel 2.1 PBI 1987 (pasal 2.1 ayat I PBI 1987).
  2. Faktor reduksi beban mati diambil 0,9 sesuai dengan PBI 1987 pasal 2.2.

- **Komponen-komponen gedung lainnya**

  Beban-beban mati komponen gedung di luar berat sendiri ditentukan dalam PBI 1987 tabel 2,13. Beban yang bekerja pada lantai dapat didistribusikan menurut metode amplop sebagai beban balok.

3.5.2 Beban hidup

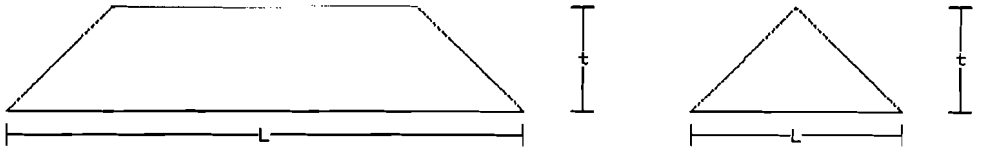
Dalam perencanaan ini beban hidup yang bekerja pada portal hanya terdapat pada lantai gedung. Hal ini disebabkan karena perencanaan atap

menggunakan rangka baja. Pada PBI 1987 pasal 3.1 memuat ketentuan-ketentuan tentang beban hidup pada lantai.

- Beban hidup pada lantai gedung harus diambil menurut Tabel 3.1. dalam beban hidup tersebut sudah termasuk perlengkapan ruang sesuai dengan kegunaan lantai ruang yang bersangkutan, dan juga dinding-dinding pemisah ringan dengan berat tidak lebih dari 100 kg/m^2. Gedung digunakan sebagai ruang kuliah dan kantor dengan beban hidup sebesar 250 kg/m^2.
- Lantai-lantai gedung yang diharapkan akan dipakai untuk berbagai tujuan harus direncanakan terhadap beban hidup terberat yang mungkin terjadi.
- Faktor reduksi untuk beban hidup ditentukan oleh PBI 1987 Tabel 3.3.

3.5.3 Distribusi beban hidup dan mati pada lantai

Pendistribusian beban yang ditransferkan ke balok menggunakan metode amplop sesuai dengan denah bangunan sehingga diperoleh pembebanan yang berupa beban segitiga dan trapesium.



Gambar 3.2 Bentuk Distribusi Beban Pelat pada Balok

3.6 Perencanaan Pondasi

3.6.1 Perhitungan Daya Dukung Tiang Pondasi

Dalam proyek ini digunakan pondasi *bored pile* yang dihitung berdasarkan parameter kekuatan tanah yang diperoleh dari data penyelidikan sondir atau CPT (*Cone Penetration Test*) di lapangan. Adapun metode yang dapat dipakai dalam penghitungan kapasitas dukung tiang adalah sebagai berikut:

1. Metode Vesic (1967)

   Vesic dan Hardiyatmo (2001), menyarankan tahanan ujung tiang persatuan lus (fb) ekivalen dengan tahanan kerucut (qc), atau

   $fb = qc\ (kg/cm^2)$ .....**(3.162)**

   $Qb = Ab.fb\ (ton)$ .....**(3.163)**

   $fs = 2.qf\ (kg/cm^2)$ .....**(3.164)**

   $Qs = As.fs(ton)$ .....**(3.165)**

   $Qu = Qb+Qs\ (ton)$ .....**(3.166)**

   $$Qa = \frac{Qb}{3} + \frac{Qs}{1,5}$$ .....**(3.167)**

   Dimana: Qb = tahanan ujung ultimit tiang

   fs = tahanan gesek pada kulit tiang

   Qs = tahanan gesek ultimit tiang

   Qu = kapasitas ultimit tiang

   Qa = kapasitas ijin tiang bor

2. Metode Meyerhof (1976)

   $$qb = \frac{qc1 + qc2}{2}\ (ton)$$ .....**(3.168)**

- **Gaya-gaya di dalam tiang**

Momen lentur dan gaya geser di dalam tiang akibat momen luar Mo dan beban horizontal Ho dapat dihitung dengan rumus sebagai berikut:

$$\text{Momen} = \text{Ho.l}\left[\left(\frac{E}{L}+\frac{X}{L}\right)-\left(4\frac{E}{L}+3\right)\left(\frac{X}{L}\right)^3+\left(3\frac{E}{L}+2\right)\left(\frac{X}{L}\right)^4\right] \text{.(3.172)}$$

$$\text{Gaya geser} = \text{Ho}\left[1-3\left(4\frac{E}{L}+3\right)\left(\frac{X}{L}\right)^2+4\left(3\frac{E}{L}+2\right)\left(\frac{X}{L}\right)^3\right] \text{.....(3.173)}$$

Dimana:

Mo momen luar akibat beban kerja yang menangkap di ujung atas tiang atau sumuran dalam kgm/m' diameter tiang atau sumuran, bertanda positif bila menyebabkan simpangan dalam arah yang sama dengan arah kerja dari beban horizontal

Ho beban horizontal akibat beban kerja yang menangkap di ujung atas tiang atau sumuran dalam kg/m diameter tiang atau sumuran

L panjang penunjangan tiang atau sumuran dalam m yang diukur ke bawah dari taraf yang terletak 30 cm dibawah ujung atas tiang atau sumuran

E perbandingan Mo/Ro

X kedalaman penampang tiang atau sumuran, dimana momen dan gaya geser dihitung, yang diukur dari permukaan tanah

3. **Tiang pendek dengan ujung atas ditahan terhadap perputaran sudut**

- **Menentukan tegangan tanah lateral izin**

  Bila tidak ditentukan dari penyelidikan tanah, maka R ditentukan dari tabel diatas.

- **Menentukan panjang penunjangan**

  Panjang penunjangan (L) yang diperlukan tiang atau sumuran untuk menyalurkan momen luar Mo dan beban horizontal Ho akibat beban kerja dari ujung atas tiang atau sumuran ke tanah sekillingnya tanpa dilampauinya tegangan tanah lateral yang diizinkan, dapat ditentukan dengan rumus berikut ini:

  $L = 1{,}68\sqrt[3]{\frac{Mo}{R}}$, untuk tiang atau sumuran bulat.....**(3.174)**

  $L = 1{,}44\sqrt[3]{\frac{Mo}{R}}$, untuk tiang persegi.....**(3.175)**

  Apabila panjang tiang atau sumuran yang sesungguhnya lebih besar dari panjang penunjangan yang diperlukan menurut perhitungan, maka tiang atau sumuran tersebut harus direncanakan sebagai tiang panjang.

- **Gaya-gaya dalam di dalam tiang atau sumuran**

  Momen lentur dan gaya geser maksimum di dalam tiang atau sumuran terjadi pada ujung atas sebesar momen luar dan gaya horizontal yang menangkap di ujung atas itu. Momen lentur dan gaya geser sepanjang kedalaman tiang atau sumuran dapat dihitung dengan rumus-rumus sebagai berikut:

$$\text{Momen} = \text{Ho.l}\left[\left(\frac{E}{L}+\frac{X}{L}\right)-\left(4\frac{E}{L}+3\right)\left(\frac{X}{L}\right)^3+\left(3\frac{E}{L}+2\right)\left(\frac{X}{L}\right)^4\right]$$

$$\text{Gaya geser} = \text{Ho}\left[1-3\left(4\frac{E}{L}+3\right)\left(\frac{X}{L}\right)^2+4\left(3\frac{E}{L}+2\right)\left(\frac{X}{L}\right)^3\right]$$

  Dimana:

$$\frac{E}{L} = -\frac{2}{3}$$

  Mo momen luar akibat beban kerja yang menangkap di ujung atas tiang atau sumuran dalam kgm/m' diameter tiang atau sumuran, bertanda positif bila menyebabkan simpangan dalam arah ayng sama dengan arah kerja dari beban horizontal Ho

  Ho beban horizontal akibat beban kerja yang menangkap di ujung atas tiang atau sumuran dalam kg/m diameter tiang atau sumuran

  L panjang penunjangan tiang atau sumuran dalam m yang diukur ke bawah dari taraf yang terletak 30 cm dibawah ujung atas tiang atau sumuran

E perbandingan Mo/Ro

X kedalaman penampang tiang atau sumuran, dimana momen dan gaya geser dihitung, yang diukur dari permukaan tanah

4. Tiang panjang

- **Sifat-sifat tanah**

  Untuk keperluan perencanaan tiang atau sumuran, sifat-sifat tanah berikut harus ditentukan:

  a. Tanah kohesif

     Untuk tanah kohesif harus ditentukan kekuatan kohesi (cu), yang dapat ditentukan dari percobaan triaksial dengan kadar air tetap, percobaan geser langsung atau percobaan vane.

  b. Tanah butiran

     Untuk tanah butiran harus ditentukan berat volume tanah (γ) (kg/m^3), sudut gesekan dalam ($\emptyset$) dan koefisien tekanan pasif (Kp).

     $Kp = tg^2 (45°\alpha+0,5.\emptyset)$ **.....(3.175)**

- **Gaya-gaya dalam di dalam tiang atau sumuran pada tanah kohesif**

  a. Pastikan bahwa panjang tiang atau sumuran sesungguhnya melampaui panjang penunjangan yang diperlukan. Apabila panjang penunjangan lebih kecil dari panjang tiang

sesungguhnya, maka tiang atau sumuran harus direncanakan sebagai tiang atau sumuran pendek.

b. Hitung besarnya kohesi rencana (cr) yang diperlukan dengan mengalikan cu dengan 0,5 (kg/m^2)

c. Hitung besaran Ho, dimana:

Ho beban horizontal akibat beban kerja yang menangkap di ujung atas tiang (kg/m diameter tiang atau sumuran)

D adalah diameter tiang atau sumuran (m).

d. Tentukan nilai $Mo/CR.D^2$, dimana

Mo momen luar akibat beban kerja yang menangkap di ujung atas tiang atau sumuran (kgm/m' diameter tiang atau sumuran)

e. Rencanakan penulangan tiang atau sumuran terhadap Mo dan P dengan cara perencanaan kekuatan batas.

f. Hitung kedalaman dimana momen lentur adalah maksimum (L_1) dan kedalaman dimana momen lentur adalah nol (L_2) menurut rumus berikut:

$L_1 = f + 1{,}5D$ .....**(3.176)**

$L_2 = 2{,}2.L1$ .....**(3.177)**

$$f = \frac{Ho}{9.cr.D} \text{ .....(3.178)}$$

g. Pada tiang-tiang beton bertulang harus diadakan tulangan melintang berupa tulangan spiral, atau sengkang-sengkang rapat.

- **Gaya-gaya dalam di dalam tiang atau sumuran pada tanah butiran**

a. Pastikan dahulu bahwa panjang tiang atau sumuran yang sesungguhnya melampaui panjang penunjangan yang diperlukan. Apabila panjang penunjangan tersebut lebih kecil dari pada panajang tiang atau sumuran yang sesungguhnya, maka tiang atau sumuran tersebut harus direncanakan sebagai tiang pendek.

b. Hitung besaran $Ho/Kp.D^2.\gamma$, dimana

Ho beban horizontal akibat beban kerja yang menangkap diatas tiang atau sumuran (kg/m dimeter tiang atau sumuran),

D diameter tiang atau sumuran (m), dan

γ adalah berat volume tanah (kg/m^3).

c. Tentukan $Mo/ Kp.D^3.\gamma$, dimana:

Mo momen luar akibat beban kerja yang menangkap di ujung atas tiang atau sumuran (kgm/m diameter tiang atau sumuran).

d. Rencanakan penulangan tiang atau sumuran terhadap Mo dan P dengan metode kekuatan batas.

e. Hitung kedalaman dimana momen lentur adalah maksimum (L_1) dan kedalaman dimana momen lentur adalah nol (L_2) menurut rumus berikut:

Untuk ujung atas ditahan terhadap perputaran sudut

$$L_1 = 0{,}82.\sqrt{\frac{Ho}{\gamma.D.Kp}} \quad \text{.....(3.179)}$$

$$L_2 = 2{,}2.\ L_1 \quad \text{.....(3.180)}$$

Untuk ujung atas tidak ditahan terhadap perputaran sudut

$$L_1 = 0{,}22.\sqrt{\frac{Ho}{\gamma.D.Kp}} \quad \text{.....(3.181)}$$

$$L_2 = 2{,}2.L_1 \quad \text{.....(3.182)}$$

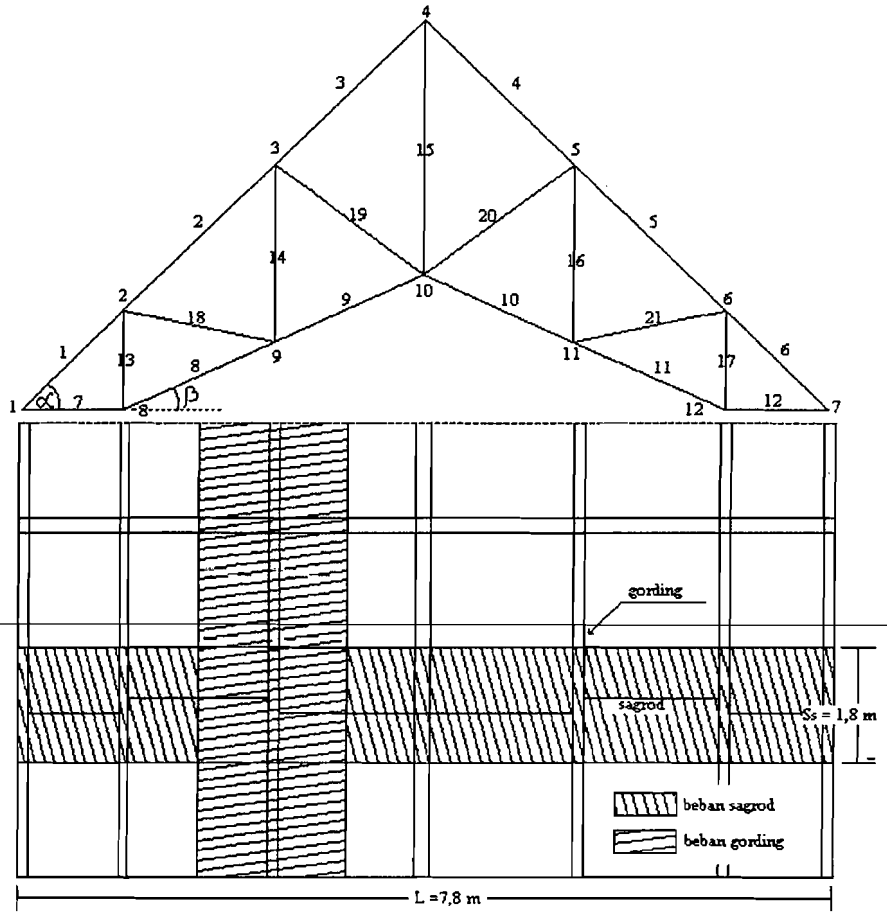
f. Pada tiang-tiang beton bertulang harus diadakan tulangan melintang berupa tulangan spiral, atau sengkang-sengkang rapat.

BAB IV

PERHITUNGAN KONSTRUKSI

4.1 Perencanaan Atap

Pada perencanaan ulang ini digunakan 2 macam rangka atap (kuda-kuda) yang direncanakan dengan menggunakan profil baja, di bawah ini diberikan gambar kuda-kuda 1 (KK-1) beserta perencanaannya, sedangkan untuk KK2, KK3, dan KK4 dapat dilihat pada lampiran.



Gambar 4.1 Pembebanan gording (KK-1)

4.1.1 Perencanaan Gording KK-1

1. Data-data

   Jarak antar kuda-kuda = 3.6 m

   Mutu baja profil fy = 2400 kg/cm²

   Kuat tarik fu = 3700 kg/cm²

   Mutu baut non full drat AISC A_{325x}

   fy = 2050 kg/cm²

   fu = 8250 kg/cm²

   Direncanakan untuk bangunan di darat.

2. Panjang batang

   Berikut ini contoh perencanaan kuda-kuda KK-1 dengan bentang 7,8 m. Adapun panjang tiap batang dapat dilihat pada tabel 4.1

   Tabel 4.1 Panjang batang rangka atap KK-1

No	No Btg	Nama Btg	Panjang Btg (m)
1	1	Batang atas	1.414
2	2	Batang atas	2.051
3	3	Batang atas	2.051
4	4	Batang atas	2.051
5	5	Batang atas	2.051
6	6	Batang atas	1.414
7	7	Batang bawah	1.000
8	8	Batang bawah	1.600
9	9	Batang bawah	1.600

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Dengan:

qc1 = nilai rata-rata qc dari ujung tiang sampai 8d diatas ujung tiang

qc2 = nilai rata-rata qc dari ujung tiang sampai 4d dibawah ujung tiang

$Qb = qb.Ab$ ..... **...(3.169)**

$fs = \frac{qb}{200} (kg/cm^2)$ ..... **(3.170)**

$Qs = As.fs(ton)$ ..... **(3.171)**

$Qu = Qb+Qs$ (ton)

$Qa = \frac{Qb}{3} + \frac{Qs}{1,5}$

Dimana: Qb = tahanan ujung ultimit tiang

fs = tahanan gesek pada kulit tiang

Qs = tahanan gesek ultimit tiang

Qu = kapasitas ultimit tiang

Qa = kapasitas ijin tiang bor

3.6.2 Perencanaan Pondasi Tiang Bor

Langkah-langkah perencanaan pondasi tiang bor adalah sebagai berikut:

1. **Penentuan jenis tiang bor**

   Semua tiang harus direncanakan sebagai tiang pendek sesuai dengan ketentuan yang ada, kecuali apabila panjang tiang atau sumuran yang sesungguhnya lebih besar daripada panjang penunjangan yang diperlukan menurut perhitungan.

2. Tiang pendek dengan ujung atas ditahan terhadap perputaran sudut

- **Menentukan tegangan tanah lateral izin (R)**

  Apabila tidak ditentukan dari hasil penyelidikan tanah, maka tegangan tanah lateral izin dapat ditentukan berdasarkan tabel berikut ini:

Jenis tanah	Tegangan Tanah Lateral Izin $kg/cm^2/m'$ kedalaman
Kerikil bergradasi baik dan padat	6500
Lempung keras padat	6500
Pasir kasar padat	5500
Pasir kasar dan halus padat	5000
Lempung setengah keras	5000
Pasir halus padat	4000
Lanau	3500
Lempung pasiran	3500
Campuran pasir dan lanau padat	3500
Lempung lunak	1500
Campuran pasir organic lunak atau lepas dan lanau atau lumpur	0

- **Menentukan panjang penunjangan**

  Panjang penunjangan (L) yang diperlukan tiang atau sumuran untuk menyalurkan momen luar Mo dan beban horizontal Ho akibat beban kerja dari ujung atas tiang atau sumuran ke tanah sekillingnya tanpa dilampauinya tegangan tanah lateral yang diizinkan, dapat ditentukan dengan gambar dibawah ini. Untuk tampang persegi maka dikalikan dengan 1,75.

  Apabila panjang tiang sesungguhnya lebih besar dari pada panjang penunjangan maka tiang direncanakan sebagai tiang panjang.

Lanjutan tabel 4.1 Panjang batang rangka atap KK-1

10	10	Batang bawah	1.600
11	11	Batang bawah	1.600
12	12	Batang bawah	1.000
13	13	Batang vertikal	1.000
14	14	Batang vertikal	1.774
15	15	Batang vertikal	2.548
16	16	Batang vertikal	1.774
17	17	Batang vertikal	1.000
18	18	Batang diagonal	1.486
19	19	Batang diagonal	1.819
20	20	Batang diagonal	1.819
21	21	Batang diagonal	1.486

Pembebanan gording

Dicoba profil 100 X 50 X 20 X 3,2 (*Ligth Lip Channel*)

A = 7,007 cm^4

W = 5,5 kg/m'

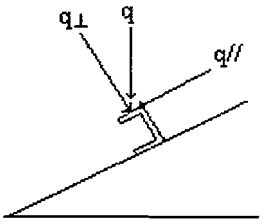
Ix =107 cm^4

Iy = 24,5 cm^4

Sx = 21,3 cm^3

Sy = 7,81 cm^3

Jarak antar gording maks = 2.051 m'



gambar 4.2 Distribusi beban pada gording

A Beban tetap

-Berat penutup atap = 50 × 2,051 = 102,55 kg/m'

-Beban gording = 5,5 kg/m'

q = 108,05kg/m'

$q\perp = q \cos \alpha = 108{,}05 \cos 45° = 76{,}403$ kg/m'

$q// = q \sin \alpha = 108{,}05 \sin 45° = 76{,}403$ kg/m'

B Beban Hidup

Sesuai dengan PPI beban hidup yang diakibatkan oleh orang bekerja sebesar 100 kg.

$p\perp = p \cos \alpha = 100 \cos 45° = 70{,}711$ kg

$p// = p \sin \alpha = 100 \sin 45° = 70{,}711$ kg

C Beban angin

Pada daerah daratan w = 25 kg/cm²

a. Angin tekan (wt) untuk $\alpha < 65°$

diketahui $\alpha = 45°$

$C_1 = 0{,}02\alpha - 0{,}4 = 0{,}02.45° - 0{,}4 = 0{,}5$

Wt = C_1.w.jarak gording = 0,5.25.2,051 =25,6375 kg/m'

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b. Angin hisap (wh)

$C_2 = -0,4$

Wh = C_2.w.jarak gording = -0,4.25.2,051 = -20,51 kg/m'

D Perhitungan momen

1. Akibat beban tetap

q⊥ = 76,403 kg/m, maka $M\perp_{bt}$ = 1/8.q⊥.b^2

= 1/8.76,403.3,6^2

= 123,77286 kgm' = 12377,286 kgcm'

q // = 76,403 kg/m, maka $M//_{bt}$ = 1/8. q//.Ss^2

= 1/8.76,403.1,8^2

= 30,943215 kgm' =3094,3215 kgcm'

2.Akibat beban hidup

P⊥ = 78,711 kg, maka $M\perp_{bh}$ = 1/4.P(.b

= 1/4.70,711.3,6

= 63,6399 kgm' = 6363,99 kgcm'

P// = 78,711 kg, maka M//bh = 1/4. P//.Ss

= 1/4.70,711. 1,8

=31,81995 kgm' = 3181,995 kgcm'

3. Akibat beban angin

Mba = 1/8. w. b^2

= 1/8.25,6375.3,6^2

= 41,53275 kgm' = 4153,275 kgcm'

72

M⊥ =12377,286 +6363,99 = 18741,276 kgcm'

M⊥=12377,286 +4153,275 = 16530,561 kgcm'

M// =3094,322+3181,995 = 6276.317 kgcm'

E Dimensi Gording

Kontrol Tegangan

$$\frac{fbx}{0,66.fy}+\frac{fby}{0,75.fy}<1$$

$$fbx=\frac{M\perp}{Sx}=\frac{18741,276}{21,3}=879,8721127\ kg/cm^2$$

$$fby=\frac{M.//}{Sx}=\frac{6276,317}{7,81}=803,6257362\ kg/cm^2$$

maka, $\frac{879,872}{0,66.2400}+\frac{803,626}{0,75.2400}=1,001933\sim 1.0$ ok!

Kontrol Lendutan

$$\delta\perp=\frac{5}{384}\frac{q\perp.b^4}{E.Ix}+\frac{1}{48}\frac{p\perp.b^3}{E.Ix}=\frac{5}{384}\frac{0,76403.360^4}{2,1.10^6.107}+\frac{1}{48}\frac{0,70711.360^3}{2,1.10^6.107}$$

=0,74669 cm

$$\delta//=\frac{5}{384}\frac{q//.Ss^4}{E.Iy}+\frac{1}{48}\frac{p//.Ss^3}{E.Iy}=\frac{5}{384}\frac{0,76403.180^4}{2,1.10^6.24,5}+\frac{1}{48}\frac{0,70711.180^3}{2,1.10^6.24,5}$$

= 0,20465 cm

cek → $\sqrt{(\delta \perp)^2 + (\delta //)^2} = \sqrt{0{,}74669^2 + 0{,}20465^2} = 0{,}77423 < 1$ → OK

Profil *Light Lip Channel* 100 x 50 x 20 x 3,2 dapat digunakan.

4.1.2 Perencanaan Sagrod dan tierod

a. Beban Sagrod

-berat penutup atap x (½L/cosα) = 50x(½.7,8/cos 45°) = 275,772 kg/m'

-jml gording satu sisi miring x berat gording = 4 x 5,5 = 22,00 kg/m'

→ maka q = 275,772+22,00 = 297,772 kg/m'

-beban hidup akibat pekerja = 100 kg

P// = q.sin α . Ss + p.sin α =297,772.sin 45°.1,8 + 100 sin 45°

= 281,267 kg

b. Dimensi Sagrod

$$A\ sagrod = \frac{P//}{0{,}33.Fu} = \frac{281{,}267}{0{,}33.3700}$$

$$= 0{,}230\ cm^2$$

$$D = \sqrt{\frac{4A}{\pi}} = \sqrt{\frac{4.0{,}230}{\pi}} = 0{,}542\ cm$$

Maka D sagrod = 0,542 + 0,3 = 0,842 cm → 1 cm

c. Dimensi Tierod

Beban tierod T = P//. cos α =281,267.cos 45° =198,886 kg

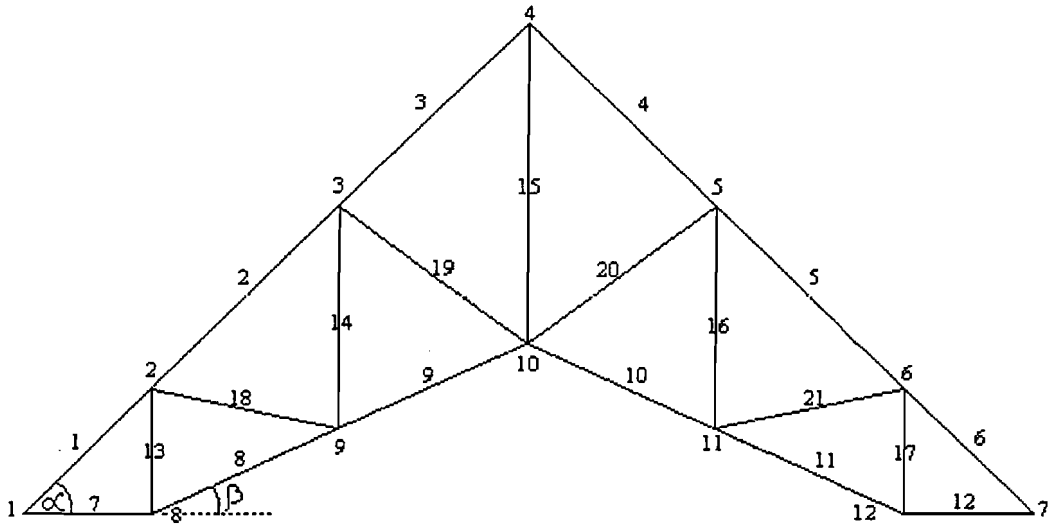
$$A\ tierod = \frac{T}{0{,}33.Fu} = \frac{198{,}886}{0{,}33.3700}$$

$$= 0{,}162888\ cm^2$$

$$D = \sqrt{\frac{4A}{\pi}} = \sqrt{\frac{4.0{,}163}{\pi}} = 0{,}456 \text{ cm}$$

Maka D tierod = 0,456+0,3 = 0,756 cm → 1 cm

4.1.3 Perencanaan Kuda-Kuda KK-1



Gambar 4.3 Rencana kuda-kuda KK-1

L = 7,8 m α = 45° β = 25°

- Pembebanan

Tabel 4.2 Profil dan berat rencana kuda-kuda KK-1

Batang	Profil(mm)	Berat Profil(kg/m)	Panjang(m)	Berat(kg)
B.Atas	2L 50x50x5	7,54	11,032	83,18128
B.Bawah	2L 50x50x5	7,54	8,4	63,336
B.Vertikal	2L 50x50x5	7,54	8,096	61,04384
B.Diagonal	2L 50x50x5	7,54	6,61	49,8394

Wtot= 257,40052 kg

75

- Berat total kuda –kuda = 105,828 kg
- Berat baut = 20%.berat total kuda-kuda

  = 51,4801 kg
- Berat akhir (Σ) = berat total kuda-kuda + berat baut

  = 257,4005 + 51,4801

  = 308,8806 kg
- Panjang rangka kuda-kuda (L)= 7,8 m
- $\frac{\sum}{L} = \frac{308,8806}{7,8} = 39,6001$ kg/m

a. Beban Tetap

-berat gording = 5,5 kg/m'

-berat eternit + penggantung = 18 kg/m'

-berat penutup atap = 50 kg/m'

-beban hidup = 20 kg/m'

-taksiran berat kuda-kuda = 16,281 kg/m'

b. Beban masing-masing join

beban mati

→P1=P7

Berat gording = 5,5x3,6 = 19,800 kg

Berat penutup atap = 50x3,6x0,5.1,414 = 127,26 kg

P1 = P7 = 147,06 kg

76

→P2=P6

Berat gording = 5,5x3,6 = 19,800 kg

Berat penutup atap = 50x3,6x(0,5.1,414+0,5.2,051) = 311,85 kg

P2 = P6 = 331,65 kg

→P3=P5

Berat gording = 5,5x3,6 = 19,800 kg

Berat penutup atap = 50x3,6x(0,5. 2,051 +0,5.2,051) = 369,18 kg

P3 = P5 = 388,98 kg

→P4

Berat gording = 2x5,5x3,6 = 32,472 kg

Berat penutup atap = 50x3,6x(0,5. 2,051 +0,5.2,051) = 369,18 kg

P4 = 408,78 kg

→P1'=P7'

Berat eternit + plafond = 18x3,6x0,5.1 = 32,4 kg

Berat taksiran kuda-kuda = 39,6001x0,5x1 = 19,800 kg

P1 = P7 = 52,200 kg

→P8=P12

Berat eternit + plafond = 18x3,6x(0,5.1+0,5.1,600) = 84,24 kg

Berat taksiran kuda-kuda = 39,6001x(0,5.1+0,5.1,600)= 51,480 kg

P8 = P12 = 135,720 kg

→P9=P11

Berat eternit + plafond = 18x3,6x(0,5.1,6+0,5.1,6) = 103,68 kg

Berat taksiran kuda-kuda = 39,6001x (0,5.1,6+0,5.1,6)= 63,360 kg

P9 = P11 = 167,040 kg

77

→P10

Berat eternit + plafond = 8x3,6x(0,5.1,6+0,5.1,6) =103,68 kg

Berat taksiran kuda-kuda = 39,6001 x(0,5.1,6+0,5.1,6)= 63,360 kg

P10 = 167,040 kg

b.Beban hidup

P = 100 kg (beban pekerja)

Ph2= Ph3= Ph4= Ph5 = 100 kg

c.Beban angin

Muatan angin di darat = 25 kg/m^2

Koefisien angin menurut Peraturan Pembebanan Indonesia untuk Gedung 1983, untuk $\alpha < 65°$

Tekan = $C_1 = 0,02 . \alpha - 0,4$

$= 0,02 . 45 - 0,4 = 0,5$

Tarik = $C_2 = -0,4$

Beban angin yang bekerja

$W_t = C_1 \times w = 0,5 . 25 = 12,5$ kg/m^2

$W_h = C_2 \times w = -0,4 . 25 = 10$ kg/m^2

o Angin tekan

Wt_1 = 12,5.3,6.0,5.1,414 = 31,815 kg

Wt_2 = 12,5.3,6(0,5.1,414+0,5.2,051) = 77,963 kg

Wt_3 = 12,5.3,6(0,5.2,051+0,5.2,051) = 92,295 kg

Wt_4 = 12,5.3,6(0,5.2,051+0,5.2,051) = 92,295 kg

o Angin Hisap

Wh_1 = -10.3,6.0,5.1,414 = -25,452 kg

Wh_2 = -10.3,6(0,5.1,414+0,5.2,051) = -62,370 kg

Wh_3 = -10.3,6(0,5.2,051+0,5.2,051) = -73,836 kg

Wh_4 = -10.3,6(0,5.2,051+0,5.2,051) = -73,836 kg

4.1.4 Perencanaan Dimensi Batang

Sebagai contoh perhitungan dicoba batang no 13 dengan data-data sebagai berikut :

- Gaya tekan = 1696 kg
- Panjang batang = 1 m =100 cm
- Fy = 2400 kg/cm^2
- Fu = 3700 kg/cm^2
- E = 2,1x10^6 Mpa
- K = 1 (sendi-sendi)
- Syarat batang tekan

$\frac{L}{r} \leq 200$ $\qquad$ $r\,min = \frac{KL}{200} = \frac{100}{200} = 0{,}5$

dicoba Profil 2L 40X40X6

A = 4,48 cm^2 $\qquad$ Atotal = 8,96 cm^2

r = 1,19 cm ≥ rmin = 0,5 cm → dipakai r = 1,19 cm

W = 3,52 kg/m

Ix=Iy = 6,33 cm^4

ix=ix = 1,19cm

e = 1,2

x = e + (0,5.tp) = 1,2 +(0,5.1)

= 1,7 cm

Ix gab = 2.Ix

= 2 . 6,33 = 12,66 cm^4

Iy gab = Ix gab+2A.x

= 12,66 + 2.4,48.1,7

= 27,892 cm^4

$$ix\ gab = \sqrt{\frac{Ixgab}{2A}} = \sqrt{\frac{12,66}{2.4,48}}$$

= 1,18867

$$iy\ gab = \sqrt{\frac{Iygab}{2A}} = \sqrt{\frac{27,892}{2.4,48}}$$

= 1,76435

dipakai r = 1,19 cm

syarat

$$\frac{KL}{r} \leq Cc \text{ sehingga } \sqrt{\frac{2.\pi^2.E}{Fy}} = \frac{6400}{\sqrt{Fy}}$$

- $\frac{KL}{r} = \frac{1.100}{1,19} = 84,0336$
- $\sqrt{\frac{2.\pi^2.E}{Fy}} = \frac{6400}{\sqrt{Fy}} = 130,6395$
- $\frac{KL}{r} < Cc$, maka digunakan rumus

$$Fs = \frac{5}{3} + \frac{3.(KL/r)}{8.Cc} - \frac{1.(KL/r)^2}{8.Cc^2} = \frac{5}{3} + \frac{3.(84,0336)}{8.130,6395} - \frac{1.(84,0336)^3}{8.130,6395^3}$$

$= 1,8746$

$$Fa = \frac{fy}{Fs}\left(1 - 0,5\left(\frac{Kl/r}{Cc}\right)^2\right) = \frac{2400}{1,8746}\left(1 - 0,5\left(\frac{84,0336}{130,6395}\right)^2\right)$$

$= 1015,3965 \text{ kg/cm}^2$

Kontrol Kapasitas

P = Fa.Atotal > Pterjadi

= 1015,3965.8,96

= 9097,9527 kg >1696 kg → OK!!!

Profil 2L 40x40x6 dapat digunakan.

Untuk perhitungan dimensi batang yang lain dapat dilihat pada lampiran.

Tabel 4.3 Rekapitulasi perhitungan tegangan batang pada KK-1

no	l(m)	Gaya batang (kg)		Tegangan Terjadi (kg/cm^2)		Tegangan Ijin (kg/cm2)		Ket
		1,25b. tetap	b.smtr	1,25b.tetap	b.smtr	1,25b.tetap	b.smtr	
1	1.414	382.5745	323.29	89.302054	75.4645	1440	1440	OK
2	2.051	-1226.4994	-1001.15	161.80731	132.0778	370.17205	370.172505	OK
3	2.051	-1145.8482	-944.38	151.16731	124.588939	370.17205	370.172505	OK
4	2.051	-1145.8482	-1027.47	151.16731	135.55013	370.17205	370.17205	OK
5	2.051	-1226.4994	-1022.47	161.81	135.55013	370.17205	370.17205	OK
6	1.414	382.5745	317.51	89.302	73.996265	1440	1440	OK
7	1	-272.9027	-253.67	36.00299	33.4656	1020.4378	1020.4678	OK
8	1.6	-313.4411	-537.61	41.351069	70.9248	608.26801	608.26801	OK
9	1.6	941.3341	1031.61	219.73252	240.80532	1440	1440	OK

Lanjutan tabel 4.3 Rekapitulasi perhitungan tagangan batang pada KK-1

10	1.6	941.3341	853.87	219.73	199.31606	1440	1440	OK
11	1.6	-313.4411	-282.12	41.351069	37.203166	608.268	608.268	OK
12	1	-272.9027	-248.45	36.002995	32.777	1020.4378	1020.4378	OK
13	1	-1960.7791	-1617.06	258.67798	213.33245	1020.4378	1020.4378	OK
14	1.774	-569.3464	-449.15	75.111662	59.254617	497.03665	497.03665	OK
15	2.548	1076.369	978.62	251.25327	228.43604	1440	1440	OK
16	1.774	-569.3464	-497.33	75.111662	59.254617	497.03665	497.03665	OK
17	1	-1960.7791	-1507.11	198.82718	213.33245	1020.4378	1020.4378	OK
18	1.486	1167.341	907.75	272.48856	211.89309	1440	1440	OK
19	1.819	-53.8916	-118.02	7.1097	15.567	470.10207	470.10207	OK
20	1.819	-53.8916	-179.89	7.1097	23.73219	470.10207	470.10207	OK
21	1.486	1167.341	980.04	272.48856	228.76751	1440	1440	OK

4.1.5 Perencanaan Pelat Kuda-Kuda

P = 1969,7847 kg

fc' = 25 Mpa

= 250 kg/cm^2

$$\text{Aperlu} = \frac{P}{0{,}33.f'c}$$

$$= \frac{1969{,}7847}{0{,}33.250}$$

= 23,8762 cm^2

Diambil ukuran pelat = 15x20 = 300 cm^2 > Aperlu

$$Q = \frac{P}{BxL}$$

$$= \frac{1969,7847}{15x20}$$

$$= 6,5659 \text{ cm}^2$$

$$x = \frac{20-(5+1+5)}{2} = 4,5 \text{ cm}$$

$M = {}^1/_2.q.x^2 = {}^1/_2.\ 6,5659.4,5^2 = 66,4802$ kg.cm

Syarat

$$0,6.Fy = \frac{M}{{}^1/_6.1.tp^2}$$

$$tp = \sqrt{\frac{10.M}{Fy}} = \sqrt{\frac{10.66,4802}{2400}} = 0,5263 \text{ cm}$$

sehingga digunakan pelat dengan tebal 1,0 cm

dimensi pelat yang digunakan 15x20x1 cm.

4.1.6 Perencanaan Dukungan Arah Lateral

Diketahui

Lb = jarak antar gording = 2,051 m

Lc = jarak antar kuda-kuda = 3,6 m

$$L = \sqrt{Lb^2 + Lc^2}$$

$$= \sqrt{2.051^2 + 3,6^2}$$

$$= 4,14326 \text{ m}$$

Syarat : ${}^L/_r \leq 300$ sehingga

$$rmin \geq \frac{L}{300} = \frac{4{,}14326}{300}$$

$$= 1{,}38109 \text{ cm}$$

Keterangan

- $L \leq 3$ m → dipakai baja tulangan ∅ 12 mm
- $L \geq 3$ m → dipakai baja tulangan ∅ 19 mm
- $3 \text{ m} < L \leq 5$ m → dipakai baja tulangan ∅ 16 mm

→ Sehingga dipakai baja tulangan ∅ 16 mm > r min = 1,381 cm

4.1.7 Perencanaan Sambungan

Perhitungan sambungan dilakukan pada setengah bentang pada tiap joint, dengan tebal pelat sambungan = 1 cm.

Mutu pelat Fy = 2800 kg/cm^2 dan Fu = 4200 kg/cm^2.

Mutu baut non full drat dari AISC A_{325x}

Fy = 2050 kg/cm^2 Fu = 8250 kg/cm^2

Tegangan tumpu yang terjadi pada pelat

Fa tumpu = 1,2xFu pelat = 1,2x4200 = 5040 kg/cm^2

Diameter baut yang dipakai 1/2= 1,27 cm.

P tumpu = tp x Ø baut x Fa tumpu x n

= 1 x 1,27 x 5040 x n

= 6400,8.n kg

P geser = ¼.π.D^2.0,33.Fu baut.2n

= ¼ x 3,14 x (1,27)^2 x 0,33.8250 x 2 x n

= 6897,556.n kg

maka, $n = \frac{P}{6400,8}$ buah

Jarak penggunaan baut 1/2"

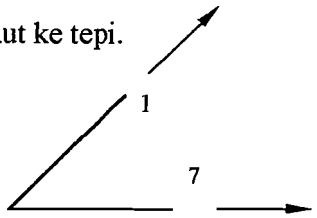
- Jarak baut ke tepi minimal 1,2.D

  Diambil 1,5.D = 1,5.1,27 = 1,905 cm dipakai 2 cm

- Jarak antar baut 2D s/d 7D

  Diambil 3.D = 3.1,27 = 3,81 cm dipakai 4 cm

Profil yang digunakan adalah 2L 40x40x5 dan 2L 40x40x6 dengan lebar masing-masing profil adalah 4 cm, dan memenuhi persyaratan jarak baut ke tepi.



1. Joint (1) dan joint (7)

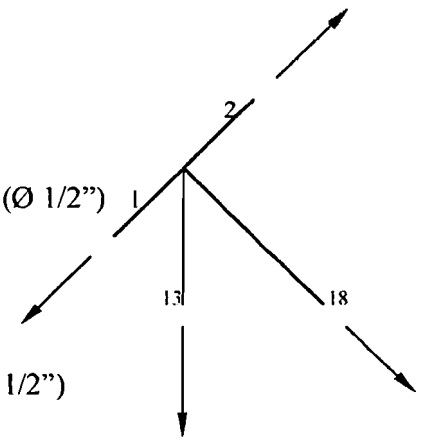
- Batang (1) = batang (6) = 381,032 kg

  $n = \frac{381,032}{6400,8} = 0,05953 \sim$ dipakai 2 buah baut (Ø 1/2")

- Batang (7) = batang (12) = 271,43 kg

  $n = \frac{271,43}{6400,8} = 0,04241 \sim$ dipakai 2 buah baut (Ø 1/2")

2. Joint (2) dan joint (6)



- Batang (1) = batang (6) = 381,032 kg

  $n = \frac{381,032}{6400,8} = 0,05953 \sim$ dipakai 2 buah baut (Ø 1/2")

- Batang (2) = batang (5) = 1063,2 kg

  $n = \frac{1063,2}{6400,8} = 0,1661 \sim$ dipakai 2 buah baut (Ø 1/2")

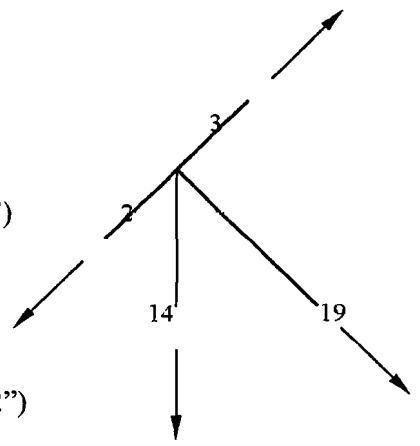
- Batang (13) = batang (17) = 1696 kg

$$n = \frac{1696}{6400,8} = 0,26497 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (18) = batang (21) = 1055,93 kg

$$n = \frac{1055,93}{6400,8} = 0,16497 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

3. Joint (3) dan joint (5)



- Batang (2) = batang (5) = 1063,2 kg

$$n = \frac{1063,2}{6400,8} = 0,1661 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (3) = batang (4) = 1042,2 kg

$$n = \frac{1042,2}{6400,8} = 0,16282 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

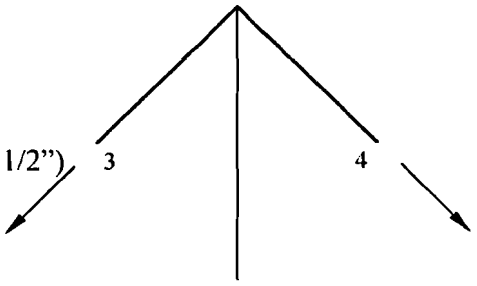
- Batang (14) = batang (16) = 493,63 kg

$$n = \frac{493,63}{6400,8} = 0,07712 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (19) = batang (20) = 87,64 kg

$$n = \frac{87,64}{6400,8} = 0,01369 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

4. Joint (4)



- Batang (3) = batang (4) = 1042,2 kg

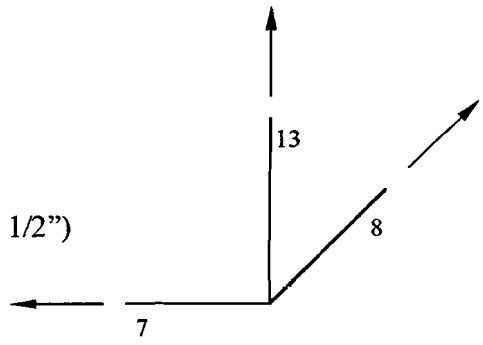
$$n = \frac{1042,2}{6400,8} = 0,16282 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (15) = 929,896 kg



$$n = \frac{929,896}{6400,8} = 0,14528 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

5. Joint (8) dan joint (12)



- Batang (7) = batang (12) = 271,43 kg

$$n = \frac{271,43}{6400,8} = 0,04241 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

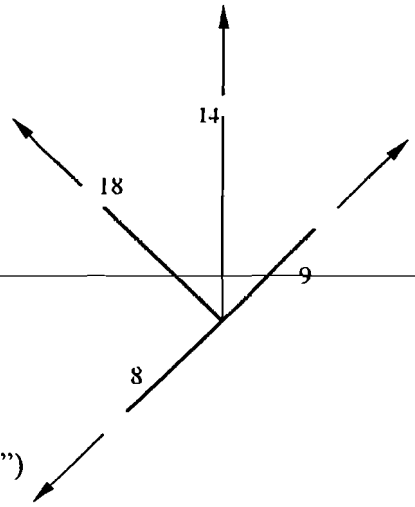
- Batang (8) = batang (11) = 535,11 kg

$$n = \frac{535,11}{6400,8} = 0,0836 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (13) = batang (17) = 1696 kg

$$n = \frac{1696}{6400,8} = 0,26497 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

6. Joint (9) dan joint (11)



- Batang (8) = batang (11) = 310,12 kg

$$n = \frac{310,12}{6400,8} = 0,0836 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (9) = batang (10) = 824,919 kg

$$n = \frac{824,919}{6400,8} = 0,12888 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

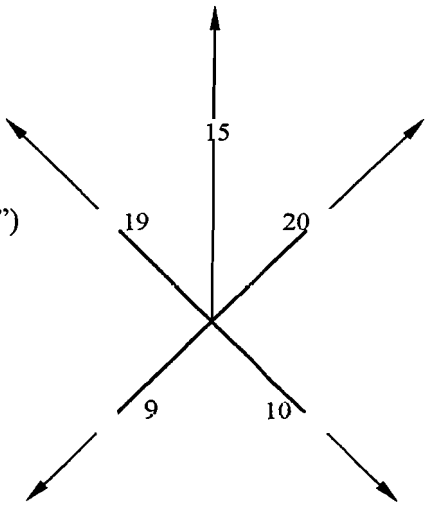
- Batang (18) = batang (21) = 1055,93 kg

$$n = \frac{1055,93}{6400,8} = 0,16497 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (14) = batang (16) = 493,63 kg

$$n = \frac{493,63}{6400,8} = 0,07712 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

7. Joint (10)



- Batang (9) = batang (10) = 824,919 kg

$$n = \frac{824,919}{6400,8} = 0,12888 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (19) = batang (20) = 87,64 kg

$$n = \frac{87,64}{6400,8} = 0,01369 \sim \text{dipakai 2 buah baut (Ø 1/2")}$$

- Batang (15) = 929,896 kg

$$n = \frac{929,896}{6400,8} = 0,14528 \sim \text{dipakai 3 buah baut (Ø 1/2")}$$

Tabel 4.4 Rekapitulasi perhitungan jumlah baut kuda-kuda KK-1

Join	Btg	Profil	Ø (cm)	Gaya Btg (Kg)	Jml Baut
1	1	2L 40x40x5	1.27	382.5745	3
	7	2L 40x40x5	1.27	-272.9027	3
2	1	2L 40x40x5	1.27	382.5745	3
	13	2L 40x40x6	1.27	-1960.779	3
	18	2L 40x40x5	1.27	1167.341	3
	2	2L 40x40x5	1.27	-1226.499	3
3	2	2L 40x40x5	1.27	-1226.499	3
	14	2L 40x40x5	1.27	-569.3464	3
	19	2L 40x40x5	1.27	-118.02	3
	3	2L 40x40x5	1.27	-1145.848	3
4	3	2L 40x40x5	1.27	-1145.848	3
	15	2L 40x40x5	1.27	1076.369	3
	4	2L 40x40x5	1.27	-1145.848	3
5	4	2L 40x40x5	1.27	-1145.848	3
	20	2L 40x40x5	1.27	-179.341	3
	16	2L 40x40x5	1.27	-569.3464	3
	5	2L 40x40x5	1.27	-1226.499	3

Lanjutan tabel 4.4

6	5	2L 40x40x5	1.27	-1246.499	3
	21	2L 40x40x5	1.27	1164.341	3
	17	2L 40x40x6	1.27	-1960.779	3
	6	2L 40x40x5	1.27	381.0317	3
7	6	2L 40x40x5	1.27	381.0317	3
	17	2L 40x40x6	1.27	-1960.779	3
	12	2L 40x40x5	1.27	-272.9027	3
8	7	2L 40x40x5	1.27	-272.1907	3
	13	2L 40x40x6	1.27	-1960.779	3
	8	2L 40x40x5	1.27	-537.61	3
9	8	2L 40x40x5	1.27	-537.61	3
	18	2L 40x40x5	1.27	1167.341	3
	14	2L 40x40x5	1.27	-569.3464	3
	9	2L 40x40x5	1.27	1031.51	3
10	9	2L 40x40x5	1.27	1031.51	3
	19	2L 40x40x5	1.27	-118.02	3
	15	2L 40x40x5	1.27	1076.369	3
	20	2L 40x40x5	1.27	-179.89	3
	10	2L 40x40x5	1.27	941.3341	3
11	10	2L 40x40x5	1.27	941.3341	3
	16	2L 40x40x5	1.27	-569.3464	3
	21	2L 40x40x5	1.27	1167.341	3
	11	2L 40x40x5	1.27	-313.4411	3
12	11	2L 40x40x5	1.27	-313.4411	3
	17	2L 40x40x6	1.27	-1960.779	3
	12	2L 40x40x5	1.27	-272.9027	3

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4.2 Perencanaan Pelat Lantai

4.2.1 Pembebanan Pelat Lantai Datar

- Fungsi bangunan : gelagar rumah sakit (ql) = 3 KN/m^2
- Spesifikasi bahan : mutu beton (f'c) = 25 Mpa

  mutu baja (fy) = 240 Mpa
- Perhitungan beban

  Tebal pelat lantai (h) = 120 cm

  - Beban mati (qD)

    Berat pelat beton = 0,12.24 = 2,88 KN/m^2

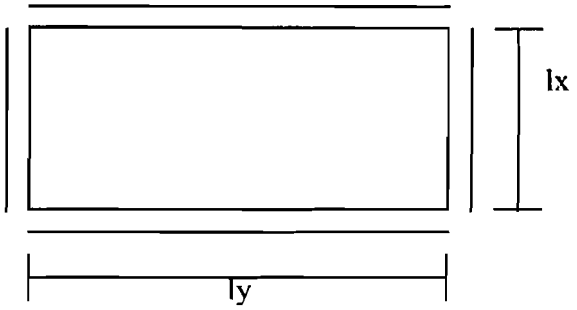
    Berat spesi (3cm) = 0,03.24 = 0,72 KN/m^2

    qD = 3,6 KN/m^2
  - Beban hidup (qL) = 3 KN/m^2

    Qu = 1,2.qD + 1,6.qL

    = 1,2.3,6 + 1,6.3

    = 9,12 KN/m^2
- Menghitung distribusi momen



Ly = 2500 mm dan Lx = 2400 mm

Ly/Lx =1,0417

Mu/ϕ = 2,0172/0,8 =2,52149 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{2,52149.10^6}{1000.95^2} = 0,27939 \text{ Mpa}$$

$$m = \frac{fy}{0,85.f'c} = \frac{240}{0,85.25} = 11,29412$$

$$\rho \text{ perlu} = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{1}{11,29412}\left[1-\sqrt{1-\frac{2.11,29412.0,27939}{240}}\right] =$$

$$= 0,001172$$

$$\rho b = \frac{0,85.f'c.\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0,85.25.0,85}{240}\left[\frac{600}{600+240}\right] =$$

$$= 0,05376$$

ρmaks = 0,75. ρb =0,75.0,05376 = 0,04032

$$\rho min = \frac{1,4}{fy} = \frac{1,4}{240} = 0,00583$$

1,33. ρperlu = 1,33.0,001172 = 0,00156 < ρmin = 0,00583

ρ terpakai = 1,33. ρperlu = 0,00156

As perlu = ρ terpakai.b.d = 0,00156.1000.95 = 148,06722 mm^2

Dipakai tulangan pokok Ø 10 mm dengan A1Ø = 78,53982 mm^2

$$\text{Jarak tulangan : } S \leq \frac{A1Ø}{As\,perlu} = \frac{78,53982.1000}{148,06722} = 530,43351 \text{ mm}$$

Dipakai jarak (S) =200mm

$$As\ ada = \frac{A1Ø.1000}{S\,terpakai} = \frac{78,53982.1000}{200} = 392,69908\ mm^2 > As\ perlu$$

KONTROL KAPASITAS MOMEN (Mn)

$$a = \frac{As\,ada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519\ mm^2$$

Mn = As.fy.(d-a/2) = 392,69908.240(95-4,43519 /2)

= 8,74454 kNm ≥ Mu/ϕ = 2,0172 kN/m →OK!

→dipakai tulangan Lx – Tx $P_{10\text{-}200}$

b. Perencanaan tulangan Ty

H = 120 mm

Pb = 20 mm

Øtul = 10 mm

d = h-pb-1/2. Øtul

= 120-20-1/2.10 = 95 mm

Mu Ty = 1,91214 kN/m

Mu/ϕ = 1,91214/0,8 =2,39017 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{2,39017.10^6}{1000.95^2} = 0,26484\ Mpa$$

$$m = \frac{fy}{0,85.f'c} = \frac{240}{0,85.25} = 11,29412$$

$$\rho\ perlu = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{1}{11,26412}\left[1-\sqrt{1-\frac{2.11,29412..0,26484}{240}}\right] =$$

= 0,001110

$$\rho b = \frac{0,85.f'c..\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0,85.25.0,85}{240}\left[\frac{600}{600+240}\right] =$$

= 0,05376

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$\rho maks = 0,75.\ \rho b = 0,75.0,05376 = 0,040318$

$\rho min = \frac{1,4}{fy} = \frac{1,4}{240} = 0,00583$

$1,33.\ \rho perlu = 1,33.0,001110 = 0,0014769 < \rho min = 0,00583$

ρ terpakai $= 1,33.\ \rho perlu = 0,0014769$

As perlu $= \rho$ terpakai.b.d $= 0,0014769.1000.95 = 140,3064\ mm^2$

Dipakai tulangan pokok Ø 10 mm dengan A1Ø = 78,53982 mm^2

Jarak tulangan : $S \leq \frac{A1Ø}{As\,perlu} = \frac{78,53982.1000}{140,3064} = 559,7736$ mm

Dipakai jarak (S) =200 mm

As ada $= \frac{A1Ø.1000}{S\,terpakai} = \frac{78,53982.1000}{200} = 392,69908\ mm^2 >$ As perlu

KONTROL KAPASITAS MOMEN (Mn)

$a = \frac{As\,ada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519$ mm

Mn = As.fy.(d-a/2) = 392,69908.240(95-4,435189/2)

$= 8,74454\ kNm \geq Mu/\phi = 2,39017\ kN/m \rightarrow$OK!

→dipakai tulangan Ty $P_{10\text{-}200}$

c. Perencanaan tulangan Ly

H = 120 mm

Pb = 20 mm

Øtul = 10 mm

d = h-pb-1,5 Øtul

= 120-20-1,5.10 = 85 mm

Mu Ly = 1,91214 kN/m

Mu/ϕ = 1,91214/0,8 =2,39017 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{2,39017.10^6}{1000.85^2} = 0,33082 \text{ Mpa}$$

$$m = \frac{fy}{0,85.f'c} = \frac{240}{0,85.25} = 11,29412$$

$$\rho \text{ perlu} = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{1}{11,29412}\left[1-\sqrt{1-\frac{2.11,29412..0,33082}{240}}\right] =$$

$$= 0,001389$$

$$\rho b = \frac{0,85.f'c..\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0,85.25.0,85}{240}\left[\frac{600}{600+240}\right] =$$

$$= 0,05376$$

ρmaks = 0,75. ρb =0,75.0,05376 = 0,04032

$$\rho min = \frac{1,4}{fy} = \frac{1,4}{240} = 0,00583$$

1,33. ρperlu = 1,33.0,001389 = 0,001848 < ρmin = 0,00583

ρ terpakai = 1,33. ρperlu = 0,001848

As perlu = ρ terpakai.b.d = 0,001848.10000.85 = 157,06192 mm^2

Dipakai tulangan pokok Ø 10mm dengan A1Ø = 78,53982 mm^2

$$\text{Jarak tulangan : } S \leq \frac{A1Ø}{As\,perlu} = \frac{78,53982.1000}{157,06192} = 500,05639 \text{ mm}$$

Dipakai jarak (S) = 200 mm

$$As\ ada = \frac{A1Ø.1000}{S\,terpakai} = \frac{78,53982.1000}{200} = 392,69908 \text{ mm}^2 > As\ perlu$$

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KONTROL KAPASITAS MOMEN (Mn)

$$a = \frac{As\,ada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519 \text{ mm}$$

Mn = As.fy.(d-a/2) = 392,69908.240(85-4,43519/2)

= 7,80206 kNm ≥ Mu/ϕ = 2,39017 kN/m →OK!

→dipakai tulangan Ly $P_{10\text{-}200}$

4.2.3 Pembebanan Pelat Lantai Miring

- Fungsi bangunan : gelagar rumah sakit (ql) = 3 KN/m^2
- Spesifikasi bahan : mutu beton (f'c) = 25 Mpa

  mutu baja (fy) = 240 Mpa
- Perhitungan beban

  Tebal pelat lantai (h) = 120 cm

  - Beban mati (qD)

    Berat pelat beton = 0,12.24 = 2,88 KN/m^2

    Berat spesi (3cm) = 3.0,24 = 0,72 KN/m^2

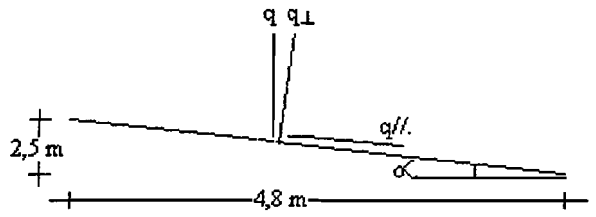
    qD = 3,6 KN/m^2

  - Beban hidup (qL) = 3 KN/m^2

    Qu = 1,2.qD + 1,6.qL

    = 1,2.3,6 + 1,6.3

    = 9,12 KN/m^2



Gambar 4.4 Distribusi beban pada pelat lantai miring

α = arc tg (0,86/4,8)

= 10,157°

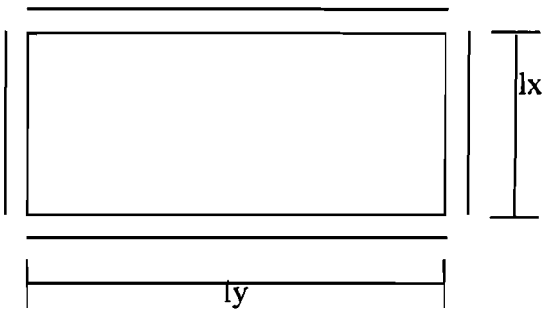
$Qu\perp$ = Qu.cos α = 9,12.cos 10,157°

= 8,977 KN/m^2

Qu// = Qu.sin α = 9,12.sin 10,157°

= 1,608 KN/m^2

- Menghitung distribusi momen



Ly = 4800 mm dan Lx = 2500 mm

Ly/Lx = 1,92

dari tabel 13.3.2 PBI 1997 (tumpuan tepi dianggap jepit elastis)

didapat clx = 61,2 ctx = 61,2

cly = 35 cty = 35

97

Mulx = 0,001.qu⊥.lx^2.clx = 0.001.8,977.2,5^2.61,2 = 3,43373 kNm

Mutx = -0,001.qu⊥.lx^2.ctx = -0.001.8,977.2,5^2.61,2 = -3,43373 kNm

Muly = 0,001.qu⊥.lx^2.cly = 0.001.8,977.2,5^2.35 = 1,96373 kNm

Mutx = -0,001.qu⊥.lx^2.cyx = -0.001.8,977.2,5^2.35 = -1,96373 kNm

4.2.4 Perhitungan Tulangan Pelat Lantai Miring

a. Perencanaan tulangan Lx = Tx

Perkiraan tebal pelat:

$$\beta = \frac{7,2}{3} = 2,4$$

$$hmin = \frac{\ln(0,8 + fy/1500)}{36 + 9.\beta}$$

$$= \frac{\ln(0,8 + fy/1500)}{36 + 9.\beta}$$

$$= \frac{3000.(0,8 + 240/1500)}{36 + 9.2,4} = 50 \text{ mm} = 5 \text{ cm} < 12 \text{ cm, maka}$$

h pakai = 120 mm

Pb = 20 mm

Øtul = 10 mm

d = h-pb-1/2. Øtul

= 120-20-1/2.10 = 95 mm

Mu Lx = 3,43373 kN/m

Mu/ϕ = 3,43373/0,8 = 4,29216 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{4,29216.10^6}{1000.96^2} = 0,47559 \text{ Mpa}$$

$$m = \frac{fy}{0,85.f'c} = \frac{240}{0,85.25} = 11,29412$$

$$\rho \text{ perlu} = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{1}{11,29412}\left[1-\sqrt{1-\frac{2.11,29412.0,47559}{240}}\right] =$$

$$= 0,002004$$

$$\rho b = \frac{0,85.f'c..\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0,85.25.0,85}{240}\left[\frac{600}{600+240}\right] =$$

$$= 0,05376$$

$\rho maks = 0,75.\ \rho b = 0,75.0,05376 = 0,040318$

$$\rho min = \frac{1,4}{fy} = \frac{1,4}{240} = 0,00583$$

$1,33.\ \rho perlu = 1,33.0,002004 = 0,00266 < \rho min = 0,00583$

ρ terpakai $= 1,33.\ \rho perlu = 0,00266$

As perlu $= \rho$ terpakai.b.d $= 0,00266.1000.95 = 253,24248\ mm^2$

Dipakai tulangan pokok Ø 10 mm dengan A1Ø = 78,53982 mm^2

$$\text{Jarak tulangan : } S \leq \frac{A1Ø}{As\ perlu} = \frac{78,53982.1000}{253,24248} = 310,13682 \text{ mm}$$

Dipakai jarak (S) =200 mm

$$\text{As ada} = \frac{A1Ø.1000}{S\ terpakai} = \frac{78,53982.1000}{200} = 392,69908\ mm^2 > \text{As perlu}$$

KONTROL KAPASITAS MOMEN (Mn)

$$a = \frac{Asada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519 \text{ mm}$$

Mn = As.fy.(d-a/2) = 392,69908.240(95-4,43519/2)

= 8,74454 kNm ≥ Mu/ϕ = 4,293 kN/m →OK!

→dipakai tulangan Lx = Tx $P_{10\text{-}200}$

b. Perencanaan tulangan Ty

H = 120 mm

Pb = 20 mm

Øtul = 10 mm

d = h-pb-1/2. Øtul

= 120-20-1/2.10 = 95 mm

Mu Ty = 1,96373 kN/m

Mu/ϕ = 1,96373/0,8 = 2,45457 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{2{,}45457.10^6}{1000.95^2} = 0{,}27199 \text{ Mpa}$$

$$m = \frac{fy}{0{,}85.f'c} = \frac{240}{0{,}85.25} = 11{,}29412$$

$$\rho \text{ perlu} = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{1}{11{,}29412}\left[1-\sqrt{1-\frac{2.11{,}29412.0{,}27199}{240}}\right] =$$

= 0,00114

$$\rho b = \frac{0{,}85.f'c..\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0{,}85.25.0{,}85}{240}\left[\frac{600}{600+240}\right] =$$

= 0,05376

ρmaks = 0,75. ρb =0,75.0,05376 = 0,040318

$$\rho min = \frac{1{,}4}{fy} = \frac{1{,}4}{240} = 0{,}00583$$

1,33. ρperlu = 1,33.0,00114 = 0,001517 < ρmin = 0,00583

ρ terpakai = 1,33. ρperlu = 0,001517

As perlu = ρ terpakai.b.d = 0,001517.1000.95 = 144,11728 mm

Dipakai tulangan pokok Ø 10 mm dengan A1Ø = 78,53982 mm^2

Jarak tulangan : $S \leq \frac{A1Ø}{As\,perlu} = \frac{78,53982.1000}{144,11728} = 544,97155$ mm

Dipakai jarak (S) =200 mm

As ada = $\frac{A1Ø.1000}{S\,terpakai} = \frac{78,53982.1000}{200} = 392,69908\ mm^2 > As\ perlu$

KONTROL KAPASITAS MOMEN (Mn)

a = $\frac{As\,ada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519$ mm

Mn = As.fy.(d-a/2) = 392,69908.240(95-4,43519/2)

= 8,74454 kNm ≥ Mu/ϕ = 2,45467 kN/m →OK!

→dipakai tulangan Ty $P_{10\text{-}200}$

c. Perencanaan tulangan Ly

H = 120 mm

Pb = 20 mm

Øtul = 10 mm

d = h-pb-1,5 Øtul

= 120-20-1,5.10 = 85 mm

Mu Ly = 1,96373 kN/m

Mu/ϕ = 1,96373/0,8 =2,45467 kN/m

$$Rn = \frac{Mu/\phi}{bd^2} = \frac{2,45467.10^6}{1000.85^2} = 0,33975 \text{ Mpa}$$

$$m = \frac{fy}{0,85.f'c} = \frac{240}{0,85.25} = 11,29412$$

$$\rho \text{ perlu} = \frac{1}{m}\left[1-\sqrt{1-\frac{2m.Rn}{fy}}\right] = \frac{I}{11,29412}\left[1-\sqrt{1-\frac{2.11,29412.0,33975}{240}}\right] =$$

$$= 0,001427$$

$$\rho b = \frac{0,85.f'c.\beta}{fy}\left[\frac{600}{600+fy}\right] = \frac{0,85.25.0,85}{240}\left[\frac{600}{600+240}\right] =$$

$$= 0,05376$$

$\rho maks = 0,75.\ \rho b = 0,75.0,05376 = 0,04032$

$$\rho min = \frac{1,4}{fy} = \frac{1,4}{240} = 0,00583$$

$1,33.\ \rho perlu = 1,33.0,001427 = 0,001898 < \rho min = 0,00583$

ρ terpakai $= 1,33.\ \rho perlu = 0,001898$

As perlu $= \rho$ terpakai.b.d $= 0,001898.1000.85 = 161,33496 \text{ mm}^2$

Dipakai tulangan pokok Ø 10 mm dengan A1Ø = 78,53982 mm^2

$$\text{Jarak tulangan : } S \leq \frac{A1Ø}{As\ perlu} = \frac{50,265.1000}{155,76} = 486,81214 \text{ mm}^2$$

Dipakai jarak (S) = 200 mm

$$As\ ada = \frac{A1Ø.1000}{S\ terpakai} = \frac{78,53982.1000}{200} = 392,69908 \text{ mm}^2 > As\ perlu$$

KONTROL KAPASITAS MOMEN (Mn)

$$a = \frac{As\ ada.fy}{0,85.f'c.b} = \frac{392,69908.240}{0,85.25.1000} = 4,43519 \text{ mm}^2$$

Mn = As.fy.(d-a/2) = 392,69908.240(85-4,43519/2)

= 7,80206 kNm ≥ Mu/ϕ = 2,45457 kN/m →OK!

→dipakai tulangan Ly $P_{10\text{-}200}$

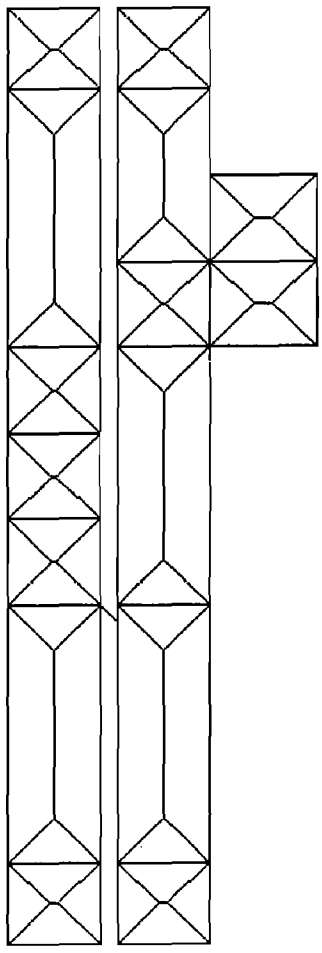
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4.3 Perencanaan Struktur

Pada perencanaan ulang gedung Ramp RSUP Dr Sardjito ini, perencanaan portal dianalisis dengan SAP2000 dengan analisis struktur tiga (3) Dimensi. Adapun distribusi dan pola-pola pembebanan pada struktur bangunan fakultas hukum adalah sebagai berikut :

4.3.1 Distribusi Beban Pelat Pada Balok

- Beban mati (qD) pelat = 3,6 kN/m^2
- Beban hidup (qL) pelat = 3 kN/m^2

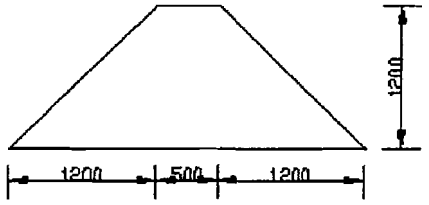


Gambar 4.5 Distribusi beban pelat

K1

4.3.2 Pola Distribusi Pembebanan Balok

1 Tipe 1



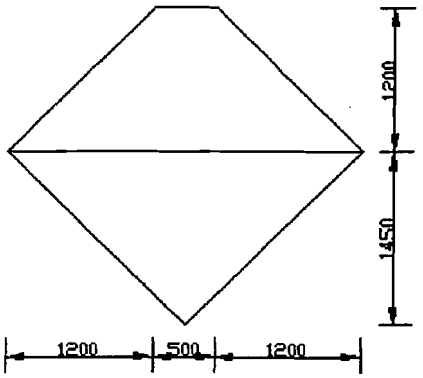
Gambar 4.6 Pola Pembebanan 1

t = 1,2 m

qD = 1,2.3,6 = 4,32 kN/m'

qL = 1,2.3 = 3,6 kN/m'

2 Tipe 2



Gambar 4.7 Pola Pembebanan 1

t_1 = 1,2 m

qD = 1,2.3,6 = 4,32 kN/m'

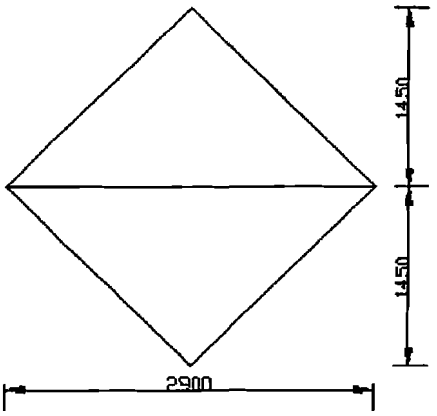
qL = 1,2.3 = 3,6 kN/m'

t_2 = 1,45 m

qD = 1,45.3,6 = 5,23 kN/m'

$qL = 1,45.3 \quad = 4,35$ kN/m'

3 Tipe 3



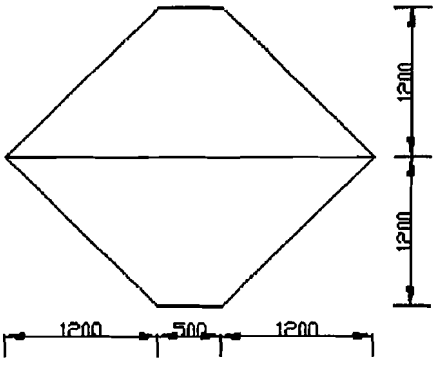
Gambar 4.8 Pola Pembebanan 1

$t_1 = t_2 = 1,45$ m

$qD_1 = qD_2 = 1,45.3,6 \quad = 5,23$ kN/m'

$qL_1 = qL_2 = 1,45.3 \quad = 4,35$ kN/m'

4 Tipe 4



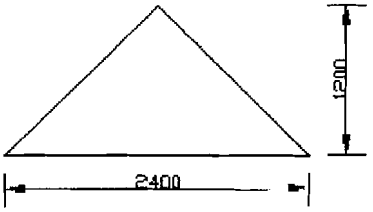
Gambar 4.9 Pola Pembebanan 1

$t_1 = t_2 = 1,2$ m

$qD_1 = qD_2 = 1,2.3,6 = 4,32$ kN/m'

$qL_1 = qL_2 = 1,2.3 \quad = 3,6$ kN/m'

5 Tipe 5



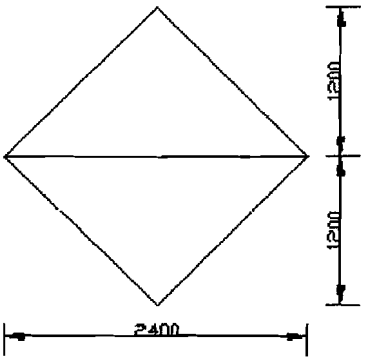
Gambar 4.10 Pola Pembebanan 1

t = 1,2 m

qD = 1,2.3,6 = 4,32 kN/m'

qL = 1,2.3 = 3,6 kN/m'

6 Tipe 6



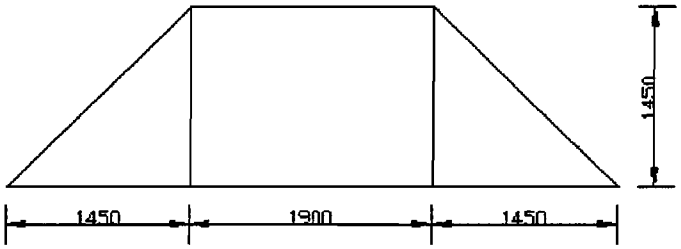
Gambar 4.11 Pola Pembebanan 1

$t_1 - t_2 - 1,2$ m

$qD_1 = qD_2 = 1,2.3,6 = 4,32$ kN/m'

$qL_1 = qL_2 = 1,2.3 = 3,6$ kN/m'

7 Tipe 7



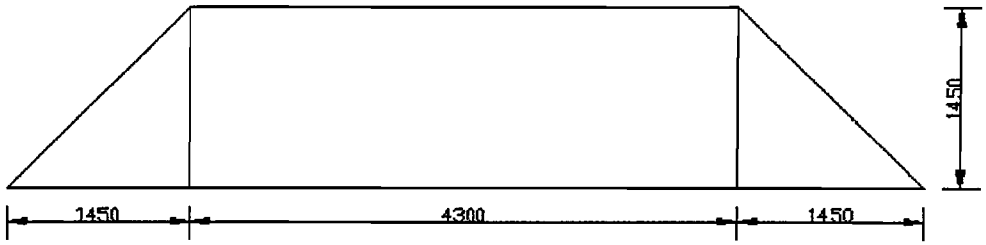
Gambar 4.12 Pola Pembebanan 1

t = 1,45 m

qD = 1,45.3,6 = 5,23 kN/m'

qL = 1,45.3 = 4,35 kN/m'

8 Tipe 8



Gambar 4.13 Pola Pembebanan 1

t = 1,45 m

qD = 1,45.3,6 = 5,23 kN/m'

qL = 1,45.3 = 4,35 kN/m'

4.4 Perencanaan Balok

4.4.1 Perencanaan Tulangan Lentur Balok

Desain tulangan lentur balok

A. Momen Rencana Balok

Momen rencana balok diambil yang terbesar dari hasil perhitungan analisa struktur dengan menggunakan SAP 2000.

Berikut contoh perhitungan balok portal as A bentang 2-4 lantai 4. Untuk perhitungan balok lainnya dapat dilihat pada lampiran .....

B. Perencanaan Tulangan Tumpuan

Mu maks = 137,52 kNm

$$Mn = \frac{Mu}{\Phi} = 171,9 \text{ kNm}$$

d = h-pb-Øsengkang-0,5. Øtul memanjang

= 500-40-10-0,5.19 = 440,5 mm

$$\rho \text{ balance} = \frac{0,85.f'c.\beta}{fy}\left[\frac{600}{600+fy}\right]$$

$$= \frac{0,85.25.0,85}{400}\left[\frac{600}{600+400}\right] = 0,02709$$

ρ maks = 0,75. ρ balance

= 0,75.0,02709 = 0,02032

ρ rencana = 0,5. ρ maks

= 0,5.0,02032 =0,01016

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ρ min $= \frac{1,4}{fy}$

$= \frac{1,4}{400} = 0,0035$

m $= \frac{fy}{0,85.f'c}$

$= \frac{400}{0,85.25} = 18,82353$

Rn $= \rho.fy\left(1-\frac{1}{2}.\rho.m\right)$

$= 0,010156.400\left(1-\frac{1}{2}.0,01016.18,8235\right)$

$= 3,67544$ Mpa

$b.d_{perlu}^2 = \frac{Mn}{Rn}$

$d_{perlu} = \sqrt{\frac{Mn.10^6}{Rn.b}} = \sqrt{\frac{171,9.10^6}{3,67544.300}}$

$= 394,8415$ mm < d ada = 440,5 mm

→ maka digunakan tulangan sebelah

Rn baru $= \frac{Mu/\Phi}{b.d^2}$

$= \frac{(137,52/0,8).10^6}{300.440,5^2} = 2,953$ Mpa

ρ baru $= \frac{2,953}{3,67544} \cdot 0,01016 = 0,00816$

As perlu = ρ baru.b.d

= 0,00816.300.440,5

= 1134,752mm^2

digunakan D19, maka A1Ø = 283,6429 mm^2

jumlah tulangan terpakai = $\frac{1134,752}{283,6429}$ = 4,00064 batang

→ maka digunakan 4D19.

C. Perencanaan Tulangan Lapangan

Mu maks = 78,28/ kNm

Mn = $\frac{Mu}{\Phi}$ = 97,85 kNm

d = h-pb-Øsengkang-0,5. Øtul memanjang

= 500-40-10-0,5.19 = 440,5 mm

ρ balance = $\frac{0,85.f'c.\beta}{fy}\left[\frac{600}{600+fy}\right]$

= $\frac{0,85.25.0,85}{400}\left[\frac{600}{600+400}\right]$ = 0,02709

ρ maks = 0,75. ρ balance

= 0,75.0,02709 = 0,02032

ρ rencana = 0,5. ρ maks

= 0,5.0,02032 = 0,01016

ρ min $= \frac{1,4}{fy}$

$= \frac{1,4}{400} = 0,0035$

m $= \frac{fy}{0,85.f'c}$

$= \frac{400}{0,85.25} = 18,82353$

Rn $= \rho.fy\left(1-\frac{1}{2}.\rho.m\right)$

$= 0,01016.400\left(1-\frac{1}{2}.0,01016.18,82353\right)$

$= 3,67544$ Mpa

$b.d_{perlu}^2 = \frac{Mn}{Rn}$

$d_{perlu} = \sqrt{\frac{Mn.10^6}{Rn.b}} = \sqrt{\frac{97,85.10^6}{3,67544.300}}$

$= 297,8964$ mm < d ada = 440,5 mm

→ maka digunakan tulangan sebelah

Rn baru $= \frac{Mu/\Phi}{b.d^2}$

$= \frac{(78,28/0,8).10^6}{300.440,5^2} = 1,68092$ Mpa

ρ baru $= \frac{1,68092}{3,67544} \cdot 0,01016 = 0,00465$

As perlu = ρ baru.b.d

= 0,00465.300.440,5

= 614,0537 mm^2

digunakan D19, maka A1Ø = 283,6429 mm^2

jumlah tulangan terpakai = $\frac{614,0537}{283,6429}$ = 2,16488 batang

→ maka digunakan 3D19.

MOMEN NOMINAL AKTUAL BALOK NEGATIF

ρ aktual = $\frac{1134,5716}{300.500}$

= 0,00756

Rn = ρ.fy.(1-0.5. ρm)

= 0,00756.400.(1-0,5.0,00756. 18,8235)

= 2,8088 Mpa

$Mnak^-$ = 2,8088.300.500^2.10^{-6}

= 210,66 KNm.

MOMEN NOMINAL AKTUAL BALOK POSITIF

ρ aktual = $\frac{850,6429}{300.500}$

= 0,00567

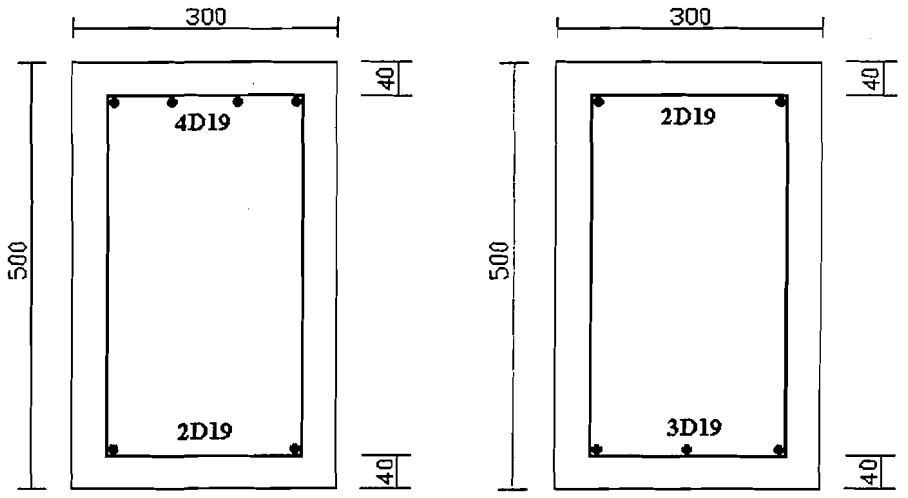
Rn = ρ.fy.(1-0.5. ρm)

= 0,00567.400.(1-0,5.0,00567. 18,8235)

= 2,14696 Mpa

Mnak$^-$ = 2,14696.300.500^2.10^{-6}

= 161,022 KNm.



Gambar 4.14 Penulangan balok As A/2-4 lantai 4

4.4.2 Perencanaan Tulangan Geser

Vu = 107,5 kN

$$Vc = \frac{1}{6}\cdot\sqrt{fc'}\cdot bw\cdot d = \frac{1}{6}\cdot\sqrt{25}\cdot 300\cdot 440{,}5$$

= 110625 N = 110,625 kN

θVc – 0,6.110,625 = 66,075 kN

0,5.θ.Vc= 0,5.66,075 = 33,0375 kN

$$Vs_1 = \frac{1}{6}\cdot\sqrt{fc'}\cdot bw\cdot d = \frac{1}{6}\cdot\sqrt{25}\cdot 300\cdot 440{,}5$$

= 22025 N = 220,25 kN

$Vs_2 = \frac{2}{3} \cdot \sqrt{fc'} \cdot bw \cdot d = \frac{2}{3} \cdot \sqrt{25} \cdot 300 \cdot 440,5$

$= 440500$ KN $= 440,5$ kN

$\theta(Vc+Vs_1) = 0,6(110,125+220,25) = 198,225$ kN

$\theta(Vc+Vs_2) = 0,6(110,125+440,5) = 330,375$ kN

gaya geser rencana pada jarak d dari perletakan

Vu kritis $= \frac{3,6-(0,4405+0,15)}{3,6} .107,5$

$= 89,867$ kN

→ $\theta Vc = 66,075$ kN < Vu kritis $= 89,867$ kN < $\theta(Vc+Vs_1) = 198,225$ kN

Berarti ukuran penampang dapat digunakan tetapi dibutuhkan tulangan geser.

Titik dimana $Vu = \theta Vc = 66,075$ kN

x1 $= (66,075/107,5)3600$

$= 2212,7442$ mm

Titik dimana $Vu = 0,5.\theta Vc = 33,0375$ kN

x1 $= (33,0375/107,5)3600$

$= 1106,3721$ mm

- Daerah 1

  $\theta.Vs = Vu-\theta.Vc$

  $= 198,225 - 66,075 = 132,15$ KN

  $Vs = 132,15/0,6 = 220,25$ kN

$$s = \frac{Av.fy.d}{Vs} = \frac{(2.0{,}25.\pi.8^2).240.442{,}5}{220{,}25.10^3}$$

$$= 75{,}4286 \text{ mm}$$

$$s = \frac{d}{4} = \frac{442{,}5}{4}$$

$$= 110{,}625 \text{ mm}$$

$$s = 600 \text{ mm}$$

$$s \text{ pakai} = 70 \text{ mm}$$

→ P8-70

- Daerah 2

dipakai sengkang geser minimum

$$s = \frac{3.Av.fy}{b} = \frac{3.(2.0{,}25.\pi.8^2).240}{300.}$$

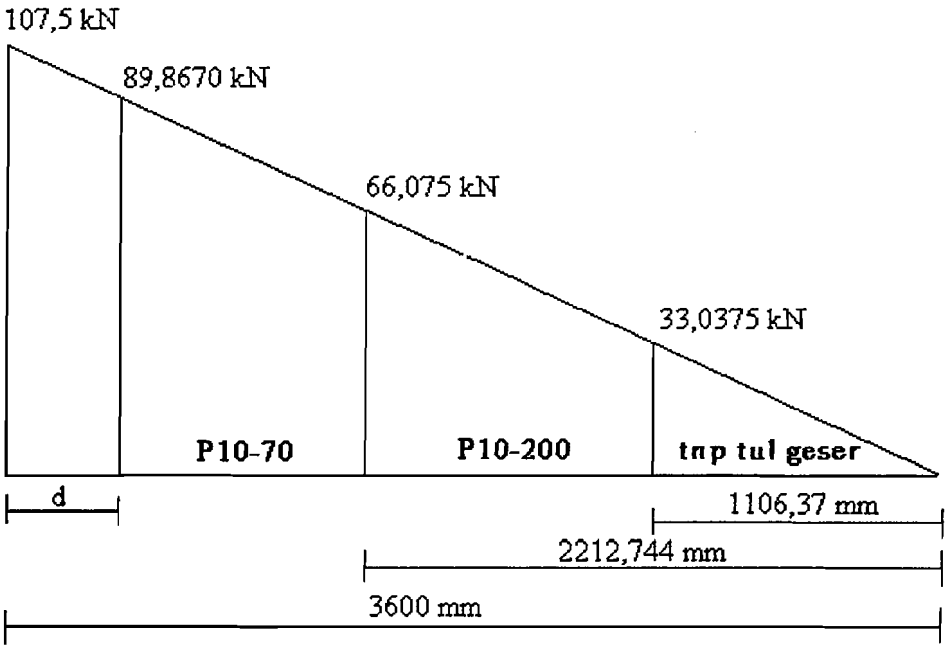
$$= 377{,}1429 \text{ mm}$$

$$s = \frac{d}{2} = \frac{442{,}5}{2}$$

$$= 221{,}25 \text{ mm}$$

$$s \text{ pakai} = 220 \text{ mm}$$

→P8-200



Gamber 4.15 Diagram tulangan geser balok as A / 2-4 lantai 4

4.5 Perencanaan Kolom

4.5.1 Perhitungan Grafik Mn-Pn

Berikut ini adalah contoh perhitungan Mn-Pn untuk Ast = 1% Ag.

1. Batang Desak Aksial

$Ag = b.h$

$= 400.400 = 160000\ mm^2$

$Ast = 1\%.Ag$

$= 1\%.160000 = 1600\ mm^2$

$Po = (0{,}85.fc'.(Ag-Ast) + Ast.fy).10^{-3}$

$= (0{,}85.25.(160000-1600) + 1600.400).\ 10^{-3}$

$= 4006\ KN$

2. Kondisi seimbang

$$xb = \frac{600}{600 + fy}.d$$

$$= \frac{600}{600 + 400}.350 = 210\ mm$$

$$fs' = \frac{xb - d'}{xb}.600$$

$$= \frac{210 - 50}{210}.600 = 457\ Mpa > fy = 400\ Mpa$$

$\rightarrow$ fs' pakai = 400 Mpa

$ab = \beta 1.xb$

$= 0{,}85.210 = 178{,}5\ mm$

$Cc = 0{,}85.fc'.b.ab.10^{-3}$

$= 0{,}85.25.400.178{,}5.10^{-3} = 1517{,}250\ KN$

$As = As' = \frac{1}{2}.Ast = \frac{1}{2}.1600 = 800\ mm^2$

$Cs = As'.(fs'-0{,}85.fc').10^{-3}$

$= 800.(400-0{,}85.25).10^{-3} = 303\ KN$

$Ts = As.fy.10^{-3}$

$= 800.400.10^{-3} = 320KN$

Mnb = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

= 1517,250.(400/2-178,5/2) + 303.(400/2-50) + 320.(350-400/2)

= 261,485 KNm

Pnb = Cc + Cs – Ts

= 1517,250 + 303 – 320 = 1500,250 KN

$eb = \frac{Mnb}{Pnb} = \frac{261,485}{1500,250} = 0,1743$ m

3. Kondisi Patah Desak

- x = 180%.xb

  = 1,8.210 = 378 mm

  $fs' = \frac{x - d'}{x}.600$

  $= \frac{378 - 50}{378}.600 = 520,635$ Mpa > fy = 400 Mpa

  →fs' pakai = 400 Mpa

  $fs = \frac{d - x}{x} \cdot 600$

  $= \frac{350 - 378}{378} \cdot 600 = -44,444$ Mpa < fy = 400 Mpa

  →fs pakai = -44,444 MPa

  a = β1.x

  = 0,85.378 = 321,300 mm

  Cc = 0,85.fc'.b.a.10^{-3}

  = 0,85.400.400.321,300.10^{-3} = 2731,050 KN

  Cs = As'.(fs'-0,85.fc').10^{-3}

  = 800.(400-0,85.25).10^{-3} = 303 KN

  Ts = As.fs.10^{-3}

  = 800.-44,444.10^{-3} = -35,556 KN

  Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

  = 2731,05.(400/2-321,3/2) + 303.(400/2-50) – 35,556.(350-400/2)

  = 147,583 KNm

Pn = Cc + Cs – Ts

= 2731,050 + 303 + 35,556 = 3069,606 kn

$e = \frac{Mn}{Pn} = \frac{147,583}{3069,606} = 0,048$ m

- x = 160%.xb

  = 1,6.210 = 336 mm

  $fs' = \frac{b - d'}{b}.600$

  $= \frac{336 - 50}{336}.600 = 510,714$ Mpa > fy = 400 Mpa

  →fs' pakai = 400 Mpa

  $fs = \frac{d - x}{x} \cdot 600$

  $= \frac{350 - 336}{350} \cdot 600 = 25$ Mpa < fy = 400 Mpa

  →fs pakai = 25 MPa

  a = β1.x

  = 0,85.336 = 285,6 mm

  $Cc = 0,85.fc'.b.a.10^{-3}$

  $= 0,85.25.400.285,6.10^{-3} = 2427,6$ KN

  $Cs = As'.(fs'-0,85.fc').10^{-3}$

  $= 800.(400-0,85.25).10^{-3} = 303$ KN

  $Ts = As.fs.10^{-3}$

  $= 800.25.10^{-3} = 20$ KN

  Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

  = 2427,6.(400/2-285,6/2) + 303.(400/2-50) + 20.(350-400/2)

  = 187,309 KNm

  Pn = Cc + Cs – Ts

  = 2427,6 + 303 – 20 = 2710,6 KN

$$e = \frac{Mn}{Pn} = \frac{187,309}{2710,6} = 0,069 \text{ m}$$

- $x = 140\%.xb$

  $= 1,4.210 = 294$ mm

  $fs' = \frac{x - d'}{x}.600$

  $= \frac{294 - 50}{294}.600 = 497,959$ Mpa > fy = 400 Mpa

  →fs' pakai = 400 Mpa

  $fs = \frac{d - x}{x} \cdot 600$

  $= \frac{350 - 294}{350} \cdot 600 = 114,286$ Mpa < fy = 400 Mpa

  →fs pakai = 114,286 MPa

  $a = \beta 1.x$

  $= 0,85.294 = 249,9$ mm

  $Cc = 0,85.fc'.b.a.10^{-3}$

  $= 0,85.25.400.249,9.10^{-3} = 2124,15$ KN

  $Cs = As'.(fs'-0,85.fc').10^{-3}$

  $= 800.(400 - 0,85.25).10^{-3} = 303$ KN

  $Ts = As.fs.10^{-3}$

  $= 800.114,286.10^{-3} = 91,429$ KN

  $Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)$

  $= 2124,15.(400/2-249,9/2) + 303.(400/2-50) + 91,429.(350-400/2)$

  $= 218,582$ KNm

  $Pn = Cc + Cs - Ts$

  $= 2124,15 + 303 - 91,429 = 2335,721$ KN

  $e = \frac{Mn}{Pn} = \frac{218,582}{2335,721} = 0,094$ m

- x = 120%.xb

  = 1,2.210 = 252 mm

  $fs' = \frac{x-d'}{x}.600$

  $= \frac{252-50}{252}.600 = 480,952$ Mpa > fy = 400 Mpa

  →fs' pakai = 400 Mpa

  $fs = \frac{d-x}{x}\cdot 600$

  $= \frac{350-252}{252}\cdot 600 = 233,333$ Mpa < fy = 400 Mpa

  →fs pakai = 233,333 MPa

  a = β1.x

  = 0,85.252 = 214,2mm

  $Cc = 0,85.fc'.b.a.10^{-3}$

  $= 0,85.25.400.214,2.10^{-3} = 1820,7$ KN

  $Cs = As'.(fs'-0,85.fc').10^{-3}$

  $= 800.(400-0,85.25).10^{-3} = 303$ KN

  $Ts = As.fs.10^{-3}$

  $= 800.233,333.10^{-3} = 186,667$ KN

  Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

  = 1820,7.(400/2-214,2/2) + 303.(400/2-50) + 186,667.(350-400/2)

  = 242,593 KNm

  Pn = Cc + Cs – Ts

  = 1820,7 + 303 – 186,667 = 1937,033 KN

  $e = \frac{Mn}{Pn} = \frac{242,593}{1937,033} = 0,125$ m

4. Patah Tarik

- x = 90%.xb

  = 0,9.210 = 189 mm

$$fs' = \frac{x - d'}{x}.600$$

$$= \frac{189 - 50}{189}.600 = 441{,}27 \text{ Mpa} > fy = 400 \text{ Mpa}$$

→fs' pakai = 400 Mpa

$$fs = \frac{d - x}{x} \cdot 600$$

$$= \frac{350 - 189}{350} \cdot 600 = 511 \text{ Mpa} > fy = 400 \text{ Mpa}$$

→fs pakai = 400 MPa

$a = \beta 1.x$

$= 0{,}85.189 = 160{,}65$ mm

$Cc = 0{,}85.fc'.b.a.10^{-3}$

$= 0{,}85.25.400.160{,}64.10^{-3} = 1365{,}525$ KN

$Cs = As'.(fs'-0{,}85.fc').10^{-3}$

$= 800.(400-0{,}85.25).10^{-3} = 303$ KN

$Ts = As.fs.10^{-3}$

$= 800.400.10^{-3} = 320$ KN

$Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)$

$= 136{,}525.(400/2-160{,}65/2) + 303.(400/2-50) + 320.(350-400/2)$

$= 256{,}869$ KNm

$Pn = Cc + Cs - Ts$

$= 1365{,}525 + 303 - 320 = 1348{,}525$ KN

$$e = \frac{Mn}{Pn} = \frac{256{,}869}{1348{,}525} = 0{,}190 \text{ m}$$

- $x = 80\%.xb$

  $= 0{,}8.210 = 168$ mm

$fs' = \frac{x - d'}{x}.600$

$= \frac{168 - 50}{168}.600 = 421{,}429$ Mpa > fy = 400 Mpa

→fs' pakai = 400 Mpa

$fs = \frac{d - x}{x} \cdot 600$

$= \frac{350 - 168}{168} \cdot 600 = 650$ Mpa > fy = 400 Mpa

→fs pakai = 400 MPa

$a = \beta 1.x$

$= 0{,}85.168 = 142{,}8$ mm

$Cc = 0{,}85.fc'.b.a.10^{-3}$

$= 0{,}85.25.400.142{,}8.10^{-3} = 1213{,}8$ KN

$Cs = As'.(fs'-0{,}85.fc').10^{-3}$

$= 800.(400-0{,}85.25).10^{-3} = 303$ KN

$Ts = As.fs.10^{-3}$

$= 800.400.\ 10^{-3} = 320$ KN

Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

= 1213,8.(400/2-142,8/2) + 303.(400/2-50) + 320.(350-400/2)

= 249,545 KNm

Pn = Cc + Cs – Ts

= 1213,8 + 303 – 320 = 1196,8 KN

$e = \frac{Mn}{Pn} = \frac{249{,}545}{1196{,}8} = 0{,}208$ m

- $x = 70\%.xb$

$= 0{,}7.210 = 147$ mm

$fs' = \frac{x - d'}{x}.600$

$= \frac{147 - 50}{147}.600 = 395{,}918$ Mpa < fy = 400 Mpa

→fs' pakai = 395,918 Mpa

$fs = \frac{d-x}{x} \cdot 600$

$= \frac{350-147}{147} \cdot 600 = 828,571$ Mpa > fy = 400 Mpa

→fs pkai = 400 MPa

$a = \beta 1.x$

$= 0,85.147 = 124,950$ mm

$Cc = 0,85.fc'.b.a.10^{-3}$

$= 0,85.25.400.124,95.10^{-3} = 1062,075$ KN

$Cs = As'.(fs'-0,85.fc').10^{-3}$

$= 800.(395,918 - 0,85.25).10^{-3} = 299,735$ KN

$Ts = As.fs.10^{-3}$

$= 800.400.10^{-3} = 320$ KN

Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)

= 1062,075.(400/2-124,95/2) + 299,735.(400/2-50) + 320.(350-400/2)

= 239,022 KNm

Pn = Cc + Cs – Ts

= 1062,075 + 299,735 – 320 = 1041,810 KN

$e = \frac{Mn}{Pn} = \frac{239,022}{1041,810} = 0,229$ m

- x = 60%.xb

= 0,6.210 = 126 mm

$fs' = \frac{x-d'}{x}.600$

$= \frac{126-50}{126}.600 = 361,905$ Mpa < fy = 400 Mpa

→fs' pakai = 361,905 Mpa

$$fs = \frac{d-x}{x} \cdot 600$$

$$= \frac{350-126}{126} \cdot 600 = 1066{,}667 \text{ Mpa} > fy = 400 \text{ Mpa}$$

→fs pakai = 400 MPa

$a = \beta 1.x$

$= 0{,}85.126 = 107{,}1$ mm

$Cc = 0{,}85.fc'.b.a.10^{-3}$

$= 0{,}85.25.400.107{,}1.10^{-3} = 910{,}35$ KN

$Cs = As'.(fs'-0{,}85.fc').10^{-3}$

$= 800.(361{,}905-0{,}85.25).10^{-3} = 272{,}527$ KN

$Ts = As.fs.10^{-3}$

$= 800.400.10^{-3} = 320$ KN

$Mn = Cc.(h/2-a/2) + Cs.(h/2-d') + Ts.(d-h/2)$

$= 910{,}35.(400/2-107{,}1/2) + 272{,}527.(400/2-50) + 320.(350-400/2)$

$= 222{,}199$ KNm

$Pn = Cc + Cs - Ts$

$= 910{,}35 + 272{,}527 - 222{,}199 = 862{,}874$ KN

$$e = \frac{Mn}{Pn} = \frac{222{,}199}{862{,}874} = 0{,}257 \text{ m}$$

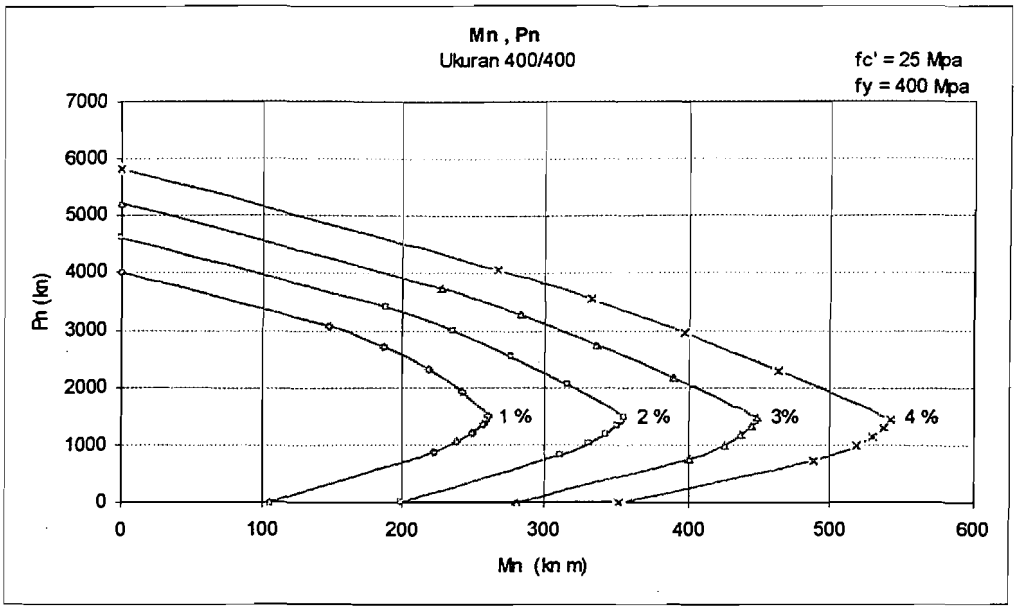
5. Batang Lentur Murni

$$a = \frac{As.fy}{0{,}85.fc.b}$$

$$= \frac{800.400}{0{,}85.25.400} = 37{,}647 \text{ mm}$$

$Mn = As.fy.(d-a/2).10^{6}$

$= 800.400.(350-37{,}467/2).10^{6} = 105{,}976$ KNm



Gambar 4.16 Grafik Mn-Pn

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4.5.2 Perencanaan Tulangan Lentur Kolom

Dari hasil output SAP didapat data sebagai berikut:

Untuk kolom lantai 3 B-2

	P	M2	M3		P	M2	M3
Da	136,68	8,53	14,65	Db	152,21	8,03	12,7
La	30,76	3,353	3,09	Lb	30,76	3,32	2,38
Mua	213,232	15,596	22,524	Mub	231,868	14,948	19,048

Perencanaan kolom sisi atas

Pu = 213,232 KN

Mux = 15,596 KNm

Muy = 22,524 KNm

L = 4,2 m

fy = 400 MPa

fc' = 25 MPa

d' = 50 mm

b = 400 mm

h = 400 mm

d = 350 mm

Φ = 0,65

Pu/Φ = 328,04923 KN

Mux/Φ = 23,99384 KNm

Muy/Φ = 34,65230 KNm

$\beta 1$ = 0,85

Perencancaan arah x:

Pn desain = 328,04923 KN

M desain = 23.993845 KNm

e = 0,073141 m

Dari grafik Pu & Mn didapat:

Ast = 1 %

= 0,01 x 400 x 400 = 1600 mm^2

Øtul = 19 mm

AlØ = 283,64 mm^2

$$\text{Jml tul} = \frac{1600}{283,64} = 5,6409$$

Jml pakai = 6 batang (6D19) → Ast = 6 x 283,64 = 1701,9 mm^2

As = As' = 0,5.Ast = 0,5. 1701,9 = 850,93 mm^2

$$xb = \frac{600.d}{600 + fy} = \frac{600..350}{600 + 400}$$

= 210 mm

ab = xb.β1

= 210.0,85 = 178,5 mm

$$fs' = \frac{xb - d'}{xb} x600$$

$$= \frac{210 - 50}{210} x600 = 457,14 \text{ mm}$$

fs' < fy = 400 MPa

Pnb = β1.fc'.b.d + As.fy – As'.fs'

= 0,85.25.400.400 + 850,93.400 – 850.93.400

= 1517,3 KN

Mnb = 0,85.fc'b.a.(h/a-a/2) + As'(fs'-0,85.fc')(h/2-d') + As.fy(d-h/2)

= 0,85.20.400.178.5(400/178.5-178.5/2) + 850,93.(400-0,85.25).(400/2-

50) + 850,93.400(350-400/2)

= 267,43 KNm

eb $= \frac{267,43}{1517,3} = 0,1763$mm → e = 0,073141 m < eb = 0,1763 m

Patah Desak

Perencancaan arah y:

Pn desain = 213,232 KN

M desain = 22,524 KNm

e = 0,10563 m

Dari grafik Pu & Mn didapat:

Ast = 1 %

= 0,01 x 400 x 400 = 1600 mm^2

Øtul = 19 mm

AlØ = 283,64 mm^2

Jml tul $= \frac{1600}{283,64} = 5,6409$

Jml pakai = 6 batang (6D19) → Ast = 6 x 283,64 = 1701,9 mm^2

As = As' = 0,5.Ast = 0,5. 1701,9 = 850,93 mm^2

$$xb = \frac{600.d}{600+fy} = \frac{600..350}{600+400}$$

$= 210$ mm

$ab = xb.\beta 1$

$= 210.0{,}85 = 178{,}5$ mm

$$fs' = \frac{xb-d'}{xb} x600$$

$$= \frac{210-50}{210} x600 = 457{,}14 \text{ mm}$$

$fs' < fy = 400$ MPa

$Pnb = \beta 1.fc'.b.d + As.fy - As'.fs'$

$= 0{,}85.25.400.400 + 850{,}93.400 - 850.93.400$

$= 1517{,}3$ KN

$Mnb = 0{,}85.fc'b.a.(h/a-a/2) + As'(fs'-0{,}85.fc')(h/2-d') + As.fy(d-h/2)$

$= 0{,}85.20.400.178.5(400/178.5-178.5/2) + 850{,}93.(400-0{,}85.25).(400/2-$

$50) + 850{,}93.400(350-400/2)$

$= 267{,}43$ KNm

$$eb = \frac{267{,}43}{1517{,}3} = 0{,}1763 \text{mm} \rightarrow e = 0{,}10563 \text{ m} < eb = 0{,}1763 \text{ m}$$

Patah desak

4.6 Perencanaan Fondasi Tiang

Dalam perencanaan proyek ini digunakan pondasi dalam karena lapisan tanah keras yang terletak pada kedalaman 9 m, adapun pondasi dalam yang digunakan adalah pondasi *bored pile* karena lokasi proyek yang terletak dalam area rumah sakit.

4.6.1 Perencananaan Tulangan Pondasi *Bored Pile*

Pondasi bored pile yang digunakan direncanakan sebagai tiang panjang pada tanah berbutir.

d = 60 cm

Qa = 390,1284 ton > Paksial =156,0133 ton

γ = 1,686667 gr/cm^3

= 1686,667 kg/m^3

θ = 38,66°

Kp = tg^2(45°+1/2.θ)

= tg^2(45°+1/2.38,66°)

= tg^2 64,33 = 4,329

$$\frac{Ho}{Kp.\gamma.D^2} = \frac{10167,867}{4,329.1686,667.0,6^2}$$

= 3,8682

→ Grafik $\frac{Ho}{Kp.\gamma.D^2}$ Vs $\frac{Mo}{Kp.\gamma.D^3}$ untuk ujung atas ditahan, didapat

$$\frac{Mo}{Kp.\gamma.D^3} = 1,1$$

$Mo = 1,1.Kp.\gamma.D^3$

$= 1,1.4,329.1686,667.0,6\text{^}3$

$= 1734,855$ kgm

$P = 146941$ kg

$eu = \frac{1734,855}{146941} = 0,011806$ m

$= 1,11806$ cm

$ht = 60$ cm

$\frac{eu}{ht} = \frac{1,11806}{60}$

$= 0,01967$

$\sigma^*ou = \frac{Nu}{1/4.\pi.ht^2}$

$= \frac{146941}{0,25.3,14.60^2}$

$= 51,9488$ kg/cm^2

$\sigma'bk = 175$ kg/cm^2

$\frac{\sigma^*ou}{2.ko.\sigma'bk} = \frac{51,9488}{2.0,6.175}$

$= 0,247375$

berdasarkan $\frac{eu}{ht}$ dan, dari grafik Reinforced Concrete Column didapat qtot minimum, sehingga digunakan syarat tulangan minimum pada Buku Pedoman Perencanaan Untuk Struktur Beton Bertulang Biasa dan Struktur Tembok Bertulang untuk Gedung 1983.

Untuk D<80 cm, maka:

$$\text{Amin} = \sqrt{\frac{Ag}{2}}$$

$$= \sqrt{\frac{0{,}25.3{,}14.60^2}{2}} = 37{,}6070 \text{ cm}^2$$

$$\text{Amin} = 0{,}01.Ag$$

$$= 0{,}01.0{,}25.3{,}14.60^2 = 28{,}2857 \text{ cm}^2$$

$$\text{Amaks} = 0{,}06.Ag$$

$$= 0{,}06.0{,}25.3{,}14.60^2 = 169{,}7143 \text{ cm}^2$$

→Amin terpakai = 37,6070 cm^2

Digunakan tulangan pokok D19

$$A_{1D19} = 0{,}25.3{,}14.19^2$$

$$= 283{,}6429 \text{ mm}^2$$

$$= 2{,}8364 \text{ cm}^2$$

$$n = \frac{37{,}6070}{2{,}8364}$$

$$= 13{,}2586 \rightarrow 16D19$$

Tulangan spiral

Digunakan tulangan spiral P10

$$\text{Daerah 1, s maks} = \frac{D}{5} = \frac{60}{5} = 12{,}5 \text{ cm, atau}$$

$$= 12 \text{ cm, atau}$$

$$= 6.D19 = 6.19 = 114 \text{ mm} = 11{,}4 \text{ cm}$$

s dipakai yang terkecil dari ketiga s maks yang ada

→P10-11

Daerah 2, s maks $= \frac{D}{2} = \frac{60}{2} = 30$ cm, atau

$= 30$ cm, atau

$= 12.D19 = 6.19 = 228$ mm $= 22,8$ cm

s dipakai yang terkecil dari ketiga s maks yang ada

→P10-20

4.6.2 Perencanaan *Pile Cap* (kepala tiang)

ht = diameter tiang bor

= 60 cm

b = 120 cm

d = 5 cm

h = 100-5 = 95 cm

e = 42,5 cm

M = 0,35.1.1.2,4.0,425+0,35.1.1.1,8.0,425

= 0,4845 tm

Digunakan

Beton mutu K175 = 175 kg/cm^2

Beton mutu U39 = 3390 kg/cm^2

$$Cu = \frac{h}{\sqrt{\frac{M}{2.ko.\sigma'bk.b}}}$$

$$= \frac{95}{\sqrt{\frac{0,4845.1000.100}{2.0,6.175.120}}} = 62,544$$

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cu diluar chart Wiratman sehinga digunakan

qmin = 0,0433

$$A = q.\frac{2.ko.\sigma' bk.b.h}{\sigma * au}$$

$$= 0{,}0433.\frac{2.0{,}6.175.120.95}{3390} = 30{,}5782\ cm^2$$

Digunakan tulangan D19

$A_{1D19} = 283{,}6426\ mm^2$

$= 2{,}836426\ cm^2$

n $\frac{30{,}5782}{2{,}836426} = 10{,}7805 \rightarrow$ 12D19 dengan jarak s = 10 cm.

BAB V

PEMBAHASAN

5.1 Tinjaun Umum

Pada gedung bertingkat perlakuan struktur akibat beban menyebabakan terjadinya distribusi gaya. Untuk mempersingkat hitungan, perencana menganggap elemen-elemen tertentu pada bengunan portal memiliki persamaan gaya. Sehingga hasil hitungan diambil atau digunakan pada elemen yang memiliki momen terbesar diantara tipe batang yang sama.

Spesifikasi bahan yang dipakai pada desain ulang ini, untuk beton fc' = 254 MPa, untuk baja tulangan dengan diameter kurang atau sama dengan 12 mm dipakai fy = 240 MPa dan untuk diameter lebih besar digunakan tulangan dengan mutu baja fy = 400 MPa.

Pada Tugas Akhir ini digunakan program SAP 2000 versi 7.42 untuk perhitungan portal guna mencari momen-momen yang terjadi pada struktur. Hasil momen tersebut dikalikan faktor-faktor dan momen terfaktor ini yang digunakan sebagai momen rencana dalam perhitungan.

5.2 Atap

Pada perencanaan ini atap menggunakan rangka baja sebagai kuda-kudanya. Perencanaan kuda-kuda baja pada Tugas Akhir ini menggunakan metode ASD *(Allowable Stress Design)* yaitu perencanaan elastis dari AISC. Profil rangka kuda-kuda yang digunakan yaitu 2L 40x40x5, diameter baut A_{325x}

J1

(non full draat) diameter ½" dan tebal pelat sambung 1 cm serta profil gording *Light Lip Channel* 100 x 50 x 20 x 3,2.

5.3 Pelat

Perencanaan tipe pelat dihitung berdasarkan panjang sisi-sisinya dan dukungan pada pelat, sehingga didapatkan tipe pelat dua arah dengan ditumpu pada keempat sisinya. Perencanaan pelat mengacu pada PBI 1971 tabel 13.3.2.

Tebal pelat lantai direncanakan 120 mm. Penentuan tebal pelat lantai didasarkan pada panjang bentang sesuai dengan rumus SK-SNI T-15-1991-03. Untuk tulangan pokok dan tulangan bagi digunakan baja tulangan Ø 8 mm dengan fy = 240 MPa dan fc' = 25 MPa.

Tabel 5.1 Rekapitulasi tulangan pelat lantai terpasang

Pelat	Tebal	tulangan	tx	lx	ty	ly
PL1 (2,9x 2,4)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL2 (4,8x 2,5)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL3 (2,9x 2,4)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL4 (7,2x 2,5)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL5 (7,2x 2,5)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL6 (7,2x 2,5)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL7 (2,4x 2,4)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL8 (2,5x 2,4)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200
PL9 (2,5x 2,4)m	120 mm	Tul.Pokok	P8-200	P8-200	P8-200	P8-200
		Tul.Bagi	P8-200	P8-200	P8-200	P8-200

5.4 Balok

Pada perencanaan ini didapat penulangan balok yang menggunakan tulangan sebelah maupun tulangan rangkap. Penentuan balok tersebut sebagai tulangan sebelah atau rangkap didasarkan pada tinggi efektif balok. Apabila tinggi efektif balok yang direncanakan lebih besar dari tinggi efektif balok yang diperlukan, maka balok tersebut menggunakan tulangan sebelah. Dan apabila tinggi efektif balok yang direncanakan lebih kecil dari tinggi efektif balok yang diperlukan, maka balok tersebut menggunakan tulangan rangkap. Spesifikasi bahan yang digunakan adalah fc' = 25 MPa, fy = 400 MPa untuk tulangan ulir dan fy = 240 MPa untuk tulangan polos. Tulangan pokok yang digunakan adalah Ø 19 mm dengan tulangan geser Ø 10 mm.``

Tabel 5.2 Rekapitulasi tulangan balok terpasang

Tipe balok	Dimensi (mm)	Tul Lentur Tumpuan				Tul Lapangan Tul Lentur	
		Kiri		Kanan			
		Atas	Bwh	Atas	Bwh	Atas	Bwh
1-2/A lt 4	300/500	4D19	2D19	2D19	2D19	2D19	2D19
2-4/A lt 4	300/500	4D19	2D19	4D19	2D19	2D19	3D19
4-7/A lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/A lt 4	300/500	4D19	2D19	5D19	2D19	2D19	3D19
8-9/A lt 4	300/500	5D19	2D19	2D19	2D19	2D19	2D19
1-2/A lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
2-4/A lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
4-7/A lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/A lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
8-9/A lt 1	300/500	4D19	2D19	2D19	2D19	2D19	2D19
1-2/B lt 4	300/500	2D19	2D19	4D19	2D19	2D19	2D19
2-4/B lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
4-7/B lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/B lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
8-9/B lt 4	300/500	4D19	2D19	2D19	2D19	2D19	2D19
1-2/B lt 1-3	300/500	2D19	2D19	3D19	2D19	2D19	2D19
2-4/B lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
4-7/B lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/B lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19

lanjutan tabel 5.2 Rekapitulasi tulangan balok terpasang

8-9/B lt 1-3	300/500	4D19	2D19	2D19	2D19	2D19	2D19
1-2/C lt 4	300/500	4D19	2D19	2D19	2D19	2D19	2D19
2-4/C lt 4	300/500	4D19	2D19	4D19	2D19	2D19	3D19
4-7/C lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/C lt 4	300/500	4D19	2D19	5D19	2D19	2D19	3D19
8-9/C lt 4	300/500	5D19	2D19	2D19	2D19	2D19	2D19
1-2/C lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
2-4/C lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
4-7/C lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/C lt 1-3	300/500	4D19	2D19	4D19	2D19	2D19	2D19
8-9/C lt 1	300/500	4D19	2D19	2D19	2D19	2D19	2D19
1-2/D lt 4	300/500	2D19	2D19	4D19	2D19	2D19	2D19
2-4/D lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
4-7/D lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/D lt 4	300/500	3D19	2D19	3D19	2D19	2D19	2D19
8-9/D lt 4	300/500	4D19	2D19	2D19	2D19	2D19	2D19
1-2/D lt 1-3	300/500	2D19	2D19	3D19	2D19	2D19	2D19
2-4/D lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
4-7/D lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19
7-8/D lt 1-3	300/500	3D19	2D19	3D19	2D19	2D19	2D19

5.5 Kolom

Kolom juga merupakan struktur portal yang direncanakan berdasarkan analisis portal. Penentuan lebar kolom disesuaikan dengan lebar balok agar mempermudah pemasangan tulangan. Spesifikasi bahan yang digunakan adalah fc' = 25 MPa, fy = 400 MPa untuk tulangan ulir dan fy = 240 MPa untuk tulangan polos. Tulangan pokok yang digunakan adalah tulangan ulir diameter 19 mm dan tulangan geser menggunakan tulangan polos 10 mm.

Tabel 5.3 Rekapitulasi tulangan kolom terpasang

Lantai	Kolom	Dimensi	Tul	Tul geser
Dasar	as A	400/400	12D19	P10-150
	as B	400/400	12D19	P10-150
	as C	400/400	12D19	P10-150
	as D	400/400	12D19	P10-150

lanjutan tabel 5.3 Rekapitulasi tulangan kolom terpasang

Lt 1	as A	400/400	12D19	P10-150
	as B	400/400	12D19	P10-150
	as C	400/400	12D19	P10-150
	as D	400/400	12D19	P10-150
Lt 2	as A	400/400	12D19	P10-150
	as B	400/400	12D19	P10-150
	as C	400/400	12D19	P10-150
	as D	400/400	12D19	P10-150
Lt 3	as A	400/400	12D19	P10-150
	as B	400/400	12D19	P10-150
	as C	400/400	12D19	P10-150
	as D	400/400	12D19	P10-150
Lt 4	as A	400/400	12D19	P10-150
	as B	400/400	12D19	P10-150
	as C	400/400	12D19	P10-150
	as D	400/400	12D19	P10-150

5.6 Pondasi

Pondasi direncanakan sebagai pondasi tiang bor atau *bored pile.* Hal ini dikarenakan kondisi tanah yang jelek dan area proyek yang terletak dalam lingkungan rumah sakit.

Pondasi tiang bor ini menggunakan tulangan pokok Ø 19 mm dan tulangan bagi Ø 10 mm.

BAB VI

KESIMPULAN DAN SARAN

6.1 Kesimpulan

Berdasarkan hasil perhitungan dan pembahasan pada bab-bab sebelumnya dapat diambil kesimpulan sebagai berikut:

1. Bangunan Ramp RSUP Dr. Sardjito terletak dalam area rumah sakit RSUP Dr. Sardjito dan direncanakan dengan menggunakan analisis 2-D untuk rangka atap dan analisis 3-D untuk portal dengan menggunakan program SAP 2000 Versi 7.42.
2. Struktur bengunan yang didisain ulang dibagi menjadi dua, yaitu struktur atas dan struktur bawah. Struktur atas merupakan elemen bangunan yang berada di atas permukaan tanah, sedangkan struktur bawah merupakan elemen bangunan yang terletak di bawah permukaan tanah.
3. Dalam perencanaan ini digunakan metode kekuatan batas yaitu beban kerja dinaikkan dengan memberikan faktor beban, sehingga diperoleh suatu beban yang dipakai sebagai beban rencana.
4. Perencanaan konstruksi meliputi:
   - Perencanaan rangka atap menggunakan metode elastis (ASD)

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- Perencanaan pelat menggunakan metode koefisien momen dengan mengganggap tumpuan jepit elastis sehingga didapat koefisien momen (tabel 13.3.2 PBI 1971)

6.2 Saran

Dengan mempertimbangkan hal-hal tersebut diatas, maka dapat diberikan beberapa saran, antara lain sebagai berikut:

1. Perlu adanya perhitungan sampai tahap akhir (RAB) pada tugas akhir ini, sehingga penghematan dari segi biaya dapat diketahui dengan jelas.
2. Perlu adanya redain untuk Tugas Akhir ini dengan peningkatan spesifikasi bahan sehingga dikethui sejauh mana efisinesi bahan yang digunakan.

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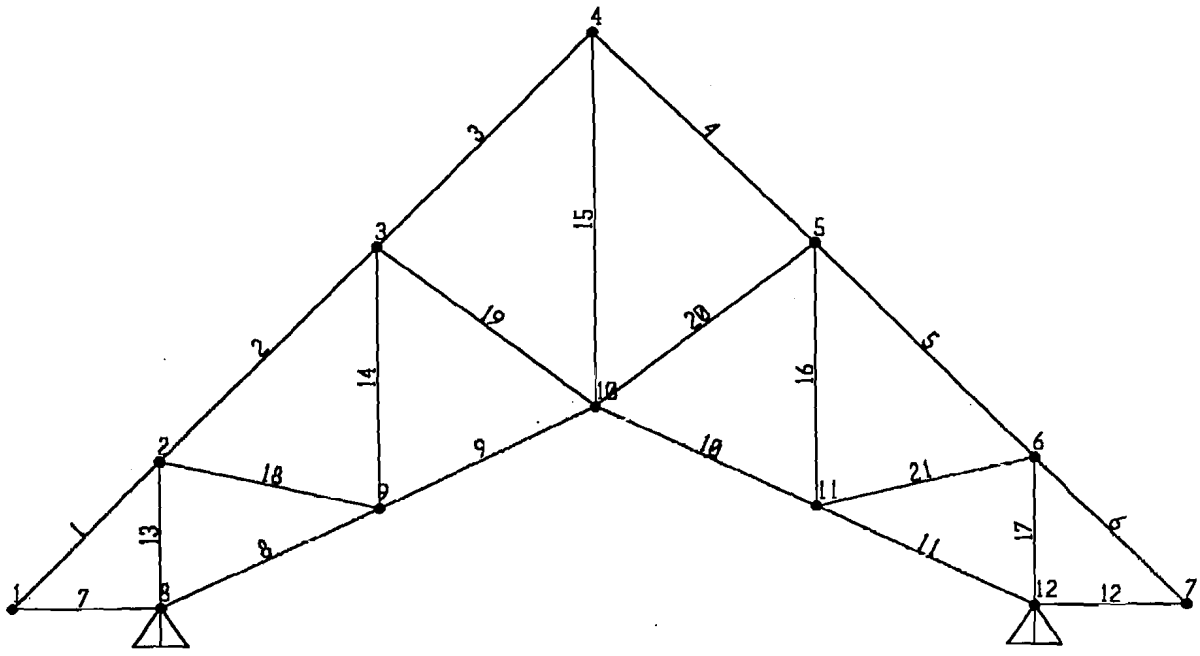
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A1

Gedubu Head Quarters

L O A D C O M B I N A T I O N M U L T I P L I E R S

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
COMB1	ADD				COMB1
		BMATI	1.4000	STATIC(DEAD)	
COMB2	ADD				COMB2
		BMATI	1.2000	STATIC(DEAD)	
		BHIDUP	1.6000	STATIC(LIVE)	
COMB3	ADD				COMB3
		BMATI	1.0000	STATIC(DEAD)	
		BAKI	1.3000	STATIC(WIND)	
		BAKA	1.3000	STATIC(WIND)	
COMB4	ADD				COMB4
		BMATI	1.2000	STATIC(DEAD)	
		BAKI	-1.3000	STATIC(WIND)	
		BAKA	-1.3000	STATIC(WIND)	

Gedubu Head Quarters

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	BMATI	1.229E-03	0.0000	-0.0134	0.0000	-1.454E-04	0.0000
1	BHIDUP	0.0000	0.0000	-9.492E-04	0.0000	-9.122E-06	0.0000
1	BAKI	2.789E-04	0.0000	2.063E-03	0.0000	2.211E-05	0.0000
1	BAKA	-2.233E-04	0.0000	-2.281E-03	0.0000	-2.455E-05	0.0000
1	COMB1	1.721E-03	0.0000	-0.0188	0.0000	-2.036E-04	0.0000
1	COMB2	1.474E-03	0.0000	-0.0176	0.0000	-1.891E-04	0.0000
1	COMB3	1.302E-03	0.0000	-0.0137	0.0000	-1.486E-04	0.0000
1	COMB4	1.403E-03	0.0000	-0.0158	0.0000	-1.713E-04	0.0000
2	BMATI	-2.428E-03	0.0000	-6.263E-03	0.0000	2.872E-05	0.0000
2	BHIDUP	4.947E-05	0.0000	-1.001E-03	0.0000	6.029E-06	0.0000
2	BAKI	3.012E-03	0.0000	-2.766E-04	0.0000	2.156E-05	0.0000
2	BAKA	-2.901E-03	0.0000	8.122E-05	0.0000	-1.930E-05	0.0000
2	COMB1	-3.400E-03	0.0000	-8.768E-03	0.0000	4.021E-05	0.0000
2	COMB2	-2.835E-03	0.0000	-9.116E-03	0.0000	4.411E-05	0.0000
2	COMB3	-2.284E-03	0.0000	-6.517E-03	0.0000	3.166E-05	0.0000
2	COMB4	-3.058E-03	0.0000	-7.261E-03	0.0000	3.153E-05	0.0000
3	BMATI	4.542E-03	0.0000	-0.0223	0.0000	3.128E-05	0.0000
3	BHIDUP	6.963E-04	0.0000	-2.925E-03	0.0000	1.877E-06	0.0000
3	BAKI	4.191E-03	0.0000	-9.226E-04	0.0000	4.552E-06	0.0000
3	BAKA	-3.868E-03	0.0000	1.526E-04	0.0000	-3.362E-06	0.0000
3	COMB1	6.359E-03	0.0000	-0.0312	0.0000	4.380E-05	0.0000
3	COMB2	6.565E-03	0.0000	-0.0314	0.0000	4.054E-05	0.0000
3	COMB3	4.962E-03	0.0000	-0.0233	0.0000	3.283E-05	0.0000
3	COMB4	5.031E-03	0.0000	-0.0257	0.0000	3.599E-05	0.0000
4	BMATI	0.0000	0.0000	-0.0243	0.0000	0.0000	0.0000
4	BHIDUP	0.0000	0.0000	-2.561E-03	0.0000	0.0000	0.0000
4	BAKI	4.985E-03	0.0000	-4.210E-04	0.0000	3.968E-06	0.0000
4	BAKA	-4.985E-03	0.0000	-4.210E-04	0.0000	-3.968E-06	0.0000
4	COMB1	0.0000	0.0000	-0.0340	0.0000	0.0000	0.0000
4	COMB2	0.0000	0.0000	-0.0333	0.0000	0.0000	0.0000
4	COMB3	0.0000	0.0000	-0.0254	0.0000	0.0000	0.0000
4	COMB4	0.0000	0.0000	-0.0281	0.0000	0.0000	0.0000
5	BMATI	-4.542E-03	0.0000	-0.0223	0.0000	-3.128E-05	0.0000
5	BHIDUP	-6.963E-04	0.0000	-2.925E-03	0.0000	-1.877E-06	0.0000
5	BAKI	3.868E-03	0.0000	1.526E-04	0.0000	3.362E-06	0.0000
5	BAKA	-4.191E-03	0.0000	-9.226E-04	0.0000	-4.552E-06	0.0000
5	COMB1	-6.359E-03	0.0000	-0.0312	0.0000	-4.380E-05	0.0000
5	COMB2	-6.565E-03	0.0000	-0.0314	0.0000	-4.054E-05	0.0000
5	COMB3	-4.962E-03	0.0000	-0.0233	0.0000	-3.283E-05	0.0000
5	COMB4	-5.031E-03	0.0000	-0.0257	0.0000	-3.599E-05	0.0000
6	BMATI	2.428E-03	0.0000	-6.263E-03	0.0000	-2.872E-05	0.0000
6	BHIDUP	-4.947E-05	0.0000	-1.001E-03	0.0000	-6.029E-06	0.0000
6	BAKI	2.901E-03	0.0000	8.122E-05	0.0000	1.930E-05	0.0000

6	COMB1	3.400E-03	0.0000	-8.708E-03	0.0000	-4.522E-05	0.0000
6	COMB2	2.835E-03	0.0000	-9.116E-03	0.0000	-4.411E-05	0.0000
6	COMB3	2.284E-03	0.0000	-6.517E-03	0.0000	-3.166E-05	0.0000
6	COMB4	3.058E-03	0.0000	-7.261E-03	0.0000	-3.153E-05	0.0000
7	BMATI	-1.229E-03	0.0000	-0.0134	0.0000	1.454E-04	0.0000
7	BHIDUP	0.0000	0.0000	-9.492E-04	0.0000	9.122E-06	0.0000
7	BAKI	2.233E-04	0.0000	-2.281E-03	0.0000	2.455E-05	0.0000
7	BAKA	-2.789E-04	0.0000	2.063E-03	0.0000	-2.211E-05	0.0000
7	COMB1	-1.721E-03	0.0000	-0.0188	0.0000	2.036E-04	0.0000
7	COMB2	-1.474E-03	0.0000	-0.0176	0.0000	1.891E-04	0.0000
7	COMB3	-1.302E-03	0.0000	-0.0137	0.0000	1.486E-04	0.0000
7	COMB4	-1.403E-03	0.0000	-0.0158	0.0000	1.713E-04	0.0000
8	BMATI	0.0000	0.0000	0.0000	0.0000	-3.942E-05	0.0000
8	BHIDUP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	BAKI	0.0000	0.0000	0.0000	0.0000	2.496E-05	0.0000
8	BAKA	0.0000	0.0000	0.0000	0.0000	-2.443E-05	0.0000
8	COMB1	0.0000	0.0000	0.0000	0.0000	-5.519E-05	0.0000
8	COMB2	0.0000	0.0000	0.0000	0.0000	-4.802E-05	0.0000
8	COMB3	0.0000	0.0000	0.0000	0.0000	-3.873E-05	0.0000
8	COMB4	0.0000	0.0000	0.0000	0.0000	-4.799E-05	0.0000
9	BMATI	-1.215E-04	0.0000	-0.0199	0.0000	9.692E-05	0.0000
9	BHIDUP	1.894E-04	0.0000	-2.543E-03	0.0000	1.038E-05	0.0000
9	BAKI	2.260E-03	0.0000	-1.328E-03	0.0000	4.411E-06	0.0000
9	BAKA	-2.190E-03	0.0000	6.171E-04	0.0000	-1.073E-06	0.0000
9	COMB1	-1.701E-04	0.0000	-0.0279	0.0000	1.357E-04	0.0000
9	COMB2	1.573E-04	0.0000	-0.0280	0.0000	1.329E-04	0.0000
9	COMB3	-2.989E-05	0.0000	-0.0208	0.0000	1.013E-04	0.0000
9	COMB4	-2.374E-04	0.0000	-0.0230	0.0000	1.120E-04	0.0000
10	BMATI	0.0000	0.0000	-0.0260	0.0000	0.0000	0.0000
10	BHIDUP	0.0000	0.0000	-2.974E-03	0.0000	0.0000	0.0000
10	BAKI	2.851E-03	0.0000	-4.598E-04	0.0000	-1.601E-06	0.0000
10	BAKA	-2.851E-03	0.0000	-4.598E-04	0.0000	1.601E-06	0.0000
10	COMB1	0.0000	0.0000	-0.0364	0.0000	0.0000	0.0000
10	COMB2	0.0000	0.0000	-0.0359	0.0000	0.0000	0.0000
10	COMB3	0.0000	0.0000	-0.0272	0.0000	0.0000	0.0000
10	COMB4	0.0000	0.0000	-0.0300	0.0000	0.0000	0.0000
11	BMATI	1.215E-04	0.0000	-0.0199	0.0000	-9.692E-05	0.0000
11	BHIDUP	-1.894E-04	0.0000	-2.543E-03	0.0000	-1.038E-05	0.0000
11	BAKI	2.190E-03	0.0000	6.171E-04	0.0000	1.073E-06	0.0000
11	BAKA	-2.260E-03	0.0000	-1.328E-03	0.0000	-4.411E-06	0.0000
11	COMB1	1.701E-04	0.0000	-0.0279	0.0000	-1.357E-04	0.0000
11	COMB2	-1.573E-04	0.0000	-0.0280	0.0000	-1.329E-04	0.0000
11	COMB3	2.989E-05	0.0000	-0.0208	0.0000	-1.013E-04	0.0000
11	COMB4	2.374E-04	0.0000	-0.0230	0.0000	-1.120E-04	0.0000
12	BMATI	0.0000	0.0000	0.0000	0.0000	3.942E-05	0.0000
12	BHIDUP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	BAKI	0.0000	0.0000	0.0000	0.0000	2.443E-05	0.0000
12	BAKA	0.0000	0.0000	0.0000	0.0000	-2.496E-05	0.0000
12	COMB1	0.0000	0.0000	0.0000	0.0000	5.519E-05	0.0000
12	COMB2	0.0000	0.0000	0.0000	0.0000	4.802E-05	0.0000
12	COMB3	0.0000	0.0000	0.0000	0.0000	3.873E-05	0.0000
12	COMB4	0.0000	0.0000	0.0000	0.0000	4.799E-05	0.0000

Gedubu Head Quarters

J O I N T R E A C T I O N S

JOINT	LOAD	F1	F2	F3	M1	M2	M3
8	BMATI	580.6435	0.0000	1374.6400	0.0000	0.0000	0.0000
8	BHIDUP	82.5774	0.0000	200.0000	0.0000	0.0000	0.0000
8	BAKI	-181.0131	0.0000	-18.6947	0.0000	0.0000	0.0000
8	BAKA	193.6539	0.0000	60.3237	0.0000	0.0000	0.0000
8	COMB1	812.9009	0.0000	1924.4960	0.0000	0.0000	0.0000
8	COMB2	828.8960	0.0000	1969.5680	0.0000	0.0000	0.0000
8	COMB3	597.0766	0.0000	1428.7577	0.0000	0.0000	0.0000
8	COMB4	680.3390	0.0000	1595.4503	0.0000	0.0000	0.0000
12	BMATI	-580.6435	0.0000	1374.6400	0.0000	0.0000	0.0000
12	BHIDUP	-82.5774	0.0000	200.0000	0.0000	0.0000	0.0000
12	BAKI	-193.6539	0.0000	60.3237	0.0000	0.0000	0.0000
12	BAKA	181.0131	0.0000	-18.6947	0.0000	0.0000	0.0000
12	COMB1	-812.9009	0.0000	1924.4960	0.0000	0.0000	0.0000
12	COMB2	-828.8960	0.0000	1969.5680	0.0000	0.0000	0.0000
12	COMB3	-597.0766	0.0000	1428.7577	0.0000	0.0000	0.0000
12	COMB4	-680.3390	0.0000	1595.4503	0.0000	0.0000	0.0000

Gedubu Head Quarters

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
1	BMATI							
		0.00	280.32	-4.632E-02	0.00	0.00	0.00	-24.98
		70.71	280.32	-4.632E-02	0.00	0.00	0.00	-21.70
		141.42	280.32	-4.632E-02	0.00	0.00	0.00	-18.43
1	BHIDUP							
		0.00	-1.183E-01	-2.164E-02	0.00	0.00	0.00	-3.42
		70.71	-1.183E-01	-2.164E-02	0.00	0.00	0.00	-1.89
		141.42	-1.183E-01	-2.164E-02	0.00	0.00	0.00	-3.580E-01
1	BAKI							
		0.00	31.76	-3.716E-02	0.00	0.00	0.00	-2.56
		70.71	31.76	-3.716E-02	0.00	0.00	0.00	6.944E-02
		141.42	31.76	-3.716E-02	0.00	0.00	0.00	2.70
1	BAKA							
		0.00	-25.44	3.453E-02	0.00	0.00	0.00	1.79
		70.71	-25.44	3.453E-02	0.00	0.00	0.00	-6.548E-01
		141.42	-25.44	3.453E-02	0.00	0.00	0.00	-3.10
1	COMB1							
		0.00	392.45	-6.485E-02	0.00	0.00	0.00	-34.97
		70.71	392.45	-6.485E-02	0.00	0.00	0.00	-30.39
		141.42	392.45	-6.485E-02	0.00	0.00	0.00	-25.80
1	COMB2							
		0.00	336.20	-9.021E-02	0.00	0.00	0.00	-35.45
		70.71	336.20	-9.021E-02	0.00	0.00	0.00	-29.07
		141.42	336.20	-9.021E-02	0.00	0.00	0.00	-22.69
1	COMB3							
		0.00	288.55	-4.974E-02	0.00	0.00	0.00	-25.98
		70.71	288.55	-4.974E-02	0.00	0.00	0.00	-22.47
		141.42	288.55	-4.974E-02	0.00	0.00	0.00	-18.95
1	COMB4							
		0.00	328.16	-5.216E-02	0.00	0.00	0.00	-28.97
		70.71	328.16	-5.216E-02	0.00	0.00	0.00	-25.28
		141.42	328.16	-5.216E-02	0.00	0.00	0.00	-21.60
2	BMATI							
		0.00	-503.58	-2.476E-01	0.00	0.00	0.00	-25.61
		102.53	-503.58	-2.476E-01	0.00	0.00	0.00	-2.202E-01
		205.06	-503.58	-2.476E-01	0.00	0.00	0.00	25.17
2	BHIDUP							
		0.00	-71.04	-2.467E-02	0.00	0.00	0.00	-2.17
		102.53	-71.04	-2.467E-02	0.00	0.00	0.00	3.569E-01
		205.06	-71.04	-2.467E-02	0.00	0.00	0.00	2.89
2	BAKI							
		0.00	29.62	3.397E-02	0.00	0.00	0.00	4.94
		102.53	29.62	3.397E-02	0.00	0.00	0.00	1.46
		205.06	29.62	3.397E-02	0.00	0.00	0.00	-2.02
2	BAKA							
		0.00	-49.81	-3.892E-02	0.00	0.00	0.00	-5.36
		102.53	-49.81	-3.892E-02	0.00	0.00	0.00	-1.37
		205.06	-49.81	-3.892E-02	0.00	0.00	0.00	2.62
2	COMB1							
		0.00	-705.01	-3.466E-01	0.00	0.00	0.00	-35.85
		102.53	-705.01	-3.466E-01	0.00	0.00	0.00	-3.082E-01
		205.06	-705.01	-3.466E-01	0.00	0.00	0.00	35.23
2	COMB2							
		0.00	-717.97	-3.366E-01	0.00	0.00	0.00	-34.20
		102.53	-717.97	-3.366E-01	0.00	0.00	0.00	3.068E-01
		205.06	-717.97	-3.366E-01	0.00	0.00	0.00	34.82
2	COMB3							
		0.00	-529.82	-2.540E-01	0.00	0.00	0.00	-26.15
		102.53	-529.82	-2.540E-01	0.00	0.00	0.00	-1.006E-01
		205.06	-529.82	-2.540E-01	0.00	0.00	0.00	25.95
2	COMB4							
		0.00	-578.05	-2.907E-01	0.00	0.00	0.00	-30.19
		102.53	-578.05	-2.907E-01	0.00	0.00	0.00	-3.838E-01
		205.06	-578.05	-2.907E-01	0.00	0.00	0.00	29.42
3	BMATI							
		0.00	-364.55	1.224E-01	0.00	0.00	0.00	15.24
		102.53	-364.55	1.224E-01	0.00	0.00	0.00	2.69
		205.06	-364.55	1.224E-01	0.00	0.00	0.00	-9.86
3	BHIDUP							
		0.00	-18.50	2.307E-02	0.00	0.00	0.00	2.53
		102.53	-18.50	2.307E-02	0.00	0.00	0.00	1.613E-01
		205.06	-18.50	2.307E-02	0.00	0.00	0.00	-2.20
3	BAKI							
		0.00	72.09	1.632E-02	0.00	0.00	0.00	1.72
		102.53	72.09	1.632E-02	0.00	0.00	0.00	5.020E-02
		205.06	72.09	1.632E-02	0.00	0.00	0.00	-1.62

	0.00	-94.03	-8.991E-03	0.00	0.00	0.00	[illegible]
	102.53	-94.03	-8.991E-03	0.00	0.00	0.00	5.209E-02
	205.06	-94.03	-8.991E-03	0.00	0.00	0.00	9.739E-01
3	COMB1						
	0.00	-510.37	1.713E-01	0.00	0.00	0.00	21.33
	102.53	-510.37	1.713E-01	0.00	0.00	0.00	3.76
	205.06	-510.37	1.713E-01	0.00	0.00	0.00	-13.80
3	COMB2						
	0.00	-467.07	1.838E-01	0.00	0.00	0.00	22.33
	102.53	-467.07	1.838E-01	0.00	0.00	0.00	3.48
	205.06	-467.07	1.838E-01	0.00	0.00	0.00	-15.36
3	COMB3						
	0.00	-393.08	1.319E-01	0.00	0.00	0.00	16.35
	102.53	-393.08	1.319E-01	0.00	0.00	0.00	2.82
	205.06	-393.08	1.319E-01	0.00	0.00	0.00	-10.70
3	COMB4						
	0.00	-408.93	1.373E-01	0.00	0.00	0.00	17.17
	102.53	-408.93	1.373E-01	0.00	0.00	0.00	3.09
	205.06	-408.93	1.373E-01	0.00	0.00	0.00	-10.99
4	BMATI						
	0.00	-364.55	-1.224E-01	0.00	0.00	0.00	-9.86
	102.53	-364.55	-1.224E-01	0.00	0.00	0.00	2.69
	205.06	-364.55	-1.224E-01	0.00	0.00	0.00	15.24
4	BHIDUP						
	0.00	-18.50	-2.307E-02	0.00	0.00	0.00	-2.20
	102.53	-18.50	-2.307E-02	0.00	0.00	0.00	1.613E-01
	205.06	-18.50	-2.307E-02	0.00	0.00	0.00	2.53
4	BAKI						
	0.00	-94.03	8.991E-03	0.00	0.00	0.00	9.739E-01
	102.53	-94.03	8.991E-03	0.00	0.00	0.00	5.209E-02
	205.06	-94.03	8.991E-03	0.00	0.00	0.00	-8.698E-01
4	BAKA						
	0.00	72.09	-1.632E-02	0.00	0.00	0.00	-1.62
	102.53	72.09	-1.632E-02	0.00	0.00	0.00	5.020E-02
	205.06	72.09	-1.632E-02	0.00	0.00	0.00	1.72
4	COMB1						
	0.00	-510.37	-1.713E-01	0.00	0.00	0.00	-13.80
	102.53	-510.37	-1.713E-01	0.00	0.00	0.00	3.76
	205.06	-510.37	-1.713E-01	0.00	0.00	0.00	21.33
4	COMB2						
	0.00	-467.07	-1.838E-01	0.00	0.00	0.00	-15.36
	102.53	-467.07	-1.838E-01	0.00	0.00	0.00	3.48
	205.06	-467.07	-1.838E-01	0.00	0.00	0.00	22.33
4	COMB3						
	0.00	-393.08	-1.319E-01	0.00	0.00	0.00	-10.70
	102.53	-393.08	-1.319E-01	0.00	0.00	0.00	2.82
	205.06	-393.08	-1.319E-01	0.00	0.00	0.00	16.35
4	COMB4						
	0.00	-408.93	-1.373E-01	0.00	0.00	0.00	-10.99
	102.53	-408.93	-1.373E-01	0.00	0.00	0.00	3.09
	205.06	-408.93	-1.373E-01	0.00	0.00	0.00	17.17
5	BMATI						
	0.00	-503.58	2.476E-01	0.00	0.00	0.00	25.17
	102.53	-503.58	2.476E-01	0.00	0.00	0.00	-2.202E-01
	205.06	-503.58	2.476E-01	0.00	0.00	0.00	-25.61
5	BHIDUP						
	0.00	-71.04	2.467E-02	0.00	0.00	0.00	2.89
	102.53	-71.04	2.467E-02	0.00	0.00	0.00	3.569E-01
	205.06	-71.04	2.467E-02	0.00	0.00	0.00	-2.17
5	BAKI						
	0.00	-49.81	3.892E-02	0.00	0.00	0.00	2.62
	102.53	-49.81	3.892E-02	0.00	0.00	0.00	-1.37
	205.06	-49.81	3.892E-02	0.00	0.00	0.00	-5.36
5	BAKA						
	0.00	29.62	-3.397E-02	0.00	0.00	0.00	-2.02
	102.53	29.62	-3.397E-02	0.00	0.00	0.00	1.46
	205.06	29.62	-3.397E-02	0.00	0.00	0.00	4.94
5	COMB1						
	0.00	-705.01	3.466E-01	0.00	0.00	0.00	35.23
	102.53	-705.01	3.466E-01	0.00	0.00	0.00	-3.082E-01
	205.06	-705.01	3.466E-01	0.00	0.00	0.00	-35.85
5	COMB2						
	0.00	-717.97	3.366E-01	0.00	0.00	0.00	34.82
	102.53	-717.97	3.366E-01	0.00	0.00	0.00	3.068E-01
	205.06	-717.97	3.366E-01	0.00	0.00	0.00	-34.20
5	COMB3						
	0.00	-529.82	2.540E-01	0.00	0.00	0.00	25.95
	102.53	-529.82	2.540E-01	0.00	0.00	0.00	-1.006E-01
	205.06	-529.82	2.540E-01	0.00	0.00	0.00	-26.15
5	COMB4						
	0.00	-578.05	2.907E-01	0.00	0.00	0.00	29.42
	102.53	-578.05	2.907E-01	0.00	0.00	0.00	-3.838E-01
	205.06	-578.05	2.907E-01	0.00	0.00	0.00	-30.19
6	BMATI						
	0.00	280.32	4.632E-02	0.00	0.00	0.00	-18.43
	70.71	280.32	4.632E-02	0.00	0.00	0.00	-21.70
	141.42	280.32	4.632E-02	0.00	0.00	0.00	-24.98
6	BHIDUP						
	0.00	-1.183E-01	2.164E-02	0.00	0.00	0.00	-3.580E-01

	141.42	-1.163E-01	2.164E-02	0.00	0.00	0.00	-3.42
6	BAKI						
	0.00	-25.44	-3.453E-02	0.00	0.00	0.00	-3.10
	70.71	-25.44	-3.453E-02	0.00	0.00	0.00	-6.548E-01
	141.42	-25.44	-3.453E-02	0.00	0.00	0.00	1.79
6	BAKA						
	0.00	31.76	3.716E-02	0.00	0.00	0.00	2.70
	70.71	31.76	3.716E-02	0.00	0.00	0.00	6.944E-02
	141.42	31.76	3.716E-02	0.00	0.00	0.00	-2.56
6	COMB1						
	0.00	392.45	6.485E-02	0.00	0.00	0.00	-25.80
	70.71	392.45	6.485E-02	0.00	0.00	0.00	-30.39
	141.42	392.45	6.485E-02	0.00	0.00	0.00	-34.97
6	COMB2						
	0.00	336.20	9.021E-02	0.00	0.00	0.00	-22.69
	70.71	336.20	9.021E-02	0.00	0.00	0.00	-29.07
	141.42	336.20	9.021E-02	0.00	0.00	0.00	-35.45
6	COMB3						
	0.00	288.55	4.974E-02	0.00	0.00	0.00	-18.95
	70.71	288.55	4.974E-02	0.00	0.00	0.00	-22.47
	141.42	288.55	4.974E-02	0.00	0.00	0.00	-25.98
6	COMB4						
	0.00	328.16	5.216E-02	0.00	0.00	0.00	-21.60
	70.71	328.16	5.216E-02	0.00	0.00	0.00	-25.28
	141.42	328.16	5.216E-02	0.00	0.00	0.00	-28.97
7	BMATI						
	0.00	-198.25	8.733E-01	0.00	0.00	0.00	24.98
	25.00	-198.25	8.733E-01	0.00	0.00	0.00	3.15
	50.00	-198.25	8.733E-01	0.00	0.00	0.00	-18.68
	75.00	-198.25	8.733E-01	0.00	0.00	0.00	-40.52
	100.00	-198.25	8.733E-01	0.00	0.00	0.00	-62.35
7	BHIDUP						
	0.00	6.835E-02	9.895E-02	0.00	0.00	0.00	3.42
	25.00	6.835E-02	9.895E-02	0.00	0.00	0.00	9.447E-01
	50.00	6.835E-02	9.895E-02	0.00	0.00	0.00	-1.53
	75.00	6.835E-02	9.895E-02	0.00	0.00	0.00	-4.00
	100.00	6.835E-02	9.895E-02	0.00	0.00	0.00	-6.48
7	BAKI						
	0.00	-44.98	6.120E-02	0.00	0.00	0.00	2.56
	25.00	-44.98	6.120E-02	0.00	0.00	0.00	1.03
	50.00	-44.98	6.120E-02	0.00	0.00	0.00	-5.016E-01
	75.00	-44.98	6.120E-02	0.00	0.00	0.00	-2.03
	100.00	-44.98	6.120E-02	0.00	0.00	0.00	-3.56
7	BAKA						
	0.00	36.01	-3.531E-02	0.00	0.00	0.00	-1.79
	25.00	36.01	-3.531E-02	0.00	0.00	0.00	-9.042E-01
	50.00	36.01	-3.531E-02	0.00	0.00	0.00	-2.152E-02
	75.00	36.01	-3.531E-02	0.00	0.00	0.00	8.612E-01
	100.00	36.01	-3.531E-02	0.00	0.00	0.00	1.74
7	COMB1						
	0.00	-277.55	1.22	0.00	0.00	0.00	34.97
	25.00	-277.55	1.22	0.00	0.00	0.00	4.41
	50.00	-277.55	1.22	0.00	0.00	0.00	-26.16
	75.00	-277.55	1.22	0.00	0.00	0.00	-56.72
	100.00	-277.55	1.22	0.00	0.00	0.00	-87.29
7	COMB2						
	0.00	-237.79	1.21	0.00	0.00	0.00	35.45
	25.00	-237.79	1.21	0.00	0.00	0.00	5.29
	50.00	-237.79	1.21	0.00	0.00	0.00	-24.87
	75.00	-237.79	1.21	0.00	0.00	0.00	-55.02
	100.00	-237.79	1.21	0.00	0.00	0.00	-85.18
7	COMB3						
	0.00	-209.92	9.069E-01	0.00	0.00	0.00	25.98
	25.00	-209.92	9.069E-01	0.00	0.00	0.00	3.31
	50.00	-209.92	9.069E-01	0.00	0.00	0.00	-19.36
	75.00	-209.92	9.069E-01	0.00	0.00	0.00	-42.04
	100.00	-209.92	9.069E-01	0.00	0.00	0.00	-64.71
7	COMB4						
	0.00	-226.23	1.01	0.00	0.00	0.00	28.97
	25.00	-226.23	1.01	0.00	0.00	0.00	3.62
	50.00	-226.23	1.01	0.00	0.00	0.00	-21.74
	75.00	-226.23	1.01	0.00	0.00	0.00	-47.10
	100.00	-226.23	1.01	0.00	0.00	0.00	-72.45
8	BMATI						
	0.00	-859.27	-6.903E-01	0.00	0.00	0.00	-70.24
	79.99	-859.27	-6.903E-01	0.00	0.00	0.00	-15.02
	159.98	-859.27	-6.903E-01	0.00	0.00	0.00	40.20
8	BHIDUP						
	0.00	-91.02	-8.197E-02	0.00	0.00	0.00	-7.75
	79.99	-91.02	-8.197E-02	0.00	0.00	0.00	-1.19
	159.98	-91.02	-8.197E-02	0.00	0.00	0.00	5.36
8	BAKI						
	0.00	149.93	9.822E-03	0.00	0.00	0.00	3.05
	79.99	149.93	9.822E-03	0.00	0.00	0.00	2.26
	159.98	149.93	9.822E-03	0.00	0.00	0.00	1.48
8	BAKA						
	0.00	-173.78	-2.862E-02	0.00	0.00	0.00	-4.86
	79.99	-173.78	-2.862E-02	0.00	0.00	0.00	-2.57
	159.98	-173.78	-2.862E-02	0.00	0.00	0.00	-2.840E-01
8	COMB1						

	79.99	-1202.97	-9.664E-01	0.00	0.00	0.00	-21.03
	159.98	-1202.97	-9.664E-01	0.00	0.00	0.00	56.27
8	COMB2						
	0.00	-1176.75	-9.595E-01	0.00	0.00	0.00	-96.68
	79.99	-1176.75	-9.595E-01	0.00	0.00	0.00	-19.93
	159.98	-1176.75	-9.595E-01	0.00	0.00	0.00	56.82
8	COMB3						
	0.00	-890.27	-7.147E-01	0.00	0.00	0.00	-72.59
	79.99	-890.27	-7.147E-01	0.00	0.00	0.00	-15.42
	159.98	-890.27	-7.147E-01	0.00	0.00	0.00	41.75
8	COMB4						
	0.00	-1000.11	-8.039E-01	0.00	0.00	0.00	-81.93
	79.99	-1000.11	-8.039E-01	0.00	0.00	0.00	-17.62
	159.98	-1000.11	-8.039E-01	0.00	0.00	0.00	46.68
9	BMATI						
	0.00	-247.62	1.132E-01	0.00	0.00	0.00	19.73
	79.99	-247.62	1.132E-01	0.00	0.00	0.00	10.68
	159.98	-247.62	1.132E-01	0.00	0.00	0.00	1.62
9	BHIDUP						
	0.00	-35.67	2.676E-02	0.00	0.00	0.00	3.28
	79.99	-35.67	2.676E-02	0.00	0.00	0.00	1.14
	159.98	-35.67	2.676E-02	0.00	0.00	0.00	-9.977E-01
9	BAKI						
	0.00	90.96	3.928E-02	0.00	0.00	0.00	3.80
	79.99	90.96	3.928E-02	0.00	0.00	0.00	6.624E-01
	159.98	90.96	3.928E-02	0.00	0.00	0.00	-2.48
9	BAKA						
	0.00	-106.28	-3.373E-02	0.00	0.00	0.00	-2.99
	79.99	-106.28	-3.373E-02	0.00	0.00	0.00	-2.946E-01
	159.98	-106.28	-3.373E-02	0.00	0.00	0.00	2.40
9	COMB1						
	0.00	-346.67	1.584E-01	0.00	0.00	0.00	27.62
	79.99	-346.67	1.584E-01	0.00	0.00	0.00	14.95
	159.98	-346.67	1.584E-01	0.00	0.00	0.00	2.27
9	COMB2						
	0.00	-354.21	1.786E-01	0.00	0.00	0.00	28.93
	79.99	-354.21	1.786E-01	0.00	0.00	0.00	14.64
	159.98	-354.21	1.786E-01	0.00	0.00	0.00	3.530E-01
9	COMB3						
	0.00	-267.54	1.204E-01	0.00	0.00	0.00	20.79
	79.99	-267.54	1.204E-01	0.00	0.00	0.00	11.16
	159.98	-267.54	1.204E-01	0.00	0.00	0.00	1.53
9	COMB4						
	0.00	-277.23	1.286E-01	0.00	0.00	0.00	22.62
	79.99	-277.23	1.286E-01	0.00	0.00	0.00	12.34
	159.98	-277.23	1.286E-01	0.00	0.00	0.00	2.05
10	BMATI						
	0.00	-247.62	-1.132E-01	0.00	0.00	0.00	1.62
	79.99	-247.62	-1.132E-01	0.00	0.00	0.00	10.68
	159.98	-247.62	-1.132E-01	0.00	0.00	0.00	19.73
10	BHIDUP						
	0.00	-35.67	-2.676E-02	0.00	0.00	0.00	-9.977E-01
	79.99	-35.67	-2.676E-02	0.00	0.00	0.00	1.14
	159.98	-35.67	-2.676E-02	0.00	0.00	0.00	3.28
10	BAKI						
	0.00	-106.28	3.373E-02	0.00	0.00	0.00	2.40
	79.99	-106.28	3.373E-02	0.00	0.00	0.00	-2.946E-01
	159.98	-106.28	3.373E-02	0.00	0.00	0.00	-2.99
10	BAKA						
	0.00	90.96	-3.928E-02	0.00	0.00	0.00	-2.48
	79.99	90.96	-3.928E-02	0.00	0.00	0.00	6.624E-01
	159.98	90.96	-3.928E-02	0.00	0.00	0.00	3.80
10	COMB1						
	0.00	-346.67	-1.584E-01	0.00	0.00	0.00	2.27
	79.99	-346.67	-1.584E-01	0.00	0.00	0.00	14.95
	159.98	-346.67	-1.584E-01	0.00	0.00	0.00	27.62
10	COMB2						
	0.00	-354.21	-1.786E-01	0.00	0.00	0.00	3.530E-01
	79.99	-354.21	-1.786E-01	0.00	0.00	0.00	14.64
	159.98	-354.21	-1.786E-01	0.00	0.00	0.00	28.93
10	COMB3						
	0.00	-267.54	-1.204E-01	0.00	0.00	0.00	1.53
	79.99	-267.54	-1.204E-01	0.00	0.00	0.00	11.16
	159.98	-267.54	-1.204E-01	0.00	0.00	0.00	20.79
10	COMB4						
	0.00	-277.23	-1.286E-01	0.00	0.00	0.00	2.05
	79.99	-277.23	-1.286E-01	0.00	0.00	0.00	12.34
	159.98	-277.23	-1.286E-01	0.00	0.00	0.00	22.62
11	BMATI						
	0.00	-859.27	6.903E-01	0.00	0.00	0.00	40.20
	79.99	-859.27	6.903E-01	0.00	0.00	0.00	-15.02
	159.98	-859.27	6.903E-01	0.00	0.00	0.00	-70.24
11	BHIDUP						
	0.00	-91.02	8.197E-02	0.00	0.00	0.00	5.36
	79.99	-91.02	8.197E-02	0.00	0.00	0.00	-1.19
	159.98	-91.02	8.197E-02	0.00	0.00	0.00	-7.75
11	BAKI						
	0.00	-173.78	2.862E-02	0.00	0.00	0.00	-2.840E-01
	79.99	-173.78	2.862E-02	0.00	0.00	0.00	-2.57

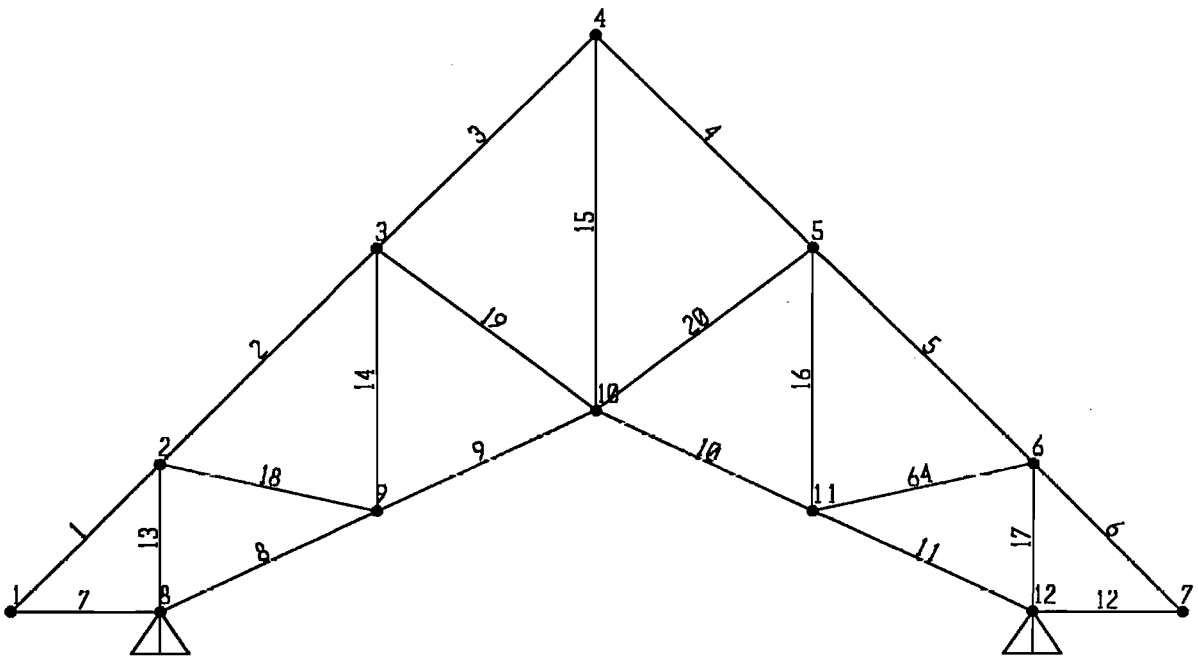
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11	BAKA						
	0.00	149.93	-9.822E-03	0.00	0.00	0.00	1.48
	79.99	149.93	-9.822E-03	0.00	0.00	0.00	2.26
	159.98	149.93	-9.822E-03	0.00	0.00	0.00	3.05
11	COMB1						
	0.00	-1202.97	9.664E-01	0.00	0.00	0.00	56.27
	79.99	-1202.97	9.664E-01	0.00	0.00	0.00	-21.03
	159.98	-1202.97	9.664E-01	0.00	0.00	0.00	-98.33
11	COMB2						
	0.00	-1176.75	9.595E-01	0.00	0.00	0.00	56.82
	79.99	-1176.75	9.595E-01	0.00	0.00	0.00	-19.93
	159.98	-1176.75	9.595E-01	0.00	0.00	0.00	-96.68
11	COMB3						
	0.00	-890.27	7.147E-01	0.00	0.00	0.00	41.75
	79.99	-890.27	7.147E-01	0.00	0.00	0.00	-15.42
	159.98	-890.27	7.147E-01	0.00	0.00	0.00	-72.59
11	COMB4						
	0.00	-1000.11	8.039E-01	0.00	0.00	0.00	46.68
	79.99	-1000.11	8.039E-01	0.00	0.00	0.00	-17.62
	159.98	-1000.11	8.039E-01	0.00	0.00	0.00	-81.93
12	BMATI						
	0.00	-198.25	-8.733E-01	0.00	0.00	0.00	-62.35
	25.00	-198.25	-8.733E-01	0.00	0.00	0.00	-40.52
	50.00	-198.25	-8.733E-01	0.00	0.00	0.00	-18.68
	75.00	-198.25	-8.733E-01	0.00	0.00	0.00	3.15
	100.00	-198.25	-8.733E-01	0.00	0.00	0.00	24.98
12	BHIDUP						
	0.00	6.835E-02	-9.895E-02	0.00	0.00	0.00	-6.48
	25.00	6.835E-02	-9.895E-02	0.00	0.00	0.00	-4.00
	50.00	6.835E-02	-9.895E-02	0.00	0.00	0.00	-1.53
	75.00	6.835E-02	-9.895E-02	0.00	0.00	0.00	9.447E-01
	100.00	6.835E-02	-9.895E-02	0.00	0.00	0.00	3.42
12	BAKI						
	0.00	36.01	3.531E-02	0.00	0.00	0.00	1.74
	25.00	36.01	3.531E-02	0.00	0.00	0.00	8.612E-01
	50.00	36.01	3.531E-02	0.00	0.00	0.00	-2.152E-02
	75.00	36.01	3.531E-02	0.00	0.00	0.00	-9.042E-01
	100.00	36.01	3.531E-02	0.00	0.00	0.00	-1.79
12	BAKA						
	0.00	-44.98	-6.120E-02	0.00	0.00	0.00	-3.56
	25.00	-44.98	-6.120E-02	0.00	0.00	0.00	-2.03
	50.00	-44.98	-6.120E-02	0.00	0.00	0.00	-5.016E-01
	75.00	-44.98	-6.120E-02	0.00	0.00	0.00	1.03
	100.00	-44.98	-6.120E-02	0.00	0.00	0.00	2.56
12	COMB1						
	0.00	-277.55	-1.22	0.00	0.00	0.00	-87.29
	25.00	-277.55	-1.22	0.00	0.00	0.00	-56.72
	50.00	-277.55	-1.22	0.00	0.00	0.00	-26.16
	75.00	-277.55	-1.22	0.00	0.00	0.00	4.41
	100.00	-277.55	-1.22	0.00	0.00	0.00	34.97
12	COMB2						
	0.00	-237.79	-1.21	0.00	0.00	0.00	-85.18
	25.00	-237.79	-1.21	0.00	0.00	0.00	-55.02
	50.00	-237.79	-1.21	0.00	0.00	0.00	-24.87
	75.00	-237.79	-1.21	0.00	0.00	0.00	5.29
	100.00	-237.79	-1.21	0.00	0.00	0.00	35.45
12	COMB3						
	0.00	-209.92	-9.069E-01	0.00	0.00	0.00	-64.71
	25.00	-209.92	-9.069E-01	0.00	0.00	0.00	-42.04
	50.00	-209.92	-9.069E-01	0.00	0.00	0.00	-19.36
	75.00	-209.92	-9.069E-01	0.00	0.00	0.00	3.31
	100.00	-209.92	-9.069E-01	0.00	0.00	0.00	25.98
12	COMB4						
	0.00	-226.23	-1.01	0.00	0.00	0.00	-72.45
	25.00	-226.23	-1.01	0.00	0.00	0.00	-47.10
	50.00	-226.23	-1.01	0.00	0.00	0.00	-21.74
	75.00	-226.23	-1.01	0.00	0.00	0.00	3.62
	100.00	-226.23	-1.01	0.00	0.00	0.00	28.97
13	DMATI						
	0.00	-1010.06	-3.980E-01	0.00	0.00	0.00	-7.89
	50.00	-1010.06	-3.980E-01	0.00	0.00	0.00	12.01
	100.00	-1010.06	-3.980E-01	0.00	0.00	0.00	31.91
13	BHIDUP						
	0.00	-161.37	-4.827E-02	0.00	0.00	0.00	-1.27
	50.00	-161.37	-4.827E-02	0.00	0.00	0.00	1.14
	100.00	-161.37	-4.827E-02	0.00	0.00	0.00	3.55
13	BAKI						
	0.00	-44.61	1.442E-01	0.00	0.00	0.00	6.61
	50.00	-44.61	1.442E-01	0.00	0.00	0.00	-5.998E-01
	100.00	-44.61	1.442E-01	0.00	0.00	0.00	-7.81
13	BAKA						
	0.00	13.10	-1.502E-01	0.00	0.00	0.00	-6.61
	50.00	13.10	-1.502E-01	0.00	0.00	0.00	9.045E-01
	100.00	13.10	-1.502E-01	0.00	0.00	0.00	8.42
13	COMB1						
	0.00	-1414.09	-5.572E-01	0.00	0.00	0.00	-11.04
	50.00	-1414.09	-5.572E-01	0.00	0.00	0.00	16.81
	100.00	-1414.09	-5.572E-01	0.00	0.00	0.00	44.67
13	COMB2						
	0.00	-1470.26	-5.548E-01	0.00	0.00	0.00	-11.50

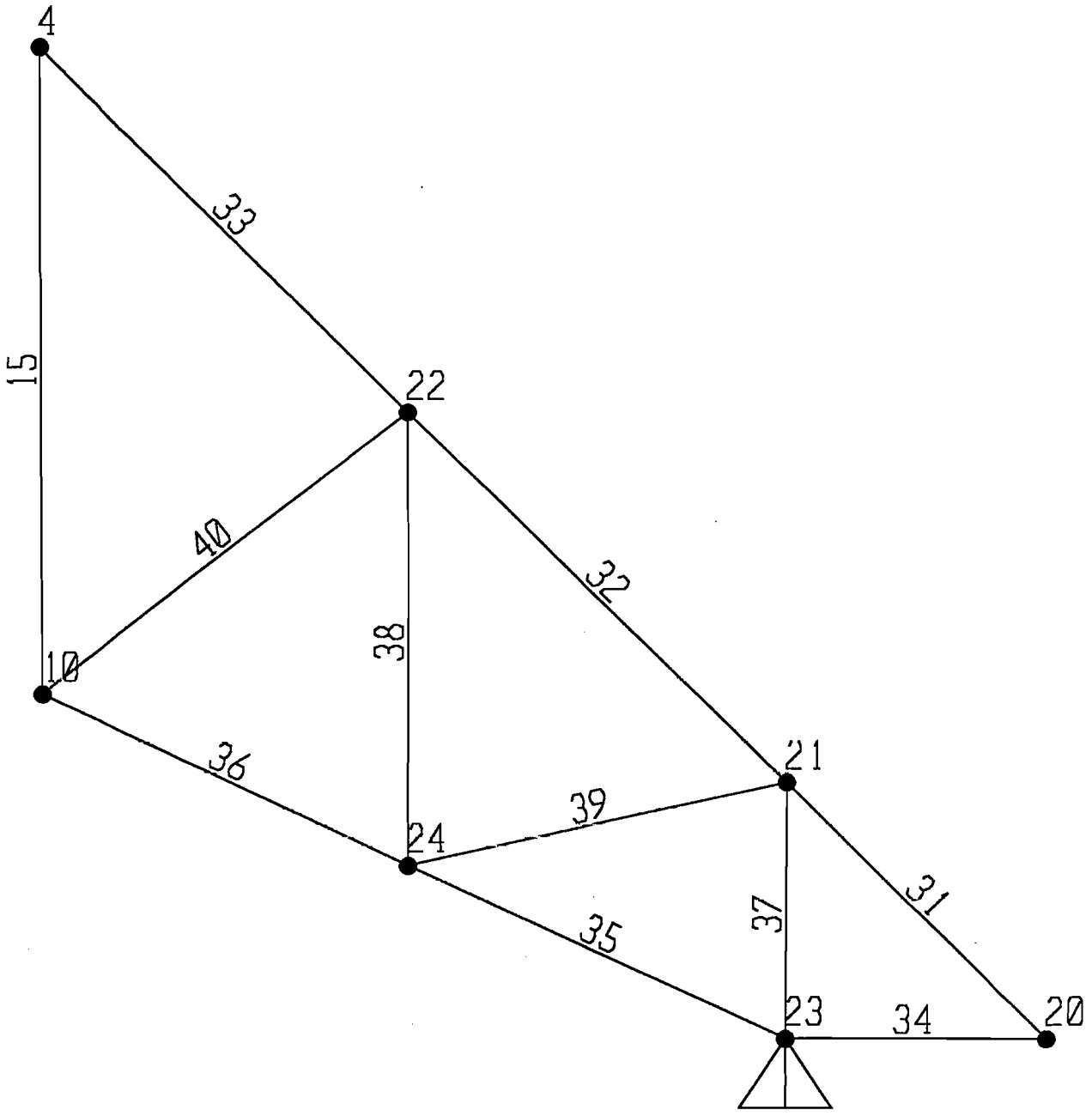
	100.00	-1470.28	-5.548E-01	0.00	0.00	0.00	45.98
13	COMB3						
	0.00	-1051.02	-4.058E-01	0.00	0.00	0.00	-7.88
	50.00	-1051.02	-4.058E-01	0.00	0.00	0.00	12.41
	100.00	-1051.02	-4.058E-01	0.00	0.00	0.00	32.70
13	COMB4						
	0.00	-1171.12	-4.698E-01	0.00	0.00	0.00	-9.47
	50.00	-1171.12	-4.698E-01	0.00	0.00	0.00	14.02
	100.00	-1171.12	-4.698E-01	0.00	0.00	0.00	37.51
14	BMATI						
	0.00	-216.10	-2.536E-01	0.00	0.00	0.00	-29.02
	88.70	-216.10	-2.536E-01	0.00	0.00	0.00	-6.52
	177.40	-216.10	-2.536E-01	0.00	0.00	0.00	15.97
14	BHIDUP						
	0.00	-34.70	-2.193E-02	0.00	0.00	0.00	-2.79
	88.70	-34.70	-2.193E-02	0.00	0.00	0.00	-8.444E-01
	177.40	-34.70	-2.193E-02	0.00	0.00	0.00	1.10
14	BAKI						
	0.00	36.88	4.293E-02	0.00	0.00	0.00	3.82
	88.70	36.88	4.293E-02	0.00	0.00	0.00	1.402E-02
	177.40	36.88	4.293E-02	0.00	0.00	0.00	-3.79
14	BAKA						
	0.00	-42.23	-4.858E-02	0.00	0.00	0.00	-4.54
	88.70	-42.23	-4.858E-02	0.00	0.00	0.00	-2.274E-01
	177.40	-42.23	-4.858E-02	0.00	0.00	0.00	4.08
14	COMB1						
	0.00	-302.54	-3.551E-01	0.00	0.00	0.00	-40.62
	88.70	-302.54	-3.551E-01	0.00	0.00	0.00	-9.13
	177.40	-302.54	-3.551E-01	0.00	0.00	0.00	22.36
14	COMB2						
	0.00	-314.84	-3.394E-01	0.00	0.00	0.00	-39.28
	88.70	-314.84	-3.394E-01	0.00	0.00	0.00	-9.18
	177.40	-314.84	-3.394E-01	0.00	0.00	0.00	20.93
14	COMB3						
	0.00	-223.06	-2.610E-01	0.00	0.00	0.00	-29.95
	88.70	-223.06	-2.610E-01	0.00	0.00	0.00	-6.80
	177.40	-223.06	-2.610E-01	0.00	0.00	0.00	16.35
14	COMB4						
	0.00	-252.36	-2.970E-01	0.00	0.00	0.00	-33.89
	88.70	-252.36	-2.970E-01	0.00	0.00	0.00	-7.55
	177.40	-252.36	-2.970E-01	0.00	0.00	0.00	18.80
15	BMATI						
	0.00	106.60	0.00	0.00	0.00	0.00	0.00
	127.40	106.60	0.00	0.00	0.00	0.00	0.00
	254.80	106.60	0.00	0.00	0.00	0.00	0.00
15	BHIDUP						
	0.00	26.13	0.00	0.00	0.00	0.00	0.00
	127.40	26.13	0.00	0.00	0.00	0.00	0.00
	254.80	26.13	0.00	0.00	0.00	0.00	0.00
15	BAKI						
	0.00	2.46	2.341E-02	0.00	0.00	0.00	3.37
	127.40	2.46	2.341E-02	0.00	0.00	0.00	3.853E-01
	254.80	2.46	2.341E-02	0.00	0.00	0.00	-2.60
15	BAKA						
	0.00	2.46	-2.341E-02	0.00	0.00	0.00	-3.37
	127.40	2.46	-2.341E-02	0.00	0.00	0.00	-3.853E-01
	254.80	2.46	-2.341E-02	0.00	0.00	0.00	2.60
15	COMB1						
	0.00	149.24	0.00	0.00	0.00	0.00	0.00
	127.40	149.24	0.00	0.00	0.00	0.00	0.00
	254.80	149.24	0.00	0.00	0.00	0.00	0.00
15	COMB2						
	0.00	169.74	0.00	0.00	0.00	0.00	0.00
	127.40	169.74	0.00	0.00	0.00	0.00	0.00
	254.80	169.74	0.00	0.00	0.00	0.00	0.00
15	COMB3						
	0.00	113.00	0.00	0.00	0.00	0.00	0.00
	127.40	113.00	0.00	0.00	0.00	0.00	0.00
	254.80	113.00	0.00	0.00	0.00	0.00	0.00
15	COMB4						
	0.00	121.53	0.00	0.00	0.00	0.00	0.00
	127.40	121.53	0.00	0.00	0.00	0.00	0.00
	254.80	121.53	0.00	0.00	0.00	0.00	0.00
16	BMATI						
	0.00	-216.10	2.536E-01	0.00	0.00	0.00	29.02
	88.70	-216.10	2.536E-01	0.00	0.00	0.00	6.52
	177.40	-216.10	2.536E-01	0.00	0.00	0.00	-15.97
16	BHIDUP						
	0.00	-34.70	2.193E-02	0.00	0.00	0.00	2.79
	88.70	-34.70	2.193E-02	0.00	0.00	0.00	8.444E-01
	177.40	-34.70	2.193E-02	0.00	0.00	0.00	-1.10
16	BAKI						
	0.00	-42.23	4.858E-02	0.00	0.00	0.00	4.54
	88.70	-42.23	4.858E-02	0.00	0.00	0.00	2.274E-01
	177.40	-42.23	4.858E-02	0.00	0.00	0.00	-4.08
16	BAKA						
	0.00	36.88	-4.293E-02	0.00	0.00	0.00	-3.82
	88.70	36.88	-4.293E-02	0.00	0.00	0.00	-1.402E-02
	177.40	36.88	-4.293E-02	0.00	0.00	0.00	3.79

	0.00	-302.54	3.551E-01	0.00	0.00	0.00	40.62
	88.70	-302.54	3.551E-01	0.00	0.00	0.00	9.13
	177.40	-302.54	3.551E-01	0.00	0.00	0.00	-22.36
16	COMB2						
	0.00	-314.84	3.394E-01	0.00	0.00	0.00	39.28
	88.70	-314.84	3.394E-01	0.00	0.00	0.00	9.18
	177.40	-314.84	3.394E-01	0.00	0.00	0.00	-20.93
16	COMB3						
	0.00	-223.06	2.610E-01	0.00	0.00	0.00	29.95
	88.70	-223.06	2.610E-01	0.00	0.00	0.00	6.80
	177.40	-223.06	2.610E-01	0.00	0.00	0.00	-16.35
16	COMB4						
	0.00	-252.36	2.970E-01	0.00	0.00	0.00	33.89
	88.70	-252.36	2.970E-01	0.00	0.00	0.00	7.55
	177.40	-252.36	2.970E-01	0.00	0.00	0.00	-18.80
17	BMATI						
	0.00	-1010.06	3.980E-01	0.00	0.00	0.00	7.89
	50.00	-1010.06	3.980E-01	0.00	0.00	0.00	-12.01
	100.00	-1010.06	3.980E-01	0.00	0.00	0.00	-31.91
17	BHIDUP						
	0.00	-161.37	4.827E-02	0.00	0.00	0.00	1.27
	50.00	-161.37	4.827E-02	0.00	0.00	0.00	-1.14
	100.00	-161.37	4.827E-02	0.00	0.00	0.00	-3.55
17	BAKI						
	0.00	13.10	1.502E-01	0.00	0.00	0.00	6.61
	50.00	13.10	1.502E-01	0.00	0.00	0.00	-9.045E-01
	100.00	13.10	1.502E-01	0.00	0.00	0.00	-8.42
17	BAKA						
	0.00	-44.61	-1.442E-01	0.00	0.00	0.00	-6.61
	50.00	-44.61	-1.442E-01	0.00	0.00	0.00	5.998E-01
	100.00	-44.61	-1.442E-01	0.00	0.00	0.00	7.81
17	COMB1						
	0.00	-1414.09	5.572E-01	0.00	0.00	0.00	11.04
	50.00	-1414.09	5.572E-01	0.00	0.00	0.00	-16.81
	100.00	-1414.09	5.572E-01	0.00	0.00	0.00	-44.67
17	COMB2						
	0.00	-1470.26	5.548E-01	0.00	0.00	0.00	11.50
	50.00	-1470.26	5.548E-01	0.00	0.00	0.00	-16.24
	100.00	-1470.26	5.548E-01	0.00	0.00	0.00	-43.98
17	COMB3						
	0.00	-1051.02	4.058E-01	0.00	0.00	0.00	7.88
	50.00	-1051.02	4.058E-01	0.00	0.00	0.00	-12.41
	100.00	-1051.02	4.058E-01	0.00	0.00	0.00	-32.70
17	COMB4						
	0.00	-1171.12	4.698E-01	0.00	0.00	0.00	9.47
	50.00	-1171.12	4.698E-01	0.00	0.00	0.00	-14.02
	100.00	-1171.12	4.698E-01	0.00	0.00	0.00	-37.51
18	BMATI						
	0.00	567.47	-2.240E-01	0.00	0.00	0.00	-24.73
	74.29	567.47	-2.240E-01	0.00	0.00	0.00	-8.09
	148.58	567.47	-2.240E-01	0.00	0.00	0.00	8.55
18	BHIDUP						
	0.00	51.34	-1.648E-02	0.00	0.00	0.00	-1.74
	74.29	51.34	-1.648E-02	0.00	0.00	0.00	-5.156E-01
	148.58	51.34	-1.648E-02	0.00	0.00	0.00	7.087E-01
18	BAKI						
	0.00	-54.75	4.751E-02	0.00	0.00	0.00	5.56
	74.29	-54.75	4.751E-02	0.00	0.00	0.00	2.03
	148.58	-54.75	4.751E-02	0.00	0.00	0.00	-1.50
18	BAKA						
	0.00	62.66	-5.371E-02	0.00	0.00	0.00	-8.15
	74.29	62.66	-5.371E-02	0.00	0.00	0.00	-2.16
	148.58	62.66	-5.371E-02	0.00	0.00	0.00	1.83
18	COMB1						
	0.00	794.46	-3.136E-01	0.00	0.00	0.00	-34.63
	74.29	794.46	-3.136E-01	0.00	0.00	0.00	-11.33
	148.58	794.46	-3.136E-01	0.00	0.00	0.00	11.97
18	COMB2						
	0.00	763.11	-2.952E-01	0.00	0.00	0.00	-32.46
	74.29	763.11	-2.952E-01	0.00	0.00	0.00	-10.53
	148.58	763.11	-2.952E-01	0.00	0.00	0.00	11.40
18	COMB3						
	0.00	577.75	-2.321E-01	0.00	0.00	0.00	-25.50
	74.29	577.75	-2.321E-01	0.00	0.00	0.00	-8.26
	148.58	577.75	-2.321E-01	0.00	0.00	0.00	8.98
18	COMB4						
	0.00	670.68	-2.608E-01	0.00	0.00	0.00	-28.92
	74.29	670.68	-2.608E-01	0.00	0.00	0.00	-9.54
	148.58	670.68	-2.608E-01	0.00	0.00	0.00	9.83
19	BMATI						
	0.00	-123.23	-9.980E-02	0.00	0.00	0.00	-6.04
	90.94	-123.23	-9.980E-02	0.00	0.00	0.00	3.03
	181.88	-123.23	-9.980E-02	0.00	0.00	0.00	12.11
19	BHIDUP						
	0.00	-46.58	-1.014E-02	0.00	0.00	0.00	-7.401E-01
	90.94	-46.58	-1.014E-02	0.00	0.00	0.00	1.819E-01
	181.88	-46.58	-1.014E-02	0.00	0.00	0.00	1.10
19	BAKI						
	0.00	-119.48	-6.018E-03	0.00	0.00	0.00	4.904E-02

	181.88	-119.48	-6.018E-03	0.00	0.00	0.00	1.14
19	BAKA						
	0.00	104.68	-1.207E-03	0.00	0.00	0.00	-5.907E-01
	90.94	104.68	-1.207E-03	0.00	0.00	0.00	-4.810E-01
	181.88	104.68	-1.207E-03	0.00	0.00	0.00	-3.712E-01
19	COMB1						
	0.00	-172.52	-1.397E-01	0.00	0.00	0.00	-8.46
	90.94	-172.52	-1.397E-01	0.00	0.00	0.00	4.24
	181.88	-172.52	-1.397E-01	0.00	0.00	0.00	16.95
19	COMB2						
	0.00	-222.40	-1.360E-01	0.00	0.00	0.00	-8.44
	90.94	-222.40	-1.360E-01	0.00	0.00	0.00	3.93
	181.88	-222.40	-1.360E-01	0.00	0.00	0.00	16.30
19	COMB3						
	0.00	-142.47	-1.092E-01	0.00	0.00	0.00	-6.75
	90.94	-142.47	-1.092E-01	0.00	0.00	0.00	3.18
	181.88	-142.47	-1.092E-01	0.00	0.00	0.00	13.11
19	COMB4						
	0.00	-128.63	-1.104E-01	0.00	0.00	0.00	-6.55
	90.94	-128.63	-1.104E-01	0.00	0.00	0.00	3.49
	181.88	-128.63	-1.104E-01	0.00	0.00	0.00	13.53
20	BMATI						
	0.00	-123.23	9.980E-02	0.00	0.00	0.00	12.11
	90.94	-123.23	9.980E-02	0.00	0.00	0.00	3.03
	181.88	-123.23	9.980E-02	0.00	0.00	0.00	-6.04
20	BHIDUP						
	0.00	-46.58	1.014E-02	0.00	0.00	0.00	1.10
	90.94	-46.58	1.014E-02	0.00	0.00	0.00	1.819E-01
	181.88	-46.58	1.014E-02	0.00	0.00	0.00	-7.401E-01
20	BAKI						
	0.00	104.68	1.207E-03	0.00	0.00	0.00	-3.712E-01
	90.94	104.68	1.207E-03	0.00	0.00	0.00	-4.810E-01
	181.88	104.68	1.207E-03	0.00	0.00	0.00	-5.907E-01
20	BAKA						
	0.00	-119.48	6.018E-03	0.00	0.00	0.00	1.14
	90.94	-119.48	6.018E-03	0.00	0.00	0.00	5.963E-01
	181.88	-119.48	6.018E-03	0.00	0.00	0.00	4.904E-02
20	COMB1						
	0.00	-172.52	1.397E-01	0.00	0.00	0.00	16.95
	90.94	-172.52	1.397E-01	0.00	0.00	0.00	4.24
	181.88	-172.52	1.397E-01	0.00	0.00	0.00	-8.46
20	COMB2						
	0.00	-222.40	1.360E-01	0.00	0.00	0.00	16.30
	90.94	-222.40	1.360E-01	0.00	0.00	0.00	3.93
	181.88	-222.40	1.360E-01	0.00	0.00	0.00	-8.44
20	COMB3						
	0.00	-142.47	1.092E-01	0.00	0.00	0.00	13.11
	90.94	-142.47	1.092E-01	0.00	0.00	0.00	3.18
	181.88	-142.47	1.092E-01	0.00	0.00	0.00	-6.75
20	COMB4						
	0.00	-128.63	1.104E-01	0.00	0.00	0.00	13.53
	90.94	-128.63	1.104E-01	0.00	0.00	0.00	3.49
	181.88	-128.63	1.104E-01	0.00	0.00	0.00	-6.55
21	BMATI						
	0.00	567.47	2.240E-01	0.00	0.00	0.00	8.55
	74.29	567.47	2.240E-01	0.00	0.00	0.00	-8.09
	148.58	567.47	2.240E-01	0.00	0.00	0.00	-24.73
21	BHIDUP						
	0.00	51.34	1.648E-02	0.00	0.00	0.00	7.087E-01
	74.29	51.34	1.648E-02	0.00	0.00	0.00	-5.156E-01
	148.58	51.34	1.648E-02	0.00	0.00	0.00	-1.74
21	BAKI						
	0.00	62.66	5.371E-02	0.00	0.00	0.00	1.83
	74.29	62.66	5.371E-02	0.00	0.00	0.00	-2.16
	148.58	62.66	5.371E-02	0.00	0.00	0.00	-6.15
21	BAKA						
	0.00	-54.75	-4.751E-02	0.00	0.00	0.00	-1.50
	74.29	-54.75	-4.751E-02	0.00	0.00	0.00	2.03
	148.58	-54.75	-4.751E-02	0.00	0.00	0.00	5.56
21	COMB1						
	0.00	794.46	3.136E-01	0.00	0.00	0.00	11.97
	74.29	794.46	3.136E-01	0.00	0.00	0.00	-11.33
	148.58	794.46	3.136E-01	0.00	0.00	0.00	-34.63
21	COMB2						
	0.00	763.11	2.952E-01	0.00	0.00	0.00	11.40
	74.29	763.11	2.952E-01	0.00	0.00	0.00	-10.53
	148.58	763.11	2.952E-01	0.00	0.00	0.00	-32.46
21	COMB3						
	0.00	577.75	2.321E-01	0.00	0.00	0.00	8.98
	74.29	577.75	2.321E-01	0.00	0.00	0.00	-8.26
	148.58	577.75	2.321E-01	0.00	0.00	0.00	-25.50
21	COMB4						
	0.00	670.68	2.608E-01	0.00	0.00	0.00	9.83
	74.29	670.68	2.608E-01	0.00	0.00	0.00	-9.54
	148.58	670.68	2.608E-01	0.00	0.00	0.00	-28.92



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Gedubu Head Quarters

L O A D C O M B I N A T I O N M U L T I P L I E R S

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
COMB1	ADD				COMB1
		BM	1.4000	STATIC(DEAD)	
COMB2	ADD				COMB2
		BM	1.2000	STATIC(DEAD)	
		BH	1.6000	STATIC(LIVE)	
COMB3	ADD				COMB3
		BM	1.2000	STATIC(DEAD)	
		BAKA	1.3000	STATIC(WIND)	
		BAKI	1.3000	STATIC(WIND)	
COMB4	ADD				COMB4
		BM	1.2000	STATIC(DEAD)	
		BAKA	-1.3000	STATIC(WIND)	
		BAKI	-1.3000	STATIC(WIND)	

Gedubu Head Quarters

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	BM	-6.090E-04	1.226E-03	-0.0127	0.0000	0.0000	0.0000
1	BH	-2.244E-04	-1.706E-06	-1.274E-03	0.0000	0.0000	0.0000
1	BAKA	-8.676E-06	2.874E-04	2.848E-04	0.0000	0.0000	0.0000
1	BAKI	-8.294E-06	-2.227E-04	-4.780E-04	0.0000	0.0000	0.0000
1	COMB1	-8.526E-04	1.716E-03	-0.0177	0.0000	0.0000	0.0000
1	COMB2	-1.090E-03	1.468E-03	-0.0172	0.0000	0.0000	0.0000
1	COMB3	-7.528E-04	1.555E-03	-0.0154	0.0000	0.0000	0.0000
1	COMB4	-7.087E-04	1.387E-03	-0.0149	0.0000	0.0000	0.0000
2	BM	-2.314E-03	-2.434E-03	-5.528E-03	0.0000	0.0000	0.0000
2	BH	-8.527E-04	-5.405E-05	-1.226E-03	0.0000	0.0000	0.0000
2	BAKA	-3.297E-05	1.436E-03	-4.564E-04	0.0000	0.0000	0.0000
2	BAKI	-3.151E-05	-1.333E-03	3.163E-04	0.0000	0.0000	0.0000
2	COMB1	-3.240E-03	-3.408E-03	-7.739E-03	0.0000	0.0000	0.0000
2	COMB2	-4.141E-03	-3.007E-03	-8.595E-03	0.0000	0.0000	0.0000
2	COMB3	-2.861E-03	-2.787E-03	-6.815E-03	0.0000	0.0000	0.0000
2	COMB4	-2.693E-03	-3.054E-03	-6.451E-03	0.0000	0.0000	0.0000
3	BM	-9.100E-03	4.791E-03	-0.0201	0.0000	0.0000	0.0000
3	BH	-3.034E-03	1.591E-03	-4.905E-03	0.0000	0.0000	0.0000
3	BAKA	-1.349E-04	1.731E-03	-8.981E-04	0.0000	0.0000	0.0000
3	BAKI	-1.285E-04	-1.511E-03	4.617E-04	0.0000	0.0000	0.0000
3	COMB1	-0.0127	6.707E-03	-0.0281	0.0000	0.0000	0.0000
3	COMB2	-0.0158	8.295E-03	-0.0320	0.0000	0.0000	0.0000
3	COMB3	-0.0113	6.035E-03	-0.0247	0.0000	0.0000	0.0000
3	COMB4	-0.0106	5.462E-03	-0.0236	0.0000	0.0000	0.0000
4	BM	-0.0185	0.0000	-0.0216	0.0000	0.0000	0.0000
4	BH	-4.816E-03	0.0000	-4.695E-03	0.0000	0.0000	0.0000
4	BAKA	-2.971E-04	1.244E-03	-2.081E-04	0.0000	0.0000	0.0000
4	BAKI	-2.808E-04	-1.228E-03	-1.952E-04	0.0000	0.0000	0.0000
4	COMB1	-0.0259	0.0000	-0.0302	0.0000	0.0000	0.0000
4	COMB2	-0.0299	0.0000	-0.0334	0.0000	0.0000	0.0000
4	COMB3	-0.0230	2.013E-05	-0.0264	0.0000	0.0000	0.0000
4	COMB4	-0.0215	-2.013E-05	-0.0254	0.0000	0.0000	0.0000
5	BM	-9.100E-03	-4.791E-03	-0.0201	0.0000	0.0000	0.0000
5	BH	-3.034E-03	-1.591E-03	-4.905E-03	0.0000	0.0000	0.0000
5	BAKA	-1.349E-04	1.526E-03	4.429E-04	0.0000	0.0000	0.0000
5	BAKI	-1.285E-04	-1.723E-03	-8.929E-04	0.0000	0.0000	0.0000
5	COMB1	-0.0127	-6.707E-03	-0.0281	0.0000	0.0000	0.0000
5	COMB2	-0.0158	-8.295E-03	-0.0320	0.0000	0.0000	0.0000
5	COMB3	-0.0113	-6.005E-03	-0.0247	0.0000	0.0000	0.0000
5	COMB4	-0.0106	-5.493E-03	-0.0235	0.0000	0.0000	0.0000
6	BM	-2.314E-03	2.434E-03	-5.528E-03	0.0000	0.0000	0.0000
6	BH	-8.527E-04	5.405E-05	-1.226E-03	0.0000	0.0000	0.0000
6	BAKA	-3.297E-05	1.343E-03	2.814E-04	0.0000	0.0000	0.0000
6	BAKI	-3.151E-05	-1.432E-03	-4.563E-04	0.0000	0.0000	0.0000
6	COMB1	-3.240E-03	3.408E-03	-7.739E-03	0.0000	0.0000	0.0000
6	COMB2	-4.141E-03	3.007E-03	-8.595E-03	0.0000	0.0000	0.0000

6	COMB4	-2.695E-03	3.037E-03	-8.408E-03	0.0000	0.0000	0.0000
7	BM	-6.090E-04	-1.226E-03	-0.0127	0.0000	0.0000	0.0000
7	BH	-2.244E-04	1.706E-06	-1.274E-03	0.0000	0.0000	0.0000
7	BAKA	-8.676E-06	1.799E-04	-6.259E-04	0.0000	0.0000	0.0000
7	BAKI	-8.294E-06	-2.874E-04	2.814E-04	0.0000	0.0000	0.0000
7	COMB1	-8.526E-04	-1.716E-03	-0.0177	0.0000	0.0000	0.0000
7	COMB2	-1.090E-03	-1.468E-03	-0.0172	0.0000	0.0000	0.0000
7	COMB3	-7.528E-04	-1.611E-03	-0.0156	0.0000	0.0000	0.0000
7	COMB4	-7.087E-04	-1.331E-03	-0.0147	0.0000	0.0000	0.0000
8	BM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	BH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	BAKA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	BAKI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	COMB1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	COMB2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	COMB3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	COMB4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	BM	-3.988E-03	-5.101E-04	-0.0179	0.0000	0.0000	0.0000
9	BH	-1.592E-03	2.969E-05	-4.299E-03	0.0000	0.0000	0.0000
9	BAKA	-5.480E-05	1.122E-03	-1.040E-03	0.0000	0.0000	0.0000
9	BAKI	-5.258E-05	-1.057E-03	6.231E-04	0.0000	0.0000	0.0000
9	COMB1	-5.584E-03	-7.142E-04	-0.0251	0.0000	0.0000	0.0000
9	COMB2	-7.333E-03	-5.647E-04	-0.0284	0.0000	0.0000	0.0000
9	COMB3	-4.926E-03	-5.275E-04	-0.0220	0.0000	0.0000	0.0000
9	COMB4	-4.647E-03	-6.969E-04	-0.0210	0.0000	0.0000	0.0000
10	BM	-8.929E-03	0.0000	-0.0255	0.0000	0.0000	0.0000
10	BH	-3.784E-03	0.0000	-6.412E-03	0.0000	0.0000	0.0000
10	BAKA	-1.190E-04	1.165E-03	-2.551E-04	0.0000	0.0000	0.0000
10	BAKI	-1.146E-04	-1.160E-03	-2.455E-04	0.0000	0.0000	0.0000
10	COMB1	-0.0125	0.0000	-0.0357	0.0000	0.0000	0.0000
10	COMB2	-0.0168	0.0000	-0.0408	0.0000	0.0000	0.0000
10	COMB3	-0.0110	6.480E-06	-0.0312	0.0000	0.0000	0.0000
10	COMB4	-0.0104	-6.480E-06	-0.0299	0.0000	0.0000	0.0000
11	BM	-3.988E-03	5.101E-04	-0.0179	0.0000	0.0000	0.0000
11	BH	-1.592E-03	-2.969E-05	-4.299E-03	0.0000	0.0000	0.0000
11	BAKA	-5.480E-05	1.058E-03	6.081E-04	0.0000	0.0000	0.0000
11	BAKI	-5.258E-05	-1.120E-03	-1.035E-03	0.0000	0.0000	0.0000
11	COMB1	-5.584E-03	7.142E-04	-0.0251	0.0000	0.0000	0.0000
11	COMB2	-7.333E-03	5.647E-04	-0.0284	0.0000	0.0000	0.0000
11	COMB3	-4.926E-03	5.317E-04	-0.0220	0.0000	0.0000	0.0000
11	COMB4	-4.647E-03	6.927E-04	-0.0209	0.0000	0.0000	0.0000
12	BM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	BH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	BAKA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	BAKI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	COMB1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	COMB2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	COMB3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
12	COMB4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	BM	-1.255E-03	0.0000	-4.282E-03	0.0000	0.0000	0.0000
20	BH	-4.533E-06	0.0000	1.622E-03	0.0000	0.0000	0.0000
20	BAKA	0.0000	3.791E-05	8.652E-05	0.0000	0.0000	0.0000
20	BAKI	0.0000	-3.769E-05	8.328E-05	0.0000	0.0000	0.0000
20	COMB1	-1.757E-03	0.0000	-5.995E-03	0.0000	0.0000	0.0000
20	COMB2	-1.513E-03	0.0000	-2.544E-03	0.0000	0.0000	0.0000
20	COMB3	-1.507E-03	0.0000	-4.918E-03	0.0000	0.0000	0.0000
20	COMB4	-1.506E-03	0.0000	-5.360E-03	0.0000	0.0000	0.0000
21	BM	-4.339E-03	0.0000	-3.819E-03	0.0000	0.0000	0.0000
21	BH	-2.626E-03	0.0000	-9.895E-04	0.0000	0.0000	0.0000
21	BAKA	-8.738E-05	1.441E-04	0.0000	0.0000	0.0000	0.0000
21	BAKI	-8.411E-05	-1.432E-04	0.0000	0.0000	0.0000	0.0000
21	COMB1	-6.075E-03	0.0000	-5.346E-03	0.0000	0.0000	0.0000
21	COMB2	-9.408E-03	0.0000	-6.165E-03	0.0000	0.0000	0.0000
21	COMB3	-5.430E-03	1.124E-06	-4.583E-03	0.0000	0.0000	0.0000
21	COMB4	-4.984E-03	-1.124E-06	-4.582E-03	0.0000	0.0000	0.0000
22	BM	-0.0157	0.0000	-0.0175	0.0000	0.0000	0.0000
22	BH	-5.483E-03	0.0000	-5.066E-03	0.0000	0.0000	0.0000
22	BAKA	-2.165E-04	7.768E-04	-1.293E-04	0.0000	0.0000	0.0000
22	BAKI	-2.084E-04	-7.712E-04	-1.244E-04	0.0000	0.0000	0.0000
22	COMB1	-0.0220	0.0000	-0.0245	0.0000	0.0000	0.0000
22	COMB2	-0.0276	0.0000	-0.0291	0.0000	0.0000	0.0000
22	COMB3	-0.0194	7.280E-06	-0.0213	0.0000	0.0000	0.0000
22	COMB4	-0.0183	-7.280E-06	-0.0207	0.0000	0.0000	0.0000
23	BM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	BH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	BAKA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	BAKI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	COMB1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	COMB2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	COMB3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
23	COMB4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24	BM	-4.358E-03	0.0000	-0.0164	0.0000	0.0000	0.0000
24	BH	-2.276E-03	0.0000	-4.681E-03	0.0000	0.0000	0.0000
24	BAKA	-5.909E-05	4.926E-04	-1.289E-04	0.0000	0.0000	0.0000

24	COMB1	-6.101E-03	0.0000	-0.0230	0.0000	0.0000	0.0000
24	COMB2	-8.872E-03	0.0000	-0.0272	0.0000	0.0000	0.0000
24	COMB3	-5.381E-03	3.376E-06	-0.0200	0.0000	0.0000	0.0000
24	COMB4	-5.079E-03	-3.376E-06	-0.0194	0.0000	0.0000	0.0000
25	BM	-1.987E-03	-1.695E-03	-0.0130	0.0000	0.0000	0.0000
25	BH	-2.448E-04	2.400E-04	1.594E-03	0.0000	0.0000	0.0000
25	BAKA	-2.856E-05	3.031E-05	-7.476E-04	0.0000	0.0000	0.0000
25	BAKI	1.139E-05	-1.352E-05	9.112E-04	0.0000	0.0000	0.0000
25	COMB1	-2.782E-03	-2.372E-03	-0.0183	0.0000	0.0000	0.0000
25	COMB2	-2.776E-03	-1.649E-03	-0.0131	0.0000	0.0000	0.0000
25	COMB3	-2.406E-03	-2.012E-03	-0.0154	0.0000	0.0000	0.0000
25	COMB4	-2.362E-03	-2.055E-03	-0.0159	0.0000	0.0000	0.0000
26	BM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	BH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	BAKA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	BAKI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	COMB1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	COMB2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	COMB3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
26	COMB4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
27	BM	-8.630E-04	-3.556E-05	-3.495E-03	0.0000	0.0000	0.0000
27	BH	-1.938E-03	-5.657E-04	-8.982E-04	0.0000	0.0000	0.0000
27	BAKA	2.792E-04	4.458E-04	-2.711E-05	0.0000	0.0000	0.0000
27	BAKI	-4.100E-04	-4.805E-04	2.618E-05	0.0000	0.0000	0.0000
27	COMB1	-1.208E-03	-4.978E-05	-4.893E-03	0.0000	0.0000	0.0000
27	COMB2	-4.136E-03	-9.477E-04	-5.631E-03	0.0000	0.0000	0.0000
27	COMB3	-1.206E-03	-8.776E-05	-4.195E-03	0.0000	0.0000	0.0000
27	COMB4	-8.656E-04	2.421E-06	-4.193E-03	0.0000	0.0000	0.0000
28	BM	-6.390E-04	-3.243E-03	-0.0196	0.0000	0.0000	0.0000
28	BH	-1.159E-03	-1.271E-03	-5.592E-03	0.0000	0.0000	0.0000
28	BAKA	-9.464E-04	1.575E-03	2.967E-06	0.0000	0.0000	0.0000
28	BAKI	8.260E-04	-1.567E-03	-2.573E-04	0.0000	0.0000	0.0000
28	COMB1	-8.946E-04	-4.541E-03	-0.0275	0.0000	0.0000	0.0000
28	COMB2	-2.622E-03	-5.925E-03	-0.0325	0.0000	0.0000	0.0000
28	COMB3	-9.234E-04	-3.882E-03	-0.0239	0.0000	0.0000	0.0000
28	COMB4	-6.103E-04	-3.902E-03	-0.0232	0.0000	0.0000	0.0000
29	BM	-0.0138	-1.760E-03	-0.0200	0.0000	0.0000	0.0000
29	BH	-6.442E-03	6.562E-04	-5.877E-03	0.0000	0.0000	0.0000
29	BAKA	-5.216E-04	1.424E-03	-2.143E-05	0.0000	0.0000	0.0000
29	BAKI	1.588E-04	-1.477E-03	-2.340E-04	0.0000	0.0000	0.0000
29	COMB1	-0.0194	-2.465E-03	-0.0281	0.0000	0.0000	0.0000
29	COMB2	-0.0269	-1.063E-03	-0.0334	0.0000	0.0000	0.0000
29	COMB3	-0.0171	-2.181E-03	-0.0244	0.0000	0.0000	0.0000
29	COMB4	-0.0161	-2.044E-03	-0.0237	0.0000	0.0000	0.0000
34	BM	-1.987E-03	1.695E-03	-0.0130	0.0000	0.0000	0.0000
34	BH	-2.448E-04	-2.400E-04	1.594E-03	0.0000	0.0000	0.0000
34	BAKA	1.113E-05	1.329E-05	9.201E-04	0.0000	0.0000	0.0000
34	BAKI	-2.811E-05	-2.986E-05	-7.452E-04	0.0000	0.0000	0.0000
34	COMB1	-2.782E-03	2.372E-03	-0.0183	0.0000	0.0000	0.0000
34	COMB2	-2.776E-03	1.649E-03	-0.0131	0.0000	0.0000	0.0000
34	COMB3	-2.406E-03	2.012E-03	-0.0154	0.0000	0.0000	0.0000
34	COMB4	-2.362E-03	2.055E-03	-0.0159	0.0000	0.0000	0.0000
35	BM	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	BH	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	BAKA	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	BAKI	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	COMB1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	COMB2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	COMB3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
35	COMB4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
37	BM	-8.630E-04	3.556E-05	-3.495E-03	0.0000	0.0000	0.0000
37	BH	-1.938E-03	5.657E-04	-8.982E-04	0.0000	0.0000	0.0000
37	BAKA	-4.149E-04	4.840E-04	2.683E-05	0.0000	0.0000	0.0000
37	BAKI	2.795E-04	-4.436E-04	-2.645E-05	0.0000	0.0000	0.0000
37	COMB1	-1.208E-03	4.978E-05	-4.893E-03	0.0000	0.0000	0.0000
37	COMB2	-4.136E-03	9.477E-04	-5.631E-03	0.0000	0.0000	0.0000
37	COMB3	-1.212E-03	9.513E-05	-4.194E-03	0.0000	0.0000	0.0000
37	COMB4	-8.597E-04	-9.784E-06	-4.195E-03	0.0000	0.0000	0.0000
38	BM	-6.390E-04	3.243E-03	-0.0196	0.0000	0.0000	0.0000
38	BH	-1.159E-03	1.271E-03	-5.592E-03	0.0000	0.0000	0.0000
38	BAKA	8.272E-04	1.574E-03	-2.606E-04	0.0000	0.0000	0.0000
38	BAKI	-9.403E-04	-1.568E-03	9.326E-06	0.0000	0.0000	0.0000
38	COMB1	-8.946E-04	4.541E-03	-0.0275	0.0000	0.0000	0.0000
38	COMB2	-2.622E-03	5.925E-03	-0.0325	0.0000	0.0000	0.0000
38	COMB3	-9.138E-04	3.899E-03	-0.0239	0.0000	0.0000	0.0000
38	COMB4	-6.199E-04	3.885E-03	-0.0232	0.0000	0.0000	0.0000
39	BM	-0.0138	1.760E-03	-0.0200	0.0000	0.0000	0.0000
39	BH	-6.442E-03	-6.562E-04	-5.877E-03	0.0000	0.0000	0.0000
39	BAKA	1.563E-04	1.490E-03	-2.367E-04	0.0000	0.0000	0.0000
39	BAKI	-5.091E-04	-1.412E-03	-1.441E-05	0.0000	0.0000	0.0000
39	COMB1	-0.0194	2.465E-03	-0.0281	0.0000	0.0000	0.0000
39	COMB2	-0.0269	1.063E-03	-0.0334	0.0000	0.0000	0.0000
39	COMB3	-0.0171	2.214E-03	-0.0244	0.0000	0.0000	0.0000
39	COMB4	-0.0161	2.011E-03	-0.0237	0.0000	0.0000	0.0000

Gedubu Head Quarters

J O I N T R E A C T I O N S

JOINT	LOAD	F1	F2	F3	M1	M2	M3
8	BM	1.5845	537.3408	1236.9620	0.0000	0.0000	0.0000
8	BH	0.6046	163.7335	274.4357	0.0000	0.0000	0.0000
8	BAKA	0.0222	-100.1489	49.0042	0.0000	0.0000	0.0000
8	BAKI	0.0213	100.3390	-21.3615	0.0000	0.0000	0.0000
8	COMB1	2.2183	752.2771	1731.7469	0.0000	0.0000	0.0000
8	COMB2	2.8688	906.7825	1923.4516	0.0000	0.0000	0.0000
8	COMB3	1.9580	645.0561	1520.2900	0.0000	0.0000	0.0000
8	COMB4	1.8448	644.5617	1448.4189	0.0000	0.0000	0.0000
12	BM	1.5845	-537.3408	1236.9620	0.0000	0.0000	0.0000
12	BH	0.6046	-163.7335	274.4357	0.0000	0.0000	0.0000
12	BAKA	0.0222	-94.0862	-15.4004	0.0000	0.0000	0.0000
12	BAKI	0.0213	100.1318	48.9958	0.0000	0.0000	0.0000
12	COMB1	2.2183	-752.2771	1731.7469	0.0000	0.0000	0.0000
12	COMB2	2.8688	-906.7825	1923.4516	0.0000	0.0000	0.0000
12	COMB3	1.9580	-636.9497	1528.0285	0.0000	0.0000	0.0000
12	COMB4	1.8448	-652.6682	1440.6804	0.0000	0.0000	0.0000
23	BM	-69.0370	0.0000	744.6834	0.0000	0.0000	0.0000
23	BH	9.1791	0.0000	155.8586	0.0000	0.0000	0.0000
23	BAKA	-0.0304	-0.2091	0.0662	0.0000	0.0000	0.0000
23	BAKI	-0.0290	0.2079	0.0630	0.0000	0.0000	0.0000
23	COMB1	-96.6518	0.0000	1042.5568	0.0000	0.0000	0.0000
23	COMB2	-68.1579	0.0000	1142.9938	0.0000	0.0000	0.0000
23	COMB3	-82.9217	-1.552E-03	893.7881	0.0000	0.0000	0.0000
23	COMB4	-82.7671	1.552E-03	893.4521	0.0000	0.0000	0.0000
26	BM	32.9340	32.8862	647.6662	0.0000	0.0000	0.0000
26	BH	-5.1941	-5.3236	147.6350	0.0000	0.0000	0.0000
26	BAKA	-21.2005	-21.6384	14.2796	0.0000	0.0000	0.0000
26	BAKI	21.0603	21.4773	-14.0434	0.0000	0.0000	0.0000
26	COMB1	46.1076	46.0407	906.7327	0.0000	0.0000	0.0000
26	COMB2	31.2102	30.9457	1013.4154	0.0000	0.0000	0.0000
26	COMB3	39.3385	39.2540	777.5066	0.0000	0.0000	0.0000
26	COMB4	39.7031	39.6728	776.8923	0.0000	0.0000	0.0000
35	BM	32.9340	-32.8862	647.6662	0.0000	0.0000	0.0000
35	BH	-5.1941	5.3236	147.6350	0.0000	0.0000	0.0000
35	BAKA	21.1865	-21.6053	-14.2068	0.0000	0.0000	0.0000
35	BAKI	-21.0738	21.5090	14.1130	0.0000	0.0000	0.0000
35	COMB1	46.1076	-46.0407	906.7327	0.0000	0.0000	0.0000
35	COMB2	31.2102	-30.9457	1013.4154	0.0000	0.0000	0.0000
35	COMB3	39.6673	-39.5886	777.0776	0.0000	0.0000	0.0000
35	COMB4	39.3744	-39.3383	777.3213	0.0000	0.0000	0.0000

Gedubu Head Quarters

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
1	BM							
		0.00	280.19	5.690E-01	-4.192E-01	0.00	-29.64	40.24
		70.71	280.19	5.690E-01	-4.192E-01	0.00	0.00	0.00
		141.42	280.19	5.690E-01	-4.192E-01	0.00	29.64	-40.24
1	BH							
		0.00	-3.839E-01	5.268E-03	-1.545E-01	0.00	-10.92	3.725E-01
		70.71	-3.839E-01	5.268E-03	-1.545E-01	0.00	0.00	0.00
		141.42	-3.839E-01	5.268E-03	-1.545E-01	0.00	10.92	-3.725E-01
1	BAKA							
		0.00	32.82	-32.73	-5.973E-03	0.00	-4.223E-01	-7.04
		70.71	32.82	-9.959E-02	-5.973E-03	0.00	0.00	0.00
		141.42	32.82	69.06	-5.973E-03	0.00	4.223E-01	7.04
1	BAKI							
		0.00	-25.47	25.33	-5.709E-03	0.00	-4.037E-01	7.10
		70.71	-25.47	1.004E-01	-5.709E-03	0.00	0.00	0.00
		141.42	-25.47	-55.23	-5.709E-03	0.00	4.037E-01	-7.10
1	COMB1							
		0.00	392.27	7.966E-01	-5.869E-01	0.00	-41.50	56.33
		70.71	392.27	7.966E-01	-5.869E-01	0.00	0.00	0.00
		141.42	392.27	7.966E-01	-5.869E-01	0.00	41.50	-56.33
1	COMB2							

	70.71	335.61	6.912E-01	-7.502E-01	0.00	0.00	0.00
	141.42	335.61	6.912E-01	-7.502E-01	0.00	53.05	-48.88
1	COMB3						
	0.00	345.79	-8.95	-5.182E-01	0.00	-36.64	48.36
	70.71	345.79	6.839E-01	-5.182E-01	0.00	0.00	0.00
	141.42	345.79	18.67	-5.182E-01	0.00	36.64	-48.36
1	COMB4						
	0.00	326.67	10.31	-4.879E-01	0.00	-34.50	48.21
	70.71	326.67	6.818E-01	-4.879E-01	0.00	0.00	0.00
	141.42	326.67	-17.30	-4.879E-01	0.00	34.50	-48.21
2	BM						
	0.00	-408.78	-3.776E-01	-5.502E-01	0.00	-56.41	-38.71
	102.53	-408.78	-3.776E-01	-5.502E-01	0.00	0.00	0.00
	205.06	-408.78	-3.776E-01	-5.502E-01	0.00	56.41	38.71
2	BH						
	0.00	-113.11	-9.221E-02	-1.769E-01	0.00	-18.14	-9.45
	102.53	-113.11	-9.221E-02	-1.769E-01	0.00	0.00	0.00
	205.06	-113.11	-9.221E-02	-1.769E-01	0.00	18.14	9.45
2	BAKA						
	0.00	-8.11	-1.277E-02	-8.269E-03	0.00	-8.478E-01	-1.31
	102.53	-8.11	-1.277E-02	-8.269E-03	0.00	0.00	0.00
	205.06	-8.11	-1.277E-02	-8.269E-03	0.00	8.478E-01	1.31
2	BAKI						
	0.00	-1.83	5.606E-03	-7.863E-03	0.00	-8.062E-01	5.747E-01
	102.53	-1.83	5.606E-03	-7.863E-03	0.00	0.00	0.00
	205.06	-1.83	5.606E-03	-7.863E-03	0.00	8.062E-01	-5.747E-01
2	COMB1						
	0.00	-572.29	-5.286E-01	-7.703E-01	0.00	-78.98	-54.19
	102.53	-572.29	-5.286E-01	-7.703E-01	0.00	0.00	0.00
	205.06	-572.29	-5.286E-01	-7.703E-01	0.00	78.98	54.19
2	COMB2						
	0.00	-671.50	-6.006E-01	-9.433E-01	0.00	-96.71	-61.58
	102.53	-671.50	-6.006E-01	-9.433E-01	0.00	0.00	0.00
	205.06	-671.50	-6.006E-01	-9.433E-01	0.00	96.71	61.58
2	COMB3						
	0.00	-503.45	-4.624E-01	-6.812E-01	0.00	-69.85	-47.41
	102.53	-503.45	-4.624E-01	-6.812E-01	0.00	0.00	0.00
	205.06	-503.45	-4.624E-01	-6.812E-01	0.00	69.85	47.41
2	COMB4						
	0.00	-477.61	-4.437E-01	-6.393E-01	0.00	-65.55	-45.50
	102.53	-477.61	-4.437E-01	-6.393E-01	0.00	0.00	0.00
	205.06	-477.61	-4.437E-01	-6.393E-01	0.00	65.55	45.50
3	BM						
	0.00	-348.97	5.727E-02	-7.632E-01	0.00	-78.25	5.87
	102.53	-348.97	5.727E-02	-7.632E-01	0.00	0.00	0.00
	205.06	-348.97	5.727E-02	-7.632E-01	0.00	78.25	-5.87
3	BH						
	0.00	-76.80	3.119E-02	-1.444E-01	0.00	-14.81	3.20
	102.53	-76.80	3.119E-02	-1.444E-01	0.00	0.00	0.00
	205.06	-76.80	3.119E-02	-1.444E-01	0.00	14.81	-3.20
3	BAKA						
	0.00	11.26	-64.71	-1.315E-02	0.00	-1.35	2.09
	102.53	11.26	2.039E-02	-1.315E-02	0.00	0.00	0.00
	205.06	11.26	25.42	-1.315E-02	0.00	1.35	-2.09
3	BAKI						
	0.00	-20.82	51.77	-1.235E-02	0.00	-1.27	-1.67
	102.53	-20.82	-1.627E-02	-1.235E-02	0.00	0.00	0.00
	205.06	-20.82	-20.33	-1.235E-02	0.00	1.27	1.67
3	COMB1						
	0.00	-488.56	8.017E-02	-1.07	0.00	-109.55	8.22
	102.53	-488.56	8.017E-02	-1.07	0.00	0.00	0.00
	205.06	-488.56	8.017E-02	-1.07	0.00	109.55	-8.22
3	COMB2						
	0.00	-541.65	1.186E-01	-1.15	0.00	-117.60	12.16
	102.53	-541.65	1.186E-01	-1.15	0.00	0.00	0.00
	205.06	-541.65	1.186E-01	-1.15	0.00	117.60	-12.16
3	COMB3						
	0.00	-431.18	-16.76	-9.490E-01	0.00	-97.30	7.60
	102.53	-431.18	7.408E-02	-9.490E-01	0.00	0.00	0.00
	205.06	-431.18	6.68	-9.490E-01	0.00	97.30	-7.60
3	COMB4						
	0.00	-406.35	16.89	-8.827E-01	0.00	-90.50	6.50
	102.53	-406.35	6.336E-02	-8.827E-01	0.00	0.00	0.00
	205.06	-406.35	-6.54	-8.827E-01	0.00	90.50	-6.50
4	BM						
	0.00	-348.97	-5.727E-02	7.632E-01	0.00	78.25	-5.87
	102.53	-348.97	-5.727E-02	7.632E-01	0.00	0.00	0.00
	205.06	-348.97	-5.727E-02	7.632E-01	0.00	-78.25	5.87
4	BH						
	0.00	-76.80	-3.119E-02	1.444E-01	0.00	14.81	-3.20
	102.53	-76.80	-3.119E-02	1.444E-01	0.00	0.00	0.00
	205.06	-76.80	-3.119E-02	1.444E-01	0.00	-14.81	3.20
4	BAKA						
	0.00	-20.49	20.33	1.315E-02	0.00	1.35	1.66
	102.53	-20.49	1.617E-02	1.315E-02	0.00	0.00	0.00
	205.06	-20.49	-51.77	1.315E-02	0.00	-1.35	-1.66
4	BAKI						
	0.00	11.29	-25.42	1.235E-02	0.00	1.27	-2.12
	102.53	11.29	-2.065E-02	1.235E-02	0.00	0.00	0.00
	205.06	11.29	64.71	1.235E-02	0.00	-1.27	2.12
4	COMB1						
	0.00	-488.56	-8.017E-02	1.07	0.00	109.55	-8.22

	205.06	-488.56	-8.017E-02	1.07	0.00	-109.33	8.22
4	COMB2							
	0.00	-541.65	-1.186E-01	1.15	0.00	117.60	-12.16
	102.53	-541.65	-1.186E-01	1.15	0.00	0.00	0.00
	205.06	-541.65	-1.186E-01	1.15	0.00	-117.60	12.16
4	COMB3							
	0.00	-430.73	-6.68	9.490E-01	0.00	97.30	-7.64
	102.53	-430.73	-7.455E-02	9.490E-01	0.00	0.00	0.00
	205.06	-430.73	16.76	9.490E-01	0.00	-97.30	7.64
4	COMB4							
	0.00	-406.80	6.54	8.827E-01	0.00	90.50	-6.45
	102.53	-406.80	-6.289E-02	8.827E-01	0.00	0.00	0.00
	205.06	-406.80	-16.89	8.827E-01	0.00	-90.50	6.45
5	BM							
	0.00	-408.78	3.776E-01	5.502E-01	0.00	56.41	38.71
	102.53	-408.78	3.776E-01	5.502E-01	0.00	0.00	0.00
	205.06	-408.78	3.776E-01	5.502E-01	0.00	-56.41	-38.71
5	BH							
	0.00	-113.11	9.221E-02	1.769E-01	0.00	18.14	9.45
	102.53	-113.11	9.221E-02	1.769E-01	0.00	0.00	0.00
	205.06	-113.11	9.221E-02	1.769E-01	0.00	-18.14	-9.45
5	BAKA							
	0.00	-1.23	-5.980E-03	8.269E-03	0.00	8.478E-01	-6.131E-01
	102.53	-1.23	-5.980E-03	8.269E-03	0.00	0.00	0.00
	205.06	-1.23	-5.980E-03	8.269E-03	0.00	-8.478E-01	6.131E-01
5	BAKI							
	0.00	-8.09	1.261E-02	7.863E-03	0.00	8.062E-01	1.29
	102.53	-8.09	1.261E-02	7.863E-03	0.00	0.00	0.00
	205.06	-8.09	1.261E-02	7.863E-03	0.00	-8.062E-01	-1.29
5	COMB1							
	0.00	-572.29	5.286E-01	7.703E-01	0.00	78.98	54.19
	102.53	-572.29	5.286E-01	7.703E-01	0.00	0.00	0.00
	205.06	-572.29	5.286E-01	7.703E-01	0.00	-78.98	-54.19
5	COMB2							
	0.00	-671.50	6.006E-01	9.433E-01	0.00	96.71	61.58
	102.53	-671.50	6.006E-01	9.433E-01	0.00	0.00	0.00
	205.06	-671.50	6.006E-01	9.433E-01	0.00	-96.71	-61.58
5	COMB3							
	0.00	-502.66	4.617E-01	6.812E-01	0.00	69.85	47.34
	102.53	-502.66	4.617E-01	6.812E-01	0.00	0.00	0.00
	205.06	-502.66	4.617E-01	6.812E-01	0.00	-69.85	-47.34
5	COMB4							
	0.00	-478.41	4.444E-01	6.393E-01	0.00	65.55	45.57
	102.53	-478.41	4.444E-01	6.393E-01	0.00	0.00	0.00
	205.06	-478.41	4.444E-01	6.393E-01	0.00	-65.55	-45.57
6	BM							
	0.00	280.19	-5.690E-01	4.192E-01	0.00	29.64	-40.24
	70.71	280.19	-5.690E-01	4.192E-01	0.00	0.00	0.00
	141.42	280.19	-5.690E-01	4.192E-01	0.00	-29.64	40.24
6	BH							
	0.00	-3.839E-01	-5.268E-03	1.545E-01	0.00	10.92	-3.725E-01
	70.71	-3.839E-01	-5.268E-03	1.545E-01	0.00	0.00	0.00
	141.42	-3.839E-01	-5.268E-03	1.545E-01	0.00	-10.92	3.725E-01
6	BAKA							
	0.00	-20.61	51.68	5.973E-03	0.00	4.223E-01	-7.72
	70.71	-20.61	-1.091E-01	5.973E-03	0.00	0.00	0.00
	141.42	-20.61	-20.43	5.973E-03	0.00	-4.223E-01	7.72
6	BAKI							
	0.00	32.82	-69.07	5.709E-03	0.00	4.037E-01	7.02
	70.71	32.82	9.923E-02	5.709E-03	0.00	0.00	0.00
	141.42	32.82	32.74	5.709E-03	0.00	-4.037E-01	-7.02
6	COMB1							
	0.00	392.27	-7.966E-01	5.869E-01	0.00	41.50	-56.33
	70.71	392.27	-7.966E-01	5.869E-01	0.00	0.00	0.00
	141.42	392.27	-7.966E-01	5.869E-01	0.00	-41.50	56.33
6	COMB2							
	0.00	335.61	-6.912E-01	7.502E-01	0.00	53.05	-48.88
	70.71	335.61	-6.912E-01	7.502E-01	0.00	0.00	0.00
	141.42	335.61	-6.912E-01	7.502E-01	0.00	-53.05	48.88
6	COMB3							
	0.00	352.10	-23.29	5.182E-01	0.00	36.64	-49.19
	70.71	352.10	-6.957E-01	5.182E-01	0.00	0.00	0.00
	141.42	352.10	15.32	5.182E-01	0.00	-36.64	49.19
6	COMB4							
	0.00	320.36	21.92	4.879E-01	0.00	34.50	-47.37
	70.71	320.36	-6.700E-01	4.879E-01	0.00	0.00	0.00
	141.42	320.36	-16.68	4.879E-01	0.00	-34.50	47.37
7	BM							
	0.00	-197.72	2.66	4.192E-01	0.00	20.96	133.08
	25.00	-197.72	2.66	4.192E-01	0.00	10.48	66.54
	50.00	-197.72	2.66	4.192E-01	0.00	0.00	0.00
	75.00	-197.72	2.66	4.192E-01	0.00	-10.48	-66.54
	100.00	-197.72	2.66	4.192E-01	0.00	-20.96	-133.08
7	BH							
	0.00	2.752E-01	2.677E-01	1.545E-01	0.00	7.72	13.39
	25.00	2.752E-01	2.677E-01	1.545E-01	0.00	3.86	6.69
	50.00	2.752E-01	2.677E-01	1.545E-01	0.00	0.00	0.00
	75.00	2.752E-01	2.677E-01	1.545E-01	0.00	-3.86	-6.69
	100.00	2.752E-01	2.677E-01	1.545E-01	0.00	-7.72	-13.39
7	BAKA							
	0.00	-46.35	-5.987E-02	5.973E-03	0.00	2.986E-01	-2.99
	25.00	-46.35	-5.987E-02	5.973E-03	0.00	1.493E-01	-1.50

B2

	75.00	-46.35	-5.987E-02	5.973E-03	0.00	-1.495E-01	1.50
	100.00	-46.35	-5.987E-02	5.973E-03	0.00	-2.986E-01	2.99
7	BAKI						
	0.00	35.92	1.005E-01	5.709E-03	0.00	2.855E-01	5.02
	25.00	35.92	1.005E-01	5.709E-03	0.00	1.427E-01	2.51
	50.00	35.92	1.005E-01	5.709E-03	0.00	0.00	0.00
	75.00	35.92	1.005E-01	5.709E-03	0.00	-1.427E-01	-2.51
	100.00	35.92	1.005E-01	5.709E-03	0.00	-2.855E-01	-5.02
7	COMB1						
	0.00	-276.81	3.73	5.869E-01	0.00	29.34	186.31
	25.00	-276.81	3.73	5.869E-01	0.00	14.67	93.15
	50.00	-276.81	3.73	5.869E-01	0.00	0.00	0.00
	75.00	-276.81	3.73	5.869E-01	0.00	-14.67	-93.15
	100.00	-276.81	3.73	5.869E-01	0.00	-29.34	-186.31
7	COMB2						
	0.00	-236.83	3.62	7.502E-01	0.00	37.51	181.11
	25.00	-236.83	3.62	7.502E-01	0.00	18.75	90.56
	50.00	-236.83	3.62	7.502E-01	0.00	0.00	0.00
	75.00	-236.83	3.62	7.502E-01	0.00	-18.75	-90.56
	100.00	-236.83	3.62	7.502E-01	0.00	-37.51	-181.11
7	COMB3						
	0.00	-250.83	3.25	5.182E-01	0.00	25.91	162.33
	25.00	-250.83	3.25	5.182E-01	0.00	12.96	81.17
	50.00	-250.83	3.25	5.182E-01	0.00	0.00	0.00
	75.00	-250.83	3.25	5.182E-01	0.00	-12.96	-81.17
	100.00	-250.83	3.25	5.182E-01	0.00	-25.91	-162.33
7	COMB4						
	0.00	-223.70	3.14	4.879E-01	0.00	24.39	157.05
	25.00	-223.70	3.14	4.879E-01	0.00	12.20	78.53
	50.00	-223.70	3.14	4.879E-01	0.00	0.00	0.00
	75.00	-223.70	3.14	4.879E-01	0.00	-12.20	-78.53
	100.00	-223.70	3.14	4.879E-01	0.00	-24.39	-157.05
8	BM						
	0.00	-809.56	-8.254E-01	-6.789E-01	0.00	-54.31	-66.02
	79.99	-809.56	-8.254E-01	-6.789E-01	0.00	0.00	0.00
	159.98	-809.56	-8.254E-01	-6.789E-01	0.00	54.31	66.02
8	BH						
	0.00	-180.40	-2.014E-01	-2.709E-01	0.00	-21.67	-16.11
	79.99	-180.40	-2.014E-01	-2.709E-01	0.00	0.00	0.00
	159.98	-180.40	-2.014E-01	-2.709E-01	0.00	21.67	16.11
8	BAKA						
	0.00	58.23	-7.301E-02	-9.328E-03	0.00	-7.461E-01	-5.84
	79.99	58.23	-7.301E-02	-9.328E-03	0.00	0.00	0.00
	159.98	58.23	-7.301E-02	-9.328E-03	0.00	7.461E-01	5.84
8	BAKI						
	0.00	-70.04	5.212E-02	-8.949E-03	0.00	-7.159E-01	4.17
	79.99	-70.04	5.212E-02	-8.949E-03	0.00	0.00	0.00
	159.98	-70.04	5.212E-02	-8.949E-03	0.00	7.159E-01	-4.17
8	COMB1						
	0.00	-1133.38	-1.16	-9.504E-01	0.00	-76.03	-92.43
	79.99	-1133.38	-1.16	-9.504E-01	0.00	0.00	0.00
	159.98	-1133.38	-1.16	-9.504E-01	0.00	76.03	92.43
8	COMB2						
	0.00	-1260.11	-1.31	-1.25	0.00	-99.84	-105.01
	79.99	-1260.11	-1.31	-1.25	0.00	0.00	0.00
	159.98	-1260.11	-1.31	-1.25	0.00	99.84	105.01
8	COMB3						
	0.00	-986.82	-1.02	-8.384E-01	0.00	-67.07	-81.40
	79.99	-986.82	-1.02	-8.384E-01	0.00	0.00	0.00
	159.98	-986.82	-1.02	-8.384E-01	0.00	67.07	81.40
8	COMB4						
	0.00	-956.11	-9.633E-01	-7.909E-01	0.00	-63.27	-77.05
	79.99	-956.11	-9.633E-01	-7.909E-01	0.00	0.00	0.00
	159.98	-956.11	-9.633E-01	-7.909E-01	0.00	63.27	77.05
9	BM						
	0.00	-275.14	-3.639E-01	-8.410E-01	0.00	-67.27	-29.11
	79.99	-275.14	-3.639E-01	-8.410E-01	0.00	0.00	0.00
	159.98	-275.14	-3.639E-01	-8.410E-01	0.00	67.27	29.11
9	BH						
	0.00	-92.74	-9.806E-02	-3.732E-01	0.00	-29.85	-7.84
	79.99	-92.74	-9.806E-02	-3.732E-01	0.00	0.00	0.00
	159.98	-92.74	-9.806E-02	-3.732E-01	0.00	29.85	7.84
9	BAKA						
	0.00	37.33	3.574E-02	-1.093E-02	0.00	-8.744E-01	2.86
	79.99	37.33	3.574E-02	-1.093E-02	0.00	0.00	0.00
	159.98	37.33	3.574E-02	-1.093E-02	0.00	8.744E-01	-2.86
9	BAKI						
	0.00	-46.38	-3.833E-02	-1.055E-02	0.00	-8.438E-01	-3.07
	79.99	-46.38	-3.833E-02	-1.055E-02	0.00	0.00	0.00
	159.98	-46.38	-3.833E-02	-1.055E-02	0.00	8.438E-01	3.07
9	COMB1						
	0.00	-385.20	-5.094E-01	-1.18	0.00	-94.18	-40.75
	79.99	-385.20	-5.094E-01	-1.18	0.00	0.00	0.00
	159.98	-385.20	-5.094E-01	-1.18	0.00	94.18	40.75
9	COMB2						
	0.00	-478.56	-5.936E-01	-1.61	0.00	-128.49	-47.48
	79.99	-478.56	-5.936E-01	-1.61	0.00	0.00	0.00
	159.98	-478.56	-5.936E-01	-1.61	0.00	128.49	47.48
9	COMB3						
	0.00	-341.95	-4.400E-01	-1.04	0.00	-82.96	-35.20
	79.99	-341.95	-4.400E-01	-1.04	0.00	0.00	0.00
	159.98	-341.95	-4.400E-01	-1.04	0.00	82.96	35.20
9	COMB4						

	79.99	-318.40	-4.333E-01	-9.813E-01	0.00	0.00	0.00
	159.98	-318.40	-4.333E-01	-9.813E-01	0.00	78.50	34.66
10	BM						
	0.00	-275.14	3.639E-01	8.410E-01	0.00	67.27	29.11
	79.99	-275.14	3.639E-01	8.410E-01	0.00	0.00	0.00
	159.98	-275.14	3.639E-01	8.410E-01	0.00	-67.27	-29.11
10	BH						
	0.00	-92.74	9.806E-02	3.732E-01	0.00	29.85	7.84
	79.99	-92.74	9.806E-02	3.732E-01	0.00	0.00	0.00
	159.98	-92.74	9.806E-02	3.732E-01	0.00	-29.85	-7.84
10	BAKA						
	0.00	-46.54	3.799E-02	1.093E-02	0.00	8.744E-01	3.04
	79.99	-46.54	3.799E-02	1.093E-02	0.00	0.00	0.00
	159.98	-46.54	3.799E-02	1.093E-02	0.00	-8.744E-01	-3.04
10	BAKI						
	0.00	37.30	-3.601E-02	1.055E-02	0.00	8.438E-01	-2.88
	79.99	37.30	-3.601E-02	1.055E-02	0.00	0.00	0.00
	159.98	37.30	-3.601E-02	1.055E-02	0.00	-8.438E-01	2.88
10	COMB1						
	0.00	-385.20	5.094E-01	1.18	0.00	94.18	40.75
	79.99	-385.20	5.094E-01	1.18	0.00	0.00	0.00
	159.98	-385.20	5.094E-01	1.18	0.00	-94.18	-40.75
10	COMB2						
	0.00	-478.56	5.936E-01	1.61	0.00	128.49	47.48
	79.99	-478.56	5.936E-01	1.61	0.00	0.00	0.00
	159.98	-478.56	5.936E-01	1.61	0.00	-128.49	-47.48
10	COMB3						
	0.00	-342.19	4.392E-01	1.04	0.00	82.96	35.13
	79.99	-342.19	4.392E-01	1.04	0.00	0.00	0.00
	159.98	-342.19	4.392E-01	1.04	0.00	-82.96	-35.13
10	COMB4						
	0.00	-318.15	4.341E-01	9.813E-01	0.00	78.50	34.72
	79.99	-318.15	4.341E-01	9.813E-01	0.00	0.00	0.00
	159.98	-318.15	4.341E-01	9.813E-01	0.00	-78.50	-34.72
11	BM						
	0.00	-809.56	8.254E-01	6.789E-01	0.00	54.31	66.02
	79.99	-809.56	8.254E-01	6.789E-01	0.00	0.00	0.00
	159.98	-809.56	8.254E-01	6.789E-01	0.00	-54.31	-66.02
11	BH						
	0.00	-180.40	2.014E-01	2.709E-01	0.00	21.67	16.11
	79.99	-180.40	2.014E-01	2.709E-01	0.00	0.00	0.00
	159.98	-180.40	2.014E-01	2.709E-01	0.00	-21.67	-16.11
11	BAKA						
	0.00	-70.75	-5.143E-02	9.328E-03	0.00	7.461E-01	-4.11
	79.99	-70.75	-5.143E-02	9.328E-03	0.00	0.00	0.00
	159.98	-70.75	-5.143E-02	9.328E-03	0.00	-7.461E-01	4.11
11	BAKI						
	0.00	58.21	7.272E-02	8.949E-03	0.00	7.159E-01	5.82
	79.99	58.21	7.272E-02	8.949E-03	0.00	0.00	0.00
	159.98	58.21	7.272E-02	8.949E-03	0.00	-7.159E-01	-5.82
11	COMB1						
	0.00	-1133.38	1.16	9.504E-01	0.00	76.03	92.43
	79.99	-1133.38	1.16	9.504E-01	0.00	0.00	0.00
	159.98	-1133.38	1.16	9.504E-01	0.00	-76.03	-92.43
11	COMB2						
	0.00	-1260.11	1.31	1.25	0.00	99.84	105.01
	79.99	-1260.11	1.31	1.25	0.00	0.00	0.00
	159.98	-1260.11	1.31	1.25	0.00	-99.84	-105.01
11	COMB3						
	0.00	-987.76	1.02	8.384E-01	0.00	67.07	81.44
	79.99	-987.76	1.02	8.384E-01	0.00	0.00	0.00
	159.98	-987.76	1.02	8.384E-01	0.00	-67.07	-81.44
11	COMB4						
	0.00	-955.18	9.628E-01	7.909E-01	0.00	63.27	77.01
	79.99	-955.18	9.628E-01	7.909E-01	0.00	0.00	0.00
	159.98	-955.18	9.628E-01	7.909E-01	0.00	-63.27	-77.01
12	BM						
	0.00	-197.72	-2.66	-4.192E-01	0.00	-20.96	-133.08
	25.00	-197.72	-2.66	-4.192E-01	0.00	-10.48	-66.54
	50.00	-197.72	-2.66	-4.192E-01	0.00	0.00	0.00
	75.00	-197.72	-2.66	-4.192E-01	0.00	10.48	66.54
	100.00	-197.72	-2.66	-4.192E-01	0.00	20.96	133.08
12	BH						
	0.00	2.752E-01	-2.677E-01	-1.545E-01	0.00	-7.72	-13.39
	25.00	2.752E-01	-2.677E-01	-1.545E-01	0.00	-3.86	-6.69
	50.00	2.752E-01	-2.677E-01	-1.545E-01	0.00	0.00	0.00
	75.00	2.752E-01	-2.677E-01	-1.545E-01	0.00	3.86	6.69
	100.00	2.752E-01	-2.677E-01	-1.545E-01	0.00	7.72	13.39
12	BAKA						
	0.00	29.02	-1.316E-01	-5.973E-03	0.00	-2.986E-01	-6.58
	25.00	29.02	-1.316E-01	-5.973E-03	0.00	-1.493E-01	-3.29
	50.00	29.02	-1.316E-01	-5.973E-03	0.00	0.00	0.00
	75.00	29.02	-1.316E-01	-5.973E-03	0.00	1.493E-01	3.29
	100.00	29.02	-1.316E-01	-5.973E-03	0.00	2.986E-01	6.58
12	BAKI						
	0.00	-46.35	5.916E-02	-5.709E-03	0.00	-2.855E-01	2.96
	25.00	-46.35	5.916E-02	-5.709E-03	0.00	-1.427E-01	1.48
	50.00	-46.35	5.916E-02	-5.709E-03	0.00	0.00	0.00
	75.00	-46.35	5.916E-02	-5.709E-03	0.00	1.427E-01	-1.48
	100.00	-46.35	5.916E-02	-5.709E-03	0.00	2.855E-01	-2.96
12	COMB1						
	0.00	-276.81	-3.73	-5.869E-01	0.00	-29.34	-186.31

	50.00	-276.81	-3.73	-5.869E-01	0.00	0.00	0.00
	75.00	-276.81	-3.73	-5.869E-01	0.00	14.67	93.15
	100.00	-276.81	-3.73	-5.869E-01	0.00	29.34	186.31
12	COMB2						
	0.00	-236.83	-3.62	-7.502E-01	0.00	-37.51	-181.11
	25.00	-236.83	-3.62	-7.502E-01	0.00	-18.75	-90.56
	50.00	-236.83	-3.62	-7.502E-01	0.00	0.00	0.00
	75.00	-236.83	-3.62	-7.502E-01	0.00	18.75	90.56
	100.00	-236.83	-3.62	-7.502E-01	0.00	37.51	181.11
12	COMB3						
	0.00	-259.80	-3.29	-5.182E-01	0.00	-25.91	-164.40
	25.00	-259.80	-3.29	-5.182E-01	0.00	-12.96	-82.20
	50.00	-259.80	-3.29	-5.182E-01	0.00	0.00	0.00
	75.00	-259.80	-3.29	-5.182E-01	0.00	12.96	82.20
	100.00	-259.80	-3.29	-5.182E-01	0.00	25.91	164.40
12	COMB4						
	0.00	-214.73	-3.10	-4.879E-01	0.00	-24.39	-154.99
	25.00	-214.73	-3.10	-4.879E-01	0.00	-12.20	-77.49
	50.00	-214.73	-3.10	-4.879E-01	0.00	0.00	0.00
	75.00	-214.73	-3.10	-4.879E-01	0.00	12.20	77.49
	100.00	-214.73	-3.10	-4.879E-01	0.00	24.39	154.99
13	BM						
	0.00	-891.48	-4.864E-01	-1.68	0.00	-83.78	-24.32
	50.00	-891.48	-4.864E-01	-1.68	0.00	0.00	0.00
	100.00	-891.48	-4.864E-01	-1.68	0.00	83.78	24.32
13	BH						
	0.00	-197.76	-1.792E-01	-3.721E-02	0.00	-1.86	-8.96
	50.00	-197.76	-1.792E-01	-3.721E-02	0.00	0.00	0.00
	100.00	-197.76	-1.792E-01	-3.721E-02	0.00	1.86	8.96
13	BAKA						
	0.00	-73.60	-6.930E-03	9.882E-01	0.00	49.41	-3.465E-01
	50.00	-73.60	-6.930E-03	9.882E-01	0.00	0.00	0.00
	100.00	-73.60	-6.930E-03	9.882E-01	0.00	-49.41	3.465E-01
13	BAKI						
	0.00	51.01	-6.624E-03	-9.175E-01	0.00	-45.87	-3.312E-01
	50.00	51.01	-6.624E-03	-9.175E-01	0.00	0.00	0.00
	100.00	51.01	-6.624E-03	-9.175E-01	0.00	45.87	3.312E-01
13	COMB1						
	0.00	-1248.07	-6.810E-01	-2.35	0.00	-117.29	-34.05
	50.00	-1248.07	-6.810E-01	-2.35	0.00	0.00	0.00
	100.00	-1248.07	-6.810E-01	-2.35	0.00	117.29	34.05
13	COMB2						
	0.00	-1386.19	-8.705E-01	-2.07	0.00	-103.51	-43.52
	50.00	-1386.19	-8.705E-01	-2.07	0.00	0.00	0.00
	100.00	-1386.19	-8.705E-01	-2.07	0.00	103.51	43.52
13	COMB3						
	0.00	-1099.14	-6.013E-01	-1.92	0.00	-95.93	-30.06
	50.00	-1099.14	-6.013E-01	-1.92	0.00	0.00	0.00
	100.00	-1099.14	-6.013E-01	-1.92	0.00	95.93	30.06
13	COMB4						
	0.00	-1040.41	-5.661E-01	-2.10	0.00	-105.13	-28.30
	50.00	-1040.41	-5.661E-01	-2.10	0.00	0.00	0.00
	100.00	-1040.41	-5.661E-01	-2.10	0.00	105.13	28.30
14	BM						
	0.00	-199.25	1.933E-01	6.628E-01	0.00	58.79	-17.14
	88.70	-199.25	-1.933E-01	6.628E-01	0.00	0.00	0.00
	177.40	-199.25	-1.933E-01	6.628E-01	0.00	-58.79	17.14
14	BH						
	0.00	-55.12	-5.455E-02	1.952E-01	0.00	17.32	-4.84
	88.70	-55.12	-5.455E-02	1.952E-01	0.00	0.00	0.00
	177.40	-55.12	-5.455E-02	1.952E-01	0.00	-17.32	4.84
14	BAKA						
	0.00	12.92	-3.030E-03	7.617E-02	0.00	6.76	-2.688E-01
	88.70	12.92	-3.030E-03	7.617E-02	0.00	0.00	0.00
	177.40	12.92	-3.030E-03	7.617E-02	0.00	-6.76	2.688E-01
14	BAKI						
	0.00	-14.68	-2.870E-03	-5.677E-02	0.00	-5.04	-2.546E-01
	88.70	-14.68	-2.870E-03	-5.677E-02	0.00	0.00	0.00
	177.40	-14.68	-2.870E-03	-5.677E-02	0.00	5.04	2.546E-01
14	COMB1						
	0.00	-278.95	-2.706E-01	9.279E-01	0.00	82.30	-24.00
	88.70	-278.95	-2.706E-01	9.279E-01	0.00	0.00	0.00
	177.40	-278.95	-2.706E-01	9.279E-01	0.00	-82.30	24.00
14	COMB2						
	0.00	-327.29	-3.192E-01	1.11	0.00	98.25	-28.31
	88.70	-327.29	-3.192E-01	1.11	0.00	0.00	0.00
	177.40	-327.29	-3.192E-01	1.11	0.00	-98.25	28.31
14	COMB3						
	0.00	-241.39	-2.396E-01	8.205E-01	0.00	72.78	-21.25
	88.70	-241.39	-2.396E-01	8.205E-01	0.00	0.00	0.00
	177.40	-241.39	-2.396E-01	8.205E-01	0.00	-72.78	21.25
14	COMB4						
	0.00	-236.82	-2.242E-01	7.701E-01	0.00	68.31	-19.89
	88.70	-236.82	-2.242E-01	7.701E-01	0.00	0.00	0.00
	177.40	-236.82	-2.242E-01	7.701E-01	0.00	-68.31	19.89
15	BM						
	0.00	245.45	-1.224E-01	0.00	0.00	0.00	-15.59
	127.40	245.45	-1.224E-01	0.00	0.00	0.00	0.00
	254.80	245.45	-1.224E-01	0.00	0.00	0.00	15.59
15	BH						
	0.00	108.70	-1.318E-02	0.00	0.00	0.00	-1.68
	127.40	108.70	-1.318E-02	0.00	0.00	0.00	0.00

15	BAKA						
	0.00	2.98	-2.275E-03	3.354E-03	0.00	4.273E-01	-2.898E-01
	127.40	2.98	-2.275E-03	3.354E-03	0.00	0.00	0.00
	254.80	2.98	-2.275E-03	3.354E-03	0.00	-4.273E-01	2.898E-01
15	BAKI						
	0.00	3.18	-2.124E-03	-2.910E-03	0.00	-3.707E-01	-2.706E-01
	127.40	3.18	-2.124E-03	-2.910E-03	0.00	0.00	0.00
	254.80	3.18	-2.124E-03	-2.910E-03	0.00	3.707E-01	2.706E-01
15	COMB1						
	0.00	343.63	-1.714E-01	0.00	0.00	0.00	-21.83
	127.40	343.63	-1.714E-01	0.00	0.00	0.00	0.00
	254.80	343.63	-1.714E-01	0.00	0.00	0.00	21.83
15	COMB2						
	0.00	468.46	-1.680E-01	0.00	0.00	0.00	-21.40
	127.40	468.46	-1.680E-01	0.00	0.00	0.00	0.00
	254.80	468.46	-1.680E-01	0.00	0.00	0.00	21.40
15	COMB3						
	0.00	302.54	-1.526E-01	5.780E-04	0.00	7.364E-02	-19.44
	127.40	302.54	-1.526E-01	5.780E-04	0.00	0.00	0.00
	254.80	302.54	-1.526E-01	5.780E-04	0.00	-7.364E-02	19.44
15	COMB4						
	0.00	286.53	-1.412E-01	-5.780E-04	0.00	-7.364E-02	-17.99
	127.40	286.53	-1.412E-01	-5.780E-04	0.00	0.00	0.00
	254.80	286.53	-1.412E-01	-5.780E-04	0.00	7.364E-02	17.99
16	BM						
	0.00	-199.25	-1.933E-01	-6.628E-01	0.00	-58.79	-17.14
	88.70	-199.25	-1.933E-01	-6.628E-01	0.00	0.00	0.00
	177.40	-199.25	-1.933E-01	-6.628E-01	0.00	58.79	17.14
16	BH						
	0.00	-55.12	-5.455E-02	-1.952E-01	0.00	-17.32	-4.84
	88.70	-55.12	-5.455E-02	-1.952E-01	0.00	0.00	0.00
	177.40	-55.12	-5.455E-02	-1.952E-01	0.00	17.32	4.84
16	BAKA						
	0.00	-15.02	-3.030E-03	5.860E-02	0.00	5.20	-2.688E-01
	88.70	-15.02	-3.030E-03	5.860E-02	0.00	0.00	0.00
	177.40	-15.02	-3.030E-03	5.860E-02	0.00	-5.20	2.688E-01
16	BAKI						
	0.00	12.93	-2.870E-03	-7.545E-02	0.00	-6.69	-2.546E-01
	88.70	12.93	-2.870E-03	-7.545E-02	0.00	0.00	0.00
	177.40	12.93	-2.870E-03	-7.545E-02	0.00	6.69	2.546E-01
16	COMB1						
	0.00	-278.95	-2.706E-01	-9.279E-01	0.00	-82.30	-24.00
	88.70	-278.95	-2.706E-01	-9.279E-01	0.00	0.00	0.00
	177.40	-278.95	-2.706E-01	-9.279E-01	0.00	82.30	24.00
16	COMB2						
	0.00	-327.29	-3.192E-01	-1.11	0.00	-98.25	-28.31
	88.70	-327.29	-3.192E-01	-1.11	0.00	0.00	0.00
	177.40	-327.29	-3.192E-01	-1.11	0.00	98.25	28.31
16	COMB3						
	0.00	-241.82	-2.396E-01	-8.172E-01	0.00	-72.49	-21.25
	88.70	-241.82	-2.396E-01	-8.172E-01	0.00	0.00	0.00
	177.40	-241.82	-2.396E-01	-8.172E-01	0.00	72.49	21.25
16	COMB4						
	0.00	-236.39	-2.242E-01	-7.734E-01	0.00	-68.60	-19.89
	88.70	-236.39	-2.242E-01	-7.734E-01	0.00	0.00	0.00
	177.40	-236.39	-2.242E-01	-7.734E-01	0.00	68.60	19.89
17	BM						
	0.00	-891.48	-4.864E-01	1.68	0.00	83.78	-24.32
	50.00	-891.48	-4.864E-01	1.68	0.00	0.00	0.00
	100.00	-891.48	-4.864E-01	1.68	0.00	-83.78	24.32
17	BH						
	0.00	-197.76	-1.792E-01	3.721E-02	0.00	1.86	-8.96
	50.00	-197.76	-1.792E-01	3.721E-02	0.00	0.00	0.00
	100.00	-197.76	-1.792E-01	3.721E-02	0.00	-1.86	8.96
17	BAKA						
	0.00	45.38	-6.930E-03	9.243E-01	0.00	46.22	-3.465E-01
	50.00	45.38	-6.930E-03	9.243E-01	0.00	0.00	0.00
	100.00	45.38	-6.930E-03	9.243E-01	0.00	46.22	3.465E-01
17	BAKI						
	0.00	-73.59	-6.624E-03	-9.858E-01	0.00	-49.29	-3.312E-01
	50.00	-73.59	-6.624E-03	-9.858E-01	0.00	0.00	0.00
	100.00	-73.59	-6.624E-03	-9.858E-01	0.00	49.29	3.312E-01
17	COMB1						
	0.00	-1248.07	-6.810E-01	2.35	0.00	117.29	-34.05
	50.00	-1248.07	-6.810E-01	2.35	0.00	0.00	0.00
	100.00	-1248.07	-6.810E-01	2.35	0.00	-117.29	34.05
17	COMB2						
	0.00	-1386.19	-8.705E-01	2.07	0.00	103.51	-43.52
	50.00	-1386.19	-8.705E-01	2.07	0.00	0.00	0.00
	100.00	-1386.19	-8.705E-01	2.07	0.00	-103.51	43.52
17	COMB3						
	0.00	-1106.45	-6.013E-01	1.93	0.00	96.53	-30.06
	50.00	-1106.45	-6.013E-01	1.93	0.00	0.00	0.00
	100.00	-1106.45	-6.013E-01	1.93	0.00	-96.53	30.06
17	COMB4						
	0.00	-1033.10	-5.661E-01	2.09	0.00	104.53	-28.30
	50.00	-1033.10	-5.661E-01	2.09	0.00	0.00	0.00
	100.00	-1033.10	-5.661E-01	2.09	0.00	-104.53	28.30
18	BM						
	0.00	496.95	-7.502E-01	-3.554E-01	0.00	-26.40	-55.73
	74.29	496.95	-7.502E-01	-3.554E-01	0.00	0.00	0.00
	148.58	496.95	-7.502E-01	-3.554E-01	0.00	26.40	55.73

	0.00	81.61	-1.917E-01	-1.568E-01	0.00	-11.65	-14.24
	74.29	81.61	-1.917E-01	-1.568E-01	0.00	0.00	0.00
	148.58	81.61	-1.917E-01	-1.568E-01	0.00	11.65	14.24
18	BAKA						
	0.00	-19.37	-4.103E-02	-4.633E-03	0.00	-3.442E-01	-3.05
	74.29	-19.37	-4.103E-02	-4.633E-03	0.00	0.00	0.00
	148.58	-19.37	-4.103E-02	-4.633E-03	0.00	3.442E-01	3.05
18	BAKI						
	0.00	21.95	2.312E-02	-4.470E-03	0.00	-3.321E-01	1.72
	74.29	21.95	2.312E-02	-4.470E-03	0.00	0.00	0.00
	148.58	21.95	2.312E-02	-4.470E-03	0.00	3.321E-01	-1.72
18	COMB1						
	0.00	695.73	-1.05	-4.975E-01	0.00	-36.96	-78.02
	74.29	695.73	-1.05	-4.975E-01	0.00	0.00	0.00
	148.58	695.73	-1.05	-4.975E-01	0.00	36.96	78.02
18	COMB2						
	0.00	726.91	-1.21	-6.774E-01	0.00	-50.32	-89.66
	74.29	726.91	-1.21	-6.774E-01	0.00	0.00	0.00
	148.58	726.91	-1.21	-6.774E-01	0.00	50.32	89.66
18	COMB3						
	0.00	599.69	-9.235E-01	-4.383E-01	0.00	-32.56	-68.61
	74.29	599.69	-9.235E-01	-4.383E-01	0.00	0.00	0.00
	148.58	599.69	-9.235E-01	-4.383E-01	0.00	32.56	68.61
18	COMB4						
	0.00	592.99	-8.770E-01	-4.146E-01	0.00	-30.80	-65.15
	74.29	592.99	-8.770E-01	-4.146E-01	0.00	0.00	0.00
	148.58	592.99	-8.770E-01	-4.146E-01	0.00	30.80	65.15
19	BM						
	0.00	-51.64	-2.515E-01	1.975E-02	0.00	1.80	-22.87
	90.94	-51.64	-2.515E-01	1.975E-02	0.00	0.00	0.00
	181.88	-51.64	-2.515E-01	1.975E-02	0.00	-1.80	22.87
19	BH						
	0.00	-31.79	-7.586E-02	-8.700E-02	0.00	-7.91	-6.90
	90.94	-31.79	-7.586E-02	-8.700E-02	0.00	0.00	0.00
	181.88	-31.79	-7.586E-02	-8.700E-02	0.00	7.91	6.90
19	BAKA						
	0.00	-74.48	5.983E-03	1.849E-03	0.00	1.681E-01	5.441E-01
	90.94	-74.48	5.983E-03	1.849E-03	0.00	0.00	0.00
	181.88	-74.48	5.983E-03	1.849E-03	0.00	-1.681E-01	-5.441E-01
19	BAKI						
	0.00	62.69	-1.234E-02	1.617E-03	0.00	1.471E-01	-1.12
	90.94	62.69	-1.234E-02	1.617E-03	0.00	0.00	0.00
	181.88	62.69	-1.234E-02	1.617E-03	0.00	-1.471E-01	1.12
19	COMB1						
	0.00	-72.30	-3.520E-01	2.765E-02	0.00	2.51	-32.01
	90.94	-72.30	-3.520E-01	2.765E-02	0.00	0.00	0.00
	181.88	-72.30	-3.520E-01	2.765E-02	0.00	-2.51	32.01
19	COMB2						
	0.00	-112.83	-4.231E-01	-1.155E-01	0.00	-10.50	-38.48
	90.94	-112.83	-4.231E-01	-1.155E-01	0.00	0.00	0.00
	181.88	-112.83	-4.231E-01	-1.155E-01	0.00	10.50	38.48
19	COMB3						
	0.00	-77.29	-3.100E-01	2.820E-02	0.00	2.56	-28.19
	90.94	-77.29	-3.100E-01	2.820E-02	0.00	0.00	0.00
	181.88	-77.29	-3.100E-01	2.820E-02	0.00	-2.56	28.19
19	COMB4						
	0.00	-46.64	-2.935E-01	1.919E-02	0.00	1.75	-26.69
	90.94	-46.64	-2.935E-01	1.919E-02	0.00	0.00	0.00
	181.88	-46.64	-2.935E-01	1.919E-02	0.00	-1.75	26.69
20	BM						
	0.00	-51.64	2.515E-01	-1.975E-02	0.00	-1.80	22.87
	90.94	-51.64	2.515E-01	-1.975E-02	0.00	0.00	0.00
	181.88	-51.64	2.515E-01	-1.975E-02	0.00	1.80	-22.87
20	BH						
	0.00	-31.79	7.586E-02	8.700E-02	0.00	7.91	6.90
	90.94	-31.79	7.586E-02	8.700E-02	0.00	0.00	0.00
	181.88	-31.79	7.586E-02	8.700E-02	0.00	-7.91	-6.90
20	BAKA						
	0.00	62.93	1.186E-02	-1.849E-03	0.00	-1.681E-01	1.08
	90.94	62.93	1.186E-02	-1.849E-03	0.00	0.00	0.00
	181.88	62.93	1.186E-02	-1.849E-03	0.00	1.681E-01	-1.08
20	BAKI						
	0.00	-74.49	-6.175E-03	-1.617E-03	0.00	-1.471E-01	-5.616E-01
	90.94	-74.49	-6.175E-03	-1.617E-03	0.00	0.00	0.00
	181.88	-74.49	-6.175E-03	-1.617E-03	0.00	1.471E-01	5.616E-01
20	COMB1						
	0.00	-72.30	3.520E-01	-2.765E-02	0.00	-2.51	32.01
	90.94	-72.30	3.520E-01	-2.765E-02	0.00	0.00	0.00
	181.88	-72.30	3.520E-01	-2.765E-02	0.00	2.51	-32.01
20	COMB2						
	0.00	-112.83	4.231E-01	1.155E-01	0.00	10.50	38.48
	90.94	-112.83	4.231E-01	1.155E-01	0.00	0.00	0.00
	181.88	-112.83	4.231E-01	1.155E-01	0.00	-10.50	-38.48
20	COMB3						
	0.00	-76.99	3.091E-01	-2.820E-02	0.00	-2.56	28.11
	90.94	-76.99	3.091E-01	-2.820E-02	0.00	0.00	0.00
	181.88	-76.99	3.091E-01	-2.820E-02	0.00	2.56	-28.11
20	COMB4						
	0.00	-46.95	2.944E-01	-1.919E-02	0.00	-1.75	26.77
	90.94	-46.95	2.944E-01	-1.919E-02	0.00	0.00	0.00
	181.88	-46.95	2.944E-01	-1.919E-02	0.00	1.75	-26.77
31	BM						

	70.71	286.13	-1.381E-01	0.00	0.00	0.00	0.00
	141.42	286.13	-1.381E-01	0.00	0.00	0.00	9.77
31	BH						
	0.00	7.580E-01	-2.758E-01	0.00	0.00	0.00	-19.50
	70.71	7.580E-01	-2.758E-01	0.00	0.00	0.00	0.00
	141.42	7.580E-01	-2.758E-01	0.00	0.00	0.00	19.50
31	BAKA						
	0.00	3.489E-02	-9.169E-03	2.610E-02	0.00	1.85	-6.484E-01
	70.71	3.489E-02	-9.169E-03	2.610E-02	0.00	0.00	0.00
	141.42	3.489E-02	-9.169E-03	2.610E-02	0.00	-1.85	6.484E-01
31	BAKI						
	0.00	3.358E-02	-8.826E-03	-2.594E-02	0.00	-1.83	-6.241E-01
	70.71	3.358E-02	-8.826E-03	-2.594E-02	0.00	0.00	0.00
	141.42	3.358E-02	-8.826E-03	-2.594E-02	0.00	1.83	6.241E-01
31	COMB1						
	0.00	400.58	-1.934E-01	0.00	0.00	0.00	-13.67
	70.71	400.58	-1.934E-01	0.00	0.00	0.00	0.00
	141.42	400.58	-1.934E-01	0.00	0.00	0.00	13.67
31	COMB2						
	0.00	344.57	-6.071E-01	0.00	0.00	0.00	-42.93
	70.71	344.57	-6.071E-01	0.00	0.00	0.00	0.00
	141.42	344.57	-6.071E-01	0.00	0.00	0.00	42.93
31	COMB3						
	0.00	343.45	-1.891E-01	2.036E-04	0.00	1.440E-02	-13.37
	70.71	343.45	-1.891E-01	2.036E-04	0.00	0.00	0.00
	141.42	343.45	-1.891E-01	2.036E-04	0.00	-1.440E-02	13.37
31	COMB4						
	0.00	343.27	-1.424E-01	-2.036E-04	0.00	-1.440E-02	-10.07
	70.71	343.27	-1.424E-01	-2.036E-04	0.00	0.00	0.00
	141.42	343.27	-1.424E-01	-2.036E-04	0.00	1.440E-02	10.07
32	BM						
	0.00	-126.83	-4.340E-01	0.00	0.00	0.00	-44.50
	102.53	-126.83	-4.340E-01	0.00	0.00	0.00	0.00
	205.06	-126.83	-4.340E-01	0.00	0.00	0.00	44.50
32	BH						
	0.00	-67.79	-1.201E-01	0.00	0.00	0.00	-12.31
	102.53	-67.79	-1.201E-01	0.00	0.00	0.00	0.00
	205.06	-67.79	-1.201E-01	0.00	0.00	0.00	12.31
32	BAKA						
	0.00	1.572E-03	-4.471E-03	5.130E-02	0.00	5.26	-4.584E-01
	102.53	1.572E-03	-4.471E-03	5.130E-02	0.00	0.00	0.00
	205.06	1.572E-03	-4.471E-03	5.130E-02	0.00	-5.26	4.584E-01
32	BAKI						
	0.00	2.154E-03	-4.303E-03	-5.092E-02	0.00	-5.22	-4.412E-01
	102.53	2.154E-03	-4.303E-03	-5.092E-02	0.00	0.00	0.00
	205.06	2.154E-03	-4.303E-03	-5.092E-02	0.00	5.22	4.412E-01
32	COMB1						
	0.00	-177.57	-6.077E-01	0.00	0.00	0.00	-62.30
	102.53	-177.57	-6.077E-01	0.00	0.00	0.00	0.00
	205.06	-177.57	-6.077E-01	0.00	0.00	0.00	62.30
32	COMB2						
	0.00	-260.67	-7.130E-01	0.00	0.00	0.00	-73.10
	102.53	-260.67	-7.130E-01	0.00	0.00	0.00	0.00
	205.06	-260.67	-7.130E-01	0.00	0.00	0.00	73.10
32	COMB3						
	0.00	-152.19	-5.323E-01	4.991E-04	0.00	5.118E-02	-54.57
	102.53	-152.19	-5.323E-01	4.991E-04	0.00	0.00	0.00
	205.06	-152.19	-5.323E-01	4.991E-04	0.00	-5.118E-02	54.57
32	COMB4						
	0.00	-152.20	-5.095E-01	-4.991E-04	0.00	-5.118E-02	-52.23
	102.53	-152.20	-5.095E-01	-4.991E-04	0.00	0.00	0.00
	205.06	-152.20	-5.095E-01	-4.991E-04	0.00	5.118E-02	52.23
33	BM						
	0.00	-79.38	-1.237E-01	0.00	0.00	0.00	-12.51
	101.16	-79.38	-1.237E-01	0.00	0.00	0.00	0.00
	202.32	-79.38	-1.237E-01	0.00	0.00	0.00	12.51
33	BH						
	0.00	-15.91	1.879E-02	0.00	0.00	0.00	1.90
	101.16	-15.91	1.879E-02	0.00	0.00	0.00	0.00
	202.32	-15.91	1.879E-02	0.00	0.00	0.00	-1.90
33	BAKA						
	0.00	-1.776E-02	-2.874E-03	3.944E-02	0.00	3.99	-2.908E-01
	101.16	-1.776E-02	-2.874E-03	3.944E-02	0.00	0.00	0.00
	202.32	-1.776E-02	-2.874E-03	3.944E-02	0.00	-3.99	2.908E-01
33	BAKI						
	0.00	-1.622E-02	-2.583E-03	-3.860E-02	0.00	-3.91	-2.613E-01
	101.16	-1.622E-02	-2.583E-03	-3.860E-02	0.00	0.00	0.00
	202.32	-1.622E-02	-2.583E-03	-3.860E-02	0.00	3.91	2.613E-01
33	COMB1						
	0.00	-111.14	-1.732E-01	0.00	0.00	0.00	-17.52
	101.16	-111.14	-1.732E-01	0.00	0.00	0.00	0.00
	202.32	-111.14	-1.732E-01	0.00	0.00	0.00	17.52
33	COMB2						
	0.00	-120.72	-1.184E-01	0.00	0.00	0.00	-11.98
	101.16	-120.72	-1.184E-01	0.00	0.00	0.00	0.00
	202.32	-120.72	-1.184E-01	0.00	0.00	0.00	11.98
33	COMB3						
	0.00	-95.31	-1.555E-01	1.085E-03	0.00	1.097E-01	-15.73
	101.16	-95.31	-1.555E-01	1.085E-03	0.00	0.00	0.00
	202.32	-95.31	-1.555E-01	1.085E-03	0.00	-1.097E-01	15.73
33	COMB4						
	0.00	-95.22	-1.413E-01	-1.085E-03	0.00	-1.097E-01	-14.30
	101.16	-95.22	-1.413E-01	-1.085E-03	0.00	0.00	0.00

34	BM						
	0.00	-202.42	9.002E-01	0.00	0.00	0.00	45.01
	25.00	-202.42	9.002E-01	0.00	0.00	0.00	22.50
	50.00	-202.42	9.002E-01	0.00	0.00	0.00	0.00
	75.00	-202.42	9.002E-01	0.00	0.00	0.00	-22.50
	100.00	-202.42	9.002E-01	0.00	0.00	0.00	-45.01
34	BH						
	0.00	-7.310E-01	-3.410E-01	0.00	0.00	0.00	-17.05
	25.00	-7.310E-01	-3.410E-01	0.00	0.00	0.00	-8.52
	50.00	-7.310E-01	-3.410E-01	0.00	0.00	0.00	0.00
	75.00	-7.310E-01	-3.410E-01	0.00	0.00	0.00	8.52
	100.00	-7.310E-01	-3.410E-01	0.00	0.00	0.00	17.05
34	BAKA						
	0.00	-3.115E-02	-1.819E-02	-2.610E-02	0.00	-1.30	-9.093E-01
	25.00	-3.115E-02	-1.819E-02	-2.610E-02	0.00	-6.525E-01	-4.546E-01
	50.00	-3.115E-02	-1.819E-02	-2.610E-02	0.00	0.00	0.00
	75.00	-3.115E-02	-1.819E-02	-2.610E-02	0.00	6.525E-01	4.546E-01
	100.00	-3.115E-02	-1.819E-02	-2.610E-02	0.00	1.30	9.093E-01
34	BAKI						
	0.00	-2.999E-02	-1.750E-02	2.594E-02	0.00	1.30	-8.752E-01
	25.00	-2.999E-02	-1.750E-02	2.594E-02	0.00	6.486E-01	-4.376E-01
	50.00	-2.999E-02	-1.750E-02	2.594E-02	0.00	0.00	0.00
	75.00	-2.999E-02	-1.750E-02	2.594E-02	0.00	-6.486E-01	4.376E-01
	100.00	-2.999E-02	-1.750E-02	2.594E-02	0.00	-1.30	8.752E-01
34	COMB1						
	0.00	-283.39	1.26	0.00	0.00	0.00	63.01
	25.00	-283.39	1.26	0.00	0.00	0.00	31.51
	50.00	-283.39	1.26	0.00	0.00	0.00	0.00
	75.00	-283.39	1.26	0.00	0.00	0.00	-31.51
	100.00	-283.39	1.26	0.00	0.00	0.00	-63.01
34	COMB2						
	0.00	-244.08	5.347E-01	0.00	0.00	0.00	26.73
	25.00	-244.08	5.347E-01	0.00	0.00	0.00	13.37
	50.00	-244.08	5.347E-01	0.00	0.00	0.00	0.00
	75.00	-244.08	5.347E-01	0.00	0.00	0.00	-13.37
	100.00	-244.08	5.347E-01	0.00	0.00	0.00	-26.73
34	COMB3						
	0.00	-242.99	1.03	-2.036E-04	0.00	-1.018E-02	51.69
	25.00	-242.99	1.03	-2.036E-04	0.00	-5.090E-03	25.84
	50.00	-242.99	1.03	-2.036E-04	0.00	0.00	0.00
	75.00	-242.99	1.03	-2.036E-04	0.00	5.090E-03	-25.84
	100.00	-242.99	1.03	-2.036E-04	0.00	1.018E-02	-51.69
34	COMB4						
	0.00	-242.83	1.13	2.036E-04	0.00	1.018E-02	56.33
	25.00	-242.83	1.13	2.036E-04	0.00	5.090E-03	28.16
	50.00	-242.83	1.13	2.036E-04	0.00	0.00	0.00
	75.00	-242.83	1.13	2.036E-04	0.00	-5.090E-03	-28.16
	100.00	-242.83	1.13	2.036E-04	0.00	-1.018E-02	-56.33
35	BM						
	0.00	-300.92	-8.614E-01	0.00	0.00	0.00	-68.90
	79.99	-300.92	-8.614E-01	0.00	0.00	0.00	0.00
	159.98	-300.92	-8.614E-01	0.00	0.00	0.00	68.90
35	BH						
	0.00	8.59	-2.682E-01	0.00	0.00	0.00	-21.45
	79.99	8.59	-2.682E-01	0.00	0.00	0.00	0.00
	159.98	8.59	-2.682E-01	0.00	0.00	0.00	21.45
35	BAKA						
	0.00	-9.162E-02	-7.307E-03	8.384E-02	0.00	6.71	-5.845E-01
	79.99	-9.162E-02	-7.307E-03	8.384E-02	0.00	0.00	0.00
	159.98	-9.162E-02	-7.307E-03	8.384E-02	0.00	-6.71	5.845E-01
35	BAKI						
	0.00	-8.792E-02	-7.032E-03	-8.340E-02	0.00	-6.67	-5.625E-01
	79.99	-8.792E-02	-7.032E-03	-8.340E-02	0.00	0.00	0.00
	159.98	-8.792E-02	-7.032E-03	-8.340E-02	0.00	6.67	5.625E-01
35	COMB1						
	0.00	-421.29	-1.21	0.00	0.00	0.00	-96.47
	79.99	-421.29	-1.21	0.00	0.00	0.00	0.00
	159.98	-421.29	-1.21	0.00	0.00	0.00	96.47
35	COMB2						
	0.00	-347.36	-1.46	0.00	0.00	0.00	-117.01
	79.99	-347.36	-1.46	0.00	0.00	0.00	0.00
	159.98	-347.36	-1.46	0.00	0.00	0.00	117.01
35	COMB3						
	0.00	-361.34	-1.05	5.747E-04	0.00	4.597E-02	-84.18
	79.99	-361.34	-1.05	5.747E-04	0.00	0.00	0.00
	159.98	-361.34	-1.05	5.747E-04	0.00	-4.597E-02	84.18
35	COMB4						
	0.00	-360.87	-1.02	-5.747E-04	0.00	-4.597E-02	-81.19
	79.99	-360.87	-1.02	-5.747E-04	0.00	0.00	0.00
	159.98	-360.87	-1.02	-5.747E-04	0.00	4.597E-02	81.19
36	BM						
	0.00	21.81	-5.585E-01	0.00	0.00	0.00	-43.69
	78.23	21.81	-5.585E-01	0.00	0.00	0.00	0.00
	156.46	21.81	-5.585E-01	0.00	0.00	0.00	43.69
36	BH						
	0.00	63.05	-1.219E-01	0.00	0.00	0.00	-9.53
	78.23	63.05	-1.219E-01	0.00	0.00	0.00	0.00
	156.46	63.05	-1.219E-01	0.00	0.00	0.00	9.53
36	BAKA						
	0.00	-4.877E-02	-7.695E-03	1.223E-01	0.00	9.57	-6.019E-01
	78.23	-4.877E-02	-7.695E-03	1.223E-01	0.00	0.00	0.00
	156.46	-4.877E-02	-7.695E-03	1.223E-01	0.00	-9.57	6.019E-01

	0.00	-4.717E-02	-7.406E-03	-1.218E-01	0.00	-9.53	-5.794E-01
	78.23	-4.717E-02	-7.406E-03	-1.218E-01	0.00	0.00	0.00
	156.46	-4.717E-02	-7.406E-03	-1.218E-01	0.00	9.53	5.794E-01
36	COMB1						
	0.00	30.53	-7.819E-01	0.00	0.00	0.00	-61.17
	78.23	30.53	-7.819E-01	0.00	0.00	0.00	0.00
	156.46	30.53	-7.819E-01	0.00	0.00	0.00	61.17
36	COMB2						
	0.00	127.05	-8.652E-01	0.00	0.00	0.00	-67.68
	78.23	127.05	-8.652E-01	0.00	0.00	0.00	0.00
	156.46	127.05	-8.652E-01	0.00	0.00	0.00	67.68
36	COMB3						
	0.00	26.05	-6.898E-01	5.646E-04	0.00	4.417E-02	-53.96
	78.23	26.05	-6.898E-01	5.646E-04	0.00	0.00	0.00
	156.46	26.05	-6.898E-01	5.646E-04	0.00	-4.417E-02	53.96
36	COMB4						
	0.00	26.30	-6.505E-01	-5.646E-04	0.00	-4.417E-02	-50.89
	78.23	26.30	-6.505E-01	-5.646E-04	0.00	0.00	0.00
	156.46	26.30	-6.505E-01	-5.646E-04	0.00	4.417E-02	50.89
37	BM						
	0.00	-615.85	-9.121E-01	0.00	0.00	0.00	-45.61
	50.00	-615.85	-9.121E-01	0.00	0.00	0.00	0.00
	100.00	-615.85	-9.121E-01	0.00	0.00	0.00	45.61
37	BH						
	0.00	-159.58	-5.519E-01	0.00	0.00	0.00	-27.59
	50.00	-159.58	-5.519E-01	0.00	0.00	0.00	0.00
	100.00	-159.58	-5.519E-01	0.00	0.00	0.00	27.59
37	BAKA						
	0.00	-3.903E-02	-1.837E-02	9.917E-02	0.00	4.96	-9.184E-01
	50.00	-3.903E-02	-1.837E-02	9.917E-02	0.00	0.00	0.00
	100.00	-3.903E-02	-1.837E-02	9.917E-02	0.00	-4.96	9.184E-01
37	BAKI						
	0.00	-3.701E-02	-1.768E-02	-9.857E-02	0.00	-4.93	-8.840E-01
	50.00	-3.701E-02	-1.768E-02	-9.857E-02	0.00	0.00	0.00
	100.00	-3.701E-02	-1.768E-02	-9.857E-02	0.00	4.93	8.840E-01
37	COMB1						
	0.00	-862.19	-1.28	0.00	0.00	0.00	-63.85
	50.00	-862.19	-1.28	0.00	0.00	0.00	0.00
	100.00	-862.19	-1.28	0.00	0.00	0.00	63.85
37	COMB2						
	0.00	-994.36	-1.98	0.00	0.00	0.00	-98.88
	50.00	-994.36	-1.98	0.00	0.00	0.00	0.00
	100.00	-994.36	-1.98	0.00	0.00	0.00	98.88
37	COMB3						
	0.00	-739.12	-1.14	7.736E-04	0.00	3.868E-02	-57.07
	50.00	-739.12	-1.14	7.736E-04	0.00	0.00	0.00
	100.00	-739.12	-1.14	7.736E-04	0.00	-3.868E-02	57.07
37	COMB4						
	0.00	-738.92	-1.05	-7.736E-04	0.00	-3.868E-02	-52.39
	50.00	-738.92	-1.05	-7.736E-04	0.00	0.00	0.00
	100.00	-738.92	-1.05	-7.736E-04	0.00	3.868E-02	52.39
38	BM						
	0.00	-97.95	-4.300E-01	0.00	0.00	0.00	-38.14
	88.70	-97.95	-4.300E-01	0.00	0.00	0.00	0.00
	177.40	-97.95	-4.300E-01	0.00	0.00	0.00	38.14
38	BH						
	0.00	-34.97	-1.212E-01	0.00	0.00	0.00	-10.75
	88.70	-34.97	-1.212E-01	0.00	0.00	0.00	0.00
	177.40	-34.97	-1.212E-01	0.00	0.00	0.00	10.75
38	BAKA						
	0.00	-3.612E-02	-5.950E-03	3.553E-02	0.00	3.15	-5.278E-01
	88.70	-3.612E-02	-5.950E-03	3.553E-02	0.00	0.00	0.00
	177.40	-3.612E-02	-5.950E-03	3.553E-02	0.00	-3.15	5.278E-01
38	BAKI						
	0.00	-3.445E-02	-5.728E-03	-3.516E-02	0.00	-3.12	-5.080E-01
	88.70	-3.445E-02	-5.728E-03	-3.516E-02	0.00	0.00	0.00
	177.40	-3.445E-02	-5.728E-03	-3.516E-02	0.00	3.12	5.080E-01
38	COMB1						
	0.00	-137.13	-6.020E-01	0.00	0.00	0.00	-53.39
	88.70	-137.13	-6.020E-01	0.00	0.00	0.00	0.00
	177.40	-137.13	-6.020E-01	0.00	0.00	0.00	53.39
38	COMB2						
	0.00	-173.48	-7.100E-01	0.00	0.00	0.00	-62.97
	88.70	-173.48	-7.100E-01	0.00	0.00	0.00	0.00
	177.40	-173.48	-7.100E-01	0.00	0.00	0.00	62.97
38	COMB3						
	0.00	-117.63	-5.312E-01	4.880E-04	0.00	4.329E-02	-47.11
	88.70	-117.63	-5.312E-01	4.880E-04	0.00	0.00	0.00
	177.40	-117.63	-5.312E-01	4.880E-04	0.00	-4.329E-02	47.11
38	COMB4						
	0.00	-117.44	-5.008E-01	-4.880E-04	0.00	-4.329E-02	-44.42
	88.70	-117.44	-5.008E-01	-4.880E-04	0.00	0.00	0.00
	177.40	-117.44	-5.008E-01	-4.880E-04	0.00	4.329E-02	44.42
39	BM						
	0.00	300.11	-7.901E-01	0.00	0.00	0.00	-58.70
	74.29	300.11	-7.901E-01	0.00	0.00	0.00	0.00
	148.58	300.11	-7.901E-01	0.00	0.00	0.00	58.70
39	BH						
	0.00	50.40	-2.366E-01	0.00	0.00	0.00	-17.58
	74.29	50.40	-2.366E-01	0.00	0.00	0.00	0.00
	148.58	50.40	-2.366E-01	0.00	0.00	0.00	17.58
39	BAKA						

		74.29	4.826E-02	-8.471E-03	7.397E-02	0.00	0.00	0.00
		148.58	4.826E-02	-8.471E-03	7.397E-02	0.00	-5.49	6.293E-01
39	BAKI							
		0.00	4.598E-02	-8.153E-03	-7.360E-02	0.00	-5.47	-6.057E-01
		74.29	4.598E-02	-8.153E-03	-7.360E-02	0.00	0.00	0.00
		148.58	4.598E-02	-8.153E-03	-7.360E-02	0.00	5.47	6.057E-01
39	COMB1							
		0.00	420.15	-1.11	0.00	0.00	0.00	-82.18
		74.29	420.15	-1.11	0.00	0.00	0.00	0.00
		148.58	420.15	-1.11	0.00	0.00	0.00	82.18
39	COMB2							
		0.00	440.77	-1.33	0.00	0.00	0.00	-98.56
		74.29	440.77	-1.33	0.00	0.00	0.00	0.00
		148.58	440.77	-1.33	0.00	0.00	0.00	98.56
39	COMB3							
		0.00	360.25	-9.698E-01	4.780E-04	0.00	3.551E-02	-72.04
		74.29	360.25	-9.698E-01	4.780E-04	0.00	0.00	0.00
		148.58	360.25	-9.698E-01	4.780E-04	0.00	-3.551E-02	72.04
39	COMB4							
		0.00	360.01	-9.265E-01	-4.780E-04	0.00	-3.551E-02	-68.83
		74.29	360.01	-9.265E-01	-4.780E-04	0.00	0.00	0.00
		148.58	360.01	-9.265E-01	-4.780E-04	0.00	3.551E-02	68.83
40	BM							
		0.00	-42.37	-3.867E-01	0.00	0.00	0.00	-34.57
		89.39	-42.37	-3.867E-01	0.00	0.00	0.00	0.00
		178.79	-42.37	-3.867E-01	0.00	0.00	0.00	34.57
40	BH							
		0.00	-46.34	-7.779E-02	0.00	0.00	0.00	-6.95
		89.39	-46.34	-7.779E-02	0.00	0.00	0.00	0.00
		178.79	-46.34	-7.779E-02	0.00	0.00	0.00	6.95
40	BAKA							
		0.00	3.061E-02	-5.877E-03	4.739E-02	0.00	4.24	-5.254E-01
		89.39	3.061E-02	-5.877E-03	4.739E-02	0.00	0.00	0.00
		178.79	3.061E-02	-5.877E-03	4.739E-02	0.00	-4.24	5.254E-01
40	BAKI							
		0.00	2.943E-02	-5.657E-03	-4.747E-02	0.00	-4.24	-5.057E-01
		89.39	2.943E-02	-5.657E-03	-4.747E-02	0.00	0.00	0.00
		178.79	2.943E-02	-5.657E-03	-4.747E-02	0.00	4.24	5.057E-01
40	COMB1							
		0.00	-59.31	-5.414E-01	0.00	0.00	0.00	-48.40
		89.39	-59.31	-5.414E-01	0.00	0.00	0.00	0.00
		178.79	-59.31	-5.414E-01	0.00	0.00	0.00	48.40
40	COMB2							
		0.00	-124.99	-5.886E-01	0.00	0.00	0.00	-52.61
		89.39	-124.99	-5.886E-01	0.00	0.00	0.00	0.00
		178.79	-124.99	-5.886E-01	0.00	0.00	0.00	52.61
40	COMB3							
		0.00	-50.76	-4.791E-01	-9.768E-05	0.00	-8.732E-03	-42.83
		89.39	-50.76	-4.791E-01	-9.768E-05	0.00	0.00	0.00
		178.79	-50.76	-4.791E-01	-9.768E-05	0.00	8.732E-03	42.83
40	COMB4							
		0.00	-50.92	-4.491E-01	9.768E-05	0.00	8.732E-03	-40.15
		89.39	-50.92	-4.491E-01	9.768E-05	0.00	0.00	0.00
		178.79	-50.92	-4.491E-01	9.768E-05	0.00	-8.732E-03	40.15
41	BM							
		0.00	-296.86	9.725E-01	-5.082E-02	0.00	-3.59	68.77
		35.36	-296.86	9.725E-01	-5.082E-02	0.00	-1.80	34.38
		70.71	-296.86	9.725E-01	-5.082E-02	0.00	0.00	0.00
		106.07	296.86	9.725E-01	-5.082E-02	0.00	1.80	-34.38
		141.42	-296.86	9.725E-01	-5.082E-02	0.00	3.59	-68.77
41	BH							
		0.00	-3.829E-01	-1.188E-01	-8.428E-02	0.00	-5.96	-8.40
		35.36	-3.829E-01	-1.188E-01	-8.428E-02	0.00	-2.98	-4.20
		70.71	-3.829E-01	-1.188E-01	-8.428E-02	0.00	0.00	0.00
		106.07	-3.829E-01	-1.188E-01	-8.428E-02	0.00	2.98	4.20
		141.42	-3.829E-01	-1.188E-01	-8.428E-02	0.00	5.96	8.40
41	BAKA							
		0.00	1.410E-01	5.573E-02	-1.023E-02	0.00	-7.236E-01	3.94
		35.36	1.410E-01	5.573E-02	-1.023E-02	0.00	-3.618E-01	1.97
		70.71	1.410E-01	5.573E-02	-1.023E-02	0.00	0.00	0.00
		106.07	1.410E-01	5.573E-02	-1.023E-02	0.00	3.618E-01	-1.97
		141.42	1.410E-01	5.573E-02	-1.023E-02	0.00	7.236E-01	-3.94
41	BAKI							
		0.00	-1.724E-01	-6.793E-02	4.331E-03	0.00	3.062E-01	-4.80
		35.36	-1.724E-01	-6.793E-02	4.331E-03	0.00	1.531E-01	-2.40
		70.71	-1.724E-01	-6.793E-02	4.331E-03	0.00	0.00	0.00
		106.07	-1.724E-01	-6.793E-02	4.331E-03	0.00	-1.531E-01	2.40
		141.42	-1.724E-01	-6.793E-02	4.331E-03	0.00	-3.062E-01	4.80
41	COMB1							
		0.00	-415.60	1.36	-7.114E-02	0.00	-5.03	96.27
		35.36	-415.60	1.36	-7.114E-02	0.00	-2.52	48.14
		70.71	-415.60	1.36	-7.114E-02	0.00	0.00	0.00
		106.07	-415.60	1.36	-7.114E-02	0.00	2.52	-48.14
		141.42	-415.60	1.36	-7.114E-02	0.00	5.03	-96.27
41	COMB2							
		0.00	-356.85	9.769E-01	-1.958E-01	0.00	-13.85	69.08
		35.36	-356.85	9.769E-01	-1.958E-01	0.00	-6.92	34.54
		70.71	-356.85	9.769E-01	-1.958E-01	0.00	0.00	0.00
		106.07	-356.85	9.769E-01	-1.958E-01	0.00	6.92	-34.54
		141.42	-356.85	9.769E-01	-1.958E-01	0.00	13.85	-69.08
41	COMB3							
		0.00	-356.27	1.15	-6.866E-02	0.00	-4.85	81.40
		35.36	-356.27	1.15	-6.866E-02	0.00	-2.43	40.70

		106.07	-356.27	1.15	-6.866E-02	0.00	2.43	-40.70
		141.42	-356.27	1.15	-6.866E-02	0.00	4.85	-81.40
41	COMB4							
		0.00	-356.19	1.18	-5.331E-02	0.00	-3.77	83.64
		35.36	-356.19	1.18	-5.331E-02	0.00	-1.88	41.82
		70.71	-356.19	1.18	-5.331E-02	0.00	0.00	0.00
		106.07	-356.19	1.18	-5.331E-02	0.00	1.88	-41.82
		141.42	-356.19	1.18	-5.331E-02	0.00	3.77	-83.64
42	BM							
		0.00	363.83	3.629E-01	5.082E-02	0.00	4.40	31.43
		86.60	363.83	3.629E-01	5.082E-02	0.00	0.00	0.00
		173.21	363.83	3.629E-01	5.082E-02	0.00	-4.40	-31.43
42	BH							
		0.00	3.813E-01	-1.241E-01	8.428E-02	0.00	7.30	-10.75
		86.60	3.813E-01	-1.241E-01	8.428E-02	0.00	0.00	0.00
		173.21	3.813E-01	-1.241E-01	8.428E-02	0.00	-7.30	10.75
42	BAKA							
		0.00	-1.473E-01	3.589E-02	1.023E-02	0.00	8.863E-01	3.11
		86.60	-1.473E-01	3.589E-02	1.023E-02	0.00	0.00	0.00
		173.21	-1.473E-01	3.589E-02	1.023E-02	0.00	-8.863E-01	-3.11
42	BAKI							
		0.00	1.800E-01	-4.408E-02	-4.331E-03	0.00	-3.750E-01	-3.82
		86.60	1.800E-01	-4.408E-02	-4.331E-03	0.00	0.00	0.00
		173.21	1.800E-01	-4.408E-02	-4.331E-03	0.00	3.750E-01	3.82
42	COMB1							
		0.00	509.37	5.081E-01	7.114E-02	0.00	6.16	44.00
		86.60	509.37	5.081E-01	7.114E-02	0.00	0.00	0.00
		173.21	509.37	5.081E-01	7.114E-02	0.00	-6.16	-44.00
42	COMB2							
		0.00	437.21	2.369E-01	1.958E-01	0.00	16.96	20.52
		86.60	437.21	2.369E-01	1.958E-01	0.00	0.00	0.00
		173.21	437.21	2.369E-01	1.958E-01	0.00	-16.96	-20.52
42	COMB3							
		0.00	436.64	4.248E-01	6.866E-02	0.00	5.95	36.79
		86.60	436.64	4.248E-01	6.866E-02	0.00	0.00	0.00
		173.21	436.64	4.248E-01	6.866E-02	0.00	-5.95	-36.79
42	COMB4							
		0.00	436.56	4.461E-01	5.331E-02	0.00	4.62	38.64
		86.60	436.56	4.461E-01	5.331E-02	0.00	0.00	0.00
		173.21	436.56	4.461E-01	5.331E-02	0.00	-4.62	-38.64
43	BM							
		0.00	-68.57	-2.601E-01	3.514E-01	0.00	44.13	-32.67
		125.57	-68.57	-2.601E-01	3.514E-01	0.00	0.00	0.00
		251.15	-68.57	-2.601E-01	3.514E-01	0.00	-44.13	32.67
43	BH							
		0.00	-62.90	-7.210E-02	1.790E-01	0.00	22.48	-9.05
		125.57	-62.90	-7.210E-02	1.790E-01	0.00	0.00	0.00
		251.15	-62.90	-7.210E-02	1.790E-01	0.00	-22.48	9.05
43	BAKA							
		0.00	-6.36	1.027E-03	5.560E-02	0.00	6.98	1.290E-01
		125.57	-6.36	1.027E-03	5.560E-02	0.00	0.00	0.00
		251.15	-6.36	1.027E-03	5.560E-02	0.00	-6.98	-1.290E-01
43	BAKI							
		0.00	6.19	-5.161E-03	-4.892E-02	0.00	-6.14	-6.480E-01
		125.57	6.19	-5.161E-03	-4.892E-02	0.00	0.00	0.00
		251.15	6.19	-5.161E-03	-4.892E-02	0.00	6.14	6.480E-01
43	COMB1							
		0.00	-96.00	-3.642E-01	4.920E-01	0.00	61.78	-45.74
		125.57	-96.00	-3.642E-01	4.920E-01	0.00	0.00	0.00
		251.15	-96.00	-3.642E-01	4.920E-01	0.00	-61.78	45.74
43	COMB2							
		0.00	-182.92	-4.275E-01	7.081E-01	0.00	88.92	-53.69
		125.57	-182.92	-4.275E-01	7.081E-01	0.00	0.00	0.00
		251.15	-182.92	-4.275E-01	7.081E-01	0.00	-88.92	53.69
43	COMB3							
		0.00	-82.50	-3.176E-01	4.304E-01	0.00	54.05	-39.88
		125.57	-82.50	-3.176E-01	4.304E-01	0.00	0.00	0.00
		251.15	-82.50	-3.176E-01	4.304E-01	0.00	-54.05	39.88
43	COMB4							
		0.00	-82.06	-3.068E-01	4.130E-01	0.00	51.86	-38.53
		125.57	-82.06	-3.068E-01	4.130E-01	0.00	0.00	0.00
		251.15	-82.06	-3.068E-01	4.130E-01	0.00	-51.86	38.53
44	BM							
		0.00	47.01	-3.326E-02	2.081E-01	0.00	25.90	-4.14
		124.46	47.01	-3.326E-02	2.081E-01	0.00	0.00	0.00
		248.92	47.01	-3.326E-02	2.081E-01	0.00	-25.90	4.14
44	BH							
		0.00	9.64	1.846E-02	-7.371E-02	0.00	-9.17	2.30
		124.46	9.64	1.846E-02	-7.371E-02	0.00	0.00	0.00
		248.92	9.64	1.846E-02	-7.371E-02	0.00	9.17	-2.30
44	BAKA							
		0.00	-8.50	-1.858E-03	-1.300E-02	0.00	-1.62	-2.312E-01
		124.46	-8.50	-1.858E-03	-1.300E-02	0.00	0.00	0.00
		248.92	-8.50	-1.858E-03	-1.300E-02	0.00	1.62	2.312E-01
44	BAKI							
		0.00	8.25	-5.958E-04	2.216E-02	0.00	2.76	-7.416E-02
		124.46	8.25	-5.958E-04	2.216E-02	0.00	0.00	0.00
		248.92	8.25	-5.958E-04	2.216E-02	0.00	-2.76	7.416E-02
44	COMB1							
		0.00	65.82	-4.657E-02	2.914E-01	0.00	36.26	-5.80
		124.46	65.82	-4.657E-02	2.914E-01	0.00	0.00	0.00
		248.92	65.82	-4.657E-02	2.914E-01	0.00	-36.26	5.80

44	COMB2							
	0.00	71.84	-1.037E-02	1.318E-01	0.00	16.41	-1.29
	124.46	71.84	-1.037E-02	1.318E-01	0.00	0.00	0.00
	248.92	71.84	-1.037E-02	1.318E-01	0.00	-16.41	1.29
44	COMB3						
	0.00	56.09	-4.310E-02	2.617E-01	0.00	32.57	-5.36
	124.46	56.09	-4.310E-02	2.617E-01	0.00	0.00	0.00
	248.92	56.09	-4.310E-02	2.617E-01	0.00	-32.57	5.36
44	COMB4						
	0.00	56.75	-3.673E-02	2.378E-01	0.00	29.60	-4.57
	124.46	56.75	-3.673E-02	2.378E-01	0.00	0.00	0.00
	248.92	56.75	-3.673E-02	2.378E-01	0.00	-29.60	4.57
45	BM						
	0.00	-263.86	-4.089E-01	-1.280E-01	0.00	-13.82	-44.14
	107.96	-263.86	-4.089E-01	-1.280E-01	0.00	0.00	0.00
	215.92	-263.86	-4.089E-01	-1.280E-01	0.00	13.82	44.14
45	BH						
	0.00	-8.87	-1.227E-01	-5.484E-03	0.00	-5.920E-01	-13.25
	107.96	-8.87	-1.227E-01	-5.484E-03	0.00	0.00	0.00
	215.92	-8.87	-1.227E-01	-5.484E-03	0.00	5.920E-01	13.25
45	BAKA						
	0.00	-31.47	2.980E-03	1.239E-01	0.00	13.38	3.218E-01
	107.96	-31.47	2.980E-03	1.239E-01	0.00	0.00	0.00
	215.92	-31.47	2.980E-03	1.239E-01	0.00	-13.38	-3.218E-01
45	BAKI						
	0.00	31.18	-8.573E-03	-1.176E-01	0.00	-12.70	-9.255E-01
	107.96	31.18	-8.573E-03	-1.176E-01	0.00	0.00	0.00
	215.92	31.18	-8.573E-03	-1.176E-01	0.00	12.70	9.255E-01
45	COMB1						
	0.00	-369.40	-5.724E-01	-1.792E-01	0.00	-19.34	-61.79
	107.96	-369.40	-5.724E-01	-1.792E-01	0.00	0.00	0.00
	215.92	-369.40	-5.724E-01	-1.792E-01	0.00	19.34	61.79
45	COMB2						
	0.00	-330.82	-6.870E-01	-1.623E-01	0.00	-17.53	-74.17
	107.96	-330.82	-6.870E-01	-1.623E-01	0.00	0.00	0.00
	215.92	-330.82	-6.870E-01	-1.623E-01	0.00	17.53	74.17
45	COMB3						
	0.00	-317.02	-4.979E-01	-1.454E-01	0.00	-15.69	-53.75
	107.96	-317.02	-4.979E-01	-1.454E-01	0.00	0.00	0.00
	215.92	-317.02	-4.979E-01	-1.454E-01	0.00	15.69	53.75
45	COMB4						
	0.00	-316.24	-4.834E-01	-1.618E-01	0.00	-17.46	-52.18
	107.96	-316.24	-4.834E-01	-1.618E-01	0.00	0.00	0.00
	215.92	-316.24	-4.834E-01	-1.618E-01	0.00	17.46	52.18
46	BM						
	0.00	107.66	-1.447E-01	5.911E-01	0.00	63.05	-15.43
	106.66	107.66	-1.447E-01	5.911E-01	0.00	0.00	0.00
	213.32	107.66	-1.447E-01	5.911E-01	0.00	-63.05	15.43
46	BH						
	0.00	46.29	-2.327E-02	1.994E-01	0.00	21.27	-2.48
	106.66	46.29	-2.327E-02	1.994E-01	0.00	0.00	0.00
	213.32	46.29	-2.327E-02	1.994E-01	0.00	-21.27	2.48
46	BAKA						
	0.00	-26.47	-3.375E-03	-6.335E-02	0.00	-6.76	-3.600E-01
	106.66	-26.47	-3.375E-03	-6.335E-02	0.00	0.00	0.00
	213.32	-26.47	-3.375E-03	-6.335E-02	0.00	6.76	3.600E-01
46	BAKI						
	0.00	26.37	-2.265E-03	6.905E-02	0.00	7.37	-2.416E-01
	106.66	26.37	-2.265E-03	6.905E-02	0.00	0.00	0.00
	213.32	26.37	-2.265E-03	6.905E-02	0.00	-7.37	2.416E-01
46	COMB1						
	0.00	150.72	-2.025E-01	8.276E-01	0.00	88.27	-21.60
	106.66	150.72	-2.025E-01	8.276E-01	0.00	0.00	0.00
	213.32	150.72	-2.025E-01	8.276E-01	0.00	-88.27	21.60
46	COMB2						
	0.00	203.25	-2.108E-01	1.03	0.00	109.69	-22.49
	106.66	203.25	-2.108E-01	1.03	0.00	0.00	0.00
	213.32	203.25	-2.108E-01	1.03	0.00	-109.69	22.49
46	COMB3						
	0.00	129.07	-1.809E-01	7.168E-01	0.00	76.45	-19.30
	106.66	129.07	-1.809E-01	7.168E-01	0.00	0.00	0.00
	213.32	129.07	-1.809E-01	7.168E-01	0.00	-76.45	19.30
46	COMB4						
	0.00	129.32	-1.663E-01	7.019E-01	0.00	74.87	-17.73
	106.66	129.32	-1.663E-01	7.019E-01	0.00	0.00	0.00
	213.32	129.32	-1.663E-01	7.019E-01	0.00	-74.87	17.73
47	BM						
	0.00	-563.70	-1.814E-01	-2.448E-02	0.00	-1.22	-9.07
	50.00	-563.70	-1.814E-01	-2.448E-02	0.00	0.00	0.00
	100.00	-563.70	-1.814E-01	-2.448E-02	0.00	1.22	9.07
47	BH						
	0.00	-144.86	-4.074E-01	-3.894E-01	0.00	-19.47	-20.37
	50.00	-144.86	-4.074E-01	-3.894E-01	0.00	0.00	0.00
	100.00	-144.86	-4.074E-01	-3.894E-01	0.00	19.47	20.37
47	BAKA						
	0.00	-4.37	5.868E-02	3.069E-01	0.00	15.34	2.93
	50.00	-4.37	5.868E-02	3.069E-01	0.00	0.00	0.00
	100.00	-4.37	5.868E-02	3.069E-01	0.00	-15.34	-2.93
47	BAKI						
	0.00	4.22	-8.618E-02	-3.308E-01	0.00	-16.54	-4.31
	50.00	4.22	-8.618E-02	-3.308E-01	0.00	0.00	0.00
	100.00	4.22	-8.618E-02	-3.308E-01	0.00	16.54	4.31
47	COMB1						

		0.00	-789.17	-2.540E-01	-3.427E-02	0.00	-1.71	-12.70
		50.00	-789.17	-2.540E-01	-3.427E-02	0.00	0.00	0.00
		100.00	-789.17	-2.540E-01	-3.427E-02	0.00	1.71	12.70
47	COMB2							
		0.00	-908.21	-8.695E-01	-6.524E-01	0.00	-32.62	-43.47
		50.00	-908.21	-8.695E-01	-6.524E-01	0.00	0.00	0.00
		100.00	-908.21	-8.695E-01	-6.524E-01	0.00	32.62	43.47
47	COMB3							
		0.00	-676.63	-2.534E-01	-6.041E-02	0.00	-3.02	-12.67
		50.00	-676.63	-2.534E-01	-6.041E-02	0.00	0.00	0.00
		100.00	-676.63	-2.534E-01	-6.041E-02	0.00	3.02	12.67
47	COMB4							
		0.00	-676.24	-1.819E-01	1.666E-03	0.00	8.332E-02	-9.10
		50.00	-676.24	-1.819E-01	1.666E-03	0.00	0.00	0.00
		100.00	-676.24	-1.819E-01	1.666E-03	0.00	-8.332E-02	9.10
48	BM							
		0.00	-38.72	-4.987E-01	1.854E-01	0.00	16.45	-44.24
		88.70	-38.72	-4.987E-01	1.854E-01	0.00	0.00	0.00
		177.40	-38.72	-4.987E-01	1.854E-01	0.00	-16.45	44.24
48	BH							
		0.00	-25.91	-1.997E-01	2.409E-01	0.00	21.37	-17.72
		88.70	-25.91	-1.997E-01	2.409E-01	0.00	0.00	0.00
		177.40	-25.91	-1.997E-01	2.409E-01	0.00	-21.37	17.72
48	BAKA							
		0.00	-2.22	1.606E-02	-1.893E-02	0.00	-1.68	1.42
		88.70	-2.22	1.606E-02	-1.893E-02	0.00	0.00	0.00
		177.40	-2.22	1.606E-02	-1.893E-02	0.00	1.68	-1.42
48	BAKI							
		0.00	2.12	-2.523E-02	1.136E-02	0.00	1.01	-2.24
		88.70	2.12	-2.523E-02	1.136E-02	0.00	0.00	0.00
		177.40	2.12	-2.523E-02	1.136E-02	0.00	-1.01	2.24
48	COMB1							
		0.00	-54.20	-6.982E-01	2.596E-01	0.00	23.02	-61.93
		88.70	-54.20	-6.982E-01	2.596E-01	0.00	0.00	0.00
		177.40	-54.20	-6.982E-01	2.596E-01	0.00	-23.02	61.93
48	COMB2							
		0.00	-87.91	-9.181E-01	6.080E-01	0.00	53.93	-81.43
		88.70	-87.91	-9.181E-01	6.080E-01	0.00	0.00	0.00
		177.40	-87.91	-9.181E-01	6.080E-01	0.00	-53.93	81.43
48	COMB3							
		0.00	-46.59	-6.104E-01	2.127E-01	0.00	18.86	-54.14
		88.70	-46.59	-6.104E-01	2.127E-01	0.00	0.00	0.00
		177.40	-46.59	-6.104E-01	2.127E-01	0.00	-18.86	54.14
48	COMB4							
		0.00	-46.33	-5.866E-01	2.323E-01	0.00	20.61	-52.03
		88.70	-46.33	-5.866E-01	2.323E-01	0.00	0.00	0.00
		177.40	-46.33	-5.866E-01	2.323E-01	0.00	-20.61	52.03
49	BM							
		0.00	357.28	-3.679E-01	-1.896E-01	0.00	-19.68	-38.19
		103.80	357.28	-3.679E-01	-1.896E-01	0.00	0.00	0.00
		207.60	357.28	-3.679E-01	-1.896E-01	0.00	19.68	38.19
49	BH							
		0.00	52.93	-1.096E-01	-8.200E-02	0.00	-8.51	-11.38
		103.80	52.93	-1.096E-01	-8.200E-02	0.00	0.00	0.00
		207.60	52.93	-1.096E-01	-8.200E-02	0.00	8.51	11.38
49	BAKA							
		0.00	4.85	9.519E-04	1.301E-01	0.00	13.51	9.881E-02
		103.80	4.85	9.519E-04	1.301E-01	0.00	0.00	0.00
		207.60	4.85	9.519E-04	1.301E-01	0.00	-13.51	-9.881E-02
49	BAKI							
		0.00	-4.65	-6.998E-03	-1.284E-01	0.00	-13.32	-7.264E-01
		103.80	-4.65	-6.998E-03	-1.284E-01	0.00	0.00	0.00
		207.60	-4.65	-6.998E-03	-1.284E-01	0.00	13.32	7.264E-01
49	COMB1							
		0.00	500.19	-5.151E-01	-2.655E-01	0.00	-27.56	-53.47
		103.80	500.19	-5.151E-01	-2.655E-01	0.00	0.00	0.00
		207.60	500.19	-5.151E-01	-2.655E-01	0.00	27.56	53.47
49	COMB2							
		0.00	513.42	-6.169E-01	-3.588E-01	0.00	-37.24	-64.04
		103.80	513.42	-6.169E-01	-3.588E-01	0.00	0.00	0.00
		207.60	513.42	-6.169E-01	-3.588E-01	0.00	37.24	64.04
49	COMB3							
		0.00	429.00	-4.494E-01	-2.253E-01	0.00	-23.38	-46.65
		103.80	429.00	-4.494E-01	-2.253E-01	0.00	0.00	0.00
		207.60	429.00	-4.494E-01	-2.253E-01	0.00	23.38	46.65
49	COMB4							
		0.00	428.46	-4.337E-01	-2.299E-01	0.00	-23.86	-45.02
		103.80	428.46	-4.337E-01	-2.299E-01	0.00	0.00	0.00
		207.60	428.46	-4.337E-01	-2.299E-01	0.00	23.86	45.02
50	BM							
		0.00	-106.72	-1.213E-01	-1.311E-01	0.00	-15.08	-13.96
		115.10	-106.72	-1.213E-01	-1.311E-01	0.00	0.00	0.00
		230.20	-106.72	-1.213E-01	-1.311E-01	0.00	15.08	13.96
50	BH							
		0.00	-67.31	-1.958E-02	-1.356E-01	0.00	-15.60	-2.25
		115.10	-67.31	-1.958E-02	-1.356E-01	0.00	0.00	0.00
		230.20	-67.31	-1.958E-02	-1.356E-01	0.00	15.60	2.25
50	BAKA							
		0.00	1.95	-4.342E-03	-2.692E-02	0.00	-3.10	-4.998E-01
		115.10	1.95	-4.342E-03	-2.692E-02	0.00	0.00	0.00
		230.20	1.95	-4.342E-03	-2.692E-02	0.00	3.10	4.998E-01
50	BAKI							
		0.00	-1.86	-4.756E-04	2.391E-02	0.00	2.75	-5.474E-02

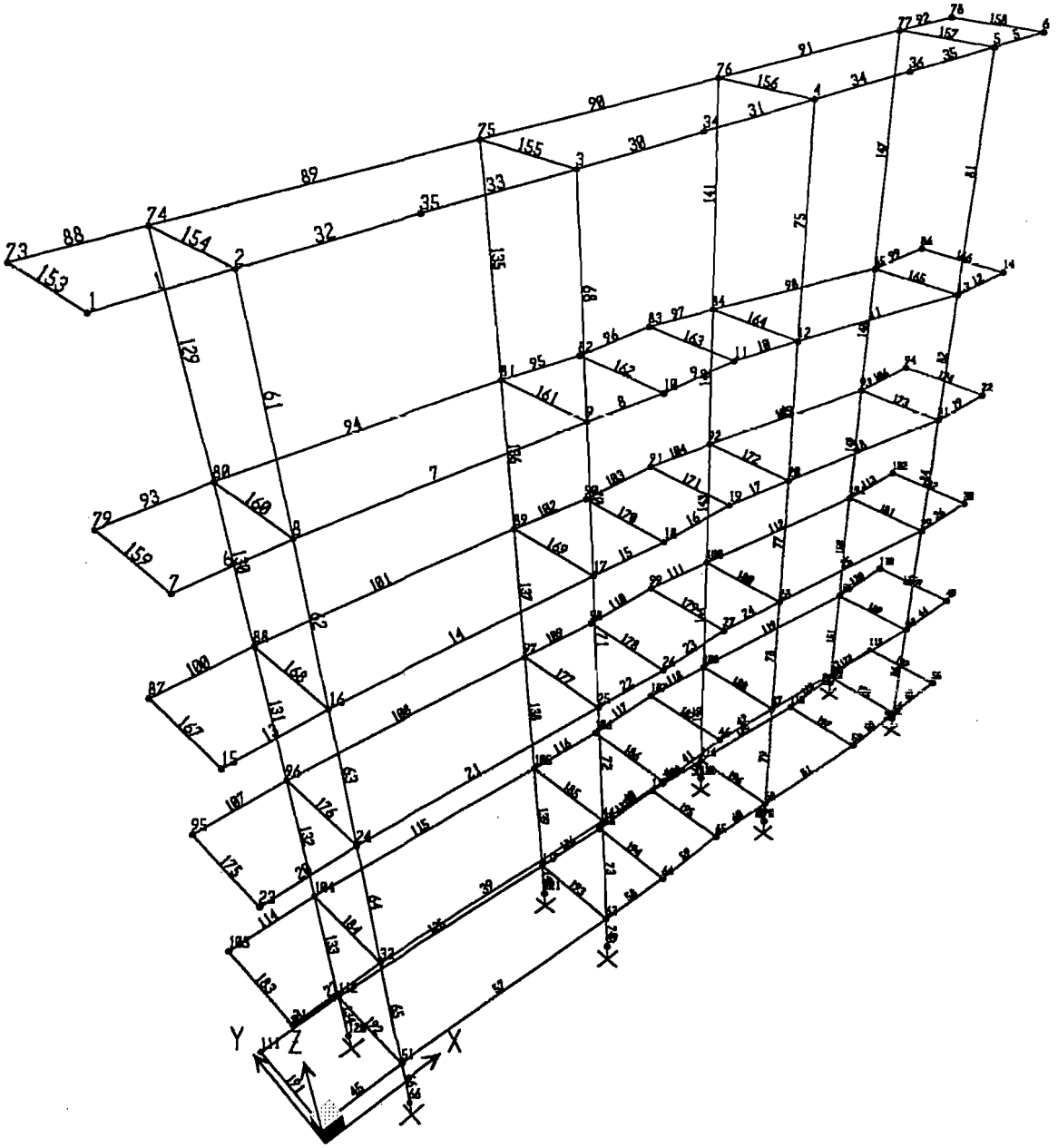
	115.10	-1.86	-4.756E-04	2.391E-02	0.00	-2.75	5.474E-02
	230.20	-1.86	-4.756E-04	2.391E-02	0.00	-2.75	5.474E-02
50	COMB1						
	0.00	-149.40	-1.698E-01	-1.835E-01	0.00	-21.12	-19.54
	115.10	-149.40	-1.698E-01	-1.835E-01	0.00	0.00	0.00
	230.20	-149.40	-1.698E-01	-1.835E-01	0.00	21.12	19.54
50	COMB2						
	0.00	-235.76	-1.769E-01	-3.742E-01	0.00	-43.07	-20.36
	115.10	-235.76	-1.769E-01	-3.742E-01	0.00	0.00	0.00
	230.20	-235.76	-1.769E-01	-3.742E-01	0.00	43.07	20.36
50	COMB3						
	0.00	-127.93	-1.518E-01	-1.612E-01	0.00	-18.55	-17.47
	115.10	-127.93	-1.518E-01	-1.612E-01	0.00	0.00	0.00
	230.20	-127.93	-1.518E-01	-1.612E-01	0.00	18.55	17.47
50	COMB4						
	0.00	-128.19	-1.393E-01	-1.534E-01	0.00	-17.65	-16.03
	115.10	-128.19	-1.393E-01	-1.534E-01	0.00	0.00	0.00
	230.20	-128.19	-1.393E-01	-1.534E-01	0.00	17.65	16.03
53	BM						
	0.00	-296.86	9.725E-01	5.082E-02	0.00	3.59	68.77
	35.36	-296.86	9.725E-01	5.082E-02	0.00	1.80	34.38
	70.71	-296.86	9.725E-01	5.082E-02	0.00	0.00	0.00
	106.07	-296.86	9.725E-01	5.082E-02	0.00	-1.80	-34.38
	141.42	-296.86	9.725E-01	5.082E-02	0.00	-3.59	-68.77
53	BH						
	0.00	-3.829E-01	-1.188E-01	8.428E-02	0.00	5.96	-8.40
	35.36	-3.829E-01	-1.188E-01	8.428E-02	0.00	2.98	-4.20
	70.71	-3.829E-01	-1.188E-01	8.428E-02	0.00	0.00	0.00
	106.07	-3.829E-01	-1.188E-01	8.428E-02	0.00	-2.98	4.20
	141.42	-3.829E-01	-1.188E-01	8.428E-02	0.00	-5.96	8.40
53	BAKA						
	0.00	-1.741E-01	-6.859E-02	-4.246E-03	0.00	-3.003E-01	-4.85
	35.36	-1.741E-01	-6.859E-02	-4.246E-03	0.00	-1.501E-01	-2.43
	70.71	-1.741E-01	-6.859E-02	-4.246E-03	0.00	0.00	0.00
	106.07	-1.741E-01	-6.859E-02	-4.246E-03	0.00	1.501E-01	2.43
	141.42	-1.741E-01	-6.859E-02	-4.246E-03	0.00	3.003E-01	4.85
53	BAKI						
	0.00	1.406E-01	5.555E-02	1.008E-02	0.00	7.126E-01	3.93
	35.36	1.406E-01	5.555E-02	1.008E-02	0.00	3.563E-01	1.96
	70.71	1.406E-01	5.555E-02	1.008E-02	0.00	0.00	0.00
	106.07	1.406E-01	5.555E-02	1.008E-02	0.00	-3.563E-01	-1.96
	141.42	1.406E-01	5.555E-02	1.008E-02	0.00	-7.126E-01	-3.93
53	COMB1						
	0.00	-415.60	1.36	7.114E-02	0.00	5.03	96.27
	35.36	-415.60	1.36	7.114E-02	0.00	2.52	48.14
	70.71	-415.60	1.36	7.114E-02	0.00	0.00	0.00
	106.07	-415.60	1.36	7.114E-02	0.00	-2.52	-48.14
	141.42	-415.60	1.36	7.114E-02	0.00	-5.03	-96.27
53	COMB2						
	0.00	-356.85	9.769E-01	1.958E-01	0.00	13.85	69.08
	35.36	-356.85	9.769E-01	1.958E-01	0.00	6.92	34.54
	70.71	-356.85	9.769E-01	1.958E-01	0.00	0.00	0.00
	106.07	-356.85	9.769E-01	1.958E-01	0.00	-6.92	-34.54
	141.42	-356.85	9.769E-01	1.958E-01	0.00	-13.85	-69.08
53	COMB3						
	0.00	-356.28	1.15	6.856E-02	0.00	4.85	81.32
	35.36	-356.28	1.15	6.856E-02	0.00	2.42	40.66
	70.71	-356.28	1.15	6.856E-02	0.00	0.00	0.00
	106.07	-356.28	1.15	6.856E-02	0.00	-2.42	-40.66
	141.42	-356.28	1.15	6.856E-02	0.00	-4.85	-81.32
53	COMB4						
	0.00	-356.19	1.18	5.340E-02	0.00	3.78	83.72
	35.36	-356.19	1.18	5.340E-02	0.00	1.89	41.86
	70.71	-356.19	1.18	5.340E-02	0.00	0.00	0.00
	106.07	-356.19	1.18	5.340E-02	0.00	-1.89	-41.86
	141.42	-356.19	1.18	5.340E-02	0.00	-3.78	-83.72
55	BM						
	0.00	363.83	3.629E-01	-5.082E-02	0.00	-4.40	31.43
	86.60	363.83	3.629E-01	-5.082E-02	0.00	0.00	0.00
	173.21	363.83	3.629E-01	-5.082E-02	0.00	4.40	-31.43
55	BH						
	0.00	3.813E-01	-1.241E-01	-8.428E-02	0.00	-7.30	-10.75
	86.60	3.813E-01	-1.241E-01	-8.428E-02	0.00	0.00	0.00
	173.21	3.813E-01	-1.241E-01	-8.428E-02	0.00	7.30	10.75
55	BAKA						
	0.00	1.817E-01	-4.450E-02	4.246E-03	0.00	3.677E-01	-3.85
	86.60	1.817E-01	-4.450E-02	4.246E-03	0.00	0.00	0.00
	173.21	1.817E-01	-4.450E-02	4.246E-03	0.00	-3.677E-01	3.85
55	BAKI						
	0.00	-1.468E-01	3.580E-02	-1.008E-02	0.00	-8.728E-01	3.10
	86.60	-1.468E-01	3.580E-02	-1.008E-02	0.00	0.00	0.00
	173.21	-1.468E-01	3.580E-02	-1.008E-02	0.00	8.728E-01	-3.10
55	COMB1						
	0.00	509.37	5.081E-01	-7.114E-02	0.00	-6.16	44.00
	86.60	509.37	5.081E-01	-7.114E-02	0.00	0.00	0.00
	173.21	509.37	5.081E-01	-7.114E-02	0.00	6.16	-44.00
55	COMB2						
	0.00	437.21	2.369E-01	-1.958E-01	0.00	-16.96	20.52
	86.60	437.21	2.369E-01	-1.958E-01	0.00	0.00	0.00
	173.21	437.21	2.369E-01	-1.958E-01	0.00	16.96	-20.52
55	COMB3						
	0.00	436.65	4.242E-01	-6.856E-02	0.00	-5.94	36.73
	86.60	436.65	4.242E-01	-6.856E-02	0.00	0.00	0.00
	173.21	436.65	4.242E-01	-6.856E-02	0.00	5.94	-36.73

55	COMB4						
	0.00	436.56	4.468E-01	-5.340E-02	0.00	-4.62	38.69
	86.60	436.56	4.468E-01	-5.340E-02	0.00	0.00	0.00
	173.21	436.56	4.468E-01	-5.340E-02	0.00	4.62	-38.69
56	BM						
	0.00	-68.57	-2.601E-01	-3.514E-01	0.00	-44.13	-32.67
	125.57	-68.57	-2.601E-01	-3.514E-01	0.00	0.00	0.00
	251.15	-68.57	-2.601E-01	-3.514E-01	0.00	44.13	32.67
56	BH						
	0.00	-62.90	-7.210E-02	-1.790E-01	0.00	-22.48	-9.05
	125.57	-62.90	-7.210E-02	-1.790E-01	0.00	0.00	0.00
	251.15	-62.90	-7.210E-02	-1.790E-01	0.00	22.48	9.05
56	BAKA						
	0.00	6.34	-5.237E-03	4.930E-02	0.00	6.19	-6.577E-01
	125.57	6.34	-5.237E-03	4.930E-02	0.00	0.00	0.00
	251.15	6.34	-5.237E-03	4.930E-02	0.00	-6.19	6.577E-01
56	BAKI						
	0.00	-6.21	1.109E-03	-5.492E-02	0.00	-6.90	1.392E-01
	125.57	-6.21	1.109E-03	-5.492E-02	0.00	0.00	0.00
	251.15	-6.21	1.109E-03	-5.492E-02	0.00	6.90	-1.392E-01
56	COMB1						
	0.00	-96.00	-3.642E-01	-4.920E-01	0.00	-61.78	-45.74
	125.57	-96.00	-3.642E-01	-4.920E-01	0.00	0.00	0.00
	251.15	-96.00	-3.642E-01	-4.920E-01	0.00	61.78	45.74
56	COMB2						
	0.00	-182.92	-4.275E-01	-7.081E-01	0.00	-88.92	-53.69
	125.57	-182.92	-4.275E-01	-7.081E-01	0.00	0.00	0.00
	251.15	-182.92	-4.275E-01	-7.081E-01	0.00	88.92	53.69
56	COMB3						
	0.00	-82.11	-3.175E-01	-4.290E-01	0.00	-53.87	-39.88
	125.57	-82.11	-3.175E-01	-4.290E-01	0.00	0.00	0.00
	251.15	-82.11	-3.175E-01	-4.290E-01	0.00	53.87	39.88
56	COMB4						
	0.00	-82.46	-3.068E-01	-4.144E-01	0.00	-52.04	-38.53
	125.57	-82.46	-3.068E-01	-4.144E-01	0.00	0.00	0.00
	251.15	-82.46	-3.068E-01	-4.144E-01	0.00	52.04	38.53
57	BM						
	0.00	47.01	-3.326E-02	-2.081E-01	0.00	-25.90	-4.14
	124.46	47.01	-3.326E-02	-2.081E-01	0.00	0.00	0.00
	248.92	47.01	-3.326E-02	-2.081E-01	0.00	25.90	4.14
57	BH						
	0.00	9.64	1.846E-02	7.371E-02	0.00	9.17	2.30
	124.46	9.64	1.846E-02	7.371E-02	0.00	0.00	0.00
	248.92	9.64	1.846E-02	7.371E-02	0.00	-9.17	-2.30
57	BAKA						
	0.00	8.45	-7.983E-04	-2.254E-02	0.00	-2.81	-9.935E-02
	124.46	8.45	-7.983E-04	-2.254E-02	0.00	0.00	0.00
	248.92	8.45	-7.983E-04	-2.254E-02	0.00	2.81	9.935E-02
57	BAKI						
	0.00	-8.29	-1.791E-03	1.323E-02	0.00	1.65	-2.230E-01
	124.46	-8.29	-1.791E-03	1.323E-02	0.00	0.00	0.00
	248.92	-8.29	-1.791E-03	1.323E-02	0.00	-1.65	2.230E-01
57	COMB1						
	0.00	65.82	-4.657E-02	-2.914E-01	0.00	-36.26	-5.80
	124.46	65.82	-4.657E-02	-2.914E-01	0.00	0.00	0.00
	248.92	65.82	-4.657E-02	-2.914E-01	0.00	36.26	5.80
57	COMB2						
	0.00	71.84	-1.037E-02	-1.318E-01	0.00	-16.41	-1.29
	124.46	71.84	-1.037E-02	-1.318E-01	0.00	0.00	0.00
	248.92	71.84	-1.037E-02	-1.318E-01	0.00	16.41	1.29
57	COMB3						
	0.00	56.63	-4.328E-02	-2.619E-01	0.00	-32.59	-5.39
	124.46	56.63	-4.328E-02	-2.619E-01	0.00	0.00	0.00
	248.92	56.63	-4.328E-02	-2.619E-01	0.00	32.59	5.39
57	COMB4						
	0.00	56.20	-3.655E-02	-2.376E-01	0.00	-29.58	-4.55
	124.46	56.20	-3.655E-02	-2.376E-01	0.00	0.00	0.00
	248.92	56.20	-3.655E-02	-2.376E-01	0.00	29.58	4.55
58	BM						
	0.00	-263.86	-4.089E-01	1.280E-01	0.00	13.82	-44.14
	107.96	-263.86	-4.089E-01	1.280E-01	0.00	0.00	0.00
	215.92	-263.86	-4.089E-01	1.280E-01	0.00	-13.82	44.14
58	BH						
	0.00	-8.87	-1.227E-01	5.484E-03	0.00	5.920E-01	-13.25
	107.96	-8.87	-1.227E-01	5.484E-03	0.00	0.00	0.00
	215.92	-8.87	-1.227E-01	5.484E-03	0.00	-5.920E-01	13.25
58	BAKA						
	0.00	31.36	-8.663E-03	1.180E-01	0.00	12.74	-9.353E-01
	107.96	31.36	-8.663E-03	1.180E-01	0.00	0.00	0.00
	215.92	31.36	-8.663E-03	1.180E-01	0.00	-12.74	9.353E-01
58	BAKI						
	0.00	-31.28	3.103E-03	-1.233E-01	0.00	-13.31	3.350E-01
	107.96	-31.28	3.103E-03	-1.233E-01	0.00	0.00	0.00
	215.92	-31.28	3.103E-03	-1.233E-01	0.00	13.31	-3.350E-01
58	COMB1						
	0.00	-369.40	-5.724E-01	1.792E-01	0.00	19.34	-61.79
	107.96	-369.40	-5.724E-01	1.792E-01	0.00	0.00	0.00
	215.92	-369.40	-5.724E-01	1.792E-01	0.00	-19.34	61.79
58	COMB2						
	0.00	-330.82	-6.870E-01	1.623E-01	0.00	17.53	-74.17
	107.96	-330.82	-6.870E-01	1.623E-01	0.00	0.00	0.00
	215.92	-330.82	-6.870E-01	1.623E-01	0.00	-17.53	74.17
58	COMB3						

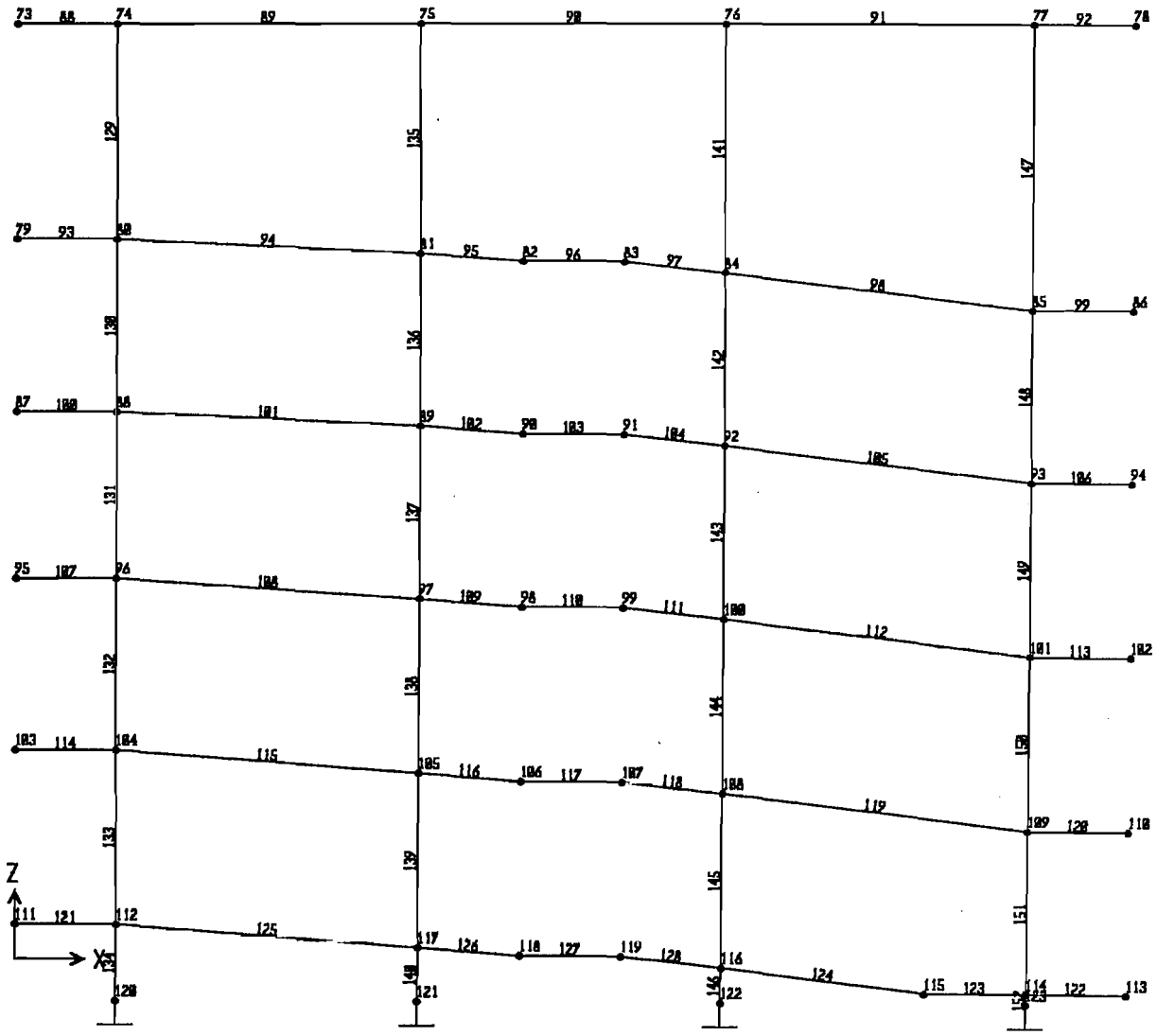
	0.00	-316.53	-4.979E-01	1.467E-01	0.00	15.84	-53.75
	107.96	-316.53	-4.979E-01	1.467E-01	0.00	0.00	0.00
	215.92	-316.53	-4.979E-01	1.467E-01	0.00	-15.84	53.75
58	COMB4						
	0.00	-316.73	-4.834E-01	1.604E-01	0.00	17.32	-52.19
	107.96	-316.73	-4.834E-01	1.604E-01	0.00	0.00	0.00
	215.92	-316.73	-4.834E-01	1.604E-01	0.00	-17.32	52.19
59	BM						
	0.00	107.66	-1.447E-01	-5.911E-01	0.00	-63.05	-15.43
	106.66	107.66	-1.447E-01	-5.911E-01	0.00	0.00	0.00
	213.32	107.66	-1.447E-01	-5.911E-01	0.00	63.05	15.43
59	BH						
	0.00	46.29	-2.327E-02	-1.994E-01	0.00	-21.27	-2.48
	106.66	46.29	-2.327E-02	-1.994E-01	0.00	0.00	0.00
	213.32	46.29	-2.327E-02	-1.994E-01	0.00	21.27	2.48
59	BAKA						
	0.00	26.43	-2.414E-03	-6.943E-02	0.00	-7.41	-2.574E-01
	106.66	26.43	-2.414E-03	-6.943E-02	0.00	0.00	0.00
	213.32	26.43	-2.414E-03	-6.943E-02	0.00	7.41	2.574E-01
59	BAKI						
	0.00	-26.41	-3.307E-03	6.317E-02	0.00	6.74	-3.527E-01
	106.66	-26.41	-3.307E-03	6.317E-02	0.00	0.00	0.00
	213.32	-26.41	-3.307E-03	6.317E-02	0.00	-6.74	3.527E-01
59	COMB1						
	0.00	150.72	-2.025E-01	-8.276E-01	0.00	-88.27	-21.60
	106.66	150.72	-2.025E-01	-8.276E-01	0.00	0.00	0.00
	213.32	150.72	-2.025E-01	-8.276E-01	0.00	88.27	21.60
59	COMB2						
	0.00	203.25	-2.108E-01	-1.03	0.00	-109.69	-22.49
	106.66	203.25	-2.108E-01	-1.03	0.00	0.00	0.00
	213.32	203.25	-2.108E-01	-1.03	0.00	109.69	22.49
59	COMB3						
	0.00	129.22	-1.810E-01	-7.175E-01	0.00	-76.52	-19.31
	106.66	129.22	-1.810E-01	-7.175E-01	0.00	0.00	0.00
	213.32	129.22	-1.810E-01	-7.175E-01	0.00	76.52	19.31
59	COMB4						
	0.00	129.16	-1.662E-01	-7.012E-01	0.00	-74.79	-17.72
	106.66	129.16	-1.662E-01	-7.012E-01	0.00	0.00	0.00
	213.32	129.16	-1.662E-01	-7.012E-01	0.00	74.79	17.72
60	BM						
	0.00	-563.70	-1.814E-01	2.448E-02	0.00	1.22	-9.07
	50.00	-563.70	-1.814E-01	2.448E-02	0.00	0.00	0.00
	100.00	-563.70	-1.814E-01	2.448E-02	0.00	-1.22	9.07
60	BH						
	0.00	-144.86	-4.074E-01	3.894E-01	0.00	19.47	-20.37
	50.00	-144.86	-4.074E-01	3.894E-01	0.00	0.00	0.00
	100.00	-144.86	-4.074E-01	3.894E-01	0.00	-19.47	20.37
60	BAKA						
	0.00	4.33	-8.720E-02	3.332E-01	0.00	16.66	-4.36
	50.00	4.33	-8.720E-02	3.332E-01	0.00	0.00	0.00
	100.00	4.33	-8.720E-02	3.332E-01	0.00	-16.66	4.36
60	BAKI						
	0.00	-4.27	5.876E-02	-3.054E-01	0.00	-15.27	2.94
	50.00	-4.27	5.876E-02	-3.054E-01	0.00	0.00	0.00
	100.00	-4.27	5.876E-02	-3.054E-01	0.00	15.27	-2.94
60	COMB1						
	0.00	-789.17	-2.540E-01	3.427E-02	0.00	1.71	-12.70
	50.00	-789.17	-2.540E-01	3.427E-02	0.00	0.00	0.00
	100.00	-789.17	-2.540E-01	3.427E-02	0.00	-1.71	12.70
60	COMB2						
	0.00	-908.21	-8.695E-01	6.524E-01	0.00	32.62	-43.47
	50.00	-908.21	-8.695E-01	6.524E-01	0.00	0.00	0.00
	100.00	-908.21	-8.695E-01	6.524E-01	0.00	-32.62	43.47
60	COMB3						
	0.00	-676.35	-2.547E-01	6.548E-02	0.00	3.27	-12.73
	50.00	-676.35	-2.547E-01	6.548E-02	0.00	0.00	0.00
	100.00	-676.35	-2.547E-01	6.548E-02	0.00	-3.27	12.73
60	COMB4						
	0.00	-676.52	-1.807E-01	-6.735E-03	0.00	-3.367E-01	-9.04
	50.00	-676.52	-1.807E-01	-6.735E-03	0.00	0.00	0.00
	100.00	-676.52	-1.807E-01	-6.735E-03	0.00	3.367E-01	9.04
61	BM						
	0.00	-38.72	-4.987E-01	-1.854E-01	0.00	-16.45	-44.24
	88.70	-38.72	-4.987E-01	-1.854E-01	0.00	0.00	0.00
	177.40	-38.72	-4.987E-01	-1.854E-01	0.00	16.45	44.24
61	BH						
	0.00	-25.91	-1.997E-01	-2.409E-01	0.00	-21.37	-17.72
	88.70	-25.91	-1.997E-01	-2.409E-01	0.00	0.00	0.00
	177.40	-25.91	-1.997E-01	-2.409E-01	0.00	21.37	17.72
61	BAKA						
	0.00	2.18	-2.537E-02	-1.051E-02	0.00	-9.325E-01	-2.25
	88.70	2.18	-2.537E-02	-1.051E-02	0.00	0.00	0.00
	177.40	2.18	-2.537E-02	-1.051E-02	0.00	9.325E-01	2.25
61	BAKI						
	0.00	-2.16	1.630E-02	1.957E-02	0.00	1.74	1.45
	88.70	-2.16	1.630E-02	1.957E-02	0.00	0.00	0.00
	177.40	-2.16	1.630E-02	1.957E-02	0.00	-1.74	-1.45
61	COMB1						
	0.00	-54.20	-6.982E-01	-2.596E-01	0.00	-23.02	-61.93
	88.70	-54.20	-6.982E-01	-2.596E-01	0.00	0.00	0.00
	177.40	-54.20	-6.982E-01	-2.596E-01	0.00	23.02	61.93
61	COMB2						
	0.00	-87.91	-9.181E-01	-6.080E-01	0.00	-53.93	-81.43

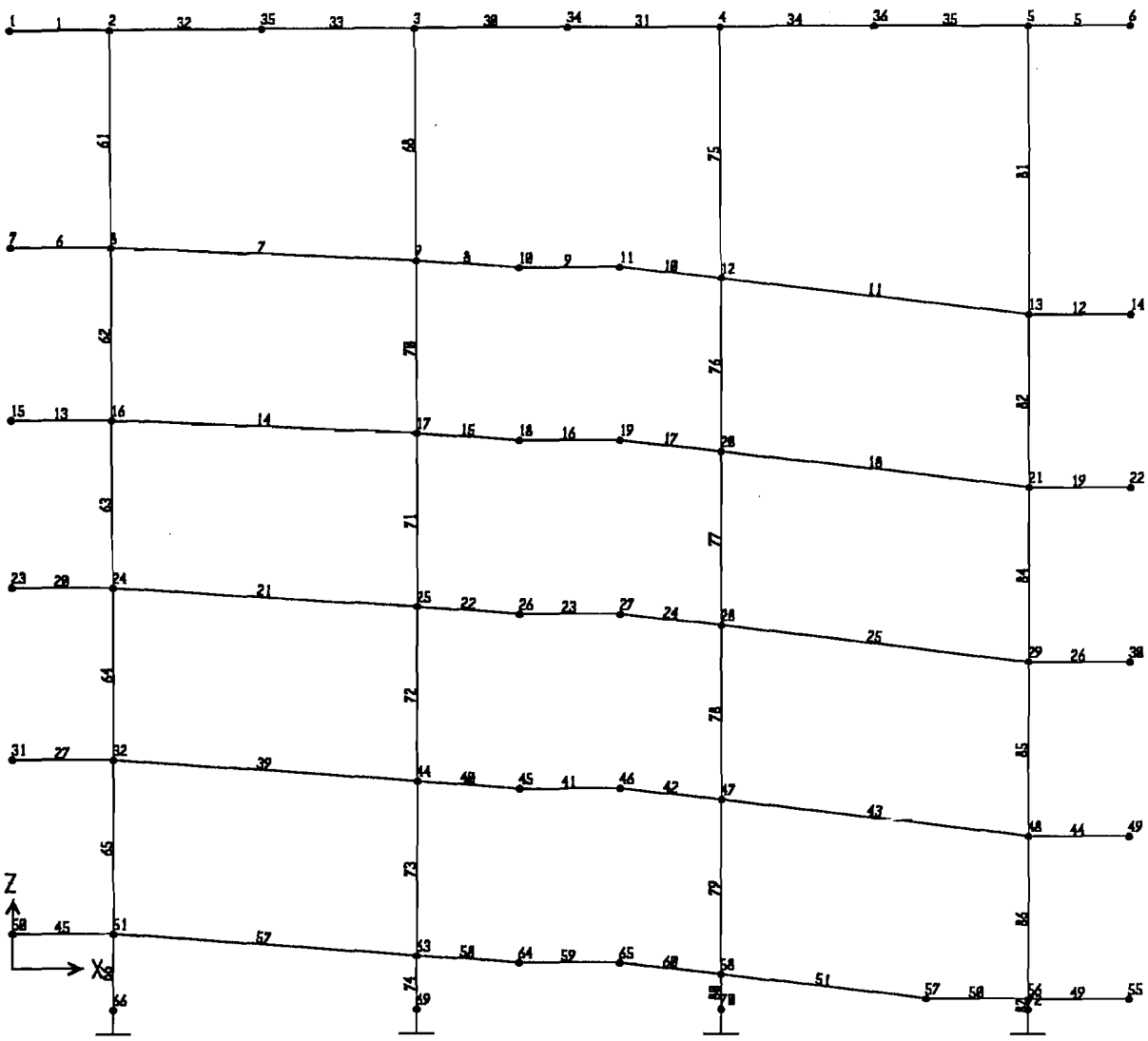
	88.70	-87.91	-9.181E-01	-6.080E-01	0.00	0.00	0.00
	177.40	-87.91	-9.181E-01	-6.080E-01	0.00	53.93	81.43
61	COMB3						
	0.00	-46.44	-6.103E-01	-2.107E-01	0.00	-18.69	-54.13
	88.70	-46.44	-6.103E-01	-2.107E-01	0.00	0.00	0.00
	177.40	-46.44	-6.103E-01	-2.107E-01	0.00	18.69	54.13
61	COMB4						
	0.00	-46.48	-5.867E-01	-2.343E-01	0.00	-20.78	-52.04
	88.70	-46.48	-5.867E-01	-2.343E-01	0.00	0.00	0.00
	177.40	-46.48	-5.867E-01	-2.343E-01	0.00	20.78	52.04
62	BM						
	0.00	357.28	-3.679E-01	1.896E-01	0.00	19.68	-38.19
	103.80	357.28	-3.679E-01	1.896E-01	0.00	0.00	0.00
	207.60	357.28	-3.679E-01	1.896E-01	0.00	-19.68	38.19
62	BH						
	0.00	52.93	-1.096E-01	8.200E-02	0.00	8.51	-11.38
	103.80	52.93	-1.096E-01	8.200E-02	0.00	0.00	0.00
	207.60	52.93	-1.096E-01	8.200E-02	0.00	-8.51	11.38
62	BAKA						
	0.00	-4.77	-7.099E-03	1.289E-01	0.00	13.38	-7.369E-01
	103.80	-4.77	-7.099E-03	1.289E-01	0.00	0.00	0.00
	207.60	-4.77	-7.099E-03	1.289E-01	0.00	-13.38	7.369E-01
62	BAKI						
	0.00	4.73	1.082E-03	-1.296E-01	0.00	-13.45	1.123E-01
	103.80	4.73	1.082E-03	-1.296E-01	0.00	0.00	0.00
	207.60	4.73	1.082E-03	-1.296E-01	0.00	13.45	-1.123E-01
62	COMB1						
	0.00	500.19	-5.151E-01	2.655E-01	0.00	27.56	-53.47
	103.80	500.19	-5.151E-01	2.655E-01	0.00	0.00	0.00
	207.60	500.19	-5.151E-01	2.655E-01	0.00	-27.56	53.47
62	COMB2						
	0.00	513.42	-6.169E-01	3.588E-01	0.00	37.24	-64.04
	103.80	513.42	-6.169E-01	3.588E-01	0.00	0.00	0.00
	207.60	513.42	-6.169E-01	3.588E-01	0.00	-37.24	64.04
62	COMB3						
	0.00	428.68	-4.494E-01	2.267E-01	0.00	23.53	-46.64
	103.80	428.68	-4.494E-01	2.267E-01	0.00	0.00	0.00
	207.60	428.68	-4.494E-01	2.267E-01	0.00	-23.53	46.64
62	COMB4						
	0.00	428.78	-4.337E-01	2.285E-01	0.00	23.71	-45.02
	103.80	428.78	-4.337E-01	2.285E-01	0.00	0.00	0.00
	207.60	428.78	-4.337E-01	2.285E-01	0.00	-23.71	45.02
63	BM						
	0.00	-106.72	-1.213E-01	1.311E-01	0.00	15.08	-13.96
	115.10	-106.72	-1.213E-01	1.311E-01	0.00	0.00	0.00
	230.20	-106.72	-1.213E-01	1.311E-01	0.00	-15.08	13.96
63	BH						
	0.00	-67.31	-1.958E-02	1.356E-01	0.00	15.60	-2.25
	115.10	-67.31	-1.958E-02	1.356E-01	0.00	0.00	0.00
	230.20	-67.31	-1.958E-02	1.356E-01	0.00	-15.60	2.25
63	BAKA						
	0.00	-1.91	-6.179E-04	-2.433E-02	0.00	-2.80	-7.112E-02
	115.10	-1.91	-6.179E-04	-2.433E-02	0.00	0.00	0.00
	230.20	-1.91	-6.179E-04	-2.433E-02	0.00	2.80	7.112E-02
63	BAKI						
	0.00	1.90	-4.299E-03	2.631E-02	0.00	3.03	-4.948E-01
	115.10	1.90	-4.299E-03	2.631E-02	0.00	0.00	0.00
	230.20	1.90	-4.299E-03	2.631E-02	0.00	-3.03	4.948E-01
63	COMB1						
	0.00	-149.40	-1.698E-01	1.835E-01	0.00	21.12	-19.54
	115.10	-149.40	-1.698E-01	1.835E-01	0.00	0.00	0.00
	230.20	-149.40	-1.698E-01	1.835E-01	0.00	-21.12	19.54
63	COMB2						
	0.00	-235.76	-1.769E-01	3.742E-01	0.00	43.07	-20.36
	115.10	-235.76	-1.769E-01	3.742E-01	0.00	0.00	0.00
	230.20	-235.76	-1.769E-01	3.742E-01	0.00	-43.07	20.36
63	COMB3						
	0.00	-128.07	-1.519E-01	1.598E-01	0.00	18.40	-17.49
	115.10	-128.07	-1.519E-01	1.598E-01	0.00	0.00	0.00
	230.20	-128.07	-1.519E-01	1.598E-01	0.00	-18.40	17.49
63	COMB4						
	0.00	-128.05	-1.391E-01	1.547E-01	0.00	17.81	-16.02
	115.10	-128.05	-1.391E-01	1.547E-01	0.00	0.00	0.00
	230.20	-128.05	-1.391E-01	1.547E-01	0.00	-17.81	16.02
64	BM						
	0.00	496.95	7.502E-01	3.554E-01	0.00	26.40	55.73
	74.29	496.95	7.502E-01	3.554E-01	0.00	0.00	0.00
	148.58	496.95	7.502E-01	3.554E-01	0.00	-26.40	-55.73
64	BH						
	0.00	81.61	1.917E-01	1.568E-01	0.00	11.65	14.24
	74.29	81.61	1.917E-01	1.568E-01	0.00	0.00	0.00
	148.58	81.61	1.917E-01	1.568E-01	0.00	-11.65	-14.24
64	BAKA						
	0.00	22.45	-2.450E-02	4.633E-03	0.00	3.442E-01	-1.82
	74.29	22.45	-2.450E-02	4.633E-03	0.00	0.00	0.00
	148.58	22.45	-2.450E-02	4.633E-03	0.00	-3.442E-01	1.82
64	BAKI						
	0.00	-19.39	4.071E-02	4.470E-03	0.00	3.321E-01	3.02
	74.29	-19.39	4.071E-02	4.470E-03	0.00	0.00	0.00
	148.58	-19.39	4.071E-02	4.470E-03	0.00	-3.321E-01	-3.02
64	COMB1						
	0.00	695.73	1.05	4.975E-01	0.00	36.96	78.02
	74.29	695.73	1.05	4.975E-01	0.00	0.00	0.00

	148.58	695.73	1.05	4.975E-01	0.00	-36.96	-78.02
64	COMB2						
	0.00	726.91	1.21	6.774E-01	0.00	50.32	89.66
	74.29	726.91	1.21	6.774E-01	0.00	0.00	0.00
	148.58	726.91	1.21	6.774E-01	0.00	-50.32	-89.66
64	COMB3						
	0.00	600.33	9.213E-01	4.383E-01	0.00	32.56	68.44
	74.29	600.33	9.213E-01	4.383E-01	0.00	0.00	0.00
	148.58	600.33	9.213E-01	4.383E-01	0.00	-32.56	-68.44
64	COMB4						
	0.00	592.36	8.792E-01	4.146E-01	0.00	30.80	65.31
	74.29	592.36	8.792E-01	4.146E-01	0.00	0.00	0.00
	148.58	592.36	8.792E-01	4.146E-01	0.00	-30.80	-65.31



C1


Z
X


Z
X

Gedubu Head Quarters

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	QD	-2.286E-05	-4.181E-04	-2.913E-04	2.174E-05	-3.031E-05	0.0000
1	QL	-2.391E-06	0.0000	-2.799E-05	0.0000	0.0000	0.0000
2	QD	-2.286E-05	-4.161E-04	-2.345E-04	2.246E-05	-5.334E-06	0.0000
2	QL	-2.391E-06	0.0000	-2.765E-05	0.0000	0.0000	0.0000
3	QD	-2.233E-05	-4.113E-04	-2.225E-04	2.214E-05	0.0000	0.0000
3	QL	-2.453E-06	0.0000	-3.158E-05	0.0000	0.0000	0.0000
4	QD	-2.172E-05	-4.066E-04	-2.171E-04	2.167E-05	-1.887E-06	0.0000
4	QL	-2.524E-06	0.0000	-3.019E-05	0.0000	0.0000	0.0000
5	QD	-2.122E-05	-4.005E-04	-2.143E-04	2.060E-05	2.488E-06	0.0000
5	QL	-2.573E-06	0.0000	-2.294E-05	0.0000	0.0000	0.0000
6	QD	-2.122E-05	-3.987E-04	-2.643E-04	1.998E-05	2.752E-05	0.0000
6	QL	-2.573E-06	0.0000	-2.236E-05	0.0000	0.0000	0.0000
7	QD	-2.040E-05	-2.869E-04	-4.010E-04	1.517E-05	-9.555E-05	0.0000
7	QL	-2.350E-06	0.0000	-3.929E-05	-1.813E-06	-7.126E-06	0.0000
8	QD	-2.040E-05	-2.859E-04	-2.273E-04	2.045E-05	-6.964E-06	0.0000
8	QL	-2.350E-06	0.0000	-2.763E-05	-1.670E-06	1.514E-06	0.0000
9	QD	-1.941E-05	-2.749E-04	-2.150E-04	2.054E-05	-2.821E-06	0.0000
9	QL	-2.669E-06	0.0000	-3.160E-05	-1.830E-06	0.0000	0.0000
10	QD	-2.481E-05	-2.700E-04	-2.930E-04	1.992E-05	2.788E-05	0.0000
10	QL	-4.018E-06	0.0000	-4.958E-05	-3.306E-06	6.774E-06	0.0000
11	QD	-2.459E-05	-2.698E-04	-2.904E-04	1.956E-05	-3.000E-05	0.0000
11	QL	-4.064E-06	0.0000	-4.900E-05	-3.304E-06	-7.210E-06	0.0000
12	QD	-1.544E-05	-2.624E-04	-2.088E-04	2.006E-05	2.981E-06	0.0000
12	QL	-2.048E-06	0.0000	-3.021E-05	-1.850E-06	0.0000	0.0000
13	QD	-1.429E-05	-2.391E-04	-2.041E-04	1.846E-05	1.467E-05	0.0000
13	QL	-1.304E-06	0.0000	-2.291E-05	-1.745E-06	-1.977E-06	0.0000
14	QD	-1.429E-05	-2.385E-04	-4.302E-04	1.351E-05	1.222E-04	0.0000
14	QL	-1.304E-06	0.0000	-3.346E-05	-1.829E-06	6.663E-06	0.0000
15	QD	-2.142E-05	-1.864E-04	-3.581E-04	1.484E-05	-8.507E-05	0.0000
15	QL	-1.838E-06	0.0000	-3.834E-05	-1.744E-06	-7.684E-06	0.0000
16	QD	-2.142E-05	-1.864E-04	-2.037E-04	1.890E-05	-5.500E-06	0.0000
16	QL	-1.838E-06	0.0000	-2.534E-05	-1.340E-06	0.0000	0.0000
17	QD	-2.099E-05	-1.774E-04	-1.916E-04	1.863E-05	-1.772E-06	0.0000
17	QL	-1.992E-06	0.0000	-2.888E-05	-1.466E-06	0.0000	0.0000
18	QD	-2.642E-05	-1.733E-04	-2.649E 04	1.732E 05	2.632E 05	0.0000
18	QL	-3.295E-06	0.0000	-4.693E-05	-3.230E-06	6.839E-06	0.0000
19	QD	-2.655E-05	-1.735E-04	-2.621E-04	1.714E-05	-2.847E-05	0.0000
19	QL	-3.288E-06	0.0000	-4.649E-05	-3.226E-06	-7.217E-06	0.0000
20	QD	-1.822E-05	-1.672E-04	-1.848E-04	1.811E-05	0.0000	0.0000
20	QL	-1.195E-06	0.0000	-2.748E-05	-1.459E-06	0.0000	0.0000
21	QD	-1.780E-05	-1.471E-04	-1.774E-04	1.676E-05	3.062E-06	0.0000
21	QL	0.0000	0.0000	-2.061E-05	-1.343E-06	-1.318E-06	0.0000
22	QD	-1.780E-05	-1.463E-04	-3.260E-04	1.257E-05	8.268E-05	0.0000
22	QL	0.0000	0.0000	-3.275E-05	-1.745E-06	7.322E-06	0.0000
23	QD	-1.760E-05	-1.030E-04	-3.224E-04	1.055E-05	-8.623E-05	0.0000
23	QL	-1.100E-06	0.0000	-3.382E-05	-1.750E-06	-7.646E-06	0.0000
24	QD	-1.760E-05	-1.032E-04	-1.654E-04	1.475E-05	-6.524E-06	0.0000
24	QL	-1.100E-06	0.0000	-2.092E-05	-1.369E-06	0.0000	0.0000
25	QD	-1.670E-05	-9.415E-05	-1.524E-04	1.422E-05	-2.592E-06	0.0000
25	QL	-1.262E-06	0.0000	-2.341E-05	-1.505E-06	0.0000	0.0000
26	QD	-2.193E-05	-9.107E-05	-2.251E-04	1.267E-05	2.647E-05	0.0000
26	QL	-2.558E-06	0.0000	-4.135E-05	-3.238E-06	6.807E-06	0.0000
27	QD	-2.192E-05	-9.150E-05	-2.228E-04	1.242E-05	-2.840E-05	0.0000
27	QL	-2.554E-06	0.0000	-4.088E-05	-3.234E-06	-7.200E-06	0.0000
28	QD	-1.337E-05	-8.669E-05	-1.449E-04	1.352E-05	0.0000	0.0000
28	QL	0.0000	0.0000	-2.200E-05	-1.501E-06	0.0000	0.0000

29	QD	-1.196E-05	-7.138E-05	-1.345E-04	1.183E-05	3.645E-06	0.0000
29	QL	0.0000	0.0000	-1.604E-05	-1.388E-06	-1.395E-06	0.0000
30	QD	-1.196E-05	-7.078E-05	-2.847E-04	7.485E-06	8.344E-05	0.0000
30	QL	0.0000	0.0000	-2.799E-05	-1.754E-06	7.245E-06	0.0000
31	QD	-1.166E-05	-3.891E-05	-2.690E-04	4.542E-06	-8.697E-05	0.0000
31	QL	0.0000	0.0000	-2.704E-05	-1.757E-06	-7.644E-06	0.0000
32	QD	-1.167E-05	-3.929E-05	-1.102E-04	8.628E-06	-7.280E-06	0.0000
32	QL	0.0000	0.0000	-1.414E-05	-1.403E-06	0.0000	0.0000
34	QD	-2.203E-05	-4.090E-04	-2.513E-04	2.190E-05	0.0000	0.0000
34	QL	-2.489E-06	0.0000	-3.167E-05	0.0000	0.0000	0.0000
35	QD	-2.259E-05	-4.136E-04	-2.533E-04	2.230E-05	-1.217E-06	0.0000
35	QL	-2.422E-06	0.0000	-2.922E-05	0.0000	0.0000	0.0000
36	QD	-2.147E-05	-4.035E-04	-2.414E-04	2.113E-05	0.0000	0.0000
36	QL	-2.548E-06	0.0000	-2.626E-05	0.0000	-1.288E-06	0.0000
44	QD	-1.085E-05	-3.311E-05	-9.742E-05	7.909E-06	-2.948E-06	0.0000
44	QL	0.0000	0.0000	-1.520E-05	-1.538E-06	0.0000	0.0000
45	QD	-1.622E-05	-3.128E-05	-1.704E-04	6.345E-06	2.679E-05	0.0000
45	QL	-1.816E-06	0.0000	-3.314E-05	-3.245E-06	6.824E-06	0.0000
46	QD	-1.632E-05	-3.186E-05	-1.686E-04	6.044E-06	-2.843E-05	0.0000
46	QL	-1.809E-06	0.0000	-3.272E-05	-3.241E-06	-7.196E-06	0.0000
47	QD	-7.711E-06	-2.893E-05	-8.913E-05	7.045E-06	-1.336E-06	0.0000
47	QL	0.0000	0.0000	-1.377E-05	-1.537E-06	0.0000	0.0000
48	QD	-6.765E-06	-1.977E-05	-7.542E-05	5.046E-06	5.724E-06	0.0000
48	QL	0.0000	0.0000	-9.190E-06	-1.412E-06	-1.151E-06	0.0000
49	QD	-6.766E-06	-1.935E-05	-2.305E-04	0.0000	8.544E-05	0.0000
49	QL	0.0000	0.0000	-2.172E-05	-1.759E-06	7.489E-06	0.0000
50	QD	-2.195E-06	-4.276E-06	-1.946E-04	-3.059E-06	-8.586E-05	0.0000
50	QL	0.0000	0.0000	-1.817E-05	-1.719E-06	-7.755E-06	0.0000
51	QD	-2.194E-06	-4.044E-06	-3.833E-05	1.175E-06	-6.337E-06	0.0000
51	QL	0.0000	0.0000	-4.998E-06	-1.216E-06	0.0000	0.0000
55	QD	-1.463E-06	0.0000	-5.398E-05	-6.552E-06	3.039E-05	0.0000
55	QL	0.0000	0.0000	-1.465E-05	-1.646E-06	8.088E-06	0.0000
56	QD	-1.464E-06	0.0000	-5.176E-06	0.0000	-6.750E-06	0.0000
56	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
57	QD	-3.375E-06	0.0000	-1.070E-04	6.423E-06	-3.690E-05	0.0000
57	QL	0.0000	0.0000	-1.939E-05	-2.969E-06	-7.215E-06	0.0000
58	QD	3.613E-06	0.0000	-1.765E-05	0.0000	3.127E-06	0.0000
58	QL	0.0000	0.0000	-2.794E-06	-1.141E-06	0.0000	0.0000
63	QD	0.0000	-2.071E-06	-2.662E-05	0.0000	-2.671E-06	0.0000
63	QL	0.0000	0.0000	-4.248E-06	-1.194E-06	0.0000	0.0000
64	QD	-5.466E-06	-1.741E-06	-9.714E-05	-1.180E-06	2.536E-05	0.0000
64	QL	-1.221E-06	0.0000	-2.182E-05	-3.172E-06	6.587E-06	0.0000
65	QD	-5.064E-06	-2.148E-06	-9.322E-05	-1.398E-06	-2.857E-05	0.0000
65	QL	-1.221E-06	0.0000	-2.098E-05	-3.159E-06	-7.199E-06	0.0000
66	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
66	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
69	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
69	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
70	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
70	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
72	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
73	QD	-2.545E-05	-4.181E-04	-2.176E-04	2.899E-05	-2.970E-05	0.0000
73	QL	-2.391E-06	0.0000	-2.799E-05	0.0000	0.0000	0.0000
74	QD	-2.545E-05	-4.161E-04	-1.631E-04	2.692E-05	-3.783E-06	0.0000
74	QL	-2.391E-06	0.0000	-2.765E-05	0.0000	0.0000	0.0000
75	QD	-2.469E-05	-4.113E-04	-1.521E-04	2.643E-05	-1.573E-06	0.0000
75	QL	-2.453E-06	0.0000	-3.158E-05	0.0000	0.0000	0.0000
76	QD	-2.412E-05	-4.067E-04	-1.477E-04	2.613E-05	0.0000	0.0000
76	QL	-2.524E-06	0.0000	-3.019E-05	0.0000	0.0000	0.0000
77	QD	-2.344E-05	-4.006E-04	-1.477E-04	2.554E-05	1.081E-06	0.0000
77	QL	-2.573E-06	0.0000	-2.294E-05	0.0000	0.0000	0.0000
78	QD	-2.344E-05	-3.987E-04	-1.955E-04	2.733E-05	2.694E-05	0.0000
78	QL	-2.573E-06	0.0000	-2.236E-05	0.0000	0.0000	0.0000

79	QD	-2.153E-05	-2.869E-04	-3.191E-04	4.072E-05	-8.982E-05	0.0000
79	QL	-2.350E-06	0.0000	-3.929E-05	1.813E-06	-7.126E-06	0.0000
80	QD	-2.153E-05	-2.860E-04	-1.560E-04	2.915E-05	-1.475E-05	0.0000
80	QL	-2.350E-06	0.0000	-2.763E-05	1.670E-06	1.514E-06	0.0000
81	QD	-2.008E-05	-2.750E-04	-1.446E-04	2.832E-05	4.341E-06	0.0000
81	QL	-2.669E-06	0.0000	-3.160E-05	1.830E-06	0.0000	0.0000
82	QD	-2.481E-05	-2.699E-04	-2.126E-04	3.487E-05	2.481E-05	0.0000
82	QL	-4.018E-06	0.0000	-4.958E-05	3.306E-06	6.774E-06	0.0000
83	QD	-2.460E-05	-2.698E-04	-2.112E-04	3.451E-05	-2.613E-05	0.0000
83	QL	-4.064E-06	0.0000	-4.900E-05	3.304E-06	-7.210E-06	0.0000
84	QD	-1.647E-05	-2.625E-04	-1.394E-04	2.798E-05	-6.014E-06	0.0000
84	QL	-2.048E-06	0.0000	-3.021E-05	1.850E-06	0.0000	0.0000
85	QD	-1.503E-05	-2.392E-04	-1.376E-04	2.828E-05	2.233E-05	0.0000
85	QL	-1.304E-06	0.0000	-2.291E-05	1.745E-06	-1.977E-06	0.0000
86	QD	-1.503E-05	-2.385E-04	-3.445E-04	4.452E-05	1.131E-04	0.0000
86	QL	-1.304E-06	0.0000	-3.346E-05	1.829E-06	6.663E-06	0.0000
87	QD	-2.125E-05	-1.864E-04	-2.805E-04	3.794E-05	-7.920E-05	0.0000
87	QL	-1.838E-06	0.0000	-3.834E-05	1.744E-06	-7.684E-06	0.0000
88	QD	-2.125E-05	-1.864E-04	-1.390E-04	2.622E-05	-9.448E-06	0.0000
88	QL	-1.838E-06	0.0000	-2.534E-05	1.340E-06	0.0000	0.0000
89	QD	-2.103E-05	-1.774E-04	-1.283E-04	2.536E-05	2.443E-06	0.0000
89	QL	-1.992E-06	0.0000	-2.888E-05	1.466E-06	0.0000	0.0000
90	QD	-2.580E-05	-1.732E-04	-1.925E-04	3.205E-05	2.363E-05	0.0000
90	QL	-3.295E-06	0.0000	-4.693E-05	3.230E-06	6.839E-06	0.0000
91	QD	-2.590E-05	-1.735E-04	-1.902E-04	3.185E-05	-2.539E-05	0.0000
91	QL	-3.288E-06	0.0000	-4.649E-05	3.226E-06	-7.217E-06	0.0000
92	QD	-1.860E-05	-1.672E-04	-1.229E-04	2.480E-05	-3.131E-06	0.0000
92	QL	-1.195E-06	0.0000	-2.748E-05	1.459E-06	0.0000	0.0000
93	QD	-1.882E-05	-1.471E-04	-1.192E-04	2.403E-05	7.118E-06	0.0000
93	QL	0.0000	0.0000	-2.061E-05	1.343E-06	-1.318E-06	0.0000
94	QD	-1.882E-05	-1.463E-04	-2.550E-04	3.566E-05	7.683E-05	0.0000
94	QL	0.0000	0.0000	-3.275E-05	1.745E-06	7.322E-06	0.0000
95	QD	-1.728E-05	-1.030E-04	-2.572E-04	3.367E-05	-8.055E-05	0.0000
95	QL	-1.100E-06	0.0000	-3.382E-05	1.750E-06	-7.646E-06	0.0000
96	QD	-1.728E-05	-1.032E-04	-1.124E-04	2.218E-05	-1.092E-05	0.0000
96	QL	-1.100E-06	0.0000	-2.092E-05	1.369E-06	0.0000	0.0000
97	QD	-1.651E-05	-9.416E-05	-1.017E-04	2.106E-05	2.174E-06	0.0000
97	QL	-1.262E-06	0.0000	-2.341E-05	1.505E-06	0.0000	0.0000
98	QD	-2.119E-05	-9.104E-05	-1.662E-04	2.742E-05	2.400E-05	0.0000
98	QL	-2.558E-06	0.0000	-4.135E-05	3.238E-06	6.807E-06	0.0000
99	QD	-2.118E-05	-9.152E-05	-1.647E-04	2.715E-05	-2.533E-05	0.0000
99	QL	-2.554E-06	0.0000	-4.088E-05	3.234E-06	-7.200E-06	0.0000
100	QD	-1.362E-05	-8.667E-05	-9.614E-05	2.034E-05	-4.409E-06	0.0000
100	QL	0.0000	0.0000	-2.200E-05	1.501E-06	0.0000	0.0000
101	QD	-1.271E-05	-7.138E-05	-9.014E-05	1.936E-05	8.290E-06	0.0000
101	QL	0.0000	0.0000	-1.604E-05	1.388E-06	-1.395E-06	0.0000
102	QD	-1.271E-05	-7.078E-05	-2.285E-04	3.063E-05	7.782E-05	0.0000
102	QL	0.0000	0.0000	-2.799E-05	1.754E-06	7.245E-06	0.0000
103	QD	-1.112E-05	-3.891E-05	-2.212E-04	2.770E-05	-8.128E-05	0.0000
103	QL	0.0000	0.0000	-2.704E-05	1.757E-06	-7.644E-06	0.0000
104	QD	-1.112E-05	-3.928E-05	-7.468E-05	1.625E-05	-1.164E-05	0.0000
104	QL	0.0000	0.0000	-1.414E-05	1.403E-06	0.0000	0.0000
105	QD	-1.052E-05	-3.312E-05	-6.482E-05	1.491E-05	1.991E-06	0.0000
105	QL	0.0000	0.0000	-1.520E-05	1.538E-06	0.0000	0.0000
106	QD	-1.531E-05	-3.126E-05	-1.298E-04	2.113E-05	2.437E-05	0.0000
106	QL	-1.816E-06	0.0000	-3.314E-05	3.245E-06	6.824E-06	0.0000
107	QD	-1.537E-05	-3.188E-05	-1.289E-04	2.081E-05	-2.532E-05	0.0000
107	QL	-1.809E-06	0.0000	-3.272E-05	3.241E-06	-7.196E-06	0.0000
108	QD	-7.734E-06	-2.890E-05	-5.902E-05	1.404E-05	-5.801E-06	0.0000
108	QL	0.0000	0.0000	-1.377E-05	1.537E-06	0.0000	0.0000
109	QD	-7.320E-06	-1.975E-05	-5.046E-05	1.281E-05	1.011E-05	0.0000
109	QL	0.0000	0.0000	-9.190E-06	1.412E-06	-1.151E-06	0.0000
110	QD	-7.319E-06	-1.935E-05	-1.933E-04	2.409E-05	7.972E-05	0.0000
110	QL	0.0000	0.0000	-2.172E-05	1.759E-06	7.489E-06	0.0000

111	QD	-2.494E-06	-4.276E-06	-1.691E-04	1.989E-05	-7.996E-05	0.0000
111	QL	0.0000	0.0000	-1.817E-05	1.719E-06	-7.755E-06	0.0000
112	QD	-2.494E-06	-4.149E-06	-2.584E-05	7.792E-06	-1.016E-05	0.0000
112	QL	0.0000	0.0000	-4.998E-06	1.216E-06	0.0000	0.0000
113	QD	0.0000	0.0000	-5.814E-05	4.124E-06	3.181E-05	0.0000
113	QL	0.0000	0.0000	-1.465E-05	1.646E-06	8.088E-06	0.0000
114	QD	0.0000	0.0000	-3.505E-06	3.049E-06	-2.679E-06	0.0000
114	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
115	QD	-1.990E-06	0.0000	-6.394E-05	1.986E-05	-2.265E-05	0.0000
115	QL	0.0000	0.0000	-1.939E-05	2.969E-06	-7.215E-06	0.0000
116	QD	1.928E-06	-1.287E-06	-1.165E-05	5.194E-06	0.0000	0.0000
116	QL	0.0000	0.0000	-2.794E-06	1.141E-06	0.0000	0.0000
117	QD	0.0000	-2.276E-06	-1.759E-05	6.010E-06	1.139E-06	0.0000
117	QL	0.0000	0.0000	-4.248E-06	1.194E-06	0.0000	0.0000
118	QD	-5.257E-06	-1.717E-06	-7.875E-05	1.327E-05	2.268E-05	0.0000
118	QL	-1.221E-06	0.0000	-2.182E-05	3.172E-06	6.587E-06	0.0000
119	QD	-5.172E-06	-2.181E-06	-7.557E-05	1.299E-05	-2.510E-05	0.0000
119	QL	-1.221E-06	0.0000	-2.098E-05	3.159E-06	-7.199E-06	0.0000
120	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
120	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
121	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
121	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
122	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
122	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
123	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Gedubu Head Quarters

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
1	QD							
		0.00	1.16	823.65	-4.314E-01	19.06	1.25	13.61
		6.0E-01	1.16	1169.63	-4.314E-01	19.06	1.51	-584.38
		1.20	1.16	1515.61	-4.314E-01	19.06	1.77	-1389.95
		1.80	1.16	1861.58	-4.314E-01	19.06	2.03	-2403.11
		2.40	1.16	2207.56	-4.314E-01	19.06	2.29	-3623.85
1	QL							
		0.00	0.00	0.00	-9.604E-02	5.03	-9.344E-02	0.00
		6.0E-01	0.00	0.00	-9.604E-02	5.03	-3.582E-02	0.00
		1.20	0.00	0.00	-9.604E-02	5.03	2.180E-02	0.00
		1.80	0.00	0.00	-9.604E-02	5.03	7.943E-02	0.00
		2.40	0.00	0.00	-9.604E-02	5.03	1.370E-01	0.00
5	QD							
		0.00	-1.899E-02	-2209.29	2.915E-01	-16.45	3.901E-01	-3628.98
		6.0E-01	-1.899E-02	-1863.31	2.915E-01	-16.45	2.152E-01	-2407.19
		1.20	-1.899E-02	-1517.34	2.915E-01	-16.45	4.032E-02	-1393.00
		1.80	-1.899E-02	-1171.36	2.915E-01	-16.45	-1.346E-01	-586.39
		2.40	-1.899E-02	-825.39	2.915E-01	-16.45	-3.094E-01	12.64
5	QL							
		0.00	0.00	0.00	5.255E-02	-4.36	6.989E-02	0.00
		6.0E-01	0.00	0.00	5.255E-02	-4.36	3.836E-02	0.00
		1.20	0.00	0.00	5.255E-02	-4.36	6.833E-03	0.00
		1.80	0.00	0.00	5.255E-02	-4.36	-2.470E-02	0.00
		2.40	0.00	0.00	5.255E-02	-4.36	-5.623E-02	0.00
6	QD							
		0.00	3.572E-02	2991.54	7.285E-01	140.53	5.311E-02	126.04
		6.0E-01	3.572E-02	4164.41	7.285E-01	140.53	-3.840E-01	-2014.14
		1.20	3.572E-02	5469.43	7.285E-01	140.53	-8.211E-01	-4897.69
		1.80	3.572E-02	6774.45	7.285E-01	140.53	-1.26	-8577.46
		2.40	3.572E-02	7947.31	7.285E-01	140.53	-1.70	-13000.59
6	QL							
		0.00	0.00	312.03	2.290E-01	3.81	-5.854E-02	0.00
		6.0E-01	0.00	367.10	2.290E-01	3.81	-1.959E-01	-198.23
		1.20	0.00	532.29	2.290E-01	3.81	-3.333E-01	-462.54
		1.80	0.00	697.49	2.290E-01	3.81	-4.707E-01	-836.98
		2.40	0.00	752.55	2.290E-01	3.81	-6.081E-01	-1277.50
7	QD							
		0.00	673.08	-8523.68	-6.675E-01	7.647E-01	-3.76	-10873.50

		3.60	266.54	-105.30	-6.675E-01	7.647E-01	-1.38	3185.11
		7.21	-139.78	8308.62	-6.675E-01	7.647E-01	1.05	-10111.19
7	QL							
		0.00	-24.17	-1269.10	-6.977E-02	-1.48	-1.39	-1724.13
		3.60	-85.77	6.55	-6.977E-02	-1.48	-1.14	974.73
		7.21	-147.20	1278.49	-6.977E-02	-1.48	-8.892E-01	-1768.65
8	QD							
		0.00	1055.39	-7860.82	-21.44	-15.65	-14.11	-9181.78
		1.20	852.58	-5146.19	-21.44	-15.65	11.69	-1302.67
		2.41	650.00	-2434.49	-21.44	-15.65	37.50	3205.26
8	QL							
		0.00	2.60	-1282.05	-9.65	-38.86	-6.31	-1802.60
		1.20	-13.90	-1061.18	-9.65	-38.86	5.31	-348.44
		2.41	-30.21	-842.76	-9.65	-38.86	16.92	752.81
9	QD							
		0.00	462.94	-952.01	23.35	-9.63	24.39	3137.52
		6.0E-01	462.94	-539.95	23.35	-9.63	10.38	3591.72
		1.20	462.94	4.26	23.35	-9.63	-3.63	3759.03
		1.80	462.94	548.47	23.35	-9.63	-17.64	3586.61
		2.40	462.94	960.52	23.35	-9.63	-31.65	3127.30
9	QL							
		0.00	-92.92	-214.10	10.64	3.968E-02	11.22	752.81
		6.0E-01	-92.92	-159.04	10.64	3.968E-02	4.83	870.26
		1.20	-92.92	6.16	10.64	3.968E-02	-1.55	921.63
		1.80	-92.92	171.35	10.64	3.968E-02	-7.94	862.87
		2.40	-92.92	226.42	10.64	3.968E-02	-14.32	738.03
10	QD							
		0.00	175.19	2532.76	-28.56	11.33	-51.64	3212.43
		1.21	-131.45	5248.32	-28.56	11.33	-17.15	-1432.37
		2.42	-437.33	7957.23	-28.56	11.33	17.34	-9459.56
10	QL							
		0.00	-187.76	834.69	-13.26	37.78	-24.05	738.03
		1.21	-212.78	1056.33	-13.26	37.78	-8.04	-359.18
		2.42	-237.18	1272.42	-13.26	37.78	7.98	-1809.90
11	QD							
		0.00	1489.38	-8721.44	-3.41	-13.44	-6.11	-10321.98
		3.63	382.68	312.87	-3.41	-13.44	6.25	5436.09
		7.25	-720.54	9318.74	-3.41	-13.44	18.60	-12570.10
11	QL							
		0.00	55.76	-1279.45	-1.10	1.15	-2.18	-1763.61
		3.63	-100.75	-1.78	-1.10	1.15	1.82	984.42
		7.25	-254.36	1252.19	-1.10	1.15	5.82	-1732.89
12	QD							
		0.00	6.408E-01	-9736.81	4.95	-131.68	10.76	-15848.13
		6.0E-01	6.408E-01	-8277.92	4.95	-131.68	7.78	-10437.10
		1.20	6.408E-01	-6686.87	4.95	-131.68	4.81	-5941.06
		1.80	6.408E-01	-5095.82	4.95	-131.68	1.84	-2412.86
		2.40	6.408E-01	-3636.92	4.95	-131.68	-1.13	200.36
12	QL							
		0.00	0.00	-752.55	1.94	-2.23	3.82	-1277.50
		6.0E-01	0.00	-697.49	1.94	-2.23	2.66	-836.98
		1.20	0.00	-532.29	1.94	-2.23	1.50	-462.54
		1.80	0.00	-367.10	1.94	-2.23	3.386E-01	-198.23
		2.40	0.00	-312.03	1.94	-2.23	-8.227E-01	0.00
13	QD							
		0.00	-1.20	2692.85	9.130E-01	107.94	-1.41	129.26
		6.0E-01	-1.20	3747.32	9.130E-01	107.94	-1.96	-1796.18
		1.20	-1.20	4933.95	9.130E-01	107.94	-2.51	-4393.96
		1.80	-1.20	6120.59	9.130E-01	107.94	-3.06	-7716.93
		2.40	-1.20	7175.06	9.130E-01	107.94	-3.60	-11712.23
13	QL							
		0.00	0.00	312.03	3.263E-01	10.76	1.190E-01	0.00
		6.0E-01	0.00	367.10	3.263E-01	10.76	-7.674E-02	-198.23
		1.20	0.00	532.29	3.263E-01	10.76	-2.725E-01	-462.54
		1.80	0.00	697.49	3.263E-01	10.76	-4.683E-01	-836.98
		2.40	0.00	752.55	3.263E-01	10.76	-6.641E-01	-1277.50
14	QD							
		0.00	254.44	-7525.91	-1.87	-2.48	-9.82	-9568.85
		3.60	-105.88	-64.74	-1.87	-2.48	-3.08	4618.57
		7.21	-465.97	7391.98	-1.87	-2.48	3.66	-9098.96
14	QL							
		0.00	73.28	-1276.39	1.287E-01	-1.18	-7.321E-01	-1761.65
		3.60	11.68	-7.315E-01	1.287E-01	-1.18	-1.20	963.45
		7.21	-49.75	1271.21	1.287E-01	-1.18	-1.66	-1753.67
15	QD							
		0.00	263.27	-6955.42	-22.19	-33.99	-13.52	-8312.00
		1.20	95.79	-4713.58	-22.19	-33.99	13.19	-1237.94
		2.41	-71.48	-2474.68	-22.19	-33.99	39.89	3033.89
15	QL							
		0.00	109.01	-1281.70	-8.79	-46.49	-4.68	-1806.39
		1.20	92.51	-1060.83	-8.79	-46.49	5.90	-352.66
		2.41	76.20	-842.41	-8.79	-46.49	16.48	748.17
16	QD							
		0.00	-262.99	-929.82	19.41	-4.63	20.54	2974.78
		6.0E-01	-262.99	-517.77	19.41	-4.63	8.89	3415.66
		1.20	-262.99	26.44	19.41	-4.63	-2.76	3569.67
		1.80	-262.99	570.65	19.41	-4.63	-14.41	3383.94

	2.40	-262.99	982.70	19.41	-4.63	-26.06	2911.32
16	QL						
	0.00	13.22	-221.67	9.57	1.135E-01	10.31	748.17
	6.0E-01	13.22	-166.61	9.57	1.135E-01	4.57	870.16
	1.20	13.22	-1.42	9.57	1.135E-01	-1.17	926.07
	1.80	13.22	163.78	9.57	1.135E-01	-6.91	871.86
	2.40	13.22	218.84	9.57	1.135E-01	-12.65	751.57
17	QD						
	0.00	-551.99	2469.42	-27.81	23.59	-51.73	2979.19
	1.21	-805.24	4712.18	-27.81	23.59	-18.15	-1303.63
	2.42	-1057.73	6948.29	-27.81	23.59	15.44	-8397.89
17	QL						
	0.00	-81.44	839.07	-11.33	46.00	-22.56	751.57
	1.21	-106.46	1060.71	-11.33	46.00	-8.88	-350.94
	2.42	-130.87	1276.81	-11.33	46.00	4.80	-1806.96
18	QD						
	0.00	587.80	-7365.27	-1.74	-11.45	-2.47	-9009.79
	3.63	-326.49	98.32	-1.74	-11.45	3.82	4678.00
	7.25	-1237.29	7533.47	-1.74	-11.45	10.11	-9701.61
18	QL						
	0.00	174.84	-1272.86	-5.785E-01	1.23	-4.165E-01	-1755.94
	3.63	18.32	4.81	-5.785E-01	1.23	1.68	968.19
	7.25	-135.29	1258.78	-5.785E-01	1.23	3.78	-1773.02
19	QD						
	0.00	-3.408E-01	-7176.97	3.24	-111.39	6.25	-11717.24
	6.0E-01	-3.408E-01	-6122.50	3.24	-111.39	4.30	-7720.79
	1.20	-3.408E-01	-4935.87	3.24	-111.39	2.36	-4396.67
	1.80	-3.408E-01	-3749.24	3.24	-111.39	4.206E-01	-1797.75
	2.40	-3.408E-01	-2694.76	3.24	-111.39	-1.52	128.84
19	QL						
	0.00	0.00	-752.55	1.24	-10.68	2.58	-1277.50
	6.0E-01	0.00	-697.49	1.24	-10.68	1.84	-836.98
	1.20	0.00	-532.29	1.24	-10.68	1.09	-462.54
	1.80	0.00	-367.10	1.24	-10.68	3.457E-01	-198.23
	2.40	0.00	-312.03	1.24	-10.68	-4.001E-01	0.00
20	QD						
	0.00	-5.871E-01	2696.16	1.66	111.61	-2.756E-01	125.15
	6.0E-01	-5.871E-01	3750.63	1.66	111.61	-1.27	-1802.28
	1.20	-5.871E-01	4937.26	1.66	111.61	-2.26	-4402.04
	1.80	-5.871E-01	6123.89	1.66	111.61	-3.26	-7726.99
	2.40	-5.871E-01	7178.37	1.66	111.61	-4.25	-11724.28
20	QL						
	0.00	0.00	312.03	6.184E-01	10.14	2.144E-01	0.00
	6.0E-01	0.00	367.10	6.184E-01	10.14	-1.566E-01	-198.23
	1.20	0.00	532.29	6.184E-01	10.14	-5.276E-01	-462.54
	1.80	0.00	697.49	6.184E-01	10.14	-8.987E-01	-836.98
	2.40	0.00	752.55	6.184E-01	10.14	-1.27	-1277.50
21	QD						
	0.00	525.55	-7552.83	-2.05	-4.84	-10.17	-9679.71
	3.61	20.13	-91.22	-2.05	-4.84	-2.79	4619.65
	7.22	-484.70	7361.63	-2.05	-4.84	4.59	-9015.00
21	QL						
	0.00	91.54	-1272.08	-2.034E-01	-1.28	-1.90	-1745.42
	3.61	5.11	3.93	-2.034E-01	-1.28	-1.17	966.27
	7.22	-80.83	1272.65	-2.034E-01	-1.28	-4.360E-01	-1768.45
22	QD						
	0.00	553.73	-6971.49	-20.01	-40.26	-10.60	-8390.92
	1.20	386.25	-4729.65	-20.01	-40.26	13.48	-1297.52
	2.41	218.98	-2490.74	-20.01	-40.26	37.56	2993.64
22	QL						
	0.00	104.88	-1281.19	-8.50	-45.66	-4.14	-1807.18
	1.20	88.38	-1060.32	-8.50	-45.66	6.09	-354.07
	2.41	72.06	-841.89	-8.50	-45.66	16.32	746.15
23	QD						
	0.00	28.10	-963.98	20.79	-6.79	21.72	2939.10
	6.0E-01	28.10	-551.92	20.79	-6.79	9.25	3400.48
	1.20	28.10	-7.71	20.79	-6.79	-3.22	3574.98
	1.80	28.10	536.50	20.79	-6.79	-15.70	3409.74
	2.40	28.10	948.55	20.79	-6.79	-28.17	2957.62
23	QL						
	0.00	9.14	-220.86	9.61	1.091E-01	10.27	746.15
	6.0E-01	9.14	-165.79	9.61	1.091E-01	4.50	867.65
	1.20	9.14	-5.968E-01	9.61	1.091E-01	-1.27	923.07
	1.80	9.14	164.60	9.61	1.091E-01	-7.04	868.36
	2.40	9.14	219.66	9.61	1.091E-01	-12.81	747.58
24	QD						
	0.00	-256.78	2473.32	-26.72	27.42	-50.52	3025.22
	1.21	-510.03	4716.09	-26.72	27.42	-18.25	-1262.32
	2.42	-762.52	6952.20	-26.72	27.42	14.02	-8361.29
24	QL						
	0.00	-85.59	839.43	-11.55	45.12	-22.72	747.58
	1.21	-110.61	1061.07	-11.55	45.12	-8.78	-355.36
	2.42	-135.01	1277.16	-11.55	45.12	5.17	-1811.80
25	QD						
	0.00	1010.48	-7351.65	-1.61	-14.52	-1.52	-8984.56
	3.63	96.19	111.94	-1.61	-14.52	4.31	4653.84
	7.25	-814.62	7547.09	-1.61	-14.52	10.15	-9775.16

25	QL						
		0.00	163.63	-1276.77	-6.402E-01	1.21	-6.205E-01	-1766.79
		3.63	7.12	8.940E-01	-6.402E-01	1.21	1.70	971.55
		7.25	-146.49	1254.87	-6.402E-01	1.21	4.02	-1755.45
26	QD							
		0.00	-2.587E-01	-7181.78	3.45	-115.49	6.72	-11733.90
		6.0E-01	-2.587E-01	-6127.31	3.45	-115.49	4.65	-7734.57
		1.20	-2.587E-01	-4940.68	3.45	-115.49	2.58	-4407.57
		1.80	-2.587E-01	-3754.05	3.45	-115.49	5.063E-01	-1805.76
		2.40	-2.587E-01	-2699.57	3.45	-115.49	-1.57	123.72
26	QL							
		0.00	0.00	-752.55	1.32	-9.75	2.70	-1277.50
		6.0E-01	0.00	-697.49	1.32	-9.75	1.92	-836.98
		1.20	0.00	-532.29	1.32	-9.75	1.13	-462.54
		1.80	0.00	-367.10	1.32	-9.75	3.373E-01	-198.23
		2.40	0.00	-312.03	1.32	-9.75	-4.518E-01	0.00
27	QD							
		0.00	-8.644E-01	2695.51	2.10	108.69	-5.036E-01	125.33
		6.0E-01	-8.644E-01	3749.98	2.10	108.69	-1.76	-1801.70
		1.20	-8.644E-01	4936.61	2.10	108.69	-3.02	-4401.08
		1.80	-8.644E-01	6123.24	2.10	108.69	-4.28	-7725.64
		2.40	-8.644E-01	7177.72	2.10	108.69	-5.53	-11722.53
27	QL							
		0.00	0.00	312.03	7.952E-01	9.43	2.843E-01	0.00
		6.0E-01	0.00	367.10	7.952E-01	9.43	-1.928E-01	-198.23
		1.20	0.00	532.29	7.952E-01	9.43	-6.699E-01	-462.54
		1.80	0.00	697.49	7.952E-01	9.43	-1.15	-836.98
		2.40	0.00	752.55	7.952E-01	9.43	-1.62	-1277.50
30	QD							
		0.00	413.56	-2081.09	1.92	-4.15	6.07	-2469.74
		9.0E-01	413.56	-1562.13	1.92	-4.15	4.34	-830.29
		1.80	413.56	-1043.16	1.92	-4.15	2.62	342.09
		2.70	413.56	-524.20	1.92	-4.15	8.874E-01	1047.40
		3.60	413.56	-5.23	1.92	-4.15	-8.410E-01	1285.65
30	QL							
		0.00	-48.01	1.78	2.239E-01	-1.025E-01	7.202E-01	24.22
		9.0E-01	-48.01	1.78	2.239E-01	-1.025E-01	5.187E-01	22.61
		1.80	-48.01	1.78	2.239E-01	-1.025E-01	3.173E-01	21.01
		2.70	-48.01	1.78	2.239E-01	-1.025E-01	1.158E-01	19.40
		3.60	-48.01	1.78	2.239E-01	-1.025E-01	-8.570E-02	17.80
31	QD							
		0.00	413.56	-5.23	1.92	-4.15	-8.410E-01	1285.65
		9.0E-01	413.56	513.73	1.92	-4.15	-2.57	1056.82
		1.80	413.56	1032.70	1.92	-4.15	-4.30	360.93
		2.70	413.56	1551.66	1.92	-4.15	-6.03	-802.03
		3.60	413.56	2070.63	1.92	-4.15	-7.75	-2432.06
31	QL							
		0.00	-48.01	1.78	2.239E-01	-1.025E-01	-8.570E-02	17.80
		9.0E-01	-48.01	1.78	2.239E-01	-1.025E-01	-2.872E-01	16.19
		1.80	-48.01	1.78	2.239E-01	-1.025E-01	-4.887E-01	14.59
		2.70	-48.01	1.78	2.239E-01	-1.025E-01	-6.901E-01	12.98
		3.60	-48.01	1.78	2.239E-01	-1.025E-01	-8.916E-01	11.37
32	QD							
		0.00	357.83	-2107.80	1.63	-2.86	6.74	-2716.46
		9.0E-01	357.83	-1588.84	1.63	-2.86	5.28	-1052.97
		1.80	357.83	-1069.87	1.63	-2.86	3.81	143.45
		2.70	357.83	-550.91	1.63	-2.86	2.35	872.80
		3.60	357.83	-31.94	1.63	-2.86	8.881E-01	1135.08
32	QL							
		0.00	-42.64	-15.71	8.594E-02	3.736E-01	2.291E-01	-65.55
		9.0E-01	-42.64	-15.71	8.594E-02	3.736E-01	1.517E-01	-51.41
		1.80	-42.64	-15.71	8.594E-02	3.736E-01	7.438E-02	-37.27
		2.70	-42.64	-15.71	8.594E-02	3.736E-01	-2.959E-03	-23.13
		3.60	-42.64	-15.71	8.594E-02	3.736E-01	-8.030E-02	-8.99
33	QD							
		0.00	357.83	-31.94	1.63	-2.86	8.881E-01	1135.08
		9.0E-01	357.83	487.02	1.63	-2.86	-5.747E-01	930.30
		1.80	357.83	1005.99	1.63	-2.86	-2.04	258.44
		2.70	357.83	1524.95	1.63	-2.86	-3.50	-880.48
		3.60	357.83	2043.92	1.63	-2.86	-4.96	-2486.47
33	QL							
		0.00	-42.64	-15.71	8.594E-02	3.736E-01	-8.030E-02	-8.99
		9.0E-01	-42.64	-15.71	8.594E-02	3.736E-01	-1.576E-01	5.15
		1.80	-42.64	-15.71	8.594E-02	3.736E-01	-2.350E-01	19.29
		2.70	-42.64	-15.71	8.594E-02	3.736E-01	-3.123E-01	33.43
		3.60	-42.64	-15.71	8.594E-02	3.736E-01	-3.897E-01	47.57
34	QD							
		0.00	343.87	-2052.56	-8.065E-01	-9.47	-2.37	-2496.41
		9.0E-01	343.87	-1533.60	-8.065E-01	-9.47	-1.64	-882.64
		1.80	343.87	-1014.64	-8.065E-01	-9.47	-9.135E-01	264.07
		2.70	343.87	-495.67	-8.065E-01	-9.47	-1.877E-01	943.70
		3.60	343.87	23.29	-8.065E-01	-9.47	5.382E-01	1156.27
34	QL							
		0.00	-33.27	19.91	1.418E-01	-5.554E-01	6.972E-01	64.85
		9.0E-01	-33.27	19.91	1.418E-01	-5.554E-01	5.695E-01	46.93
		1.80	-33.27	19.91	1.418E-01	-5.554E-01	4.419E-01	29.01
		2.70	-33.27	19.91	1.418E-01	-5.554E-01	3.142E-01	11.09
		3.60	-33.27	19.91	1.418E-01	-5.554E-01	1.866E-01	-6.83

35	QD						
	0.00	343.87	23.29	-8.065E-01	-9.47	5.382E-01	1156.27
	9.0E-01	343.87	542.26	-8.065E-01	-9.47	1.26	901.77
	1.80	343.87	1061.22	-8.065E-01	-9.47	1.99	180.21
	2.70	343.87	1580.19	-8.065E-01	-9.47	2.72	-1008.43
	3.60	343.87	2099.15	-8.065E-01	-9.47	3.44	-2664.13
35	QL						
	0.00	-33.27	19.91	1.418E-01	-5.554E-01	1.866E-01	-6.83
	9.0E-01	-33.27	19.91	1.418E-01	-5.554E-01	5.896E-02	-24.75
	1.80	-33.27	19.91	1.418E-01	-5.554E-01	-6.869E-02	-42.66
	2.70	-33.27	19.91	1.418E-01	-5.554E-01	-1.963E-01	-60.58
	3.60	-33.27	19.91	1.418E-01	-5.554E-01	-3.240E-01	-78.50
39	QD						
	0.00	460.96	-7571.92	-2.25	-6.57	-10.76	-9761.04
	3.61	-96.29	-110.12	-2.25	-6.57	-2.66	4613.77
	7.22	-652.75	7341.03	-2.25	-6.57	5.45	-8958.13
39	QL						
	0.00	104.75	-1266.06	-3.488E-01	-1.28	-2.40	-1723.56
	3.61	9.44	10.11	-3.488E-01	-1.28	-1.14	967.30
	7.22	-85.20	1277.42	-3.488E-01	-1.28	1.202E-01	-1790.07
40	QD						
	0.00	325.59	-7005.72	-20.38	-40.58	-10.80	-8473.17
	1.20	158.11	-4763.89	-20.38	-40.58	13.73	-1338.56
	2.41	-9.16	-2524.98	-20.38	-40.58	38.26	2993.79
40	QL						
	0.00	109.98	-1282.51	-8.66	-44.96	-4.37	-1811.61
	1.20	93.48	-1061.64	-8.66	-44.96	6.04	-356.91
	2.41	77.16	-843.22	-8.66	-44.96	16.46	744.90
41	QD						
	0.00	-201.99	-980.54	21.02	-8.02	22.25	2940.38
	6.0E-01	-201.99	-568.49	21.02	-8.02	9.64	3411.70
	1.20	-201.99	-24.28	21.02	-8.02	-2.97	3596.14
	1.80	-201.99	519.93	21.02	-8.02	-15.58	3440.84
	2.40	-201.99	931.98	21.02	-8.02	-28.19	2998.66
41	QL						
	0.00	14.12	-222.56	9.73	1.017E-01	10.41	744.90
	6.0E-01	14.12	-167.49	9.73	1.017E-01	4.57	867.42
	1.20	14.12	-2.30	9.73	1.017E-01	-1.27	923.86
	1.80	14.12	162.90	9.73	1.017E-01	-7.10	870.18
	2.40	14.12	217.96	9.73	1.017E-01	-12.94	750.41
42	QD						
	0.00	-484.01	2431.22	-27.23	24.64	-50.96	3067.14
	1.21	-737.25	4673.98	-27.23	24.64	-18.07	-1169.55
	2.42	-989.75	6910.09	-27.23	24.64	14.82	-8217.68
42	QL						
	0.00	-80.44	838.29	-11.74	44.38	-22.81	750.41
	1.21	-105.47	1059.94	-11.74	44.38	-8.63	-351.16
	2.42	-129.87	1276.03	-11.74	44.38	5.55	-1806.24
43	QD						
	0.00	422.42	-7328.28	-2.07	-17.14	-2.62	-8973.34
	3.63	-491.87	135.31	-2.07	-17.14	4.90	4580.29
	7.25	-1402.67	7570.46	-2.07	-17.14	12.41	-9933.48
43	QL						
	0.00	145.76	-1280.14	-7.168E-01	1.31	-9.105E-01	-1785.24
	3.63	-10.75	-2.47	-7.168E-01	1.31	1.69	965.30
	7.25	-164.37	1251.50	-7.168E-01	1.31	4.29	-1749.51
44	QD						
	0.00	-4.979E-01	-7179.80	3.17	-110.21	5.87	-11726.76
	6.0E-01	-4.979E-01	-6125.32	3.17	-110.21	3.97	-7720.62
	1.20	-4.979E-01	-4938.69	3.17	-110.21	2.06	-4402.80
	1.80	-4.979E-01	-3752.06	3.17	-110.21	1.581E-01	-1802.19
	2.40	-4.979E-01	-2697.58	3.17	-110.21	-1.75	126.10
44	QL						
	0.00	0.00	-752.55	1.22	-9.24	2.52	-1277.50
	6.0E-01	0.00	-697.49	1.22	-9.24	1.79	-836.98
	1.20	0.00	-532.29	1.22	-9.24	1.06	-462.54
	1.80	0.00	-367.10	1.22	-9.24	3.272E-01	-198.23
	2.40	0.00	-312.03	1.22	-9.24	-4.042E-01	0.00
45	QD						
	0.00	7.436E-01	2690.91	7.922E-01	112.61	8.089E-01	129.85
	6.0E-01	7.436E-01	3745.39	7.922E-01	112.61	3.336E-01	-1794.43
	1.20	7.436E-01	4932.02	7.922E-01	112.61	-1.417E-01	-4391.04
	1.80	7.436E-01	6118.65	7.922E-01	112.61	-6.171E-01	-7712.85
	2.40	7.436E-01	7173.12	7.922E-01	112.61	-1.09	-11706.99
45	QL						
	0.00	0.00	312.03	3.255E-01	13.36	-8.716E-02	0.00
	6.0E-01	0.00	367.10	3.255E-01	13.36	-2.824E-01	-198.23
	1.20	0.00	532.29	3.255E-01	13.36	-4.777E-01	-462.54
	1.80	0.00	697.49	3.255E-01	13.36	-6.730E-01	-836.98
	2.40	0.00	752.55	3.255E-01	13.36	-8.683E-01	-1277.50
49	QD						
	0.00	1.44	1251.83	3.23	-148.29	5.223E-01	-31.40
	6.0E-01	1.44	1663.88	3.23	-148.29	-1.42	-899.50
	1.20	1.44	2208.09	3.23	-148.29	-3.36	-2054.49
	1.80	1.44	2752.30	3.23	-148.29	-5.30	-3549.21
	2.40	1.44	3164.35	3.23	-148.29	-7.24	-5330.82
49	QL						
	0.00	0.00	312.03	1.40	-20.70	1.13	0.00

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	6.0E-01	0.00	367.10	1.40	-20.70	2.927E-01	-198.23
	1.20	0.00	532.29	1.40	-20.70	-5.470E-01	-462.54
	1.80	0.00	697.49	1.40	-20.70	-1.39	-836.98
	2.40	0.00	752.55	1.40	-20.70	-2.23	-1277.50
50	QD						
	0.00	3896.68	-7583.80	15.03	-196.83	24.65	-9178.74
	6.0E-01	3896.68	-6529.32	15.03	-196.83	15.63	-4938.19
	1.20	3896.68	-5342.69	15.03	-196.83	6.62	-1369.98
	1.80	3896.68	-4156.06	15.03	-196.83	-2.40	1473.04
	2.40	3896.68	-3101.59	15.03	-196.83	-11.42	3643.72
50	QL						
	0.00	725.40	-1235.36	2.09	55.89	-1.418E-01	-1735.90
	6.0E-01	725.40	-1180.30	2.09	55.89	-1.39	-1005.70
	1.20	725.40	-1015.10	2.09	55.89	-2.65	-341.57
	1.80	725.40	-849.91	2.09	55.89	-3.90	212.42
	2.40	725.40	-794.84	2.09	55.89	-5.15	700.34
51	QD						
	0.00	3628.73	-2294.50	2.90	85.18	5.21	3329.99
	2.42	4236.78	2553.68	2.90	85.18	-1.81	3294.57
	4.84	4842.33	7382.00	2.90	85.18	-8.82	-9008.91
51	QL						
	0.00	699.69	-250.23	-3.31	-23.78	-12.37	700.34
	2.42	793.19	495.26	-3.31	-23.78	-4.35	635.69
	4.84	884.61	1224.20	-3.31	-23.78	3.66	-1683.21
57	QD						
	0.00	928.07	-7556.58	-8.094E-01	-5.28	-3.39	-9692.09
	3.61	370.77	-94.78	-8.094E-01	-5.28	-4.656E-01	4627.34
	7.22	-185.74	7356.37	-8.094E-01	-5.28	2.46	-8999.97
57	QL						
	0.00	36.51	-1259.19	-4.622E-01	1.375E-01	-2.46	-1701.51
	3.61	-58.80	16.99	-4.622E-01	1.375E-01	-7.892E-01	964.54
	7.22	-153.45	1284.29	-4.622E-01	1.375E-01	8.795E-01	-1817.64
58	QD						
	0.00	1328.24	-6891.23	-11.38	-46.11	-2.94	-8231.38
	1.20	1160.80	-4649.39	-11.38	-46.11	10.75	-1234.57
	2.41	993.58	-2410.48	-11.38	-46.11	24.44	2960.00
58	QL						
	0.00	94.96	-1270.47	-8.33	-52.20	-4.40	-1781.20
	1.20	78.46	-1049.60	-8.33	-52.20	5.62	-340.99
	2.41	62.15	-831.17	-8.33	-52.20	15.65	746.32
59	QD						
	0.00	819.63	-948.14	29.56	-5.81	28.44	2900.82
	6.0E-01	819.63	-536.08	29.56	-5.81	10.70	3352.69
	1.20	819.63	8.13	29.56	-5.81	-7.03	3517.68
	1.80	819.63	552.34	29.56	-5.81	-24.77	3342.94
	2.40	819.63	964.39	29.56	-5.81	-42.50	2881.31
59	QL						
	0.00	7.268E-02	-209.43	9.77	3.566E-01	9.68	746.32
	6.0E-01	7.268E-02	-154.36	9.77	3.566E-01	3.82	860.97
	1.20	7.268E-02	10.83	9.77	3.566E-01	-2.05	909.54
	1.80	7.268E-02	176.02	9.77	3.566E-01	-7.91	847.97
	2.40	7.268E-02	231.09	9.77	3.566E-01	-13.78	720.33
60	QD						
	0.00	544.68	2572.69	-25.24	36.59	-44.31	2957.76
	1.21	291.44	4815.45	-25.24	36.59	-13.82	-1449.77
	2.42	38.94	7051.56	-25.24	36.59	16.66	-8668.74
60	QL						
	0.00	-95.88	849.76	-14.37	52.79	-25.28	720.33
	1.21	-120.91	1071.40	-14.37	52.79	-7.93	-395.09
	2.42	-145.31	1287.50	-14.37	52.79	9.42	-1864.02
61	QD						
	0.00	-5164.99	-350.03	-93.30	4.91	-219.96	-873.23
	2.63	-6678.64	-350.03	-93.30	4.91	24.95	45.59
	5.25	-8192.28	-350.03	-93.30	4.91	269.85	964.41
61	QL						
	0.00	-15.71	42.64	-20.03	-1.494E-01	-28.86	65.55
	2.63	-15.71	42.64	-20.03	-1.494E-01	23.72	-46.39
	5.25	-15.71	42.64	-20.03	-1.494E-01	76.30	-158.33
62	QD						
	0.00	-26316.72	-610.94	-174.09	5.79	-341.40	-1334.16
	2.10	-27527.64	-610.94	-174.09	5.79	24.18	-51.19
	4.20	-28738.56	-610.94	-174.09	5.79	389.76	1231.78
62	QL						
	0.00	-2668.35	128.00	-64.96	9.396E-02	-141.54	288.30
	2.10	-2668.35	128.00	-64.96	9.396E-02	-5.12	19.50
	4.20	-2668.35	128.00	-64.96	9.396E-02	131.29	-249.31
63	QD						
	0.00	-45085.21	-510.12	-169.58	1.20	-277.56	-998.51
	2.03	-46255.76	-510.12	-169.58	1.20	66.68	37.03
	4.06	-47426.31	-510.12	-169.58	1.20	410.92	1072.57
63	QL						
	0.00	-5332.96	116.37	-62.60	-1.142E-01	-126.62	234.85
	2.03	-5332.96	116.37	-62.60	-1.142E-01	4.678E-01	-1.39
	4.06	-5332.96	116.37	-62.60	-1.142E-01	127.55	-237.62
64	QD						
	0.00	-63809.60	-527.99	-164.32	7.726E-01	-244.73	-1068.83

		2.08	-65006.10	-527.99	-164.32	7.726E-01	96.23	26.75
		4.15	-66202.60	-527.99	-164.32	7.726E-01	437.19	1122.34
64	QL							
		0.00	-7994.50	111.01	-61.37	-5.659E-02	-126.80	230.29
		2.08	-7994.50	111.01	-61.37	-5.659E-02	5.310E-01	-5.517E-02
		4.15	-7994.50	111.01	-61.37	-5.659E-02	127.86	-230.40
65	QD							
		0.00	-82595.04	-429.59	-151.03	-2.90	-201.35	-935.12
		2.10	-83805.95	-429.59	-151.03	-2.90	115.81	-32.98
		4.20	-85016.88	-429.59	-151.03	-2.90	432.97	869.15
65	QL							
		0.00	-10651.03	100.84	-56.86	-1.804E-02	-122.31	215.66
		2.10	-10651.03	100.84	-56.86	-1.804E-02	-2.90	3.90
		4.20	-10651.03	100.84	-56.86	-1.804E-02	116.52	-207.87
66	QD							
		0.00	-101424.44	-787.26	-327.86	3.67	-259.97	-1229.97
		9.2E-01	-101954.94	-787.26	-327.86	3.67	41.66	-505.69
		1.84	-102485.43	-787.26	-327.86	3.67	343.30	218.59
66	QL							
		0.00	-13295.61	158.21	-121.66	6.767E-01	-155.06	216.15
		9.2E-01	-13295.61	158.21	-121.66	6.767E-01	-43.14	70.59
		1.84	-13295.61	158.21	-121.66	6.767E-01	68.79	-74.96
68	QD							
		0.00	-4962.45	-46.18	-74.41	1.83	-189.71	-53.13
		2.80	-6576.34	-46.18	-74.41	1.83	18.55	76.12
		5.60	-8190.23	-46.18	-74.41	1.83	226.80	205.37
68	QL							
		0.00	17.50	5.36	-19.13	-1.57	-28.94	23.35
		2.80	17.50	5.36	-19.13	-1.57	24.61	8.34
		5.60	17.50	5.36	-19.13	-1.57	78.17	-6.67
70	QD							
		0.00	-26039.73	-252.23	-156.99	2.63	-299.94	-566.38
		2.10	-27250.64	-252.23	-156.99	2.63	29.73	-36.69
		4.20	-28461.56	-252.23	-156.99	2.63	359.40	493.00
70	QL							
		0.00	-3178.92	12.92	-71.13	2.609E-02	-155.03	27.28
		2.10	-3178.92	12.92	-71.13	2.609E-02	-5.66	1.446E-01
		4.20	-3178.92	12.92	-71.13	2.609E-02	143.71	-26.99
71	QD							
		0.00	-44452.39	-109.45	-146.78	1.28	-239.72	-201.17
		2.10	-45663.31	-109.45	-146.78	1.28	68.53	28.68
		4.20	-46874.23	-109.45	-146.78	1.28	376.77	258.53
71	QL							
		0.00	-6370.93	11.33	-64.29	-1.182E-01	-134.42	25.73
		2.10	-6370.93	11.33	-64.29	-1.182E-01	5.999E-01	1.93
		4.20	-6370.93	11.33	-64.29	-1.182E-01	135.62	-21.86
72	QD							
		0.00	-62871.52	-130.02	-149.99	7.036E-01	-216.88	-260.63
		2.10	-64082.44	-130.02	-149.99	7.036E-01	98.10	12.41
		4.20	-65293.36	-130.02	-149.99	7.036E-01	413.07	285.46
72	QL							
		0.00	-9565.20	7.55	-65.80	-1.944E-02	-137.67	16.87
		2.10	-9565.20	7.55	-65.80	-1.944E-02	5.192E-01	1.02
		4.20	-9565.20	7.55	-65.80	-1.944E-02	138.71	-14.83
73	QD							
		0.00	-81300.22	-38.63	-136.06	9.406E-01	-171.91	-90.79
		2.10	-82511.15	-38.63	-136.06	9.406E-01	113.82	-9.67
		4.20	-83722.09	-38.63	-136.06	9.406E-01	399.55	71.45
73	QL							
		0.00	-12766.18	3.60	-59.57	7.504E-01	-130.44	6.71
		2.10	-12766.18	3.60	-59.57	7.504E-01	-5.35	-8.410E-01
		4.20	-12766.18	3.60	-59.57	7.504E-01	119.75	-8.39
74	QD							
		0.00	-99673.60	-479.30	-471.63	9.89	-277.84	-613.25
		6.5E-01	-100049.05	-479.30	-471.63	9.89	29.24	-301.17
		1.30	-100424.52	-479.30	-471.63	9.89	336.33	10.91
74	QL							
		0.00	-15965.97	-53.85	-204.22	5.17	-192.82	-44.83
		6.5E-01	-15965.97	-53.85	-204.22	5.17	-59.85	-9.77
		1.30	-15965.97	-53.85	-204.22	5.17	73.13	25.29
75	QD							
		0.00	-4952.17	74.24	-62.93	-8.155E-01	-172.96	106.29
		3.02	-6695.90	74.24	-62.93	-8.155E-01	17.35	-118.20
		6.05	-8439.62	74.24	-62.93	-8.155E-01	207.67	-342.69
75	QL							
		0.00	18.13	-14.74	-16.74	-2.47	-27.75	-53.47
		3.02	18.13	-14.74	-16.74	-2.47	22.88	-8.89
		6.05	18.13	-14.74	-16.74	-2.47	73.50	35.68
76	QD							
		0.00	-26843.43	117.35	-154.92	3.41	-294.97	321.72
		2.10	-28054.35	117.35	-154.92	3.41	30.36	75.29
		4.20	-29265.26	117.35	-154.92	3.41	355.68	-171.14
76	QL							
		0.00	-3183.23	-7.44	-71.42	3.015E-01	-156.05	-10.61
		2.10	-3183.23	-7.44	-71.42	3.015E-01	-6.08	5.01
		4.20	-3183.23	-7.44	-71.42	3.015E-01	143.90	20.62

77	QD						
	0.00	-45290.53	158.23	-145.66	1.10	-234.67	353.62
	2.10	-46501.45	158.23	-145.66	1.10	71.22	21.33
	4.20	-47712.36	158.23	-145.66	1.10	377.10	-310.96
77	QL						
	0.00	-6384.96	-12.99	-64.08	-3.091E-02	-133.91	-30.40
	2.10	-6384.96	-12.99	-64.08	-3.091E-02	6.517E-01	-3.13
	4.20	-6384.96	-12.99	-64.08	-3.091E-02	135.21	24.14
78	QD						
	0.00	-63746.68	74.35	-150.06	8.974E-01	-214.49	210.46
	2.10	-64957.59	74.35	-150.06	8.974E-01	100.65	54.33
	4.20	-66168.51	74.35	-150.06	8.974E-01	415.78	-101.80
78	QL						
	0.00	-9590.03	-11.02	-65.71	2.070E-02	-137.43	-20.88
	2.10	-9590.03	-11.02	-65.71	2.070E-02	5.572E-01	2.26
	4.20	-9590.03	-11.02	-65.71	2.070E-02	138.54	25.40
79	QD						
	0.00	-82097.41	338.87	-134.99	-8.803E-02	-174.54	555.57
	2.10	-83308.33	338.87	-134.99	-8.803E-02	108.93	-156.06
	4.20	-84519.24	338.87	-134.99	-8.803E-02	392.40	-867.68
79	QL						
	0.00	-12794.56	14.08	-58.76	7.030E-01	-129.54	4.40
	2.10	-12794.56	14.08	-58.76	7.030E-01	-6.15	-25.17
	4.20	-12794.56	14.08	-58.76	7.030E-01	117.23	-54.74
80	QD						
	0.00	-101147.10	-2676.56	-726.52	41.02	-306.82	-601.25
	4.3E-01	-101392.75	-2676.56	-726.52	41.02	2.68	538.97
	8.5E-01	-101638.39	-2676.56	-726.52	41.02	312.18	1679.18
80	QL						
	0.00	-16048.62	-711.24	-319.29	14.10	-223.43	-235.55
	4.3E-01	-16048.62	-711.24	-319.29	14.10	-87.41	67.44
	8.5E-01	-16048.62	-711.24	-319.29	14.10	48.61	370.43
81	QD						
	0.00	-5164.97	344.00	-60.78	3.38	-190.45	933.85
	3.47	-7162.98	344.00	-60.78	3.38	20.16	-258.10
	6.93	-9161.00	344.00	-60.78	3.38	230.76	-1450.06
81	QL						
	0.00	-19.91	-33.27	-12.45	-3.490E-01	-24.75	-78.50
	3.47	-19.91	-33.27	-12.45	-3.490E-01	18.38	36.77
	6.93	-19.91	-33.27	-12.45	-3.490E-01	61.51	152.04
82	QD						
	0.00	-29909.97	757.56	-185.83	-2.450E-01	-363.90	1996.71
	2.10	-31120.89	757.56	-185.83	-2.450E-01	26.36	405.83
	4.20	-32331.81	757.56	-185.83	-2.450E-01	416.61	-1185.05
82	QL						
	0.00	-2679.92	-133.49	-66.62	8.564E-02	-146.15	-303.35
	2.10	-2679.92	-133.49	-66.62	8.564E-02	-6.24	-23.03
	4.20	-2679.92	-133.49	-66.62	8.564E-02	133.67	257.30
84	QD						
	0.00	-48792.78	447.75	-161.69	1.29	-262.85	919.87
	2.10	-50003.70	447.75	-161.69	1.29	76.70	-20.40
	4.20	-51214.61	447.75	-161.69	1.29	416.24	-960.67
84	QL						
	0.00	-5331.99	-114.71	-59.11	-2.060E-03	-123.44	-238.22
	2.10	-5331.99	-114.71	-59.11	-2.060E-03	6.920E-01	2.68
	4.20	-5331.99	-114.71	-59.11	-2.060E-03	124.82	243.58
85	QD						
	0.00	-67638.57	558.58	-166.71	1.33	-244.72	1100.32
	2.10	-68849.49	558.58	-166.71	1.33	105.36	-72.69
	4.20	-70060.41	558.58	-166.71	1.33	455.45	-1245.70
85	QL						
	0.00	-7981.53	-107.54	-60.55	2.185E-02	-126.78	-234.38
	2.10	-7981.53	-107.54	-60.55	2.185E-02	3.729E-01	-8.54
	4.20	-7981.53	-107.54	-60.55	2.185E-02	127.53	217.30
86	QD						
	0.00	-86581.23	90.17	-149.05	6.25	-191.87	644.02
	1.96	-87711.43	90.17	-149.05	6.25	100.27	467.29
	3.92	-88841.62	90.17	-149.05	6.25	392.41	290.56
86	QL						
	0.00	-10629.91	-118.52	-57.22	5.698E-01	-121.21	-254.71
	1.96	-10629.91	-118.52	-57.22	5.698E-01	-9.05	-22.42
	3.92	-10629.91	-118.52	-57.22	5.698E-01	103.10	209.88
87	QD						
	0.00	-101260.54	3977.17	-627.62	-37.10	-333.46	-3467.73
	1.3E-01	-101332.62	3977.17	-627.62	-37.10	-255.01	-3964.87
	2.5E-01	-101404.70	3977.17	-627.62	-37.10	-176.56	-4462.02
87	QL						
	0.00	-13241.89	606.88	-270.34	-1.29	-260.38	-248.52
	1.3E-01	-13241.89	606.88	-270.34	-1.29	-226.59	-324.38
	2.5E-01	-13241.89	606.88	-270.34	-1.29	-192.80	-400.24
88	QD						
	0.00	-1.16	848.57	4.314E-01	-55.18	2.11	-13.61
	6.0E-01	-1.16	1194.54	4.314E-01	-55.18	1.85	-626.54
	1.20	-1.16	1540.52	4.314E-01	-55.18	1.59	-1447.06
	1.80	-1.16	1886.50	4.314E-01	-55.18	1.33	-2475.16

	2.40	-1.16	2252.47	4.514E-01			
88	QL						
	0.00	0.00	0.00	9.604E-02	-5.03	9.344E-02	0.00
	6.0E-01	0.00	0.00	9.604E-02	-5.03	3.582E-02	0.00
	1.20	0.00	0.00	9.604E-02	-5.03	-2.180E-02	0.00
	1.80	0.00	0.00	9.604E-02	-5.03	-7.943E-02	0.00
	2.40	0.00	0.00	9.604E-02	-5.03	-1.370E-01	0.00
89	QD						
	0.00	517.30	-2114.02	1.18	-4.27	5.44	-2673.48
	1.80	517.30	-1076.09	1.18	-4.27	3.31	197.62
	3.60	517.30	-38.16	1.18	-4.27	1.18	1200.45
	5.40	517.30	999.77	1.18	-4.27	-9.556E-01	335.00
	7.20	517.30	2037.70	1.18	-4.27	-3.09	-2398.72
89	QL						
	0.00	-42.64	-15.71	-8.594E-02	-3.736E-01	-2.291E-01	-65.55
	1.80	-42.64	-15.71	-8.594E-02	-3.736E-01	-7.438E-02	-37.27
	3.60	-42.64	-15.71	-8.594E-02	-3.736E-01	8.030E-02	-8.99
	5.40	-42.64	-15.71	-8.594E-02	-3.736E-01	2.350E-01	19.29
	7.20	-42.64	-15.71	-8.594E-02	-3.736E-01	3.897E-01	47.57
90	QD						
	0.00	387.55	-2081.45	9.096E-01	-2.66	2.85	-2543.60
	1.80	387.55	-1043.52	9.096E-01	-2.66	1.21	268.87
	3.60	387.55	-5.59	9.096E-01	-2.66	-4.261E-01	1213.08
	5.40	387.55	1032.34	9.096E-01	-2.66	-2.06	289.01
	7.20	387.55	2070.27	9.096E-01	-2.66	-3.70	-2503.33
90	QL						
	0.00	-48.01	1.78	-2.239E-01	1.025E-01	-7.202E-01	24.22
	1.80	-48.01	1.78	-2.239E-01	1.025E-01	-3.173E-01	21.01
	3.60	-48.01	1.78	-2.239E-01	1.025E-01	8.570E-02	17.80
	5.40	-48.01	1.78	-2.239E-01	1.025E-01	4.887E-01	14.59
	7.20	-48.01	1.78	-2.239E-01	1.025E-01	8.916E-01	11.37
91	QD						
	0.00	464.17	-2057.40	-1.43	-5.24	-5.49	-2446.26
	1.80	464.17	-1019.47	-1.43	-5.24	-2.92	322.93
	3.60	464.17	18.46	-1.43	-5.24	-3.432E-01	1223.83
	5.40	464.17	1056.39	-1.43	-5.24	2.23	256.47
	7.20	464.17	2094.32	-1.43	-5.24	4.80	-2579.17
91	QL						
	0.00	-33.27	19.91	-1.418E-01	5.554E-01	-6.972E-01	64.85
	1.80	-33.27	19.91	-1.418E-01	5.554E-01	-4.419E-01	29.01
	3.60	-33.27	19.91	-1.418E-01	5.554E-01	-1.866E-01	-6.83
	5.40	-33.27	19.91	-1.418E-01	5.554E-01	6.869E-02	-42.66
	7.20	-33.27	19.91	-1.418E-01	5.554E-01	3.240E-01	-78.50
92	QD						
	0.00	1.899E-02	-2230.74	-2.915E-01	47.56	-4.452E-01	-3705.73
	6.0E-01	1.899E-02	-1884.76	-2.915E-01	47.56	-2.703E-01	-2471.08
	1.20	1.899E-02	-1538.79	-2.915E-01	47.56	-9.540E-02	-1444.01
	1.80	1.899E-02	-1192.81	-2.915E-01	47.56	7.949E-02	-624.53
	2.40	1.899E-02	-846.84	-2.915E-01	47.56	2.544E-01	-12.64
92	QL						
	0.00	0.00	0.00	-5.255E-02	4.36	-6.989E-02	0.00
	6.0E-01	0.00	0.00	-5.255E-02	4.36	-3.836E-02	0.00
	1.20	0.00	0.00	-5.255E-02	4.36	-6.833E-03	0.00
	1.80	0.00	0.00	-5.255E-02	4.36	2.470E-02	0.00
	2.40	0.00	0.00	-5.255E-02	4.36	5.633E-02	0.00
93	QD						
	0.00	-3.572E-02	3106.80	-7.285E-01	-307.66	5.049E-02	-126.04
	6.0E-01	-3.572E-02	3518.86	-7.285E-01	-307.66	4.876E-01	-2107.13
	1.20	-3.572E-02	4063.07	-7.285E-01	-307.66	9.247E-01	-4375.10
	1.80	-3.572E-02	4607.28	-7.285E-01	-307.66	1.36	-6982.81
	2.40	-3.572E-02	5019.33	-7.285E-01	-307.66	1.80	-9877.40
93	QL						
	0.00	0.00	312.03	-2.290E-01	-3.81	5.854E-02	0.00
	6.0E-01	0.00	367.10	-2.290E-01	-3.81	1.959E-01	-198.23
	1.20	0.00	532.29	-2.290E-01	-3.81	3.333E-01	-462.54
	1.80	0.00	697.49	-2.290E-01	-3.81	4.707E-01	-836.98
	2.40	0.00	752.55	2.290E-01	3.81	6.081E-01	1277.50
94	QD						
	0.00	790.68	-3726.84	-1.417E-01	-7.12	3.96	-5450.95
	3.60	616.50	-120.20	-1.417E-01	-7.12	4.48	1990.12
	7.21	442.55	3481.99	-1.417E-01	-7.12	4.99	-4581.29
94	QL						
	0.00	-24.17	-1269.10	6.977E-02	1.48	1.39	-1724.13
	3.60	-85.77	6.55	6.977E-02	1.48	1.14	974.73
	7.21	-147.20	1278.49	6.977E-02	1.48	8.892E-01	-1768.65
95	QD						
	0.00	769.38	-4500.99	21.28	173.25	12.31	-5924.03
	1.20	697.88	-3543.99	21.28	173.25	-13.30	-1030.43
	2.41	626.60	-2589.93	21.28	173.25	-38.91	2607.03
95	QL						
	0.00	2.60	-1282.05	9.65	38.86	6.31	-1802.60
	1.20	-13.90	-1061.18	9.65	38.86	-5.31	-348.44
	2.41	-30.21	-842.76	9.65	38.86	-16.92	752.81
96	QD						
	0.00	435.79	-983.58	-23.51	-9.56	-25.31	2674.77
	6.0E-01	435.79	-571.52	-23.51	-9.56	-11.21	3147.90
	1.20	435.79	-27.31	-23.51	-9.56	2.90	3334.16
	1.80	435.79	516.90	-23.51	-9.56	17.00	3180.68

96	QL						
		0.00	-92.92	-214.10	-10.64	-3.968E-02	-11.22	752.81
		6.0E-01	-92.92	-159.04	-10.64	-3.968E-02	-4.83	870.26
		1.20	-92.92	6.16	-10.64	-3.968E-02	1.55	921.63
		1.80	-92.92	171.35	-10.64	-3.968E-02	7.94	862.87
		2.40	-92.92	226.42	-10.64	-3.968E-02	14.32	738.03
97	QD						
		0.00	150.18	2595.58	28.40	-171.46	55.54	2655.19
		1.21	42.02	3553.50	28.40	-171.46	21.24	-1004.18
		2.42	-65.40	4504.77	28.40	-171.46	-13.06	-5923.38
97	QL						
		0.00	-187.76	834.69	13.26	-37.78	24.05	738.03
		1.21	-212.78	1056.33	13.26	-37.78	8.04	-359.18
		2.42	-237.18	1272.42	13.26	-37.78	-7.98	-1809.90
98	QD						
		0.00	1250.25	-3330.86	2.71	2.17	5.44	-4226.01
		3.63	808.14	278.20	2.71	2.17	-4.39	1819.36
		7.25	369.51	3858.83	2.71	2.17	-14.23	-6222.65
98	QL						
		0.00	55.76	-1279.45	1.10	-1.15	2.18	-1763.61
		3.63	-100.75	-1.78	1.10	-1.15	-1.82	984.42
		7.25	-254.36	1252.19	1.10	-1.15	-5.82	-1732.89
99	QD						
		0.00	-6.408E-01	-5756.43	-4.95	431.80	-8.90	-11720.76
		6.0E-01	-6.408E-01	-5344.38	-4.95	431.80	-5.93	-8383.91
		1.20	-6.408E-01	-4800.17	-4.95	431.80	-2.95	-5333.94
		1.80	-6.408E-01	-4255.96	-4.95	431.80	1.917E-02	-2623.71
		2.40	-6.408E-01	-3843.90	-4.95	431.80	2.99	-200.36
99	QL						
		0.00	0.00	-752.55	-1.94	2.23	-3.82	-1277.50
		6.0E-01	0.00	-697.49	-1.94	2.23	-2.66	-836.98
		1.20	0.00	-532.29	-1.94	2.23	-1.50	-462.54
		1.80	0.00	-367.10	-1.94	2.23	-3.386E-01	-198.23
		2.40	0.00	-312.03	-1.94	2.23	8.227E-01	0.00
100	QD						
		0.00	1.20	2833.29	-9.130E-01	-311.57	-2.05	-129.26
		6.0E-01	1.20	3245.34	-9.130E-01	-311.57	-1.51	-1946.24
		1.20	1.20	3789.55	-9.130E-01	-311.57	-9.579E-01	-4050.10
		1.80	1.20	4333.76	-9.130E-01	-311.57	-4.102E-01	-6493.70
		2.40	1.20	4745.81	-9.130E-01	-311.57	1.376E-01	-9224.18
100	QL						
		0.00	0.00	312.03	-3.263E-01	-10.76	-1.190E-01	0.00
		6.0E-01	0.00	367.10	-3.263E-01	-10.76	7.674E-02	-198.23
		1.20	0.00	532.29	-3.263E-01	-10.76	2.725E-01	-462.54
		1.80	0.00	697.49	-3.263E-01	-10.76	4.683E-01	-836.98
		2.40	0.00	752.55	-3.263E-01	-10.76	6.641E-01	-1277.50
101	QD						
		0.00	-24.15	-3673.57	-2.12	-7.49	-4.78	-5112.21
		3.60	-198.32	-66.93	-2.12	-7.49	2.87	2136.87
		7.21	-372.28	3535.26	-2.12	-7.49	10.53	-4626.53
101	QL						
		0.00	73.28	-1276.39	-1.287E-01	1.18	7.321E-01	-1761.65
		3.60	11.68	-7.315E-01	-1.287E-01	1.18	1.20	963.45
		7.21	-49.75	1271.21	-1.287E-01	1.18	1.66	-1753.67
102	QD						
		0.00	117.23	-4494.12	17.54	176.74	7.25	-5959.95
		1.20	45.74	-3537.12	17.54	176.74	-13.86	-1074.62
		2.41	-25.54	-2583.06	17.54	176.74	-34.97	2554.57
102	QL						
		0.00	109.01	-1281.70	8.79	46.49	4.68	-1806.39
		1.20	92.51	-1060.83	8.79	46.49	-5.90	-352.66
		2.41	76.20	-842.41	8.79	46.49	-16.48	748.17
103	QD						
		0.00	-210.56	-936.65	-24.06	-5.17	-26.30	2613.68
		6.0E-01	-210.56	-524.59	-24.06	-5.17	-11.87	3058.66
		1.20	-210.56	19.61	-24.06	-5.17	2.57	3216.76
		1.80	-210.56	563.82	-24.06	-5.17	17.01	3035.12
		2.40	-210.56	975.88	-24.06	-5.17	31.45	2566.61
103	QL						
		0.00	13.22	-221.67	-9.57	-1.135E-01	-10.31	748.17
		6.0E-01	13.22	-166.61	-9.57	-1.135E-01	-4.57	870.16
		1.20	13.22	-1.42	-9.57	-1.135E-01	1.17	926.07
		1.80	13.22	163.78	-9.57	-1.135E-01	6.91	871.86
		2.40	13.22	218.84	-9.57	-1.135E-01	12.65	751.57
104	QD						
		0.00	-494.01	2573.62	23.16	-185.12	50.78	2498.74
		1.21	-602.18	3531.54	23.16	-185.12	22.81	-1134.12
		2.42	-709.59	4482.81	23.16	-185.12	-5.16	-6026.80
104	QL						
		0.00	-81.44	839.07	11.33	-46.00	22.56	751.57
		1.21	-106.46	1060.71	11.33	-46.00	8.88	-350.94
		2.42	-130.87	1276.81	11.33	-46.00	-4.80	-1806.96
105	QD						
		0.00	-9.36	-3525.78	1.64	-7.44	9.019E-01	-4566.56
		3.63	-451.47	83.29	1.64	-7.44	-5.03	2185.75
		7.25	-890.09	3663.91	1.64	-7.44	-10.97	-5149.31

105	QL						
		0.00	174.84	-1272.86	5.785E-01	-1.23	4.165E-01	-1755.94
		3.63	18.32	4.81	5.785E-01	-1.23	-1.68	968.19
		7.25	-135.29	1258.78	5.785E-01	-1.23	-3.78	-1773.02
106	QD						
		0.00	3.408E-01	-4743.90	-3.24	309.48	-7.23	-9219.17
		6.0E-01	3.408E-01	-4331.85	-3.24	309.48	-5.29	-6489.84
		1.20	3.408E-01	-3787.64	-3.24	309.48	-3.35	-4047.39
		1.80	3.408E-01	-3243.43	-3.24	309.48	-1.41	-1944.67
		2.40	3.408E-01	-2831.38	-3.24	309.48	5.331E-01	-128.84
106	QL						
		0.00	0.00	-752.55	-1.24	10.68	-2.58	-1277.50
		6.0E-01	0.00	-697.49	-1.24	10.68	-1.84	-836.98
		1.20	0.00	-532.29	-1.24	10.68	-1.09	-462.54
		1.80	0.00	-367.10	-1.24	10.68	-3.457E-01	-198.23
		2.40	0.00	-312.03	-1.24	10.68	4.001E-01	0.00
107	QD						
		0.00	5.871E-01	2829.98	-1.66	-305.66	-1.43	-125.15
		6.0E-01	5.871E-01	3242.03	-1.66	-305.66	-4.332E-01	-1940.15
		1.20	5.871E-01	3786.24	-1.66	-305.66	5.606E-01	-4042.02
		1.80	5.871E-01	4330.45	-1.66	-305.66	1.55	-6483.64
		2.40	5.871E-01	4742.51	-1.66	-305.66	2.55	-9212.14
107	QL						
		0.00	0.00	312.03	-6.184E-01	-10.14	-2.144E-01	0.00
		6.0E-01	0.00	367.10	-6.184E-01	-10.14	1.566E-01	-198.23
		1.20	0.00	532.29	-6.184E-01	-10.14	5.276E-01	-462.54
		1.80	0.00	697.49	-6.184E-01	-10.14	8.987E-01	-836.98
		2.40	0.00	752.55	-6.184E-01	-10.14	1.27	-1277.50
108	QD						
		0.00	274.22	-3702.69	-6.898E-01	-9.76	7.860E-01	-5246.01
		3.61	29.89	-95.61	-6.898E-01	-9.76	3.28	2115.14
		7.22	-213.85	3502.71	-6.898E-01	-9.76	5.76	-4549.62
108	QL						
		0.00	91.54	-1272.08	2.034E-01	1.28	1.90	-1745.42
		3.61	5.11	3.93	2.034E-01	1.28	1.17	966.27
		7.22	-80.83	1272.65	2.034E-01	1.28	4.360E-01	-1768.45
109	QD						
		0.00	350.18	-4509.49	18.11	168.25	7.16	-6017.06
		1.20	278.68	-3552.50	18.11	168.25	-14.63	-1113.23
		2.41	207.40	-2598.44	18.11	168.25	-36.42	2534.46
109	QL						
		0.00	104.88	-1281.19	8.50	45.66	4.14	-1807.18
		1.20	88.38	-1060.32	8.50	45.66	-6.09	-354.07
		2.41	72.06	-841.89	8.50	45.66	-16.32	746.15
110	QD						
		0.00	17.96	-972.85	-22.69	-7.27	-24.73	2589.00
		6.0E-01	17.96	-560.79	-22.69	-7.27	-11.11	3055.70
		1.20	17.96	-16.58	-22.69	-7.27	2.50	3235.52
		1.80	17.96	527.63	-22.69	-7.27	16.11	3075.60
		2.40	17.96	939.68	-22.69	-7.27	29.73	2628.80
110	QL						
		0.00	9.14	-220.86	-9.61	-1.091E-01	-10.27	746.15
		6.0E-01	9.14	-165.79	-9.61	-1.091E-01	-4.50	867.65
		1.20	9.14	-5.968E-01	-9.61	-1.091E-01	1.27	923.07
		1.80	9.14	164.60	-9.61	-1.091E-01	7.04	868.36
		2.40	9.14	219.66	-9.61	-1.091E-01	12.81	747.58
111	QD						
		0.00	-265.00	2558.11	24.82	-178.58	52.40	2561.20
		1.21	-373.17	3516.03	24.82	-178.58	22.43	-1052.93
		2.42	-480.58	4467.30	24.82	-178.58	-7.55	-5926.88
111	QL						
		0.00	-85.59	839.43	11.55	-45.12	22.72	747.58
		1.21	-110.61	1061.07	11.55	-45.12	8.78	-355.36
		2.42	-135.01	1277.16	11.55	-45.12	-5.17	-1811.80
112	QD						
		0.00	558.30	-3516.74	2.08	-9.25	2.77	-4583.39
		3.63	116.19	92.32	2.08	-9.25	-4.77	2136.15
		7.25	-322.44	3672.95	2.08	-9.25	-12.32	-5231.68
112	QL						
		0.00	163.63	-1276.77	6.402E-01	-1.21	6.205E-01	-1766.79
		3.63	7.12	8.940E-01	6.402E-01	-1.21	-1.70	971.55
		7.25	-146.49	1254.87	6.402E-01	-1.21	-4.02	-1755.45
113	QD						
		0.00	2.587E-01	-4739.09	-3.45	299.63	-7.47	-9202.51
		6.0E-01	2.587E-01	-4327.04	-3.45	299.63	-5.40	-6476.06
		1.20	2.587E-01	-3782.83	-3.45	299.63	-3.33	-4036.49
		1.80	2.587E-01	-3238.62	-3.45	299.63	-1.26	-1936.67
		2.40	2.587E-01	-2826.57	-3.45	299.63	8.149E-01	-123.72
113	QL						
		0.00	0.00	-752.55	-1.32	9.75	-2.70	-1277.50
		6.0E-01	0.00	-697.49	-1.32	9.75	-1.92	-836.98
		1.20	0.00	-532.29	-1.32	9.75	-1.13	-462.54
		1.80	0.00	-367.10	-1.32	9.75	-3.373E-01	-198.23
		2.40	0.00	-312.03	-1.32	9.75	4.518E-01	0.00
114	QD						
		0.00	8.644E-01	2830.63	-2.10	-304.62	-2.00	-125.33
		6.0E-01	8.644E-01	3242.68	-2.10	-304.62	-7.455E-01	-1940.72

		1.80	8.644E-01	4331.10	-2.10	-304.62	1.77	-6484.99
		2.40	8.644E-01	4743.16	-2.10	-304.62	3.03	-9213.88
114	QL							
		0.00	0.00	312.03	-7.952E-01	-9.43	-2.843E-01	0.00
		6.0E-01	0.00	367.10	-7.952E-01	-9.43	1.928E-01	-198.23
		1.20	0.00	532.29	-7.952E-01	-9.43	6.699E-01	-462.54
		1.80	0.00	697.49	-7.952E-01	-9.43	1.15	-836.98
		2.40	0.00	752.55	-7.952E-01	-9.43	1.62	-1277.50
115	QD							
		0.00	172.88	-3721.39	-1.635E-01	-11.68	2.77	-5326.26
		3.61	-96.52	-114.12	-1.635E-01	-11.68	3.36	2105.51
		7.22	-365.12	3482.51	-1.635E-01	-11.68	3.95	-4494.50
115	QL							
		0.00	104.75	-1266.06	3.488E-01	1.28	2.40	-1723.56
		3.61	9.44	10.11	3.488E-01	1.28	1.14	967.30
		7.22	-85.20	1277.42	3.488E-01	1.28	-1.202E-01	-1790.07
116	QD							
		0.00	202.96	-4538.29	18.40	164.53	7.96	-6085.36
		1.20	131.47	-3581.29	18.40	164.53	-14.18	-1146.88
		2.41	60.19	-2627.23	18.40	164.53	-36.33	2535.46
116	QL							
		0.00	109.98	-1282.51	8.66	44.96	4.37	-1811.61
		1.20	93.48	-1061.64	8.66	44.96	-6.04	-356.91
		2.41	77.16	-843.22	8.66	44.96	-16.46	744.90
117	QD							
		0.00	-130.96	-991.17	-23.00	-8.45	-24.85	2588.86
		6.0E-01	-130.96	-579.12	-23.00	-8.45	-11.05	3066.56
		1.20	-130.96	-34.91	-23.00	-8.45	2.75	3257.37
		1.80	-130.96	509.30	-23.00	-8.45	16.55	3108.45
		2.40	-130.96	921.36	-23.00	-8.45	30.35	2672.64
117	QL							
		0.00	14.12	-222.56	-9.73	-1.017E-01	-10.41	744.90
		6.0E-01	14.12	-167.49	-9.73	-1.017E-01	-4.57	867.42
		1.20	14.12	-2.30	-9.73	-1.017E-01	1.27	923.86
		1.80	14.12	162.90	-9.73	-1.017E-01	7.10	870.18
		2.40	14.12	217.96	-9.73	-1.017E-01	12.94	750.41
118	QD							
		0.00	-410.47	2523.02	25.25	-177.63	52.40	2604.16
		1.21	-518.64	3480.94	25.25	-177.63	21.90	-967.59
		2.42	-626.05	4432.21	25.25	-177.63	-8.59	-5799.16
118	QL							
		0.00	-80.44	838.29	11.74	-44.38	22.81	750.41
		1.21	-105.47	1059.94	11.74	-44.38	8.63	-351.16
		2.42	-129.87	1276.03	11.74	-44.38	-5.55	-1806.24
119	QD							
		0.00	17.49	-3498.59	2.05	-11.45	3.22	-4582.47
		3.63	-424.62	110.47	2.05	-11.45	-4.24	2071.22
		7.25	-863.25	3691.10	2.05	-11.45	-11.69	-5362.45
119	QL							
		0.00	145.76	-1280.14	7.168E-01	-1.31	9.105E-01	-1785.24
		3.63	-10.75	-2.47	7.168E-01	-1.31	-1.69	965.30
		7.25	-164.37	1251.50	7.168E-01	-1.31	-4.29	-1749.51
120	QD							
		0.00	4.979E-01	-4741.08	-3.17	300.11	-7.32	-9209.65
		6.0E-01	4.979E-01	-4329.02	-3.17	300.11	-5.41	-6482.01
		1.20	4.979E-01	-3784.81	-3.17	300.11	-3.51	-4041.26
		1.80	4.979E-01	-3240.60	-3.17	300.11	-1.60	-1940.24
		2.40	4.979E-01	-2828.55	-3.17	300.11	3.029E-01	-126.10
120	QL							
		0.00	0.00	-752.55	-1.22	9.24	-2.52	-1277.50
		6.0E-01	0.00	-697.49	-1.22	9.24	-1.79	-836.98
		1.20	0.00	-532.29	-1.22	9.24	-1.06	-462.54
		1.80	0.00	-367.10	-1.22	9.24	-3.272E-01	-198.23
		2.40	0.00	-312.03	-1.22	9.24	4.042E-01	0.00
121	QD							
		0.00	-7.436E-01	2835.22	-7.922E-01	-321.87	1.35	-129.85
		6.0E-01	-7.436E-01	3247.28	-7.922E-01	-321.87	1.82	-1948.00
		1.20	-7.436E-01	3791.49	-7.922E-01	-321.87	2.30	-4053.02
		1.80	-7.436E-01	4335.70	-7.922E-01	-321.87	2.77	-6497.78
		2.40	-7.436E-01	4747.75	-7.922E-01	-321.87	3.25	-9229.42
121	QL							
		0.00	0.00	312.03	-3.255E-01	-13.36	8.716E-02	0.00
		6.0E-01	0.00	367.10	-3.255E-01	-13.36	2.824E-01	-198.23
		1.20	0.00	532.29	-3.255E-01	-13.36	4.777E-01	-462.54
		1.80	0.00	697.49	-3.255E-01	-13.36	6.730E-01	-836.98
		2.40	0.00	752.55	-3.255E-01	-13.36	8.683E-01	-1277.50
122	QD							
		0.00	-1.44	1169.27	-3.23	28.59	-4.69	31.40
		6.0E-01	-1.44	1581.33	-3.23	28.59	-2.75	-787.17
		1.20	-1.44	2125.54	-3.23	28.59	-8.075E-01	-1892.63
		1.80	-1.44	2669.75	-3.23	28.59	1.13	-3337.82
		2.40	-1.44	3081.80	-3.23	28.59	3.07	-5069.89
122	QL							
		0.00	0.00	312.03	-1.40	20.70	-1.13	0.00
		6.0E-01	0.00	367.10	-1.40	20.70	-2.927E-01	-198.23
		1.20	0.00	532.29	-1.40	20.70	5.470E-01	-462.54
		1.80	0.00	697.49	-1.40	20.70	1.39	-836.98

123	QD						
	0.00	2419.52	-4201.26	5.69	-447.05	25.42	-5524.72
	6.0E-01	2419.52	-3789.20	5.69	-447.05	22.00	-3120.98
	1.20	2419.52	-3244.99	5.69	-447.05	18.59	-1004.11
	1.80	2419.52	-2700.78	5.69	-447.05	15.17	773.01
	2.40	2419.52	-2288.73	5.69	-447.05	11.75	2263.26
123	QL						
	0.00	725.40	-1235.36	-2.09	-55.89	1.418E-01	-1735.90
	6.0E-01	725.40	-1180.30	-2.09	-55.89	1.39	-1005.70
	1.20	725.40	-1015.10	-2.09	-55.89	2.65	-341.57
	1.80	725.40	-849.91	-2.09	-55.89	3.90	212.42
	2.40	725.40	-794.84	-2.09	-55.89	5.15	700.34
124	QD						
	0.00	2364.93	-671.81	17.82	192.80	61.04	2576.99
	2.42	2650.69	1606.69	17.82	192.80	17.93	1724.37
	4.84	2933.96	3865.32	17.82	192.80	-25.18	-5180.75
124	QL						
	0.00	699.69	-250.23	3.31	23.78	12.37	700.34
	2.42	793.19	495.26	3.31	23.78	4.35	635.69
	4.84	884.61	1224.20	3.31	23.78	-3.66	-1683.21
125	QD						
	0.00	924.26	-3718.08	1.69	-15.52	9.94	-5266.94
	3.61	654.85	-110.81	1.69	-15.52	3.82	2152.88
	7.22	386.22	3485.82	1.69	-15.52	-2.30	-4459.09
125	QL						
	0.00	36.51	-1259.19	4.622E-01	-1.375E-01	2.46	-1701.51
	3.61	-58.80	16.99	4.622E-01	-1.375E-01	7.892E-01	964.54
	7.22	-153.45	1284.29	4.622E-01	-1.375E-01	-8.795E-01	-1817.64
126	QD						
	0.00	516.56	-4457.83	26.13	192.00	16.30	-5937.41
	1.20	445.09	-3500.84	26.13	192.00	-15.14	-1095.75
	2.41	373.83	-2546.78	26.13	192.00	-46.59	2489.77
126	QL						
	0.00	94.96	-1270.47	8.33	52.20	4.40	-1781.20
	1.20	78.46	-1049.60	8.33	52.20	-5.62	-340.99
	2.41	62.15	-831.17	8.33	52.20	-15.65	746.32
127	QD						
	0.00	174.77	-927.22	-14.80	-7.54	-15.47	2548.95
	6.0E-01	174.77	-515.17	-14.80	-7.54	-6.59	2988.28
	1.20	174.77	29.04	-14.80	-7.54	2.30	3140.72
	1.80	174.77	573.25	-14.80	-7.54	11.18	2953.43
	2.40	174.77	985.31	-14.80	-7.54	20.06	2479.25
127	QL						
	0.00	7.268E-02	-209.43	-9.77	-3.566E-01	-9.68	746.32
	6.0E-01	7.268E-02	-154.36	-9.77	-3.566E-01	-3.82	860.97
	1.20	7.268E-02	10.83	-9.77	-3.566E-01	2.05	909.54
	1.80	7.268E-02	176.02	-9.77	-3.566E-01	7.91	847.97
	2.40	7.268E-02	231.09	-9.77	-3.566E-01	13.78	720.33
128	QD						
	0.00	-131.01	2626.24	40.00	-204.80	70.71	2402.80
	1.21	-239.18	3584.16	40.00	-204.80	22.40	-1293.59
	2.42	-346.59	4535.42	40.00	-204.80	-25.90	-6249.81
128	QL						
	0.00	-95.88	849.76	14.37	-52.79	25.28	720.33
	1.21	-120.91	1071.40	14.37	-52.79	7.93	-395.09
	2.42	-145.31	1287.50	14.37	-52.79	-9.42	-1864.02
129	QD						
	0.00	-5169.09	-525.10	90.49	5.54	209.76	-1071.53
	2.63	-6682.73	-525.10	90.49	5.54	-27.77	306.86
	5.25	-8196.38	-525.10	90.49	5.54	-265.31	1685.26
129	QL						
	0.00	-15.71	42.64	20.03	1.494E-01	28.86	65.55
	2.63	-15.71	42.64	20.03	1.494E-01	-23.72	-46.39
	5.25	-15.71	42.64	20.03	1.494E-01	-76.30	-158.33
130	QD						
	0.00	-18538.38	-1135.33	172.09	5.46	406.85	-2569.71
	2.10	-19749.30	-1135.33	172.09	5.46	45.47	-185.51
	4.20	-20960.22	-1135.33	172.09	5.46	-315.91	2198.69
130	QL						
	0.00	-2668.35	128.00	64.96	-9.396E-02	141.54	288.30
	2.10	-2668.35	128.00	64.96	-9.396E-02	5.12	19.50
	4.20	-2668.35	128.00	64.96	-9.396E-02	-131.29	-249.31
131	QD						
	0.00	-30924.92	-925.96	171.57	1.75	413.26	-1826.37
	2.03	-32095.48	-925.96	171.57	1.75	64.96	53.33
	4.06	-33266.03	-925.96	171.57	1.75	-283.33	1933.02
131	QL						
	0.00	-5332.96	116.37	62.60	1.142E-01	126.62	234.85
	2.03	-5332.96	116.37	62.60	1.142E-01	-4.678E-01	-1.39
	4.06	-5332.96	116.37	62.60	1.142E-01	-127.55	-237.62
132	QD						
	0.00	-43280.38	-945.36	169.05	1.05	444.05	-1936.27
	2.08	-44476.88	-945.36	169.05	1.05	93.28	25.35
	4.15	-45673.38	-945.36	169.05	1.05	-257.50	1986.98
132	QL						

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		0.00	-7994.50	111.01	61.37	5.659E-02	-5.310E-01	-5.517E-02
		2.08	-7994.50	111.01	61.37	5.659E-02	-127.86	-230.40
		4.15	-7994.50	111.01	61.37	5.659E-02	-127.86	-230.40
133	QD							
		0.00	-55703.90	-834.79	158.17	-2.82	463.57	-1804.68
		2.10	-56914.82	-834.79	158.17	-2.82	131.42	-51.63
		4.20	-58125.73	-834.79	158.17	-2.82	-200.72	1701.43
133	QL							
		0.00	-10651.03	100.84	56.86	1.804E-02	122.31	215.66
		2.10	-10651.03	100.84	56.86	1.804E-02	2.90	3.90
		4.20	-10651.03	100.84	56.86	1.804E-02	-116.52	-207.87
134	QD							
		0.00	-68213.27	-1484.57	334.12	1.449E-01	583.77	-2176.83
		9.2E-01	-68743.77	-1484.57	334.12	1.449E-01	276.38	-811.02
		1.84	-69274.26	-1484.57	334.12	1.449E-01	-31.01	554.79
134	QL							
		0.00	-13295.61	158.21	121.66	-6.767E-01	155.06	216.15
		9.2E-01	-13295.61	158.21	121.66	-6.767E-01	43.14	70.59
		1.84	-13295.61	158.21	121.66	-6.767E-01	-68.79	-74.96
135	QD							
		0.00	-4953.93	120.20	74.39	8.90	186.17	181.28
		2.80	-6567.83	120.20	74.39	8.90	-22.02	-155.13
		5.60	-8181.72	120.20	74.39	8.90	-230.21	-491.54
135	QL							
		0.00	17.50	5.36	19.13	1.57	28.94	23.35
		2.80	17.50	5.36	19.13	1.57	-24.61	8.34
		5.60	17.50	5.36	19.13	1.57	-78.17	-6.67
136	QD							
		0.00	-17750.84	298.66	156.31	2.75	374.24	693.54
		2.10	-18961.76	298.66	156.31	2.75	45.98	66.35
		4.20	-20172.68	298.66	156.31	2.75	-282.28	-560.83
136	QL							
		0.00	-3178.92	12.92	71.13	-2.609E-02	155.03	27.28
		2.10	-3178.92	12.92	71.13	-2.609E-02	5.66	1.446E-01
		4.20	-3178.92	12.92	71.13	-2.609E-02	-143.71	-26.99
137	QD							
		0.00	-29775.79	319.23	146.77	1.85	375.13	679.80
		2.10	-30986.71	319.23	146.77	1.85	66.92	9.41
		4.20	-32197.63	319.23	146.77	1.85	-241.30	-660.99
137	QL							
		0.00	-6370.93	11.33	64.29	1.182E-01	134.42	25.73
		2.10	-6370.93	11.33	64.29	1.182E-01	-5.999E-01	1.93
		4.20	-6370.93	11.33	64.29	1.182E-01	-135.62	-21.86
138	QD							
		0.00	-41796.38	331.02	149.14	8.141E-01	408.77	701.53
		2.10	-43007.30	331.02	149.14	8.141E-01	95.58	6.38
		4.20	-44218.21	331.02	149.14	8.141E-01	-217.61	-688.77
138	QL							
		0.00	-9565.20	7.55	65.80	1.944E-02	137.67	16.87
		2.10	-9565.20	7.55	65.80	1.944E-02	-5.192E-01	1.02
		4.20	-9565.20	7.55	65.80	1.944E-02	-138.71	-14.83
139	QD							
		0.00	-53824.88	363.61	134.78	-2.54	421.27	793.37
		2.10	-55035.81	363.61	134.78	-2.54	138.22	29.79
		4.20	-56246.74	363.61	134.78	-2.54	-144.83	-733.79
139	QL							
		0.00	-12766.18	3.60	59.57	-7.504E-01	130.44	6.71
		2.10	-12766.18	3.60	59.57	-7.504E-01	5.35	-8.410E-01
		4.20	-12766.18	3.60	59.57	-7.504E-01	-119.75	-8.39
140	QD							
		0.00	-65740.23	817.33	456.48	-14.05	598.42	660.65
		6.5E-01	-66115.69	817.33	456.48	-14.05	301.20	128.47
		1.30	-66491.15	817.33	456.48	-14.05	3.98	-403.72
140	QL							
		0.00	-15965.97	-53.85	204.22	-5.17	192.82	-44.83
		6.5E-01	-15965.97	-53.85	204.22	-5.17	59.85	-9.77
		1.30	-15965.97	-53.85	204.22	-5.17	-73.13	25.29
141	QD							
		0.00	-4970.90	-81.16	68.00	10.40	185.73	-99.01
		3.02	-6714.62	-81.16	68.00	10.40	-19.91	146.43
		6.05	-8458.34	-81.16	68.00	10.40	-225.54	391.87
141	QL							
		0.00	18.13	-14.74	16.74	2.47	27.75	-53.47
		3.02	18.13	-14.74	16.74	2.47	-22.88	-8.89
		6.05	18.13	-14.74	16.74	2.47	-73.50	35.68
142	QD							
		0.00	-17983.16	-479.39	160.52	2.40	386.52	-1107.50
		2.10	-19194.08	-479.39	160.52	2.40	49.43	-100.77
		4.20	-20405.00	-479.39	160.52	2.40	-287.66	905.95
142	QL							
		0.00	-3183.23	-7.44	71.42	-3.015E-01	156.05	-10.61
		2.10	-3183.23	-7.44	71.42	-3.015E-01	6.08	5.01
		4.20	-3183.23	-7.44	71.42	-3.015E-01	-143.90	20.62
143	QD							
		0.00	-30010.44	-243.73	146.71	1.23	377.31	-467.14

		2.10	-31221.36	-243.73	146.71	1.23	69.22	44.66
		4.20	-32432.28	-243.73	146.71	1.23	-238.87	556.51
143	QL							
		0.00	-6384.96	-12.99	64.08	3.091E-02	133.91	-30.40
		2.10	-6384.96	-12.99	64.08	3.091E-02	-6.517E-01	-3.13
		4.20	-6384.96	-12.99	64.08	3.091E-02	-135.21	24.14
144	QD							
		0.00	-42056.26	-349.43	148.74	8.122E-01	410.22	-685.14
		2.10	-43267.18	-349.43	148.74	8.122E-01	97.87	48.66
		4.20	-44478.10	-349.43	148.74	8.122E-01	-214.49	782.46
144	QL							
		0.00	-9590.03	-11.02	65.71	-2.070E-02	137.43	-20.88
		2.10	-9590.03	-11.02	65.71	-2.070E-02	-5.572E-01	2.26
		4.20	-9590.03	-11.02	65.71	-2.070E-02	-138.54	25.40
145	QD							
		0.00	-53994.12	-67.10	131.70	-3.63	414.08	-335.94
		2.10	-55205.04	-67.10	131.70	-3.63	137.51	-195.04
		4.20	-56415.96	-67.10	131.70	-3.63	-139.06	-54.13
145	QL							
		0.00	-12794.56	14.08	58.76	-7.030E-01	129.54	4.40
		2.10	-12794.56	14.08	58.76	-7.030E-01	6.15	-25.17
		4.20	-12794.56	14.08	58.76	-7.030E-01	-117.23	-54.74
146	QD							
		0.00	-66656.95	-2373.47	717.26	-23.04	703.42	-1049.45
		4.3E-01	-66902.59	-2373.47	717.26	-23.04	397.86	-38.35
		8.5E-01	-67148.23	-2373.47	717.26	-23.04	92.31	972.75
146	QL							
		0.00	-16048.62	-711.24	319.29	-14.10	223.43	-235.55
		4.3E-01	-16048.62	-711.24	319.29	-14.10	87.41	67.44
		8.5E-01	-16048.62	-711.24	319.29	-14.10	-48.61	370.43
147	QD							
		0.00	-5140.76	464.04	58.55	5.23	177.06	1157.55
		3.47	-7138.77	464.04	58.55	5.23	-25.80	-450.36
		6.93	-9136.79	464.04	58.55	5.23	-228.66	-2058.26
147	QL							
		0.00	-19.91	-33.27	12.45	3.490E-01	24.75	-78.50
		3.47	-19.91	-33.27	12.45	3.490E-01	-18.38	36.77
		6.93	-19.91	-33.27	12.45	3.490E-01	-61.51	152.04
148	QD							
		0.00	-20196.45	1304.33	182.90	-6.930E-01	450.23	3271.11
		2.10	-21407.37	1304.33	182.90	-6.930E-01	66.13	532.02
		4.20	-22618.29	1304.33	182.90	-6.930E-01	-317.97	-2207.07
148	QL							
		0.00	-2679.92	-133.49	66.62	-8.564E-02	146.15	-303.35
		2.10	-2679.92	-133.49	66.62	-8.564E-02	6.24	-23.03
		4.20	-2679.92	-133.49	66.62	-8.564E-02	-133.67	257.30
149	QD							
		0.00	-32644.10	864.04	158.66	1.28	405.64	1773.51
		2.10	-33855.01	864.04	158.66	1.28	72.45	-40.98
		4.20	-35065.93	864.04	158.66	1.28	-260.73	-1855.47
149	QL							
		0.00	-5331.99	-114.71	59.11	2.060E-03	123.44	-238.22
		2.10	-5331.99	-114.71	59.11	2.060E-03	-6.920E-01	2.68
		4.20	-5331.99	-114.71	59.11	2.060E-03	-124.82	243.58
150	QD							
		0.00	-45030.81	988.85	164.15	1.25	446.55	2013.12
		2.10	-46241.73	988.85	164.15	1.25	101.83	-63.47
		4.20	-47452.65	988.85	164.15	1.25	-242.89	-2140.06
150	QL							
		0.00	-7981.53	-107.54	60.55	-2.185E-02	126.78	-234.38
		2.10	-7981.53	-107.54	60.55	-2.185E-02	-3.729E-01	-8.54
		4.20	-7981.53	-107.54	60.55	-2.185E-02	-127.53	217.30
151	QD							
		0.00	-57499.14	577.46	146.48	3.30	449.60	1610.70
		1.96	-58629.33	577.46	146.48	3.30	162.50	478.87
		3.92	-59759.52	577.46	146.48	3.30	-124.59	-652.95
151	QL							
		0.00	-10629.91	-118.52	57.22	-5.698E-01	121.21	-254.71
		1.96	-10629.91	-118.52	57.22	-5.698E-01	9.05	-22.42
		3.92	-10629.91	-118.52	57.22	-5.698E-01	-103.10	209.88
152	QD							
		0.00	-68541.79	3006.66	645.76	-31.50	876.69	-1197.42
		1.3E-01	-68613.87	3006.66	645.76	-31.50	795.97	-1573.25
		2.5E-01	-68685.95	3006.66	645.76	-31.50	715.25	-1949.09
152	QL							
		0.00	-13241.89	606.88	270.34	1.29	260.38	-248.52
		1.3E-01	-13241.89	606.88	270.34	1.29	226.59	-324.38
		2.5E-01	-13241.89	606.88	270.34	1.29	192.80	-400.24
153	QD							
		0.00	-4.314E-01	-848.57	-1.16	13.61	-2.11	-55.18
		7.3E-01	-4.314E-01	-430.51	-1.16	13.61	-1.27	408.48
		1.45	-4.314E-01	-12.46	-1.16	13.61	-4.261E-01	569.06
		2.18	-4.314E-01	405.60	-1.16	13.61	4.135E-01	426.55
		2.90	-4.314E-01	823.65	-1.16	13.61	1.25	-19.06
153	QL							
		0.00	-9.604E-02	0.00	0.00	0.00	-9.344E-02	-5.03

	7.3E-01	-9.604E-02	0.00	0.00	0.00	-9.344E-02	-5.03
	1.45	-9.604E-02	0.00	0.00	0.00	-9.344E-02	-5.03
	2.18	-9.604E-02	0.00	0.00	0.00	-9.344E-02	-5.03
	2.90	-9.604E-02	0.00	0.00	0.00	-9.344E-02	-5.03
154 QD							
	0.00	-91.24	-822.59	-6.64	34.16	-9.91	-158.85
	7.3E-01	-91.24	-404.54	-6.64	34.16	-5.09	285.99
	1.45	-91.24	13.52	-6.64	34.16	-2.745E-01	427.74
	2.18	-91.24	431.57	-6.64	34.16	4.54	266.39
	2.90	-91.24	849.63	-6.64	34.16	9.36	-198.04
154 QL							
	0.00	-19.85	0.00	0.00	0.00	-5.736E-02	-24.20
	7.3E-01	-19.85	0.00	0.00	0.00	-5.736E-02	-24.20
	1.45	-19.85	0.00	0.00	0.00	-5.736E-02	-24.20
	2.18	-19.85	0.00	0.00	0.00	-5.736E-02	-24.20
	2.90	-19.85	0.00	0.00	0.00	-5.736E-02	-24.20
155 QD							
	0.00	-74.11	-834.78	-9.55	-36.40	-14.84	-184.57
	7.3E-01	-74.11	-416.73	-9.55	-36.40	-7.91	269.11
	1.45	-74.11	1.33	-9.55	-36.40	-9.885E-01	419.69
	2.18	-74.11	419.38	-9.55	-36.40	5.94	267.18
	2.90	-74.11	837.44	-9.55	-36.40	12.86	-188.41
155 QL							
	0.00	-19.00	0.00	0.00	0.00	-4.561E-01	-28.46
	7.3E-01	-19.00	0.00	0.00	0.00	-4.561E-01	-28.46
	1.45	-19.00	0.00	0.00	0.00	-4.561E-01	-28.46
	2.18	-19.00	0.00	0.00	0.00	-4.561E-01	-28.46
	2.90	-19.00	0.00	0.00	0.00	-4.561E-01	-28.46
156 QD							
	0.00	-65.66	-843.23	-4.55	41.93	-8.61	-188.31
	7.3E-01	-65.66	-425.18	-4.55	41.93	-5.32	271.49
	1.45	-65.66	-7.12	-4.55	41.93	-2.02	428.20
	2.18	-65.66	410.93	-4.55	41.93	1.28	281.82
	2.90	-65.66	828.99	-4.55	41.93	4.57	-167.65
156 QL							
	0.00	-16.82	0.00	0.00	0.00	-8.816E-01	-27.29
	7.3E-01	-16.82	0.00	0.00	0.00	-8.816E-01	-27.29
	1.45	-16.82	0.00	0.00	0.00	-8.816E-01	-27.29
	2.18	-16.82	0.00	0.00	0.00	-8.816E-01	-27.29
	2.90	-16.82	0.00	0.00	0.00	-8.816E-01	-27.29
157 QD							
	0.00	-59.68	-815.70	-1.090E-01	-30.99	1.160E-02	-124.26
	7.3E-01	-59.68	-397.64	-1.090E-01	-30.99	9.059E-02	315.58
	1.45	-59.68	20.41	-1.090E-01	-30.99	1.696E-01	452.32
	2.18	-59.68	438.47	-1.090E-01	-30.99	2.486E-01	285.98
	2.90	-59.68	856.52	-1.090E-01	-30.99	3.276E-01	-183.46
157 QL							
	0.00	-12.54	0.00	0.00	0.00	4.492E-02	-20.95
	7.3E-01	-12.54	0.00	0.00	0.00	4.492E-02	-20.95
	1.45	-12.54	0.00	0.00	0.00	4.492E-02	-20.95
	2.18	-12.54	0.00	0.00	0.00	4.492E-02	-20.95
	2.90	-12.54	0.00	0.00	0.00	4.492E-02	-20.95
158 QD							
	0.00	-2.915E-01	-846.84	-1.899E-02	-12.64	2.544E-01	-47.56
	7.3E-01	-2.915E-01	-428.78	-1.899E-02	-12.64	2.681E-01	414.85
	1.45	-2.915E-01	-10.73	-1.899E-02	-12.64	2.819E-01	574.17
	2.18	-2.915E-01	407.33	-1.899E-02	-12.64	2.957E-01	430.40
	2.90	-2.915E-01	825.39	-1.899E-02	-12.64	3.094E-01	-16.45
158 QL							
	0.00	-5.255E-02	0.00	0.00	0.00	5.623E-02	-4.36
	7.3E-01	-5.255E-02	0.00	0.00	0.00	5.623E-02	-4.36
	1.45	-5.255E-02	0.00	0.00	0.00	5.623E-02	-4.36
	2.18	-5.255E-02	0.00	0.00	0.00	5.623E-02	-4.36
	2.90	-5.255E-02	0.00	0.00	0.00	5.623E-02	-4.36
159 QD							
	0.00	7.285E-01	-3106.80	-3.572E-02	126.04	-5.049E-02	-307.66
	7.3E-01	7.285E-01	-1672.96	-3.572E-02	126.04	-2.459E-02	1436.67
	1.45	7.285E-01	-57.63	-3.572E-02	126.04	1.307E-03	2072.46
	2.18	7.285E-01	1557.70	-3.572E-02	126.04	2.721E-02	1520.23
	2.90	7.285E-01	2991.54	-3.572E-02	126.04	5.311E-02	-140.53
159 QL							
	0.00	2.290E-01	-312.03	0.00	0.00	-5.854E-02	-3.81
	7.3E-01	2.290E-01	-231.63	0.00	0.00	-5.854E-02	202.98
	1.45	2.290E-01	0.00	0.00	0.00	-5.854E-02	294.00
	2.18	2.290E-01	231.63	0.00	0.00	-5.854E-02	202.98
	2.90	2.290E-01	312.03	0.00	0.00	-5.854E-02	-3.81
160 QD							
	0.00	-82.18	-1562.02	-2.050E-01	-171.48	-1.74	-371.80
	7.3E-01	-82.18	-951.01	-2.050E-01	-171.48	-1.59	562.49
	1.45	-82.18	34.44	-2.050E-01	-171.48	-1.44	914.86
	2.18	-82.18	1019.89	-2.050E-01	-171.48	-1.29	512.55
	2.90	-82.18	1630.90	-2.050E-01	-171.48	-1.15	-471.67
160 QL							
	0.00	-45.23	-633.63	0.00	0.00	-6.103E-01	-212.62
	7.3E-01	-45.23	-472.83	0.00	0.00	-6.103E-01	207.90
	1.45	-45.23	0.00	0.00	0.00	-6.103E-01	396.06
	2.18	-45.23	472.83	0.00	0.00	-6.103E-01	207.90
	2.90	-45.23	633.63	0.00	0.00	-6.103E-01	-212.62

161	QD							
		0.00	-103.35	-1566.73	3.854E-01	157.67	-14.39	-425.24
		7.3E-01	-103.35	-955.72	3.854E-01	157.67	-14.67	512.46
		1.45	-103.35	29.73	3.854E-01	157.67	-14.95	868.24
		2.18	-103.35	1015.18	3.854E-01	157.67	-15.23	469.35
		2.90	-103.35	1626.20	3.854E-01	157.67	-15.51	-511.47
161	QL							
		0.00	-61.58	-633.63	0.00	0.00	-6.64	-196.35
		7.3E-01	-61.58	-472.83	0.00	0.00	-6.64	224.17
		1.45	-61.58	0.00	0.00	0.00	-6.64	412.33
		2.18	-61.58	472.83	0.00	0.00	-6.64	224.17
		2.90	-61.58	633.63	0.00	0.00	-6.64	-196.35
162	QD							
		0.00	44.79	-1645.84	3.88	-67.74	-5.808E-01	-185.23
		7.3E-01	44.79	-1034.83	3.88	-67.74	-3.40	809.82
		1.45	44.79	-60.85	3.88	-67.74	-6.21	1223.92
		2.18	44.79	913.13	3.88	-67.74	-9.03	898.06
		2.90	44.79	1524.14	3.88	-67.74	-11.84	-8.77
162	QL							
		0.00	20.29	-624.07	0.00	0.00	-2.77	-40.05
		7.3E-01	20.29	-463.27	0.00	0.00	-2.77	373.54
		1.45	20.29	0.00	0.00	0.00	-2.77	555.57
		2.18	20.29	463.27	0.00	0.00	-2.77	373.54
		2.90	20.29	624.07	0.00	0.00	-2.77	-40.05
163	QD							
		0.00	-51.91	-1633.39	4.67	85.13	-4.84	-167.05
		7.3E-01	-51.91	-1022.38	4.67	85.13	-8.23	818.98
		1.45	-51.91	-48.40	4.67	85.13	-11.62	1224.05
		2.18	-51.91	925.58	4.67	85.13	-15.00	889.16
		2.90	-51.91	1536.59	4.67	85.13	-18.39	-26.69
163	QL							
		0.00	-23.90	-624.07	0.00	0.00	-5.33	-40.20
		7.3E-01	-23.90	-463.27	0.00	0.00	-5.33	373.39
		1.45	-23.90	0.00	0.00	0.00	-5.33	555.42
		2.18	-23.90	463.27	0.00	0.00	-5.33	373.39
		2.90	-23.90	624.07	0.00	0.00	-5.33	-40.20
164	QD							
		0.00	-66.83	-1582.99	-2.73	-198.00	-29.88	-441.66
		7.3E-01	-66.83	-971.98	-2.73	-198.00	-27.90	507.84
		1.45	-66.83	13.47	-2.73	-198.00	-25.93	875.41
		2.18	-66.83	998.92	-2.73	-198.00	-23.95	488.30
		2.90	-66.83	1609.93	-2.73	-198.00	-21.97	-480.72
164	QL							
		0.00	-42.52	-633.63	0.00	0.00	-11.42	-194.31
		7.3E-01	-42.52	-472.83	0.00	0.00	-11.42	226.21
		1.45	-42.52	0.00	0.00	0.00	-11.42	414.37
		2.18	-42.52	472.83	0.00	0.00	-11.42	226.21
		2.90	-42.52	633.63	0.00	0.00	-11.42	-194.31
165	QD							
		0.00	-116.69	-1517.97	3.68	168.74	9.673E-01	-250.96
		7.3E-01	-116.69	-906.96	3.68	168.74	-1.70	651.39
		1.45	-116.69	78.49	3.68	168.74	-4.36	971.82
		2.18	-116.69	1063.94	3.68	168.74	-7.03	537.58
		2.90	-116.69	1674.95	3.68	168.74	-9.70	-478.58
165	QL							
		0.00	-51.14	-633.63	0.00	0.00	-1.66	-204.99
		7.3E-01	-51.14	-472.83	0.00	0.00	-1.66	215.53
		1.45	-51.14	0.00	0.00	0.00	-1.66	403.69
		2.18	-51.14	472.83	0.00	0.00	-1.66	215.53
		2.90	-51.14	633.63	0.00	0.00	-1.66	-204.99
166	QD							
		0.00	-4.95	-3843.90	6.408E-01	-200.36	2.99	-431.80
		7.3E-01	-4.95	-2064.44	6.408E-01	-200.36	2.53	1721.63
		1.45	-4.95	-103.49	6.408E-01	-200.36	2.06	2515.96
		2.18	-4.95	1857.46	6.408E-01	-200.36	1.60	1871.69
		2.90	-4.95	3636.92	6.408E-01	-200.36	1.13	-131.68
166	QL							
		0.00	-1.94	-312.03	0.00	0.00	8.227E-01	-2.23
		7.3E-01	-1.94	-231.63	0.00	0.00	8.227E-01	204.57
		1.45	-1.94	0.00	0.00	0.00	8.227E-01	295.58
		2.18	-1.94	231.63	0.00	0.00	8.227E-01	204.57
		2.90	-1.94	312.03	0.00	0.00	8.227E-01	-2.23
167	QD							
		0.00	9.130E-01	-2833.29	1.20	129.26	2.05	-311.57
		7.3E-01	9.130E-01	-1542.49	1.20	129.26	1.19	1286.30
		1.45	9.130E-01	-70.22	1.20	129.26	3.200E-01	1879.37
		2.18	9.130E-01	1402.06	1.20	129.26	-5.468E-01	1388.12
		2.90	9.130E-01	2692.85	1.20	129.26	-1.41	-107.94
167	QL							
		0.00	3.263E-01	-312.03	0.00	0.00	1.190E-01	-10.76
		7.3E-01	3.263E-01	-231.63	0.00	0.00	1.190E-01	196.04
		1.45	3.263E-01	0.00	0.00	0.00	1.190E-01	287.05
		2.18	3.263E-01	231.63	0.00	0.00	1.190E-01	196.04
		2.90	3.263E-01	312.03	0.00	0.00	1.190E-01	-10.76
168	QD							
		0.00	1.72	-1550.76	6.86	-86.91	8.98	-424.84
		7.3E-01	1.72	-939.75	6.86	-86.91	4.01	501.28
		1.45	1.72	45.70	6.86	-86.91	-9.638E-01	845.49
		2.18	1.72	1031.15	6.86	-86.91	-5.94	435.01

D2

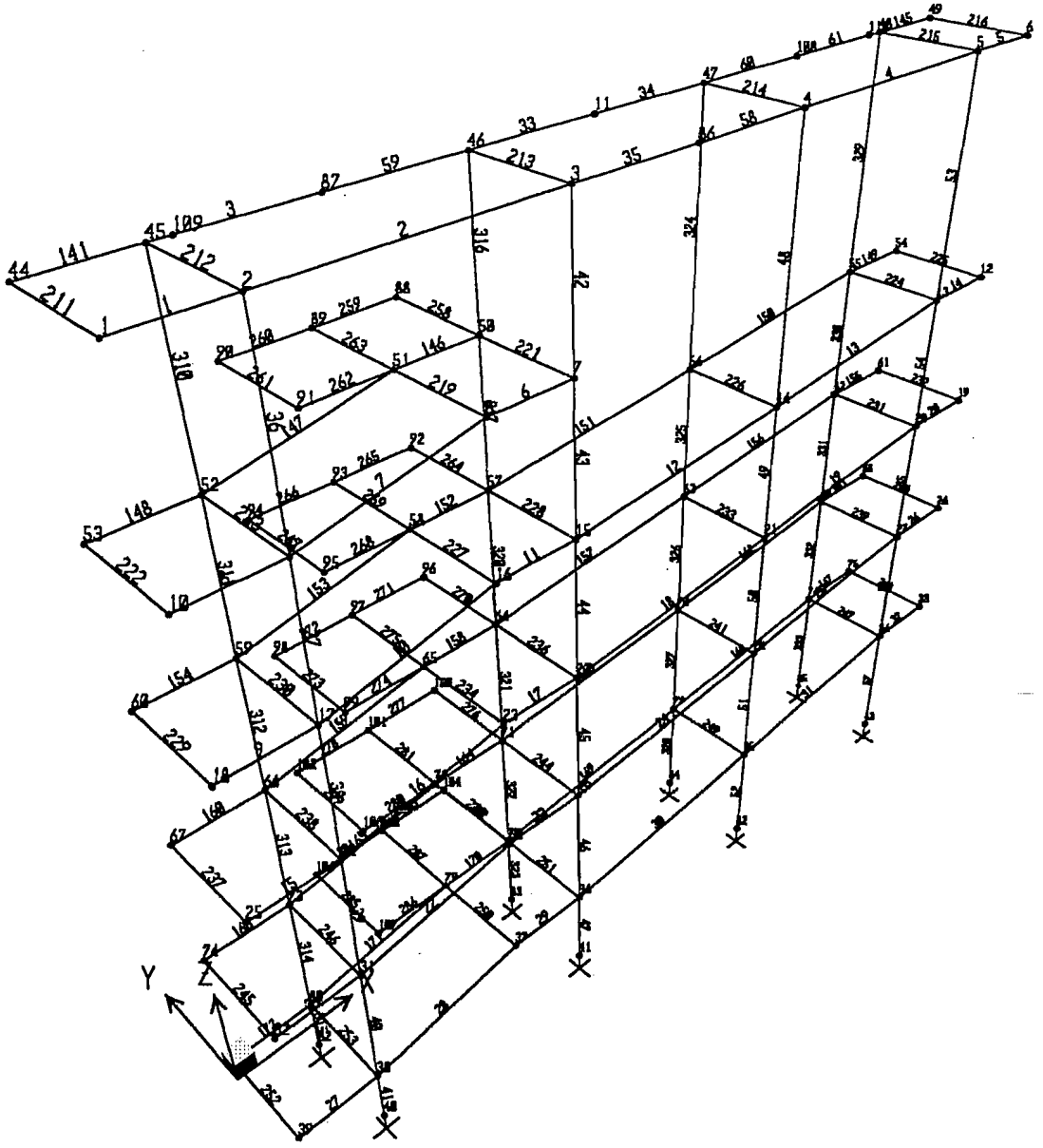
168	QL							
		0.00	2.16	-633.63	0.00	0.00	-3.320E-01	-246.01
		7.3E-01	2.16	-472.83	0.00	0.00	-3.320E-01	174.51
		1.45	2.16	0.00	0.00	0.00	-3.320E-01	362.67
		2.18	2.16	472.83	0.00	0.00	-3.320E-01	174.51
		2.90	2.16	633.63	0.00	0.00	-3.320E-01	-246.01
169	QD							
		0.00	-10.12	-1563.64	3.99	92.79	-9.34	-473.72
		7.3E-01	-10.12	-952.63	3.99	92.79	-12.23	461.75
		1.45	-10.12	32.82	3.99	92.79	-15.13	815.29
		2.18	-10.12	1018.27	3.99	92.79	-18.02	414.16
		2.90	-10.12	1629.28	3.99	92.79	-20.91	-568.89
169	QL							
		0.00	-2.09	-633.63	0.00	0.00	-6.56	-233.22
		7.3E-01	-2.09	-472.83	0.00	0.00	-6.56	187.30
		1.45	-2.09	0.00	0.00	0.00	-6.56	375.46
		2.18	-2.09	472.83	0.00	0.00	-6.56	187.30
		2.90	-2.09	633.63	0.00	0.00	-6.56	-233.22
170	QD							
		0.00	41.61	-1637.33	7.35	-59.11	4.60	-184.03
		7.3E-01	41.61	-1026.32	7.35	-59.11	-7.314E-01	804.86
		1.45	41.61	-52.34	7.35	-59.11	-6.06	1212.79
		2.18	41.61	921.64	7.35	-59.11	-11.39	880.76
		2.90	41.61	1532.65	7.35	-59.11	-16.71	-32.24
170	QL							
		0.00	18.36	-624.07	0.00	0.00	-2.67	-47.70
		7.3E-01	18.36	-463.27	0.00	0.00	-2.67	365.89
		1.45	18.36	0.00	0.00	0.00	-2.67	547.92
		2.18	18.36	463.27	0.00	0.00	-2.67	365.89
		2.90	18.36	624.07	0.00	0.00	-2.67	-47.70
171	QD							
		0.00	-47.23	-1636.92	8.44	67.87	1.76	-184.47
		7.3E-01	-47.23	-1025.91	8.44	67.87	-4.36	804.12
		1.45	-47.23	-51.93	8.44	67.87	-10.47	1211.75
		2.18	-47.23	922.05	8.44	67.87	-16.59	879.42
		2.90	-47.23	1533.06	8.44	67.87	-22.70	-33.87
171	QL							
		0.00	-20.89	-624.07	0.00	0.00	-4.61	-48.13
		7.3E-01	-20.89	-463.27	0.00	0.00	-4.61	365.46
		1.45	-20.89	0.00	0.00	0.00	-4.61	547.49
		2.18	-20.89	463.27	0.00	0.00	-4.61	365.46
		2.90	-20.89	624.07	0.00	0.00	-4.61	-48.13
172	QD							
		0.00	35.33	-1572.85	-1.994E-01	-87.15	-24.72	-489.10
		7.3E-01	35.33	-961.84	-1.994E-01	-87.15	-24.58	453.04
		1.45	35.33	23.61	-1.994E-01	-87.15	-24.43	813.26
		2.18	35.33	1009.06	-1.994E-01	-87.15	-24.29	418.80
		2.90	35.33	1620.08	-1.994E-01	-87.15	-24.14	-557.58
172	QL							
		0.00	18.09	-633.63	0.00	0.00	-10.52	-233.90
		7.3E-01	18.09	-472.83	0.00	0.00	-10.52	186.62
		1.45	18.09	0.00	0.00	0.00	-10.52	374.78
		2.18	18.09	472.83	0.00	0.00	-10.52	186.62
		2.90	18.09	633.63	0.00	0.00	-10.52	-233.90
173	QD							
		0.00	29.12	-1536.95	-1.96	89.29	-6.54	-408.08
		7.3E-01	29.12	-925.94	-1.96	89.29	-5.12	508.03
		1.45	29.12	59.51	-1.96	89.29	-3.70	842.23
		2.18	29.12	1044.96	-1.96	89.29	-2.28	421.74
		2.90	29.12	1655.97	-1.96	89.29	-8.659E-01	-580.66
173	QL							
		0.00	9.33	-633.63	0.00	0.00	-1.41	-245.66
		7.3E-01	9.33	-472.83	0.00	0.00	-1.41	174.86
		1.45	9.33	0.00	0.00	0.00	-1.41	363.02
		2.18	9.33	472.83	0.00	0.00	-1.41	174.86
		2.90	9.33	633.63	0.00	0.00	-1.41	-245.66
174	QD							
		0.00	-3.24	-2831.38	-3.408E-01	-128.84	5.331E-01	-309.48
		7.3E-01	-3.24	-1540.58	-3.408E-01	-128.84	7.801E-01	1287.01
		1.45	-3.24	-68.31	-3.408E-01	-128.84	1.03	1878.69
		2.18	-3.24	1403.97	-3.408E-01	-128.84	1.27	1386.06
		2.90	-3.24	2694.76	-3.408E-01	-128.84	1.52	-111.39
174	QL							
		0.00	-1.24	-312.03	0.00	0.00	4.001E-01	-10.68
		7.3E-01	-1.24	-231.63	0.00	0.00	4.001E-01	196.11
		1.45	-1.24	0.00	0.00	0.00	4.001E-01	287.12
		2.18	-1.24	231.63	0.00	0.00	4.001E-01	196.11
		2.90	-1.24	312.03	0.00	0.00	4.001E-01	-10.68
175	QD							
		0.00	1.66	-2829.98	5.871E-01	125.15	1.43	-305.66
		7.3E-01	1.66	-1539.19	5.871E-01	125.15	1.00	1289.83
		1.45	1.66	-66.91	5.871E-01	125.15	5.757E-01	1880.49
		2.18	1.66	1405.36	5.871E-01	125.15	1.501E-01	1386.85
		2.90	1.66	2696.16	5.871E-01	125.15	-2.756E-01	-111.61
175	QL							
		0.00	6.184E-01	-312.03	0.00	0.00	2.144E-01	-10.14
		7.3E-01	6.184E-01	-231.63	0.00	0.00	2.144E-01	196.65
		1.45	6.184E-01	0.00	0.00	0.00	2.144E-01	287.66

		2.90	6.184E-01	312.03	0.00	0.00	2.144E-01	-10.14
176	QD							
		0.00	1.56	-1559.08	3.37	-96.83	3.12	-431.51
		7.3E-01	1.56	-948.07	3.37	-96.83	6.810E-01	500.65
		1.45	1.56	37.38	3.37	-96.83	-1.76	850.89
		2.18	1.56	1022.83	3.37	-96.83	-4.20	446.45
		2.90	1.56	1633.84	3.37	-96.83	-6.65	-539.90
176	QL							
		0.00	4.169E-01	-633.63	0.00	0.00	-6.589E-01	-243.06
		7.3E-01	4.169E-01	-472.83	0.00	0.00	-6.589E-01	177.46
		1.45	4.169E-01	0.00	0.00	0.00	-6.589E-01	365.62
		2.18	4.169E-01	472.83	0.00	0.00	-6.589E-01	177.46
		2.90	4.169E-01	633.63	0.00	0.00	-6.589E-01	-243.06
177	QD							
		0.00	-21.17	-1566.55	1.67	104.92	-13.55	-472.69
		7.3E-01	-21.17	-955.54	1.67	104.92	-14.76	464.88
		1.45	-21.17	29.91	1.67	104.92	-15.97	820.53
		2.18	-21.17	1015.36	1.67	104.92	-17.19	421.51
		2.90	-21.17	1626.37	1.67	104.92	-18.40	-559.44
177	QL							
		0.00	-9.81	-633.63	0.00	0.00	-6.91	-229.31
		7.3E-01	-9.81	-472.83	0.00	0.00	-6.91	191.21
		1.45	-9.81	0.00	0.00	0.00	-6.91	379.37
		2.18	-9.81	472.83	0.00	0.00	-6.91	191.21
		2.90	-9.81	633.63	0.00	0.00	-6.91	-229.31
178	QD							
		0.00	40.80	-1633.82	4.72	-54.54	9.449E-01	-177.77
		7.3E-01	40.80	-1022.81	4.72	-54.54	-2.47	808.58
		1.45	40.80	-48.83	4.72	-54.54	-5.89	1213.96
		2.18	40.80	925.15	4.72	-54.54	-9.31	879.38
		2.90	40.80	1536.16	4.72	-54.54	-12.73	-36.16
178	QL							
		0.00	18.11	-624.07	0.00	0.00	-2.60	-46.86
		7.3E-01	18.11	-463.27	0.00	0.00	-2.60	366.73
		1.45	18.11	0.00	0.00	0.00	-2.60	548.75
		2.18	18.11	463.27	0.00	0.00	-2.60	366.73
		2.90	18.11	624.07	0.00	0.00	-2.60	-46.86
179	QD							
		0.00	-47.51	-1632.01	5.74	67.60	-2.31	-176.06
		7.3E-01	-47.51	-1021.00	5.74	67.60	-6.47	808.97
		1.45	-47.51	-47.02	5.74	67.60	-10.63	1213.04
		2.18	-47.51	926.96	5.74	67.60	-14.79	877.15
		2.90	-47.51	1537.97	5.74	67.60	-18.96	-39.70
179	QL							
		0.00	-21.16	-624.07	0.00	0.00	-4.71	-47.28
		7.3E-01	-21.16	-463.27	0.00	0.00	-4.71	366.31
		1.45	-21.16	0.00	0.00	0.00	-4.71	548.34
		2.18	-21.16	463.27	0.00	0.00	-4.71	366.31
		2.90	-21.16	624.07	0.00	0.00	-4.71	-47.28
180	QD							
		0.00	20.71	-1572.43	-2.85	-101.85	-28.75	-482.01
		7.3E-01	20.71	-961.42	-2.85	-101.85	-26.68	459.83
		1.45	20.71	24.03	-2.85	-101.85	-24.62	819.75
		2.18	20.71	1009.48	-2.85	-101.85	-22.55	424.99
		2.90	20.71	1620.49	-2.85	-101.85	-20.49	-551.69
180	QL							
		0.00	9.28	-633.63	0.00	0.00	-10.61	-229.66
		7.3E-01	9.28	-472.83	0.00	0.00	-10.61	190.86
		1.45	9.28	0.00	0.00	0.00	-10.61	379.03
		2.18	9.28	472.83	0.00	0.00	-10.61	190.86
		2.90	9.28	633.63	0.00	0.00	-10.61	-229.66
181	QD							
		0.00	4.199E-02	-1540.89	-1.48	102.24	-5.85	-399.96
		7.3E-01	4.199E-02	-929.88	-1.48	102.24	-4.77	519.01
		1.45	4.199E-02	55.57	-1.48	102.24	-3.70	856.06
		2.18	4.199E-02	1041.02	-1.48	102.24	-2.62	438.43
		2.90	4.199E-02	1652.03	-1.48	102.24	-1.55	-561.12
181	QL							
		0.00	5.143E-01	-633.63	0.00	0.00	-1.41	-241.15
		7.3E-01	5.143E-01	-472.83	0.00	0.00	-1.41	179.37
		1.45	5.143E-01	0.00	0.00	0.00	-1.41	367.53
		2.18	5.143E-01	472.83	0.00	0.00	-1.41	179.37
		2.90	5.143E-01	633.63	0.00	0.00	-1.41	-241.15
182	QD							
		0.00	-3.45	-2826.57	-2.587E-01	-123.72	8.149E-01	-299.63
		7.3E-01	-3.45	-1535.77	-2.587E-01	-123.72	1.00	1293.38
		1.45	-3.45	-63.50	-2.587E-01	-123.72	1.19	1881.57
		2.18	-3.45	1408.78	-2.587E-01	-123.72	1.38	1385.45
		2.90	-3.45	2699.57	-2.587E-01	-123.72	1.57	-115.49
182	QL							
		0.00	-1.32	-312.03	0.00	0.00	4.518E-01	-9.75
		7.3E-01	-1.32	-231.63	0.00	0.00	4.518E-01	197.05
		1.45	-1.32	0.00	0.00	0.00	4.518E-01	288.06
		2.18	-1.32	231.63	0.00	0.00	4.518E-01	197.05
		2.90	-1.32	312.03	0.00	0.00	4.518E-01	-9.75
183	QD							
		0.00	2.10	-2830.63	8.644E-01	125.33	2.00	-304.62

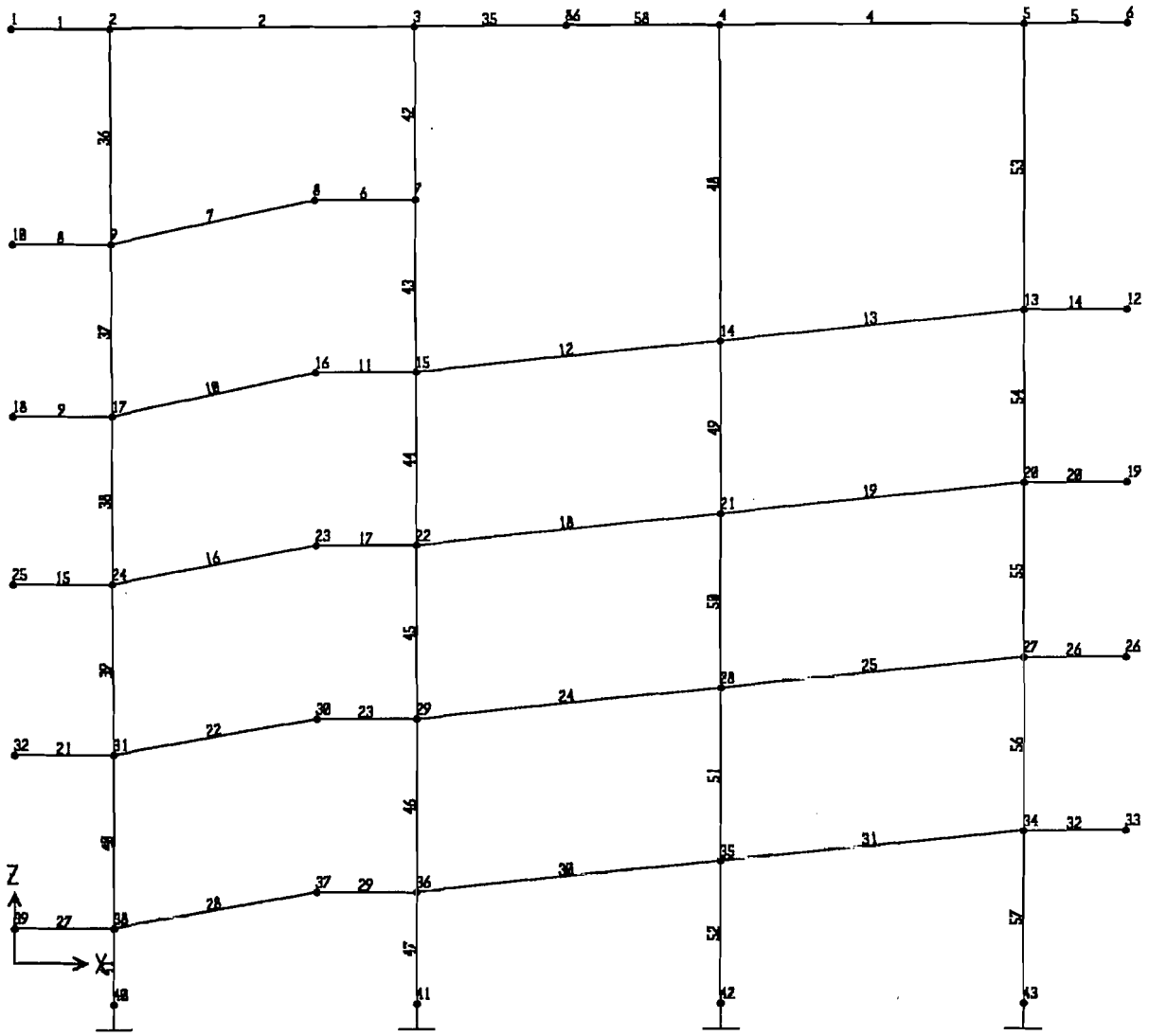
		1.45	2.10	-67.56	8.644E-01	125.33	7.499E-01	1882.47
		2.18	2.10	1404.71	8.644E-01	125.33	1.232E-01	1389.30
		2.90	2.10	2695.51	8.644E-01	125.33	-5.036E-01	-108.69
183	QL							
		0.00	7.952E-01	-312.03	0.00	0.00	2.843E-01	-9.43
		7.3E-01	7.952E-01	-231.63	0.00	0.00	2.843E-01	197.36
		1.45	7.952E-01	0.00	0.00	0.00	2.843E-01	288.37
		2.18	7.952E-01	231.63	0.00	0.00	2.843E-01	197.36
		2.90	7.952E-01	312.03	0.00	0.00	2.843E-01	-9.43
184	QD							
		0.00	8.95	-1563.43	4.96	-95.96	5.02	-428.30
		7.3E-01	8.95	-952.42	4.96	-95.96	1.42	507.01
		1.45	8.95	33.03	4.96	-95.96	-2.17	860.40
		2.18	8.95	1018.49	4.96	-95.96	-5.77	459.11
		2.90	8.95	1629.50	4.96	-95.96	-9.36	-524.10
184	QL							
		0.00	3.36	-633.63	0.00	0.00	-8.244E-01	-239.64
		7.3E-01	3.36	-472.83	0.00	0.00	-8.244E-01	180.88
		1.45	3.36	0.00	0.00	0.00	-8.244E-01	369.04
		2.18	3.36	472.83	0.00	0.00	-8.244E-01	180.88
		2.90	3.36	633.63	0.00	0.00	-8.244E-01	-239.64
185	QD							
		0.00	-4.21	-1565.83	1.62	108.72	-13.78	-463.46
		7.3E-01	-4.21	-954.82	1.62	108.72	-14.96	473.60
		1.45	-4.21	30.63	1.62	108.72	-16.14	828.73
		2.18	-4.21	1016.08	1.62	108.72	-17.31	429.19
		2.90	-4.21	1627.09	1.62	108.72	-18.49	-552.27
185	QL							
		0.00	-2.07	-633.63	0.00	0.00	-6.97	-225.92
		7.3E-01	-2.07	-472.83	0.00	0.00	-6.97	194.60
		1.45	-2.07	0.00	0.00	0.00	-6.97	382.76
		2.18	-2.07	472.83	0.00	0.00	-6.97	194.60
		2.90	-2.07	633.63	0.00	0.00	-6.97	-225.92
186	QD							
		0.00	41.40	-1633.24	4.75	-53.41	8.831E-01	-175.23
		7.3E-01	41.40	-1022.23	4.75	-53.41	-2.56	810.70
		1.45	41.40	-48.25	4.75	-53.41	-6.00	1215.66
		2.18	41.40	925.73	4.75	-53.41	-9.44	880.66
		2.90	41.40	1536.74	4.75	-53.41	-12.88	-35.30
186	QL							
		0.00	18.38	-624.07	0.00	0.00	-2.65	-46.17
		7.3E-01	18.38	-463.27	0.00	0.00	-2.65	367.42
		1.45	18.38	0.00	0.00	0.00	-2.65	549.45
		2.18	18.38	463.27	0.00	0.00	-2.65	367.42
		2.90	18.38	624.07	0.00	0.00	-2.65	-46.17
187	QD							
		0.00	-48.25	-1631.79	6.17	68.48	-1.79	-173.94
		7.3E-01	-48.25	-1020.78	6.17	68.48	-6.26	810.93
		1.45	-48.25	-46.80	6.17	68.48	-10.73	1214.84
		2.18	-48.25	927.18	6.17	68.48	-15.20	878.79
		2.90	-48.25	1538.19	6.17	68.48	-19.68	-38.22
187	QL							
		0.00	-21.47	-624.07	0.00	0.00	-4.75	-46.55
		7.3E-01	-21.47	-463.27	0.00	0.00	-4.75	367.04
		1.45	-21.47	0.00	0.00	0.00	-4.75	549.06
		2.18	-21.47	463.27	0.00	0.00	-4.75	367.04
		2.90	-21.47	624.07	0.00	0.00	-4.75	-46.55
188	QD							
		0.00	40.24	-1566.80	-9.166E-01	-98.28	-25.82	-464.79
		7.3E-01	40.24	-955.79	-9.166E-01	-98.28	-25.15	472.97
		1.45	40.24	29.66	-9.166E-01	-98.28	-24.49	828.80
		2.18	40.24	1015.11	-9.166E-01	-98.28	-23.83	429.96
		2.90	40.24	1626.12	-9.166E-01	-98.28	-23.16	-550.80
188	QL							
		0.00	17.97	-633.63	0.00	0.00	-10.55	-226.02
		7.3E-01	17.97	-472.83	0.00	0.00	-10.55	194.50
		1.45	17.97	0.00	0.00	0.00	-10.55	382.66
		2.18	17.97	472.83	0.00	0.00	-10.55	194.50
		2.90	17.97	633.63	0.00	0.00	-10.55	-226.02
189	QD							
		0.00	22.90	-1536.74	-2.86	96.44	-7.73	-382.43
		7.3E-01	22.90	-925.72	-2.86	96.44	-5.66	533.53
		1.45	22.90	59.73	-2.86	96.44	-3.58	867.57
		2.18	22.90	1045.18	-2.86	96.44	-1.51	446.93
		2.90	22.90	1656.19	-2.86	96.44	5.573E-01	-555.63
189	QL							
		0.00	5.26	-633.63	0.00	0.00	-1.35	-238.72
		7.3E-01	5.26	-472.83	0.00	0.00	-1.35	181.80
		1.45	5.26	0.00	0.00	0.00	-1.35	369.96
		2.18	5.26	472.83	0.00	0.00	-1.35	181.80
		2.90	5.26	633.63	0.00	0.00	-1.35	-238.72
190	QD							
		0.00	-3.17	-2828.55	-4.979E-01	-126.10	3.029E-01	-300.11
		7.3E-01	-3.17	-1537.76	-4.979E-01	-126.10	6.638E-01	1294.33
		1.45	-3.17	-65.48	-4.979E-01	-126.10	1.02	1883.96
		2.18	-3.17	1406.79	-4.979E-01	-126.10	1.39	1389.28
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190	QL							

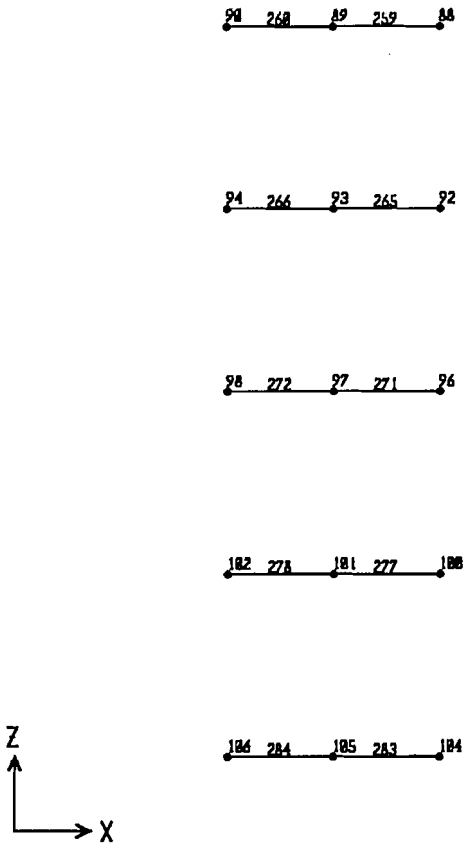
		0.00	-1.22	-312.03	0.00	0.00	4.042E-01	197.55
		7.3E-01	-1.22	-231.63	0.00	0.00	4.042E-01	288.57
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		2.18	-1.22	231.63	0.00	0.00	4.042E-01	-9.24
		2.90	-1.22	312.03	0.00	0.00	4.042E-01	
191	QD							
		0.00	7.922E-01	-2835.22	-7.436E-01	129.85	-1.35	-321.87
		7.3E-01	7.922E-01	-1544.43	-7.436E-01	129.85	-8.084E-01	1277.42
		1.45	7.922E-01	-72.16	-7.436E-01	129.85	-2.693E-01	1871.89
		2.18	7.922E-01	1400.12	-7.436E-01	129.85	2.698E-01	1382.04
		2.90	7.922E-01	2690.91	-7.436E-01	129.85	8.089E-01	-112.61
191	QL							
		0.00	3.255E-01	-312.03	0.00	0.00	-8.716E-02	-13.36
		7.3E-01	3.255E-01	-231.63	0.00	0.00	-8.716E-02	193.43
		1.45	3.255E-01	0.00	0.00	0.00	-8.716E-02	284.44
		2.18	3.255E-01	231.63	0.00	0.00	-8.716E-02	193.43
		2.90	3.255E-01	312.03	0.00	0.00	-8.716E-02	-13.36
192	QD							
		0.00	-178.44	-1563.19	-4.27	-84.22	-8.47	-478.84
		7.3E-01	-178.44	-952.18	-4.27	-84.22	-5.38	456.30
		1.45	-178.44	33.27	-4.27	-84.22	-2.29	809.52
		2.18	-178.44	1018.72	-4.27	-84.22	8.045E-01	408.06
		2.90	-178.44	1629.73	-4.27	-84.22	3.90	-575.32
192	QL							
		0.00	-65.58	-633.63	0.00	0.00	-8.779E-01	-258.54
		7.3E-01	-65.58	-472.83	0.00	0.00	-8.779E-01	161.98
		1.45	-65.58	0.00	0.00	0.00	-8.779E-01	350.15
		2.18	-65.58	472.83	0.00	0.00	-8.779E-01	161.98
		2.90	-65.58	633.63	0.00	0.00	-8.779E-01	-258.54
193	QD							
		0.00	-346.14	-1562.20	-7.94	83.88	-22.50	-537.69
		7.3E-01	-346.14	-951.18	-7.94	83.88	-16.74	396.72
		1.45	-346.14	34.27	-7.94	83.88	-10.99	749.22
		2.18	-346.14	1019.72	-7.94	83.88	-5.23	347.04
		2.90	-346.14	1630.73	-7.94	83.88	5.222E-01	-637.06
193	QL							
		0.00	-152.52	-633.63	0.00	0.00	-4.74	-260.76
		7.3E-01	-152.52	-472.83	0.00	0.00	-4.74	159.76
		1.45	-152.52	0.00	0.00	0.00	-4.74	347.92
		2.18	-152.52	472.83	0.00	0.00	-4.74	159.76
		2.90	-152.52	633.63	0.00	0.00	-4.74	-260.76
194	QD							
		0.00	40.94	-1640.33	-8.34	-59.18	-16.70	-202.47
		7.3E-01	40.94	-1029.31	-8.34	-59.18	-10.65	788.59
		1.45	40.94	-55.34	-8.34	-59.18	-4.60	1198.68
		2.18	40.94	918.64	-8.34	-59.18	1.45	868.83
		2.90	40.94	1529.65	-8.34	-59.18	7.49	-42.00
194	QL							
		0.00	18.10	-624.07	0.00	0.00	-2.03	-53.58
		7.3E-01	18.10	-463.27	0.00	0.00	-2.03	360.01
		1.45	18.10	0.00	0.00	0.00	-2.03	542.04
		2.18	18.10	463.27	0.00	0.00	-2.03	360.01
		2.90	18.10	624.07	0.00	0.00	-2.03	-53.58
195	QD							
		0.00	-54.80	-1639.04	-10.28	76.45	-27.22	-203.90
		7.3E-01	-54.80	-1028.03	-10.28	76.45	-19.77	786.23
		1.45	-54.80	-54.06	-10.28	76.45	-12.32	1195.40
		2.18	-54.80	919.92	-10.28	76.45	-4.87	864.61
		2.90	-54.80	1530.93	-10.28	76.45	2.58	-47.14
195	QL							
		0.00	-24.14	-624.07	0.00	0.00	-5.42	-54.93
		7.3E-01	-24.14	-463.27	0.00	0.00	-5.42	358.66
		1.45	-24.14	0.00	0.00	0.00	-5.42	540.68
		2.18	-24.14	463.27	0.00	0.00	-5.42	358.66
		2.90	-24.14	624.07	0.00	0.00	-5.42	-54.93
196	QD							
		0.00	-563.39	-1494.93	-40.72	-73.74	-70.20	-453.71
		7.3E-01	-563.39	-883.92	-40.72	-73.74	-48.76	431.94
		1.45	-563.39	101.53	-40.72	-73.74	-19.24	735.67
		2.18	-563.39	1086.98	-40.72	-73.74	10.28	284.72
		2.90	-563.39	1697.99	-40.72	-73.74	39.80	-748.15
196	QL							
		0.00	-249.48	-633.63	0.00	0.00	-8.47	-266.13
		7.3E-01	-249.48	-472.83	0.00	0.00	-8.47	154.39
		1.45	-249.48	0.00	0.00	0.00	-8.47	342.55
		2.18	-249.48	472.83	0.00	0.00	-8.47	154.39
		2.90	-249.48	633.63	0.00	0.00	-8.47	-266.13
197	QD							
		0.00	12.13	-1916.44	-10.62	313.73	-24.81	-645.94
		7.3E-01	12.13	-1305.43	-10.62	313.73	-17.11	545.30
		1.45	12.13	-319.98	-10.62	313.73	-9.41	1154.62
		2.18	12.13	665.47	-10.62	313.73	-1.71	1009.26
		2.90	12.13	1276.48	-10.62	313.73	5.99	281.99
197	QL							
		0.00	5.40	-633.63	0.00	0.00	-4.16	-81.02
		7.3E-01	5.40	-472.83	0.00	0.00	-4.16	339.50
		1.45	5.40	0.00	0.00	0.00	-4.16	527.66
		2.18	5.40	472.83	0.00	0.00	-4.16	339.50
		2.90	5.40	633.63	0.00	0.00	-4.16	-81.02

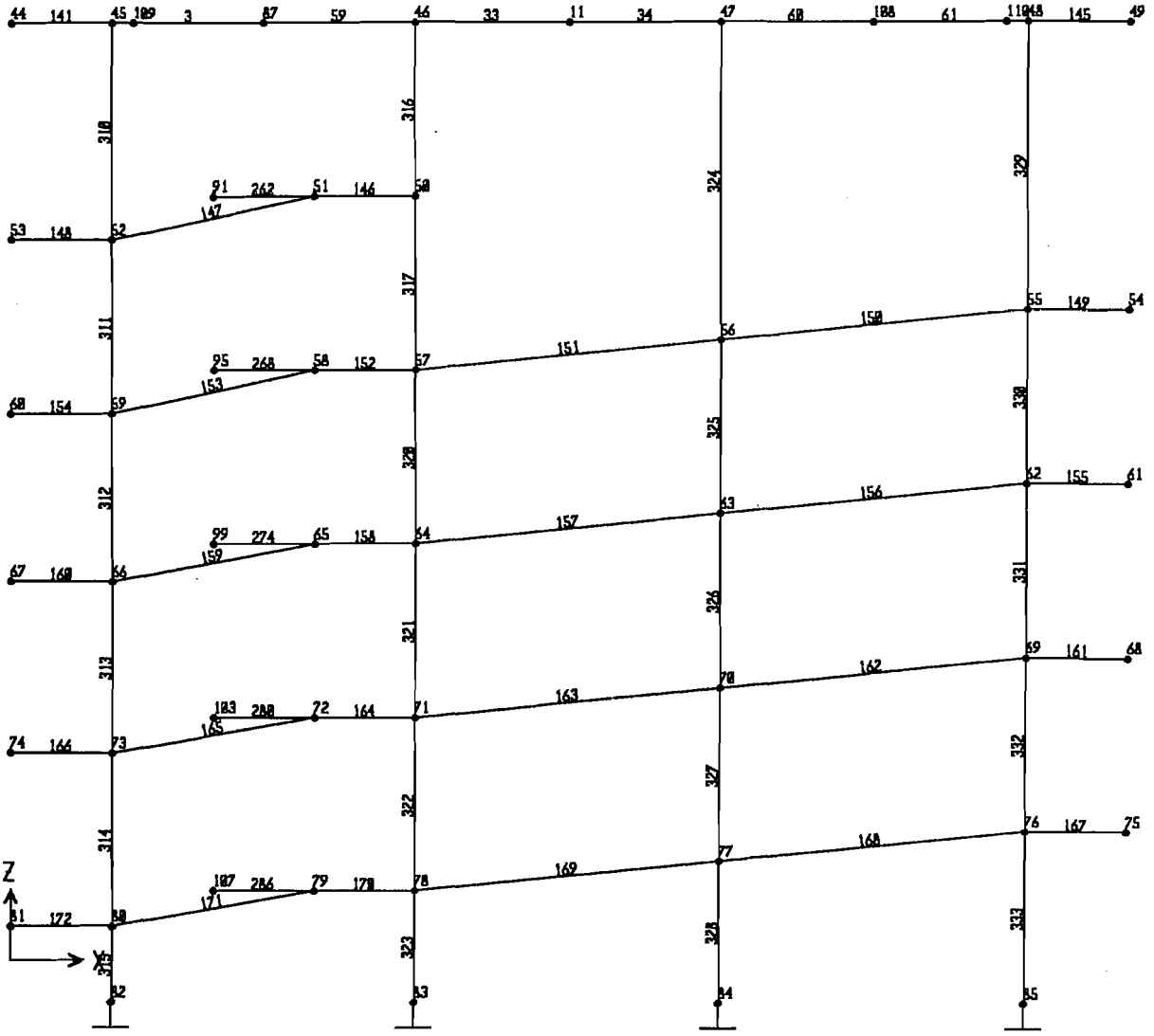
198	QD							
		0.00	-490.36	-1499.21	8.24	89.63	12.45	-525.65
		7.3E-01	-490.36	-888.20	8.24	89.63	6.47	363.11
		1.45	-490.36	85.78	8.24	89.63	4.939E-01	670.89
		2.18	-490.36	1059.76	8.24	89.63	-5.48	238.73
		2.90	-490.36	1670.77	8.24	89.63	-11.46	-774.40
198	QL							
		0.00	-213.81	-624.07	0.00	0.00	2.270E-01	-286.90
		7.3E-01	-213.81	-463.27	0.00	0.00	2.270E-01	126.69
		1.45	-213.81	0.00	0.00	0.00	2.270E-01	308.72
		2.18	-213.81	463.27	0.00	0.00	2.270E-01	126.69
		2.90	-213.81	624.07	0.00	0.00	2.270E-01	-286.90
199	QD							
		0.00	-3.23	-1169.27	1.44	31.40	4.69	-28.59
		7.3E-01	-3.23	-654.74	1.44	31.40	3.65	644.27
		1.45	-3.23	41.28	1.44	31.40	2.61	875.11
		2.18	-3.23	737.29	1.44	31.40	1.56	584.42
		2.90	-3.23	1251.83	1.44	31.40	5.223E-01	-148.29
199	QL							
		0.00	-1.40	-312.03	0.00	0.00	1.13	-20.70
		7.3E-01	-1.40	-231.63	0.00	0.00	1.13	186.10
		1.45	-1.40	0.00	0.00	0.00	1.13	277.11
		2.18	-1.40	231.63	0.00	0.00	1.13	186.10
		2.90	-1.40	312.03	0.00	0.00	1.13	-20.70



E1


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X


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268
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184
Z
X


Z
X

Gedubu Head Quarters

J O I N T D I S P L A C E M E N T S

JOINT	LOAD	U1	U2	U3	R1	R2	R3
1	QD	-2.213E-04	5.237E-04	-4.455E-04	-1.169E-05	-1.822E-04	1.129E-06
1	QL	-6.292E-05	2.265E-04	-8.014E-05	-6.415E-06	-3.024E-05	5.553E-06
2	QD	-2.214E-04	5.427E-04	-1.162E-04	-2.306E-05	-3.352E-05	1.841E-05
2	QL	-6.293E-05	2.475E-04	-2.226E-05	-9.604E-06	-1.086E-05	1.184E-05
3	QD	-2.197E-04	8.447E-04	-7.991E-05	-4.908E-05	-1.512E-05	-5.245E-06
3	QL	-6.317E-05	4.021E-04	-1.541E-05	-2.255E-05	-4.935E-06	-1.031E-06
4	QD	-2.181E-04	2.815E-04	-8.967E-05	-1.300E-05	-1.560E-05	-2.474E-05
4	QL	-6.340E-05	1.247E-04	-2.250E-05	-4.183E-06	-4.490E-06	-1.033E-05
5	QD	-2.167E-04	3.647E-05	-1.083E-04	-1.093E-06	-4.300E-05	-9.517E-06
5	QL	-6.341E-05	1.810E-05	-2.167E-05	0.0000	-4.032E-06	-2.311E-06
6	QD	-2.174E-04	3.639E-05	-3.203E-03	9.146E-04	4.747E-04	-3.926E-06
6	QL	-6.336E-05	1.605E-05	-4.736E-04	1.367E-04	6.807E-05	4.537E-06
7	QD	-1.119E-04	6.373E-04	-7.753E-05	-4.911E-05	-3.433E-05	-1.256E-06
7	QL	-2.758E-05	3.039E-04	-1.543E-05	-2.333E-05	-1.108E-05	0.0000
8	QD	-1.117E-04	6.232E-04	-1.667E-04	-9.620E-05	-2.786E-05	1.063E-05
8	QL	-2.743E-05	2.958E-04	-5.202E-05	-4.830E-05	-1.467E-05	5.659E-06
9	QD	-1.233E-04	4.092E-04	-1.121E-04	-2.867E-05	-3.061E-05	2.623E-05
9	QL	-3.367E-05	1.884E-04	-2.212E-05	-1.292E-05	0.0000	1.379E-05
10	QD	-1.233E-04	3.504E-04	-4.159E-04	-4.344E-05	-1.667E-04	2.406E-05
10	QL	-3.367E-05	1.574E-04	-5.215E-05	-7.522E-06	-1.683E-05	1.263E-05
11	QD	-2.169E-04	5.824E-04	-3.737E-04	-2.484E-05	-1.440E-05	-1.099E-04
11	QL	-7.548E-05	2.725E-04	-7.964E-05	-1.215E-05	-7.723E-06	-5.503E-05
12	QD	-3.861E-05	4.443E-05	-4.449E-04	-4.366E-05	1.932E-04	-5.799E-06
12	QL	-1.938E-05	1.033E-05	-4.151E-05	-4.579E-06	1.365E-05	-3.267E-06
13	QD	-3.860E-05	6.054E-05	-1.033E-04	-5.657E-06	2.318E-05	-7.799E-06
13	QL	-1.938E-05	1.892E-05	-2.155E-05	-2.424E-06	-6.023E-06	-3.929E-06
14	QD	-4.224E-05	1.741E-04	-8.380E-05	-1.381E-05	-9.324E-06	-1.625E-05
14	QL	-1.876E-05	7.810E-05	-2.263E-05	-6.287E-06	-2.376E-06	-8.086E-06
15	QD	-4.342E-05	4.182E-04	-7.223E-05	-4.704E-05	0.0000	-1.221E-05
15	QL	-1.860E-05	1.991E-04	-1.530E-05	-2.271E-05	2.757E-06	-6.019E-06
16	QD	-4.363E-05	4.345E-04	-1.296E-04	-9.045E-05	-2.950E-05	-1.710E-06
16	QL	-1.859E-05	2.070E-04	-3.597E-05	-4.538E-05	-1.347E-05	0.0000
17	QD	-5.038E-05	2.918E-04	-1.001E-04	-2.000E-05	-2.087E-05	1.889E-05
17	QL	-2.201E-05	1.351E-04	-2.015E-05	-1.279E-05	-2.030E-06	9.524E-06
18	QD	-5.038E-05	2.523E-04	-3.564E-04	-4.454E-05	-1.426E-04	1.538E-05
18	QL	-2.201E-05	1.153E-04	-5.695E-05	-1.074E-05	-2.017E-05	7.632E-06
19	QD	-2.664E-05	2.316E-05	-3.155E-04	-3.454E-05	1.311E-04	-8.332E-06
19	QL	-9.121E-06	3.599E-06	-4.736E-05	-5.512E-06	1.713E-05	-4.208E-06
20	QD	-2.664E-05	4.333E-05	-9.004E-05	-6.969E-06	5.324E-06	-8.552E-06
20	QL	-9.121E-06	1.381E-05	-1.936E-05	-2.343E-06	-2.881E-06	-4.332E-06
21	QD	-2.742E-05	1.195E-04	-7.239E-05	-1.284E-05	-1.415E-06	-1.199E-05
21	QL	-9.165E-06	5.431E-05	-2.021E-05	-5.695E-06	-1.265E-06	-6.020E-06
22	QD	-2.790E-05	2.411E-04	-6.079E-05	-3.697E-05	0.0000	-1.264E-05
22	QL	-9.886E-06	1.146E-04	-1.347E-05	-1.783E-05	0.0000	-6.256E-06
23	QD	-2.766E-05	2.653E-04	-1.166E-04	-8.318E-05	-2.966E-05	-6.664E-06
23	QL	-9.821E-06	1.265E-04	-3.680E-05	-4.186E-05	-1.358E-05	-3.279E-06
24	QD	-3.373E-05	1.806E-04	-8.102E-05	-2.575E-05	-1.361E-05	1.170E-05
24	QL	-1.348E-05	8.386E-05	-1.656E-05	-1.184E-05	0.0000	5.874E-06
25	QD	-3.373E-05	1.578E-04	-3.184E-04	-3.965E-05	-1.344E-04	8.539E-06
25	QL	-1.348E-05	7.240E-05	-4.921E-05	-8.267E-06	-1.824E-05	4.278E-06
26	QD	-1.009E-05	4.641E-06	-3.020E-04	-3.406E-05	1.345E-04	-8.316E-06
26	QL	-1.889E-06	-1.914E-06	-4.321E-05	-5.575E-06	1.722E-05	-4.173E-06
27	QD	-1.010E-05	2.387E-05	-6.840E-05	-6.487E-06	8.740E-06	-7.760E-06
27	QL	-1.891E-06	7.766E-06	-1.503E-05	-2.359E-06	-2.827E-06	-3.916E-06
28	QD	-1.200E-05	6.473E-05	-5.356E-05	-1.205E-05	-2.627E-06	-8.129E-06
28	QL	-1.870E-06	2.980E-05	-1.534E-05	-5.560E-06	0.0000	-4.076E-06

29	QD	-1.327E-05	1.078E-04	-4.312E-05	-2.712E-05	0.0000	-1.052E-05
29	QL	-2.460E-06	5.116E-05	-9.895E-06	-1.313E-05	0.0000	-5.214E-06
30	QD	-1.337E-05	1.326E-04	-9.880E-05	-7.523E-05	-2.882E-05	-8.245E-06
30	QL	-2.504E-06	6.342E-05	-3.327E-05	-3.809E-05	-1.372E-05	-4.092E-06
31	QD	-2.140E-05	8.066E-05	-5.390E-05	-2.095E-05	-1.309E-05	7.745E-06
31	QL	-6.477E-06	3.750E-05	-1.117E-05	-9.637E-06	0.0000	3.888E-06
32	QD	-2.141E-05	6.539E-05	-2.893E-04	-3.373E-05	-1.333E-04	6.095E-06
32	QL	-6.480E-06	2.978E-05	-4.190E-05	-5.536E-06	-1.735E-05	3.090E-06
33	QD	-2.062E-06	-5.929E-06	-2.831E-04	-3.522E-05	1.394E-04	-6.243E-06
33	QL	2.208E-06	-4.358E-06	-4.005E-05	-6.318E-06	1.873E-05	-3.130E-06
34	QD	-2.068E-06	7.725E-06	-3.831E-05	-6.177E-06	1.288E-05	-5.192E-06
34	QL	2.205E-06	2.500E-06	-8.567E-06	-2.370E-06	-1.691E-06	-2.611E-06
35	QD	-2.418E-06	1.804E-05	-2.737E-05	-9.275E-06	-1.461E-06	-4.393E-06
35	QL	2.092E-06	8.410E-06	-8.026E-06	-4.434E-06	0.0000	-2.204E-06
36	QD	-2.650E-06	2.097E-05	-1.916E-05	-1.450E-05	2.860E-06	-6.655E-06
36	QL	1.777E-06	9.961E-06	-4.550E-06	-7.085E-06	2.618E-06	-3.314E-06
37	QD	-2.586E-06	4.078E-05	-6.536E-05	-5.699E-05	-2.493E-05	-7.519E-06
37	QL	1.827E-06	1.985E-05	-2.378E-05	-2.919E-05	-1.267E-05	-3.782E-06
38	QD	-1.057E-05	9.775E-06	-1.870E-05	-1.127E-05	-1.589E-05	3.651E-06
38	QL	-1.538E-06	4.561E-06	-3.972E-06	-5.165E-06	0.0000	1.818E-06
39	QD	-1.058E-05	2.462E-06	-2.656E-04	-3.275E-05	-1.392E-04	3.209E-06
39	QL	-1.541E-06	0.0000	-3.870E-05	-5.302E-06	-1.955E-05	1.620E-06
40	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
40	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
41	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
41	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
42	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
42	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
43	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
43	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
44	QD	-2.214E-04	5.237E-04	-4.513E-04	5.333E-06	-1.650E-04	1.875E-06
44	QL	-7.578E-05	2.265E-04	-9.893E-05	-6.566E-06	-2.839E-05	5.941E-06
45	QD	-2.213E-04	5.425E-04	-1.700E-04	-2.202E-05	-1.231E-05	1.604E-05
45	QL	-7.577E-05	2.475E-04	-4.694E-05	-1.060E-05	-7.598E-06	1.069E-05
46	QD	-2.198E-04	8.450E-04	-2.075E-04	-3.880E-05	1.376E-06	-3.888E-06
46	QL	-7.615E-05	4.023E-04	-7.519E-05	-1.878E-05	1.196E-06	0.0000
47	QD	-2.141E-04	2.814E-04	-1.103E-04	-1.088E-05	-2.475E-05	-2.521E-05
47	QL	-7.480E-05	1.247E-04	-2.837E-05	-5.533E-06	-9.190E-06	-1.041E-05
48	QD	-2.099E-04	3.610E-05	-1.171E-04	2.614E-05	0.0000	-6.243E-06
48	QL	-7.410E-05	1.802E-05	-2.294E-05	2.794E-06	0.0000	-2.082E-06
49	QD	-2.098E-04	3.639E-05	-5.574E-04	7.994E-04	2.791E-04	0.0000
49	QL	-7.410E-05	1.605E-05	-8.244E-05	1.168E-04	3.860E-05	1.272E 06
50	QD	-1.158E-04	6.376E-04	-2.029E-04	-6.768E-05	-7.856E-05	0.0000
50	QL	-3.110E-05	3.040E-04	-7.488E-05	-3.248E-05	-3.506E-05	0.0000
51	QD	-1.148E-04	6.233E-04	-5.752E-04	-2.215E-04	-1.176E-04	5.790E-06
51	QL	-3.045E-05	2.959E-04	-2.551E-04	-1.090E-04	-5.842E-05	3.298E-06
52	QD	-2.004E-04	4.091E-04	-1.650E-04	-2.250E-05	-3.943E-06	2.169E-05
52	QL	-7.376E-05	1.883E-04	-4.659E-05	-1.038E-05	1.317E-05	1.157E-05
53	QD	-2.004E-04	3.504E-04	-4.259E-04	3.169E-05	-1.536E-04	2.590E-05
53	QL	-7.376E-05	1.574E-04	-5.456E-05	3.386E-06	-9.888E-06	1.353E-05
54	QD	-2.414E-05	4.444E-05	-4.364E-04	4.799E-05	1.880E-04	-6.063E-06
54	QL	-1.079E-05	1.033E-05	-3.775E-05	6.557E-06	1.188E-05	-3.291E-06
55	QD	-2.415E-05	6.053E-05	-1.099E-04	0.0000	1.517E-05	-7.174E-06
55	QL	-1.079E-05	1.886E-05	-2.257E-05	0.0000	-8.263E-06	-3.790E-06
56	QD	-2.583E-05	1.740E-04	-9.983E-05	-7.595E-06	-1.018E-05	-1.643E-05
56	QL	-9.666E-06	7.802E-05	-2.760E-05	-2.584E-06	-3.482E-06	-8.105E-06
57	QD	-1.787E-05	4.181E-04	-1.864E-04	-5.756E-05	-3.378E-05	-1.072E-05
57	QL	-5.075E-06	1.990E-04	-6.993E-05	-2.744E-05	-1.435E-05	-5.289E-06
58	QD	-1.856E-05	4.346E-04	-5.182E-04	-2.144E-04	-1.179E-04	-6.639E-06
58	QL	-5.364E-06	2.071E-04	-2.285E-04	-1.054E-04	-5.665E-05	-3.270E-06
59	QD	-9.926E-05	2.917E-04	-1.481E-04	-2.379E-05	-8.472E-06	1.411E-05
59	QL	-4.585E-05	1.351E-04	-4.244E-05	-1.112E-05	3.937E-06	7.196E-06
60	QD	-9.926E-05	2.523E-04	-3.876E-04	2.020E-05	-1.383E-04	1.738E-05
60	QL	-4.585E-05	1.153E-04	-7.050E-05	0.0000	-1.773E-05	8.607E-06

61	QD	-1.520E-06	2.316E-05	-3.203E-04	3.074E-05	1.309E-04	-8.448E-06
61	QL	3.453E-06	3.599E-06	-4.701E-05	5.387E-06	1.658E-05	-4.254E-06
62	QD	-1.521E-06	4.333E-05	-9.533E-05	0.0000	5.076E-06	-8.279E-06
62	QL	3.453E-06	1.383E-05	-2.023E-05	0.0000	-3.222E-06	-4.241E-06
63	QD	-1.819E-06	1.196E-04	-8.523E-05	-8.774E-06	-3.038E-06	-1.214E-05
63	QL	3.682E-06	5.434E-05	-2.435E-05	-3.586E-06	-1.835E-06	-6.067E-06
64	QD	5.449E-06	2.411E-04	-1.550E-04	-4.905E-05	-3.079E-05	-1.157E-05
64	QL	6.897E-06	1.146E-04	-5.885E-05	-2.342E-05	-1.555E-05	-5.726E-06
65	QD	5.510E-06	2.654E-04	-4.844E-04	-2.074E-04	-1.198E-04	-1.068E-05
65	QL	6.871E-06	1.265E-04	-2.193E-04	-1.020E-04	-5.759E-05	-5.241E-06
66	QD	-6.198E-05	1.805E-04	-1.204E-04	-2.131E-05	3.007E-06	7.313E-06
66	QL	-2.747E-05	8.383E-05	-3.489E-05	-1.006E-05	7.726E-06	3.735E-06
67	QD	-6.198E-05	1.578E-04	-3.338E-04	2.514E-05	-1.278E-04	1.037E-05
67	QL	-2.747E-05	7.242E-05	-5.474E-05	2.443E-06	-1.452E-05	5.169E-06
68	QD	1.644E-05	4.642E-06	-3.054E-04	3.114E-05	1.344E-04	-8.388E-06
68	QL	1.135E-05	-1.913E-06	-4.305E-05	5.341E-06	1.682E-05	-4.203E-06
69	QD	1.644E-05	2.385E-05	-7.216E-05	0.0000	8.530E-06	-7.564E-06
69	QL	1.135E-05	7.755E-06	-1.567E-05	0.0000	-2.952E-06	-3.831E-06
70	QD	1.523E-05	6.472E-05	-6.246E-05	-7.683E-06	-2.477E-06	-8.204E-06
70	QL	1.167E-05	2.979E-05	-1.830E-05	-3.200E-06	0.0000	-4.101E-06
71	QD	1.982E-05	1.077E-04	-1.090E-04	-3.898E-05	-3.116E-05	-9.774E-06
71	QL	1.404E-05	5.114E-05	-4.178E-05	-1.859E-05	-1.529E-05	-4.842E-06
72	QD	1.957E-05	1.327E-04	-4.429E-04	-1.992E-04	-1.219E-04	-1.183E-05
72	QL	1.392E-05	6.345E-05	-2.046E-04	-9.813E-05	-5.913E-05	-5.842E-06
73	QD	-4.468E-05	8.061E-05	-8.026E-05	-1.636E-05	6.351E-06	3.774E-06
73	QL	-1.819E-05	3.747E-05	-2.349E-05	-7.804E-06	9.673E-06	1.954E-06
74	QD	-4.467E-05	6.543E-05	-2.865E-04	3.110E-05	-1.250E-04	7.756E-06
74	QL	-1.819E-05	2.980E-05	-3.903E-05	5.188E-06	-1.281E-05	3.899E-06
75	QD	1.938E-05	-5.927E-06	-2.902E-04	3.035E-05	1.410E-04	-6.361E-06
75	QL	1.291E-05	-4.357E-06	-4.225E-05	4.749E-06	1.917E-05	-3.182E-06
76	QD	1.938E-05	7.821E-06	-4.028E-05	1.274E-06	1.597E-05	-5.040E-06
76	QL	1.292E-05	2.541E-06	-8.911E-06	0.0000	0.0000	-2.541E-06
77	QD	2.022E-05	1.808E-05	-3.159E-05	-4.400E-06	3.205E-06	-4.389E-06
77	QL	1.339E-05	8.430E-06	-9.452E-06	-1.823E-06	2.514E-06	-2.196E-06
78	QD	2.520E-05	2.099E-05	-4.817E-05	-2.621E-05	-1.892E-05	-6.226E-06
78	QL	1.570E-05	9.968E-06	-1.866E-05	-1.248E-05	-8.531E-06	-3.103E-06
79	QD	2.739E-05	4.086E-05	-3.530E-04	-1.817E-04	-1.156E-04	-1.094E-05
79	QL	1.681E-05	1.989E-05	-1.675E-04	-8.959E-05	-5.684E-05	-5.444E-06
80	QD	-2.505E-05	9.582E-06	-2.709E-05	-7.404E-06	-7.871E-06	0.0000
80	QL	-8.810E-06	4.479E-06	-8.283E-06	-3.618E-06	3.263E-06	0.0000
81	QD	-2.504E-05	2.488E-06	-2.634E-04	3.189E-05	-1.361E-04	4.294E-06
81	QL	-8.806E-06	0.0000	-3.681E-05	5.348E-06	-1.770E-05	2.154E-06
82	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
82	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
83	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
83	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
84	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
84	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
85	QD	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
85	QL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
86	QD	-2.189E-04	5.807E-04	-1.493E-04	-3.104E-05	9.494E-06	-1.096E-04
86	QL	-6.329E-05	2.718E-04	-1.855E-05	-1.337E-05	3.759E-06	-5.485E-05
87	QD	-2.205E-04	7.117E-04	-3.677E-04	-3.041E-05	1.042E-05	5.985E-05
87	QL	-7.596E-05	3.349E-04	-7.166E-05	-1.469E-05	7.392E-06	2.962E-05
88	QD	-1.288E-04	6.376E-04	-9.827E-04	-3.625E-04	-4.449E-04	6.307E-06
88	QL	-3.889E-05	3.040E-04	-4.458E-04	-1.718E-04	-2.177E-04	3.528E-06
89	QD	-1.288E-04	6.233E-04	-2.112E-03	-6.150E-04	-4.912E-04	5.125E-06
89	QL	-3.890E-05	2.959E-04	-9.964E-04	-2.927E-04	-2.377E-04	3.022E-06
90	QD	-1.288E-04	6.110E-04	-3.363E-03	-7.027E-04	-5.187E-04	4.941E-06
90	QL	-3.890E-05	2.886E-04	-1.597E-03	-3.374E-04	-2.477E-04	2.926E-06
91	QD	-1.148E-04	6.110E-04	-1.226E-03	-6.874E-04	-3.471E-04	4.708E-06
91	QL	-3.045E-05	2.886E-04	-5.663E-04	-3.325E-04	-1.650E-04	2.828E-06
92	QD	5.088E-06	4.181E-04	-9.371E-04	-3.531E-04	-4.281E-04	-6.356E-06
92	QL	6.206E-06	1.990E-04	-4.262E-04	-1.671E-04	-2.088E-04	-3.090E-06

93	QD	5.078E-06	4.346E-04	-2.033E-03	-6.073E-04	-4.808E-04	-7.616E-06
93	QL	6.202E-06	2.071E-04	-9.588E-04	-2.887E-04	-2.314E-04	-3.710E-06
94	QD	5.077E-06	4.525E-04	-3.264E-03	-6.897E-04	-5.109E-04	-7.578E-06
94	QL	6.201E-06	2.158E-04	-1.546E-03	-3.313E-04	-2.426E-04	-3.714E-06
95	QD	-1.856E-05	4.525E-04	-1.166E-03	-6.745E-04	-3.449E-04	-7.919E-06
95	QL	-5.363E-06	2.158E-04	-5.340E-04	-3.264E-04	-1.622E-04	-3.868E-06
96	QD	3.754E-05	2.411E-04	-8.808E-04	-3.449E-04	-4.283E-04	-1.010E-05
96	QL	2.264E-05	1.146E-04	-4.035E-04	-1.633E-04	-2.101E-04	-4.935E-06
97	QD	3.754E-05	2.654E-04	-1.978E-03	-6.000E-04	-4.817E-04	-1.044E-05
97	QL	2.264E-05	1.265E-04	-9.391E-04	-2.852E-04	-2.326E-04	-5.135E-06
98	QD	3.754E-05	2.909E-04	-3.211E-03	-6.820E-04	-5.120E-04	-1.070E-05
98	QL	2.264E-05	1.390E-04	-1.529E-03	-3.279E-04	-2.437E-04	-5.263E-06
99	QD	5.510E-06	2.909E-04	-1.136E-03	-6.669E-04	-3.465E-04	-1.062E-05
99	QL	6.871E-06	1.390E-04	-5.271E-04	-3.231E-04	-1.632E-04	-5.227E-06
100	QD	5.190E-05	1.077E-04	-8.062E-04	-3.357E-04	-4.311E-04	-1.070E-05
100	QL	2.990E-05	5.113E-05	-3.727E-04	-1.589E-04	-2.116E-04	-5.285E-06
101	QD	5.190E-05	1.327E-04	-1.911E-03	-5.911E-04	-4.845E-04	-1.051E-05
101	QL	2.990E-05	6.346E-05	-9.121E-04	-2.810E-04	-2.343E-04	-5.193E-06
102	QD	5.190E-05	1.591E-04	-3.150E-03	-6.737E-04	-5.147E-04	-1.108E-05
102	QL	2.990E-05	7.651E-05	-1.506E-03	-3.239E-04	-2.453E-04	-5.474E-06
103	QD	1.957E-05	1.591E-04	-1.100E-03	-6.587E-04	-3.488E-04	-1.062E-05
103	QL	1.392E-05	7.651E-05	-5.161E-04	-3.191E-04	-1.647E-04	-5.249E-06
104	QD	5.247E-05	2.098E-05	-7.014E-04	-3.202E-04	-4.173E-04	-9.354E-06
104	QL	2.930E-05	9.964E-06	-3.283E-04	-1.513E-04	-2.048E-04	-4.670E-06
105	QD	5.248E-05	4.087E-05	-1.774E-03	-5.759E-04	-4.722E-04	-8.004E-06
105	QL	2.931E-05	1.989E-05	-8.523E-04	-2.737E-04	-2.285E-04	-3.991E-06
106	QD	5.248E-05	6.250E-05	-2.985E-03	-6.548E-04	-5.037E-04	-9.066E-06
106	QL	2.931E-05	3.066E-05	-1.433E-03	-3.145E-04	-2.403E-04	-4.514E-06
107	QD	2.739E-05	6.251E-05	-9.931E-04	-6.395E-04	-3.411E-04	-8.051E-06
107	QL	1.681E-05	3.067E-05	-4.724E-04	-3.095E-04	-1.616E-04	-4.011E-06
108	QD	-2.120E-04	1.417E-04	-2.830E-04	7.630E-06	7.529E-06	-4.318E-05
108	QL	-7.445E-05	6.385E-05	-3.673E-05	-1.369E-06	1.343E-06	-1.906E-05
109	QD	-1.580E+10	-5.373E+12	-1.237E+13	0.0000	0.0000	0.0000
109	QL	-6000000000	-1.637E+12	-2.744E+12	0.0000	0.0000	0.0000
110	QD	1.580E+10	-5.373E+12	-1.237E+13	0.0000	0.0000	0.0000
110	QL	6000000000	-1.637E+12	-2.744E+12	0.0000	0.0000	0.0000

Gedubu Head Quarters

F R A M E E L E M E N T F O R C E S

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
1	QD							
		0.00	-79.64	999.52	20.52	-29.48	-14.54	35.05
		6.0E-01	-79.64	1114.85	20.52	-29.48	-26.85	-598.46
		1.20	-79.64	1230.18	20.52	-29.48	-39.16	-1301.97
		1.80	-79.64	1345.50	20.52	-29.48	-51.47	-2074.67
		2.40	-79.64	1460.83	20.52	-29.48	-63.78	-2916.57
1	QL							
		0.00	-1.29	149.61	-6.228E-01	-8.27	-15.00	3.84
		6.0E-01	-1.29	149.61	-6.228E-01	-8.27	-14.63	-85.93
		1.20	-1.29	149.61	-6.228E-01	-8.27	-14.26	-175.70
		1.80	-1.29	149.61	-6.228E-01	-8.27	-13.88	-265.47
		2.40	-1.29	149.61	-6.228E-01	-8.27	-13.51	-355.23
2	QD							
		0.00	399.15	-788.19	-44.42	-22.50	-142.06	-1232.40
		1.80	399.15	-442.22	-44.42	-22.50	-62.09	-125.03
		3.60	399.15	-96.24	-44.42	-22.50	17.87	359.58
		5.40	399.15	249.74	-44.42	-22.50	97.83	221.44
		7.20	399.15	595.71	-44.42	-22.50	177.80	-539.47
2	QL							
		0.00	-56.09	-34.67	-20.18	-11.19	-62.93	-142.73
		1.80	-56.09	-34.67	-20.18	-11.19	-26.60	-80.32
		3.60	-56.09	-34.67	-20.18	-11.19	9.73	-17.90
		5.40	-56.09	-34.67	-20.18	-11.19	46.05	44.51
		7.20	-56.09	-34.67	-20.18	-11.19	82.38	106.92

3	QD						
		0.00	353.72	-1432.69	-45.14	-14.50	-147.44	-2301.02
		9.0E-01	353.72	-1259.70	-45.14	-14.50	-106.82	-1089.44
		1.80	353.72	-1086.72	-45.14	-14.50	-66.19	-33.55
		2.70	353.72	-913.73	-45.14	-14.50	-25.57	866.65
		3.60	353.72	-740.74	-45.14	-14.50	15.05	1611.16
3	QL						
		0.00	-87.47	-135.56	-20.54	-7.07	-65.56	-334.59
		9.0E-01	-87.47	-135.56	-20.54	-7.07	-47.08	-212.58
		1.80	-87.47	-135.56	-20.54	-7.07	-28.59	-90.58
		2.70	-87.47	-135.56	-20.54	-7.07	-10.11	31.43
		3.60	-87.47	-135.56	-20.54	-7.07	8.37	153.43
4	QD						
		0.00	311.16	-851.15	21.23	10.29	64.94	-1320.69
		1.80	311.16	-505.18	21.23	10.29	26.72	-100.00
		3.60	311.16	-159.20	21.23	10.29	-11.50	497.94
		5.40	311.16	186.78	21.23	10.29	-49.72	473.13
		7.20	311.16	532.75	21.23	10.29	-87.94	-174.45
4	QL						
		0.00	-2.18	-20.69	10.66	3.92	32.31	-75.87
		1.80	-2.18	-20.69	10.66	3.92	13.13	-38.63
		3.60	-2.18	-20.69	10.66	3.92	-6.05	-1.38
		5.40	-2.18	-20.69	10.66	3.92	-25.24	35.86
		7.20	-2.18	-20.69	10.66	3.92	-44.42	73.11
5	QD						
		0.00	-61.48	-407.03	-2.36	45.66	-3.22	-502.03
		6.0E-01	-61.48	-392.62	-2.36	45.66	-1.81	-262.14
		1.20	-61.48	-378.20	-2.36	45.66	-3.959E-01	-30.89
		1.80	-61.48	-363.79	-2.36	45.66	1.02	191.70
		2.40	-61.48	-349.37	-2.36	45.66	2.43	405.65
5	QL						
		0.00	4.36	-55.06	6.922E-01	6.80	3.458E-01	-71.18
		6.0E-01	4.36	-55.06	6.922E-01	6.80	-6.955E-02	38.14
		1.20	4.36	-55.06	6.922E-01	6.80	-4.849E-01	-5.11
		1.80	4.36	-55.06	6.922E-01	6.80	-9.002E-01	27.93
		2.40	4.36	-55.06	6.922E-01	6.80	-1.32	60.97
6	QD						
		0.00	-176.12	-1411.66	-54.24	469.76	-178.74	-991.16
		6.0E-01	-176.12	-1129.34	-54.24	469.76	-146.20	-222.26
		1.20	-176.12	-714.87	-54.24	469.76	-113.65	337.62
		1.80	-176.12	-300.41	-54.24	469.76	-81.11	635.59
		2.40	-176.12	-18.09	-54.24	469.76	-48.57	724.53
6	QL						
		0.00	-195.34	-500.36	-25.01	249.07	-84.33	-541.42
		6.0E-01	-195.34	-445.29	-25.01	249.07	-69.33	-252.22
		1.20	-195.34	-280.10	-25.01	249.07	-54.32	-29.10
		1.80	-195.34	-114.90	-25.01	249.07	-39.32	83.90
		2.40	-195.34	-59.84	-25.01	249.07	-24.32	130.81
7	QD						
		0.00	150.53	-511.70	-137.71	-337.66	-342.09	1440.58
		2.46	-235.66	1253.74	-137.71	-337.66	-3.78	809.96
		4.91	-608.94	2960.16	-137.71	-337.66	334.53	-4673.54
7	QL						
		0.00	-22.44	-328.30	-65.72	-176.88	-163.24	480.00
		2.46	-186.60	422.12	-65.72	-176.88	-1.78	598.82
		4.91	-339.99	1123.36	-65.72	-176.88	159.67	-1555.63
8	QD						
		0.00	6.47	-3994.27	28.86	147.29	55.39	-7876.80
		6.0E-01	6.47	-3711.95	28.86	147.29	38.08	-5558.33
		1.20	6.47	-3297.49	28.86	147.29	20.76	-3448.89
		1.80	6.47	-2883.02	28.86	147.29	3.45	-1601.35
		2.40	6.47	-2600.70	28.86	147.29	-13.87	37.16
8	QL						
		0.00	2.53	-699.22	14.07	-53.84	27.94	-1129.88
		6.0E-01	2.53	-644.16	14.07	-53.84	19.50	-721.36
		1.20	2.53	-478.97	14.07	-53.84	11.06	-378.92
		1.80	2.53	-313.77	14.07	-53.84	2.62	-146.61
		2.40	2.53	-258.71	14.07	-53.84	-5.82	19.63
9	QD						
		0.00	-7.566E-01	2262.10	30.79	164.98	3.40	12.30
		6.0E-01	-7.566E-01	2544.41	30.79	164.98	-15.07	-1423.05
		1.20	-7.566E-01	2958.88	30.79	164.98	-33.55	-3067.43
		1.80	-7.566E-01	3373.35	30.79	164.98	-52.03	-4973.71
		2.40	-7.566E-01	3655.66	30.79	164.98	-70.51	-7089.02
9	QL						
		0.00	-1.53	278.81	15.00	-20.52	-8.717E-02	6.91
		6.0E-01	-1.53	333.87	15.00	-20.52	-9.09	-171.39
		1.20	-1.53	499.07	15.00	-20.52	-18.09	-415.76
		1.80	-1.53	664.26	15.00	-20.52	-27.09	-770.27
		2.40	-1.53	719.33	15.00	-20.52	-36.09	-1190.85
10	QD						
		0.00	-201.94	-2724.59	-90.29	-318.73	-190.18	-3848.25
		2.46	184.26	-959.14	-90.29	-318.73	31.63	957.63
		4.91	557.54	747.28	-90.29	-318.73	253.45	910.63
10	QL						
		0.00	-186.03	-1085.97	-47.32	-165.93	-101.37	-1422.26
		2.46	-21.88	-335.55	-47.32	-165.93	14.89	557.96
		4.91	131.52	365.69	-47.32	-165.93	131.16	264.90

3	QD						
		0.00	353.72	-1432.69	-45.14	-14.50	-147.44	-2301.02
		9.0E-01	353.72	-1259.70	-45.14	-14.50	-106.82	-1089.44
		1.80	353.72	-1086.72	-45.14	-14.50	-66.19	-33.55
		2.70	353.72	-913.73	-45.14	-14.50	-25.57	866.65
		3.60	353.72	-740.74	-45.14	-14.50	15.05	1611.16
3	QL						
		0.00	-87.47	-135.56	-20.54	-7.07	-65.56	-334.59
		9.0E-01	-87.47	-135.56	-20.54	-7.07	-47.08	-212.58
		1.80	-87.47	-135.56	-20.54	-7.07	-28.59	-90.58
		2.70	-87.47	-135.56	-20.54	-7.07	-10.11	31.43
		3.60	-87.47	-135.56	-20.54	-7.07	8.37	153.43
4	QD						
		0.00	311.16	-851.15	21.23	10.29	64.94	-1320.69
		1.80	311.16	-505.18	21.23	10.29	26.72	-100.00
		3.60	311.16	-159.20	21.23	10.29	-11.50	497.94
		5.40	311.16	186.78	21.23	10.29	-49.72	473.13
		7.20	311.16	532.75	21.23	10.29	-87.94	-174.45
4	QL						
		0.00	-2.18	-20.69	10.66	3.92	32.31	-75.87
		1.80	-2.18	-20.69	10.66	3.92	13.13	-38.63
		3.60	-2.18	-20.69	10.66	3.92	-6.05	-1.38
		5.40	-2.18	-20.69	10.66	3.92	-25.24	35.86
		7.20	-2.18	-20.69	10.66	3.92	-44.42	73.11
5	QD						
		0.00	-61.48	-407.03	-2.36	45.66	-3.22	-502.03
		6.0E-01	-61.48	-392.62	-2.36	45.66	-1.81	-262.14
		1.20	-61.48	-378.20	-2.36	45.66	-3.959E-01	-30.89
		1.80	-61.48	-363.79	-2.36	45.66	1.02	191.70
		2.40	-61.48	-349.37	-2.36	45.66	2.43	405.65
5	QL						
		0.00	4.36	-55.06	6.922E-01	6.80	3.458E-01	-71.18
		6.0E-01	4.36	-55.06	6.922E-01	6.80	-6.955E-02	-38.14
		1.20	4.36	-55.06	6.922E-01	6.80	-4.849E-01	-5.11
		1.80	4.36	-55.06	6.922E-01	6.80	-9.002E-01	27.93
		2.40	4.36	-55.06	6.922E-01	6.80	-1.32	60.97
6	QD						
		0.00	-176.12	-1411.66	-54.24	469.76	-178.74	-991.16
		6.0E-01	-176.12	-1129.34	-54.24	469.76	-146.20	-222.26
		1.20	-176.12	-714.87	-54.24	469.76	-113.65	337.62
		1.80	-176.12	-300.41	-54.24	469.76	-81.11	635.59
		2.40	-176.12	-18.09	-54.24	469.76	-48.57	724.53
6	QL						
		0.00	-195.34	-500.36	-25.01	249.07	-84.33	-541.42
		6.0E-01	-195.34	-445.29	-25.01	249.07	-69.33	-252.22
		1.20	-195.34	-280.10	-25.01	249.07	-54.32	-29.10
		1.80	-195.34	-114.90	-25.01	249.07	-39.32	83.90
		2.40	-195.34	-59.84	-25.01	249.07	-24.32	130.81
7	QD						
		0.00	150.53	-511.70	-137.71	-337.66	-342.09	1440.58
		2.46	-235.66	1253.74	-137.71	-337.66	-3.78	809.96
		4.91	-608.94	2960.16	-137.71	-337.66	334.53	-4673.54
7	QL						
		0.00	-22.44	-328.30	-65.72	-176.88	-163.24	480.00
		2.46	-186.60	422.12	-65.72	-176.88	-1.78	598.82
		4.91	-339.99	1123.36	-65.72	-176.88	159.67	-1555.63
8	QD						
		0.00	6.47	-3994.27	28.86	147.29	55.39	-7876.80
		6.0E-01	6.47	-3711.95	28.86	147.29	38.08	-5558.33
		1.20	6.47	-3297.49	28.86	147.29	20.76	-3448.89
		1.80	6.47	-2883.02	28.86	147.29	3.45	-1601.35
		2.40	6.47	-2600.70	28.86	147.29	-13.87	37.16
8	QL						
		0.00	2.53	-699.22	14.07	-53.84	27.94	-1129.88
		6.0E-01	2.53	-644.16	14.07	-53.84	19.50	-721.36
		1.20	2.53	-478.97	14.07	-53.84	11.06	-378.92
		1.80	2.53	-313.77	14.07	-53.84	2.62	-146.61
		2.40	2.53	-258.71	14.07	-53.84	-5.82	19.63
9	QD						
		0.00	-7.566E-01	2262.10	30.79	164.98	3.40	12.30
		6.0E-01	-7.566E-01	2544.41	30.79	164.98	-15.07	-1423.05
		1.20	-7.566E-01	2958.88	30.79	164.98	-33.55	-3067.43
		1.80	-7.566E-01	3373.35	30.79	164.98	-52.03	-4973.71
		2.40	-7.566E-01	3655.66	30.79	164.98	-70.51	-7089.02
9	QL						
		0.00	-1.53	278.81	15.00	-20.52	-8.717E-02	6.91
		6.0E-01	-1.53	333.87	15.00	-20.52	-9.09	-171.39
		1.20	-1.53	499.07	15.00	-20.52	-18.09	-415.76
		1.80	-1.53	664.26	15.00	-20.52	-27.09	-770.27
		2.40	-1.53	719.33	15.00	-20.52	-36.09	-1190.85
10	QD						
		0.00	-201.94	-2724.59	-90.29	-318.73	-190.18	-3848.25
		2.46	184.26	-959.14	-90.29	-318.73	31.63	957.63
		4.91	557.54	747.28	-90.29	-318.73	253.45	910.63
10	QL						
		0.00	-186.03	-1085.97	-47.32	-165.93	-101.37	-1422.26
		2.46	-21.88	-335.55	-47.32	-165.93	14.89	557.96
		4.91	131.52	365.69	-47.32	-165.93	131.16	264.90

11	QD						
		0.00	260.64	380.62	-7.34	433.08	91.53	205.05
		6.0E-01	260.64	662.93	-7.34	433.08	95.93	-101.40
		1.20	260.64	1077.40	-7.34	433.08	100.34	-616.89
		1.80	260.64	1491.87	-7.34	433.08	104.74	-1394.28
		2.40	260.64	1774.18	-7.34	433.08	109.14	-2380.70
11	QL						
		0.00	-19.22	164.21	-6.96	226.14	40.89	-79.70
		6.0E-01	-19.22	219.27	-6.96	226.14	45.06	-189.24
		1.20	-19.22	384.47	-6.96	226.14	49.24	-364.85
		1.80	-19.22	549.66	-6.96	226.14	53.41	-650.59
		2.40	-19.22	604.72	-6.96	226.14	57.59	-1002.42
12	QD						
		0.00	-288.29	-2919.48	118.51	107.97	452.32	-3953.36
		3.62	5.800E-01	-89.74	118.51	107.97	23.45	2000.47
		7.24	287.43	2720.19	118.51	107.97	-405.42	-3289.15
12	QL						
		0.00	-510.64	-1288.07	58.46	53.36	223.36	-1782.95
		3.62	-380.29	-11.12	58.46	53.36	11.80	991.98
		7.24	-251.62	1249.31	58.46	53.36	-199.75	-1690.16
13	QD						
		0.00	405.99	-2768.51	24.71	29.68	65.39	-3775.09
		3.62	694.86	61.23	24.71	29.68	-24.02	1632.43
		7.24	981.71	2871.16	24.71	29.68	-113.44	-4203.51
13	QL						
		0.00	-344.84	-1334.53	13.82	14.11	38.14	-1964.18
		3.62	-214.48	-57.59	13.82	14.11	-11.86	978.90
		7.24	-85.81	1202.84	13.82	14.11	-61.87	-1535.11
14	QD						
		0.00	-9.92	-4726.46	-4.04	-379.05	-23.98	-9656.57
		6.0E-01	-9.92	-4444.14	-4.04	-379.05	-21.55	-6898.78
		1.20	-9.92	-4029.67	-4.04	-379.05	-19.13	-4350.03
		1.80	-9.92	-3615.21	-4.04	-379.05	-16.70	-2063.17
		2.40	-9.92	-3332.89	-4.04	-379.05	-14.28	14.65
14	QL						
		0.00	-3.70	-751.60	-6.957E-01	-21.49	-7.17	-1270.20
		6.0E-01	-3.70	-696.53	-6.957E-01	-21.49	-6.75	-830.25
		1.20	-3.70	-531.34	-6.957E-01	-21.49	-6.33	-456.38
		1.80	-3.70	-366.15	-6.957E-01	-21.49	-5.92	-192.64
		2.40	-3.70	-311.08	-6.957E-01	-21.49	-5.50	5.02
15	QD						
		0.00	-3.408E-01	2245.12	28.24	138.64	3.64	18.57
		6.0E-01	-3.408E-01	2527.43	28.24	138.64	-13.30	-1406.59
		1.20	-3.408E-01	2941.90	28.24	138.64	-30.25	-3040.78
		1.80	-3.408E-01	3356.37	28.24	138.64	-47.19	-4936.87
		2.40	-3.408E-01	3638.68	28.24	138.64	-64.13	-7041.99
15	QL						
		0.00	-5.148E-01	268.97	13.75	-35.65	1.25	10.51
		6.0E-01	-5.148E-01	324.04	13.75	-35.65	-7.00	-161.88
		1.20	-5.148E-01	489.23	13.75	-35.65	-15.25	-400.36
		1.80	-5.148E-01	654.42	13.75	-35.65	-23.51	-748.96
		2.40	-5.148E-01	709.49	13.75	-35.65	-31.76	-1163.64
16	QD						
		0.00	-748.06	-2662.35	-53.88	-293.27	-97.11	-3570.82
		2.44	-413.77	-899.06	-53.88	-293.27	34.51	1050.83
		4.89	-87.96	819.51	-53.88	-293.27	166.13	847.88
16	QL						
		0.00	-253.06	-1098.12	-27.91	-152.89	-52.21	-1425.13
		2.44	-111.13	-349.51	-27.91	-152.89	15.97	576.16
		4.89	23.73	361.85	-27.91	-152.89	84.15	310.98
17	QD						
		0.00	-309.98	334.31	19.74	461.00	80.79	128.30
		6.0E-01	-309.98	616.62	19.74	461.00	68.95	-150.37
		1.20	-309.98	1031.09	19.74	461.00	57.11	-638.08
		1.80	-309.98	1445.56	19.74	461.00	45.27	-1387.68
		2.40	-309.98	1727.87	19.74	461.00	33.42	-2346.31
17	QL						
		0.00	-82.87	145.90	7.94	239.74	37.99	-40.21
		6.0E-01	-82.87	200.97	7.94	239.74	33.22	-138.77
		1.20	-82.87	366.16	7.94	239.74	28.46	-303.40
		1.80	-82.87	531.36	7.94	239.74	23.70	-578.16
		2.40	-82.87	586.42	7.94	239.74	18.93	-919.00
18	QD						
		0.00	-583.05	-2857.81	37.04	79.61	139.76	-3794.15
		3.62	-294.18	-28.06	37.04	79.61	5.74	1936.50
		7.24	-7.33	2781.87	37.04	79.61	-128.29	-3576.30
18	QL						
		0.00	-116.44	-1296.50	17.88	40.00	67.88	-1844.57
		3.62	13.92	-19.56	17.88	40.00	3.16	960.88
		7.24	142.58	1240.88	17.88	40.00	-61.56	-1690.76
19	QD						
		0.00	-718.69	-2835.94	6.88	20.49	15.92	-3792.20
		3.62	-429.82	-6.19	6.88	20.49	-8.96	1859.29
		7.24	-142.97	2803.74	6.88	20.49	-33.85	-3732.67
19	QL						
		0.00	-75.17	-1304.50	4.47	11.60	11.94	-1873.37
		3.62	55.19	-27.55	4.47	11.60	-4.24	961.01
		7.24	183.86	1232.88	4.47	11.60	-20.42	-1661.69

E2

20	QD						
	0.00	-1.609E-01	-3734.10	-1.77	-275.00	-4.22	-7289.06
	6.0E-01	-1.609E-01	-3451.79	-1.77	-275.00	-3.16	-5126.68
	1.20	-1.609E-01	-3037.32	-1.77	-275.00	-2.10	-3173.35
	1.80	-1.609E-01	-2622.85	-1.77	-275.00	-1.04	-1481.90
	2.40	-1.609E-01	-2340.54	-1.77	-275.00	2.148E-02	5.045E-01
20	QL						
	0.00	-3.541E-01	-756.12	-6.349E-01	-31.61	-1.95	-1284.51
	6.0E-01	-3.541E-01	-701.05	-6.349E-01	-31.61	-1.57	-841.85
	1.20	-3.541E-01	-535.86	-6.349E-01	-31.61	-1.19	-465.28
	1.80	-3.541E-01	-370.66	-6.349E-01	-31.61	-8.082E-01	-198.83
	2.40	-3.541E-01	-315.60	-6.349E-01	-31.61	-4.273E-01	1.55
21	QD						
	0.00	7.43	2238.01	25.57	127.46	14.91	23.65
	6.0E-01	7.43	2520.33	25.57	127.46	-4.310E-01	-1397.24
	1.20	7.43	2934.79	25.57	127.46	-15.77	-3027.17
	1.80	7.43	3349.26	25.57	127.46	-31.12	-4919.00
	2.40	7.43	3631.58	25.57	127.46	-46.46	-7019.86
21	QL						
	0.00	3.65	265.60	12.45	-40.91	7.31	12.82
	6.0E-01	3.65	320.66	12.45	-40.91	-1.596E-01	-157.55
	1.20	3.65	485.85	12.45	-40.91	-7.63	-394.00
	1.80	3.65	651.05	12.45	-40.91	-15.11	-740.57
	2.40	3.65	706.11	12.45	-40.91	-22.58	-1153.23
22	QD						
	0.00	-325.93	-2705.43	-27.69	-276.13	-38.49	-3681.38
	2.44	-10.13	-942.85	-27.69	-276.13	29.02	1045.76
	4.88	298.49	779.68	-27.69	-276.13	96.53	946.93
22	QL						
	0.00	-125.38	-1103.60	-13.84	-144.41	-20.38	-1425.48
	2.44	8.64	-355.57	-13.84	-144.41	13.35	586.31
	4.88	136.69	359.09	-13.84	-144.41	47.08	333.89
23	QD						
	0.00	128.29	379.79	43.74	479.87	74.27	203.82
	6.0E-01	128.29	662.10	43.74	479.87	48.03	-102.14
	1.20	128.29	1076.57	43.74	479.87	21.78	-617.13
	1.80	128.29	1491.04	43.74	479.87	-4.46	-1394.02
	2.40	128.29	1773.35	43.74	479.87	-30.70	-2379.94
23	QL						
	0.00	56.15	170.73	20.92	249.00	35.83	-28.43
	6.0E-01	56.15	225.80	20.92	249.00	23.28	-141.88
	1.20	56.15	390.99	20.92	249.00	10.73	-321.41
	1.80	56.15	556.18	20.92	249.00	-1.83	-611.07
	2.40	56.15	611.25	20.92	249.00	-14.38	-966.81
24	QD						
	0.00	-201.63	-2864.07	-7.00	50.39	-28.05	-3805.69
	3.62	87.24	-34.32	-7.00	50.39	-2.70	1947.60
	7.24	374.09	2775.61	-7.00	50.39	22.64	-3542.57
24	QL						
	0.00	-115.81	-1288.01	-3.77	25.28	-14.81	-1811.68
	3.62	14.55	-11.07	-3.77	25.28	-1.15	963.06
	7.24	143.22	1249.36	-3.77	25.28	12.50	-1719.29
25	QD						
	0.00	-125.27	-2814.74	-6.89	18.45	-24.29	-3756.25
	3.62	163.60	15.01	-6.89	18.45	6.297E-01	1818.53
	7.24	450.45	2824.94	-6.89	18.45	25.55	-3850.15
25	QL						
	0.00	-125.46	-1303.11	-2.76	10.59	-9.48	-1866.31
	3.62	4.89	-26.16	-2.76	10.59	5.275E-01	963.05
	7.24	133.56	1234.27	-2.76	10.59	10.53	-1664.67
26	QD						
	0.00	4.40	-3733.44	-1.20	-275.04	3.87	-7287.70
	6.0E-01	4.40	-3451.12	-1.20	-275.04	4.59	-5125.72
	1.20	4.40	-3036.66	-1.20	-275.04	5.31	-3172.78
	1.80	4.40	-2622.19	-1.20	-275.04	6.04	-1481.73
	2.40	4.40	-2339.88	-1.20	-275.04	6.76	2.765E-01
26	QL						
	0.00	2.00	-756.58	-5.144E-01	-32.08	1.84	-1286.03
	6.0E-01	2.00	-701.52	-5.144E-01	-32.08	2.15	-843.10
	1.20	2.00	-536.32	-5.144E-01	-32.08	2.45	-466.24
	1.80	2.00	-371.13	-5.144E-01	-32.08	2.76	-199.51
	2.40	2.00	-316.06	-5.144E-01	-32.08	3.07	1.14
27	QD						
	0.00	9.56	2294.12	17.51	214.28	16.79	8.83
	6.0E-01	9.56	2576.43	17.51	214.28	6.29	-1445.73
	1.20	9.56	2990.90	17.51	214.28	-4.22	-3109.32
	1.80	9.56	3405.37	17.51	214.28	-14.73	-5034.81
	2.40	9.56	3687.68	17.51	214.28	-25.24	-7169.33
27	QL						
	0.00	4.78	293.08	8.56	1.37	8.38	5.23
	6.0E-01	4.78	348.14	8.56	1.37	3.25	-181.63
	1.20	4.78	513.34	8.56	1.37	-1.89	-434.56
	1.80	4.78	678.53	8.56	1.37	-7.03	-797.63
	2.40	4.78	733.60	8.56	1.37	-12.17	-1226.78
28	QD						
	0.00	-543.74	-2699.26	-25.68	-230.63	-48.83	-3753.73
	2.44	-227.94	-936.68	-25.68	-230.63	13.79	958.36

	4.88	80.88	785.53	-20.00	-230.03	70.41	3111.10
28	QL						
	0.00	-246.49	-1082.37	-12.27	-120.97	-23.93	-1396.33
	2.44	-112.47	-334.34	-12.27	-120.97	5.99	563.71
	4.88	15.57	380.32	-12.27	-120.97	35.92	259.53
29	QD						
	0.00	-81.88	272.86	53.30	423.88	55.70	120.56
	6.0E-01	-81.88	555.17	53.30	423.88	23.72	-121.24
	1.20	-81.88	969.64	53.30	423.88	-8.27	-572.08
	1.80	-81.88	1384.11	53.30	423.88	-40.25	-1284.81
	2.40	-81.88	1666.42	53.30	423.88	-72.23	-2206.58
29	QL						
	0.00	-63.11	132.25	26.16	220.55	26.93	-92.96
	6.0E-01	-63.11	187.31	26.16	220.55	11.23	-183.32
	1.20	-63.11	352.50	26.16	220.55	-4.47	-339.76
	1.80	-63.11	517.70	26.16	220.55	-20.17	-606.33
	2.40	-63.11	572.76	26.16	220.55	-35.86	-938.97
30	QD						
	0.00	-543.09	-2835.19	-20.31	17.95	-78.95	-3692.12
	3.62	-254.22	-5.45	-20.31	17.95	-5.45	1956.68
	7.24	32.62	2804.49	-20.31	17.95	68.04	-3637.97
30	QL						
	0.00	-147.22	-1263.02	-10.18	9.10	-39.47	-1716.15
	3.62	-16.86	13.92	-10.18	9.10	-2.65	968.15
	7.24	111.81	1274.36	-10.18	9.10	34.18	-1804.63
31	QD						
	0.00	-611.28	-2768.48	-13.38	9.93	-44.88	-3615.05
	3.62	-322.41	61.27	-13.38	9.93	3.52	1792.34
	7.24	-35.56	2871.20	-13.38	9.93	51.92	-4043.73
31	QL						
	0.00	-105.70	-1288.20	-6.45	6.65	-21.40	-1812.05
	3.62	24.65	-11.25	-6.45	6.65	1.95	963.36
	7.24	153.32	1249.18	-6.45	6.65	25.29	-1718.32
32	QD						
	0.00	7.56	-3746.82	-1.30	-289.75	8.49	-7324.68
	6.0E-01	7.56	-3464.50	-1.30	-289.75	9.27	-5154.68
	1.20	7.56	-3050.04	-1.30	-289.75	10.05	-3193.71
	1.80	7.56	-2635.57	-1.30	-289.75	10.82	-1494.64
	2.40	7.56	-2353.25	-1.30	-289.75	11.60	-4.60
32	QL						
	0.00	3.69	-762.87	-5.850E-01	-39.38	4.26	-1303.51
	6.0E-01	3.69	-707.81	-5.850E-01	-39.38	4.61	-856.80
	1.20	3.69	-542.61	-5.850E-01	-39.38	4.96	-476.16
	1.80	3.69	-377.42	-5.850E-01	-39.38	5.31	-205.66
	2.40	3.69	-322.35	-5.850E-01	-39.38	5.66	-1.24
33	QD						
	0.00	1281.24	-1370.25	80.04	24.13	304.25	-1955.96
	9.0E-01	1281.24	-1197.26	80.04	24.13	232.22	-800.58
	1.80	1281.24	-1024.28	80.04	24.13	160.18	199.11
	2.70	1281.24	-851.29	80.04	24.13	88.14	1043.12
	3.60	1281.24	-678.30	80.04	24.13	16.11	1731.43
33	QL						
	0.00	307.21	-87.49	41.65	11.45	157.53	-103.59
	9.0E-01	307.21	-87.49	41.65	11.45	120.04	-24.85
	1.80	307.21	-87.49	41.65	11.45	82.55	53.89
	2.70	307.21	-87.49	41.65	11.45	45.06	132.64
	3.60	307.21	-87.49	41.65	11.45	7.57	211.38
34	QD						
	0.00	1281.24	696.52	80.04	24.13	16.11	1731.43
	9.0E-01	1281.24	869.51	80.04	24.13	-55.93	1026.72
	1.80	1281.24	1042.50	80.04	24.13	-127.96	166.31
	2.70	1281.24	1215.49	80.04	24.13	-200.00	-849.78
	3.60	1281.24	1388.47	80.04	24.13	-272.03	-2021.56
34	QL						
	0.00	307.21	112.51	41.65	11.45	7.57	211.38
	9.0E-01	307.21	112.51	41.65	11.45	-29.92	110.12
	1.80	307.21	112.51	41.65	11.45	-67.41	8.86
	2.70	307.21	112.51	41.65	11.45	-104.90	-92.40
	3.60	307.21	112.51	41.65	11.45	-142.39	-193.65
35	QD						
	0.00	366.22	-775.40	79.42	31.19	300.65	-1129.28
	9.0E-01	366.22	-602.41	79.42	31.19	229.17	-509.27
	1.80	366.22	-429.42	79.42	31.19	157.69	-44.94
	2.70	366.22	-256.43	79.42	31.19	86.21	263.69
	3.60	366.22	-83.44	79.42	31.19	14.73	416.64
35	QL						
	0.00	-52.35	-28.44	41.27	15.88	155.60	-103.72
	9.0E-01	-52.35	-28.44	41.27	15.88	118.45	-78.13
	1.80	-52.35	-28.44	41.27	15.88	81.31	-52.53
	2.70	-52.35	-28.44	41.27	15.88	44.17	-26.94
	3.60	-52.35	-28.44	41.27	15.88	7.02	-1.35
36	QD						
	0.00	-2410.24	-602.38	-20.07	-111.42	60.96	-1640.17
	2.63	-3986.96	-602.38	-20.07	-111.42	113.65	-58.91
	5.25	-5563.67	-602.38	-20.07	-111.42	166.33	1522.35
36	QL						
	0.00	-132.59	4.76	1.212E-01	-27.72	67.39	-205.74
	2.63	-132.59	4.76	1.212E-01	-27.72	67.08	-218.24

37	QD						
	0.00	-13286.75	-581.84	-26.06	130.81	-71.83	-1468.13
	2.10	-14548.12	-581.84	-26.06	130.81	-17.11	-246.27
	4.20	-15809.49	-581.84	-26.06	130.81	37.60	975.59
37	QL						
	0.00	-2386.88	119.63	-11.55	75.97	-27.41	300.69
	2.10	-2386.88	119.63	-11.55	75.97	-3.14	49.46
	4.20	-2386.88	119.63	-11.55	75.97	21.12	-201.77
38	QD						
	0.00	-22724.29	-973.62	37.86	132.34	18.19	-2166.24
	2.03	-23943.62	-973.62	37.86	132.34	-58.67	-189.80
	4.06	-25162.95	-973.62	37.86	132.34	-135.54	1786.64
38	QL						
	0.00	-4510.68	55.52	22.30	67.26	20.31	77.25
	2.03	-4510.68	55.52	22.30	67.26	-24.97	-35.44
	4.06	-4510.68	55.52	22.30	67.26	-70.24	-148.14
39	QD						
	0.00	-32069.26	-737.62	51.94	71.34	-15.13	-1543.89
	2.08	-33315.62	-737.62	51.94	71.34	-122.90	-13.33
	4.15	-34561.97	-737.62	51.94	71.34	-230.67	1517.22
39	QL						
	0.00	-6625.11	94.97	30.76	35.78	7.43	180.40
	2.08	-6625.11	94.97	30.76	35.78	-56.39	-16.65
	4.15	-6625.11	94.97	30.76	35.78	-120.21	-213.71
40	QD						
	0.00	-41469.77	-827.00	53.17	72.92	-133.20	-1666.08
	2.10	-42731.14	-827.00	53.17	72.92	-244.86	70.62
	4.20	-43992.51	-827.00	53.17	72.92	-356.51	1807.33
40	QL						
	0.00	-8736.47	56.65	30.61	36.87	-48.82	135.94
	2.10	-8736.47	56.65	30.61	36.87	-113.11	16.98
	4.20	-8736.47	56.65	30.61	36.87	-177.39	-101.99
41	QD						
	0.00	-51271.81	-681.78	-100.23	148.41	-742.84	-1544.31
	9.2E-01	-51824.41	-681.78	-100.23	148.41	-650.63	-917.07
	1.84	-52377.02	-681.78	-100.23	148.41	-558.42	-289.84
41	QL						
	0.00	-11006.37	151.44	-32.20	73.91	-327.80	99.16
	9.2E-01	-11006.37	151.44	-32.20	73.91	-298.17	-40.16
	1.84	-11006.37	151.44	-32.20	73.91	-268.55	-179.49
42	QD						
	0.00	-1620.88	65.83	19.68	-71.04	41.92	624.03
	2.10	-2882.25	65.83	19.68	-71.04	6.007E-01	485.78
	4.20	-4143.62	65.83	19.68	-71.04	-40.72	347.53
42	QL						
	0.00	26.56	32.33	31.06	-17.95	84.94	223.36
	2.10	26.56	32.33	31.06	-17.95	19.70	155.46
	4.20	26.56	32.33	31.06	-17.95	-45.53	87.56
43	QD						
	0.00	-5178.89	-61.53	284.52	194.99	545.12	-996.61
	2.10	-6440.26	-61.53	284.52	194.99	-52.37	-867.40
	4.20	-7701.64	-61.53	284.52	194.99	-649.86	-738.19
43	QL						
	0.00	-162.44	-140.58	133.90	106.78	265.50	-645.20
	2.10	-162.44	-140.58	133.90	106.78	-15.68	-349.98
	4.20	-162.44	-140.58	133.90	106.78	-296.87	-54.77
44	QD						
	0.00	-12621.65	276.88	10.89	7.70	-231.71	565.16
	2.10	-13883.02	276.88	10.89	7.70	-254.57	-16.29
	4.20	-15144.39	276.88	10.89	7.70	-277.44	-597.75
44	QL						
	0.00	-2220.44	251.43	-10.28	4.22	-145.12	589.23
	2.10	-2220.44	251.43	-10.28	4.22	-123.53	61.23
	4.20	-2220.44	251.43	-10.28	4.22	-101.94	-466.77
45	QD						
	0.00	-20194.59	286.06	-20.49	-37.64	-292.10	599.52
	2.10	-21455.96	286.06	-20.49	-37.64	-249.07	-1.21
	4.20	-22717.33	286.06	-20.49	-37.64	-206.04	-601.93
45	QL						
	0.00	-4335.93	164.54	-25.57	-18.56	-172.55	332.05
	2.10	-4335.93	164.54	-25.57	-18.56	-118.84	-13.47
	4.20	-4335.93	164.54	-25.57	-18.56	-65.14	-359.00
46	QD						
	0.00	-27819.72	297.86	-9.80	-68.91	-339.80	569.90
	2.10	-29081.10	297.86	-9.80	-68.91	-319.21	-55.60
	4.20	-30342.47	297.86	-9.80	-68.91	-298.63	-681.10
46	QL						
	0.00	-6488.42	191.05	-20.69	-33.84	-196.25	356.96
	2.10	-6488.42	191.05	-20.69	-33.84	-152.81	-44.25
	4.20	-6488.42	191.05	-20.69	-33.84	-109.38	-445.46
47	QD						
	0.00	-35376.10	383.78	82.45	-184.35	-459.14	630.62
	1.35	-36186.98	383.78	82.45	-184.35	-570.45	112.52
	2.70	-36997.87	383.78	82.45	-184.35	-681.76	-405.57

47	QL						
		0.00	-8592.76	103.53	23.35	-91.81	-247.21	242.75
		1.35	-8592.76	103.53	23.35	-91.81	-278.73	102.98
		2.70	-8592.76	103.53	23.35	-91.81	-310.25	-36.78
48	QD						
		0.00	-1607.91	224.47	12.83	-82.88	60.44	773.25
		3.83	-3909.91	224.47	12.83	-82.88	11.25	-87.03
		7.67	-6211.92	224.47	12.83	-82.88	-37.94	-947.32
48	QL						
		0.00	87.82	51.26	18.06	-21.87	98.37	167.16
		3.83	87.82	51.26	18.06	-21.87	29.15	-29.28
		7.67	87.82	51.26	18.06	-21.87	-40.07	-225.72
49	QD						
		0.00	-12583.83	-127.70	-22.50	-75.80	-71.78	-468.18
		2.10	-13845.20	-127.70	-22.50	-75.80	-24.54	-200.02
		4.20	-15106.57	-127.70	-22.50	-75.80	22.70	68.14
49	QL						
		0.00	-2943.19	32.18	-22.72	-36.79	-62.69	39.47
		2.10	-2943.19	32.18	-22.72	-36.79	-14.97	-28.11
		4.20	-2943.19	32.18	-22.72	-36.79	32.75	-95.68
50	QD						
		0.00	-21599.13	114.49	41.51	-68.82	67.20	271.09
		2.10	-22860.50	114.49	41.51	-68.82	-19.97	30.66
		4.20	-24121.87	114.49	41.51	-68.82	-107.14	-209.77
50	QL						
		0.00	-5910.82	42.67	14.49	-34.62	27.03	82.38
		2.10	-5910.82	42.67	14.49	-34.62	-3.40	-7.22
		4.20	-5910.82	42.67	14.49	-34.62	-33.84	-96.82
51	QD						
		0.00	-30536.29	16.49	31.24	-66.53	-4.69	5.12
		2.10	-31797.66	16.49	31.24	-66.53	-70.28	-29.50
		4.20	-33059.04	16.49	31.24	-66.53	-135.88	-64.12
51	QL						
		0.00	-8880.13	38.14	6.68	-33.33	-14.47	50.47
		2.10	-8880.13	38.14	6.68	-33.33	-28.49	-29.63
		4.20	-8880.13	38.14	6.68	-33.33	-42.51	-109.72
52	QD						
		0.00	-39586.56	-2.70	62.66	-95.65	-179.20	-49.80
		1.72	-40618.18	-2.70	62.66	-95.65	-286.82	-45.17
		3.44	-41649.81	-2.70	62.66	-95.65	-394.44	-40.54
52	QL						
		0.00	-11912.68	-52.23	23.57	-48.00	-96.63	-83.78
		1.72	-11912.68	-52.23	23.57	-48.00	-137.11	5.93
		3.44	-11912.68	-52.23	23.57	-48.00	-177.58	95.64
53	QD						
		0.00	-1654.22	412.79	-179.06	-18.54	-550.49	415.99
		3.47	-3735.49	412.79	-179.06	-18.54	69.96	-1014.34
		6.93	-5816.75	412.79	-179.06	-18.54	690.42	-2444.66
53	QL						
		0.00	-89.45	34.69	-30.20	17.47	-62.05	150.71
		3.47	-89.45	34.69	-30.20	17.47	42.58	30.53
		6.93	-89.45	34.69	-30.20	17.47	147.21	-89.66
54	QD						
		0.00	-14801.76	1187.13	-153.81	13.41	-289.83	2944.49
		2.10	-16063.13	1187.13	-153.81	13.41	33.17	451.53
		4.20	-17324.50	1187.13	-153.81	13.41	356.18	-2041.44
54	QL						
		0.00	-2659.06	-139.50	-81.01	7.18	-172.17	-372.44
		2.10	-2659.06	-139.50	-81.01	7.18	-2.05	-79.48
		4.20	-2659.06	-139.50	-81.01	7.18	168.06	213.47
55	QD						
		0.00	-25003.29	761.61	-145.47	-14.10	-317.68	1512.97
		2.10	-26264.67	761.61	-145.47	-14.10	-12.19	-86.41
		4.20	-27526.04	761.61	-145.47	-14.10	293.29	-1685.79
55	QL						
		0.00	-5257.12	-78.61	-63.24	-7.41	-132.42	-166.44
		2.10	-5257.12	-78.61	-63.24	-7.41	3.904E-01	-1.35
		4.20	-5257.12	-78.61	-63.24	-7.41	133.20	163.73
56	QD						
		0.00	-35272.27	883.24	-172.77	-45.73	-370.64	1750.09
		2.10	-36533.64	883.24	-172.77	-45.73	-7.83	-104.72
		4.20	-37795.02	883.24	-172.77	-45.73	354.98	-1959.53
56	QL						
		0.00	-7847.30	-89.12	-77.12	-23.24	-161.65	-215.90
		2.10	-7847.30	-89.12	-77.12	-23.24	2.954E-01	-28.75
		4.20	-7847.30	-89.12	-77.12	-23.24	162.24	158.41
57	QD						
		0.00	-45585.74	488.24	-87.00	-93.13	-338.76	1346.10
		2.09	-46838.11	488.24	-87.00	-93.13	-157.35	328.11
		4.17	-48090.47	488.24	-87.00	-93.13	24.05	-689.87
57	QL						
		0.00	-10474.73	-96.72	-41.21	-46.84	-146.31	-244.72
		2.09	-10474.73	-96.72	-41.21	-46.84	-60.38	-43.06
		4.17	-10474.73	-96.72	-41.21	-46.84	25.55	158.60
58	QD						

	0.00	366.22	-83.44	79.42	31.19	-14.75	413.89
	9.0E-01	366.22	89.54	79.42	31.19	-56.75	413.89
	1.80	366.22	262.53	79.42	31.19	-128.23	255.46
	2.70	366.22	435.52	79.42	31.19	-199.71	-58.67
	3.60	366.22	608.51	79.42	31.19	-271.19	-528.48
58	QL						
	0.00	-52.35	-28.44	41.27	15.88	7.02	-1.35
	9.0E-01	-52.35	-28.44	41.27	15.88	-30.12	24.25
	1.80	-52.35	-28.44	41.27	15.88	-67.27	49.84
	2.70	-52.35	-28.44	41.27	15.88	-104.41	75.44
	3.60	-52.35	-28.44	41.27	15.88	-141.55	101.03
59	QD						
	0.00	353.72	634.08	-45.14	-14.50	15.05	1611.16
	9.0E-01	353.72	807.07	-45.14	-14.50	55.67	962.64
	1.80	353.72	980.06	-45.14	-14.50	96.30	158.44
	2.70	353.72	1153.05	-45.14	-14.50	136.92	-801.46
	3.60	353.72	1326.03	-45.14	-14.50	177.54	-1917.04
59	QL						
	0.00	-87.47	64.44	-20.54	-7.07	8.37	153.43
	9.0E-01	-87.47	64.44	-20.54	-7.07	26.86	95.43
	1.80	-87.47	64.44	-20.54	-7.07	45.34	37.44
	2.70	-87.47	64.44	-20.54	-7.07	63.82	-20.56
	3.60	-87.47	64.44	-20.54	-7.07	82.31	-78.55
60	QD						
	0.00	959.59	-1446.83	23.04	32.00	68.63	-2384.15
	9.0E-01	959.59	-1273.84	23.04	32.00	47.89	-1159.85
	1.80	959.59	-1100.85	23.04	32.00	27.15	-91.24
	2.70	959.59	-927.86	23.04	32.00	6.41	821.69
	3.60	959.59	-754.87	23.04	32.00	-14.33	1578.92
60	QL						
	0.00	159.45	-121.51	10.76	7.20	32.43	-282.36
	9.0E-01	159.45	-121.51	10.76	7.20	22.75	-173.00
	1.80	159.45	-121.51	10.76	7.20	13.07	-63.65
	2.70	159.45	-121.51	10.76	7.20	3.39	45.71
	3.60	159.45	-121.51	10.76	7.20	-6.29	155.06
61	QD						
	0.00	959.59	619.95	23.04	32.00	-14.33	1578.92
	9.0E-01	959.59	792.93	23.04	32.00	-35.07	943.12
	1.80	959.59	965.92	23.04	32.00	-55.81	151.64
	2.70	959.59	1138.91	23.04	32.00	-76.55	-795.54
	3.60	959.59	1311.90	23.04	32.00	-97.29	-1898.40
61	QL						
	0.00	159.45	78.49	10.76	7.20	-6.29	155.06
	9.0E-01	159.45	78.49	10.76	7.20	-15.97	84.42
	1.80	159.45	78.49	10.76	7.20	-25.66	13.77
	2.70	159.45	78.49	10.76	7.20	-35.34	-56.87
	3.60	159.45	78.49	10.76	7.20	-45.02	-127.52
141	QD						
	0.00	43.53	969.45	12.37	-70.94	-17.25	-35.85
	6.0E-01	43.53	1084.78	12.37	-70.94	-24.67	-652.12
	1.20	43.53	1200.10	12.37	-70.94	-32.09	-1337.58
	1.80	43.53	1315.43	12.37	-70.94	-39.52	-2092.24
	2.40	43.53	1430.76	12.37	-70.94	-46.94	-2916.10
141	QL						
	0.00	5.28	153.88	-4.70	-10.46	-16.41	-3.84
	6.0E-01	5.28	153.88	-4.70	-10.46	-13.59	-96.17
	1.20	5.28	153.88	-4.70	-10.46	-10.77	-188.50
	1.80	5.28	153.88	-4.70	-10.46	-7.95	-280.82
	2.40	5.28	153.88	-4.70	-10.46	-5.14	-373.15
145	QD						
	0.00	25.37	-2080.91	-30.53	2005.22	-53.03	-4846.28
	6.0E-01	25.37	-1965.59	-30.53	2005.22	-34.71	-3632.33
	1.20	25.37	-1850.26	-30.53	2005.22	-16.39	-2487.57
	1.80	25.37	-1734.94	-30.53	2005.22	1.93	-1412.02
	2.40	25.37	-1619.61	-30.53	2005.22	20.25	-405.65
145	QL						
	0.00	-3.672E-01	-248.43	4.63	295.59	-2.05	-657.21
	6.0E-01	-3.672E-01	-248.43	4.63	295.59	-4.82	-508.15
	1.20	-3.672E-01	-248.43	4.63	295.59	-7.60	-359.09
	1.80	-3.672E-01	-248.43	4.63	295.59	-10.38	-210.03
	2.40	-3.672E-01	-248.43	4.63	295.59	-13.15	-60.97
146	QD						
	0.00	-1278.24	-7694.81	-127.09	1534.04	-202.18	-9554.06
	6.0E-01	-1278.24	-7346.42	-127.09	1534.04	-125.93	-5028.48
	1.20	-1278.24	-6733.72	-127.09	1534.04	-49.68	-791.22
	1.80	-1278.24	-6121.02	-127.09	1534.04	26.57	3051.99
	2.40	-1278.24	-5772.63	-127.09	1534.04	102.83	6606.87
146	QL						
	0.00	-834.66	-3786.55	-60.41	763.68	-95.78	-4855.92
	6.0E-01	-834.66	-3676.42	-60.41	763.68	-59.54	-2606.02
	1.20	-834.66	-3346.03	-60.41	763.68	-23.30	-488.27
	1.80	-834.66	-3015.64	-60.41	763.68	12.95	1409.22
	2.40	-834.66	-2905.51	-60.41	763.68	49.19	3174.55
147	QD						
	0.00	-2118.36	2731.97	-46.41	-963.60	11.96	10919.14
	2.46	-2504.55	4497.41	-46.41	-963.60	125.98	2319.63
	4.91	-2877.83	6203.84	-46.41	-963.60	240.01	-11132.77
147	QL						
	0.00	-1237.79	1282.95	-21.07	-478.20	8.91	5177.77

	2.46	-1401.94	2033.37	-21.07	-478.20	56.05	-1556.21
	4.91	-1555.34	2734.61	-21.07	-478.20	112.46	-4774.76
148	QD						
	0.00	-6.47	-4231.46	-28.86	-540.53	-74.80	-8520.40
	6.0E-01	-6.47	-3949.15	-28.86	-540.53	-57.49	-6059.61
	1.20	-6.47	-3534.68	-28.86	-540.53	-40.17	-3807.85
	1.80	-6.47	-3120.21	-28.86	-540.53	-22.86	-1817.99
	2.40	-6.47	-2837.90	-28.86	-540.53	-5.54	-37.16
148	QL						
	0.00	-2.53	-805.88	-14.07	-137.34	-35.53	-1425.12
	6.0E-01	-2.53	-750.81	-14.07	-137.34	-27.09	-952.60
	1.20	-2.53	-585.62	-14.07	-137.34	-18.65	-546.17
	1.80	-2.53	-420.42	-14.07	-137.34	-10.21	-249.86
	2.40	-2.53	-365.36	-14.07	-137.34	-1.77	-19.63
149	QD						
	0.00	9.92	3370.97	4.04	473.61	15.47	-14.65
	6.0E-01	9.92	3653.29	4.04	473.61	13.05	-2115.32
	1.20	9.92	4067.75	4.04	473.61	10.62	-4425.03
	1.80	9.92	4482.22	4.04	473.61	8.20	-6996.63
	2.40	9.92	4764.54	4.04	473.61	5.77	-9777.26
149	QL						
	0.00	3.70	312.99	6.957E-01	55.55	5.61	-5.02
	6.0E-01	3.70	368.05	6.957E-01	55.55	5.19	-203.82
	1.20	3.70	533.24	6.957E-01	55.55	4.77	-468.70
	1.80	3.70	698.44	6.957E-01	55.55	4.36	-843.72
	2.40	3.70	753.50	6.957E-01	55.55	3.94	-1284.81
150	QD						
	0.00	563.89	-2844.78	22.48	29.78	107.95	-3988.06
	3.62	275.02	-15.03	22.48	29.78	26.59	1695.44
	7.24	-11.82	2794.90	22.48	29.78	-54.77	-3864.51
150	QL						
	0.00	-127.08	-1201.91	12.23	13.21	56.70	-1474.26
	3.62	-257.43	75.04	12.23	13.21	12.46	988.88
	7.24	-386.10	1335.47	12.23	13.21	-31.79	-2005.06
151	QD						
	0.00	657.37	-2685.47	123.04	162.50	411.15	-3396.21
	3.62	368.50	144.27	123.04	162.50	-34.11	1710.81
	7.24	81.65	2954.20	123.04	162.50	-479.38	-4425.63
151	QL						
	0.00	17.11	-1232.62	60.59	80.84	202.36	-1723.21
	3.62	-113.25	44.33	60.59	80.84	-16.88	851.06
	7.24	-241.92	1304.76	60.59	80.84	-236.13	-2031.75
152	QD						
	0.00	887.67	-8323.65	-81.68	1564.37	-136.99	-11506.78
	6.0E-01	887.67	-7975.25	-81.68	1564.37	-87.98	-6603.89
	1.20	887.67	-7362.55	-81.68	1564.37	-38.97	-1989.34
	1.80	887.67	-6749.85	-81.68	1564.37	10.03	2231.17
	2.40	887.67	-6401.46	-81.68	1564.37	59.04	6163.35
152	QL						
	0.00	367.80	-4048.63	-42.96	777.44	-70.86	-5673.25
	6.0E-01	367.80	-3938.50	-42.96	777.44	-45.08	-3266.10
	1.20	367.80	-3608.11	-42.96	777.44	-19.31	-991.11
	1.80	367.80	-3277.72	-42.96	777.44	6.47	1063.63
	2.40	367.80	-3167.59	-42.96	777.44	32.24	2986.21
153	QD						
	0.00	229.04	2554.70	2.175E-01	-928.81	96.08	10429.26
	2.46	-157.16	4320.15	2.175E-01	-928.81	95.55	2265.25
	4.91	-530.44	6026.57	2.175E-01	-928.81	95.02	-10751.64
153	QL						
	0.00	33.56	1256.63	-3.25	-459.55	38.34	4970.40
	2.46	-130.60	2007.05	-3.25	-459.55	46.31	1195.45
	4.91	-283.99	2708.28	-3.25	-459.55	54.29	-4852.78
154	QD						
	0.00	7.566E-01	-3813.23	-30.79	-438.78	-68.24	-7491.78
	6.0E-01	7.566E-01	-3530.92	-30.79	-438.78	-49.76	-5281.93
	1.20	7.566E-01	-3116.45	-30.79	-438.78	-31.28	-3281.11
	1.80	7.566E-01	-2701.98	-30.79	-438.78	-12.80	-1542.19
	2.40	7.566E-01	-2419.67	-30.79	-438.78	5.67	-12.30
154	QL						
	0.00	1.53	-785.78	-15.00	-110.36	-31.50	-1364.15
	6.0E-01	1.53	-730.71	-15.00	-110.36	-22.50	-903.70
	1.20	1.53	-565.52	-15.00	-110.36	-13.50	-509.32
	1.80	1.53	-400.32	-15.00	-110.36	-4.49	-225.08
	2.40	1.53	-345.26	-15.00	-110.36	4.51	-6.91
155	QD						
	0.00	1.609E-01	2341.23	1.77	313.49	5.042E-01	-5.045E-01
	6.0E-01	1.609E-01	2623.55	1.77	313.49	-5.571E-01	-1483.33
	1.20	1.609E-01	3038.01	1.77	313.49	-1.62	-3175.19
	1.80	1.609E-01	3452.48	1.77	313.49	-2.68	-5128.95
	2.40	1.609E-01	3734.80	1.77	313.49	-3.74	-7291.74
155	QL						
	0.00	3.541E-01	308.47	6.349E-01	52.12	6.351E-01	-1.55
	6.0E-01	3.541E-01	363.53	6.349E-01	52.12	2.541E-01	-197.64
	1.20	3.541E-01	528.73	6.349E-01	52.12	-1.268E-01	-459.81
	1.80	3.541E-01	693.92	6.349E-01	52.12	-5.078E-01	-832.11
	2.40	3.541E-01	748.99	6.349E-01	52.12	-8.888E-01	-1270.49
156	QD						

		0.00	-19.36	-2823.61	4.49	27.90	23.02	3703.03
		3.62	-308.43	6.14	4.49	27.90	9.56	1847.19
		7.24	-595.28	2816.07	4.49	27.90	-6.70	-3789.39
156	QL							
		0.00	210.44	-1248.10	3.37	12.95	16.74	-1671.30
		3.62	80.08	28.85	3.37	12.95	4.55	959.00
		7.24	-48.59	1289.28	3.37	12.95	-7.63	-1867.79
157	QD							
		0.00	228.87	-2725.07	41.54	132.34	135.57	-3576.02
		3.62	-60.00	104.67	41.54	132.34	-14.75	1674.29
		7.24	-346.84	2914.61	41.54	132.34	-165.08	-4318.85
157	QL							
		0.00	259.62	-1220.11	20.05	65.17	65.08	-1702.97
		3.62	129.26	56.84	20.05	65.17	-7.46	826.04
		7.24	5.952E-01	1317.27	20.05	65.17	-80.00	-2102.03
158	QD							
		0.00	-77.62	-8270.46	-45.97	1579.95	-63.68	-11573.05
		6.0E-01	-77.62	-7922.07	-45.97	1579.95	-36.10	-6702.08
		1.20	-77.62	-7309.37	-45.97	1579.95	-8.51	-2119.43
		1.80	-77.62	-6696.67	-45.97	1579.95	19.07	2069.17
		2.40	-77.62	-6348.28	-45.97	1579.95	46.66	5969.43
158	QL							
		0.00	33.36	-4014.48	-24.03	783.94	-33.47	-5625.37
		6.0E-01	33.36	-3904.35	-24.03	783.94	-19.06	-3238.71
		1.20	33.36	-3573.96	-24.03	783.94	-4.64	-984.21
		1.80	33.36	-3243.57	-24.03	783.94	9.77	1050.04
		2.40	33.36	-3133.45	-24.03	783.94	24.19	2952.14
159	QD							
		0.00	-607.92	2414.48	26.00	-912.54	143.31	10215.71
		2.44	-942.21	4177.77	26.00	-912.54	79.80	2443.93
		4.89	-1268.02	5896.34	26.00	-912.54	16.29	-10160.45
159	QL							
		0.00	-236.99	1224.09	10.99	-450.90	65.85	4931.13
		2.44	-378.91	1972.71	10.99	-450.90	39.02	1259.84
		4.89	-513.78	2684.07	10.99	-450.90	12.18	-4677.92
160	QD							
		0.00	3.408E-01	-3830.21	-28.24	-463.38	-63.11	-7538.80
		6.0E-01	3.408E-01	-3547.90	-28.24	-463.38	-46.17	-5318.76
		1.20	3.408E-01	-3133.43	-28.24	-463.38	-29.22	-3307.75
		1.80	3.408E-01	-2718.96	-28.24	-463.38	-12.28	-1558.64
		2.40	3.408E-01	-2436.65	-28.24	-463.38	4.66	-18.57
160	QL							
		0.00	5.148E-01	-795.61	-13.75	-124.74	-30.21	-1391.36
		6.0E-01	5.148E-01	-740.55	-13.75	-124.74	-21.96	-925.01
		1.20	5.148E-01	-575.35	-13.75	-124.74	-13.71	-524.73
		1.80	5.148E-01	-410.16	-13.75	-124.74	-5.46	-234.58
		2.40	5.148E-01	-355.09	-13.75	-124.74	2.79	-10.51
161	QD							
		0.00	-4.40	2341.89	1.20	315.51	-6.43	-2.765E-01
		6.0E-01	-4.40	2624.21	1.20	315.51	-7.16	-1483.50
		1.20	-4.40	3038.68	1.20	315.51	-7.88	-3175.76
		1.80	-4.40	3453.14	1.20	315.51	-8.60	-5129.91
		2.40	-4.40	3735.46	1.20	315.51	-9.32	-7293.10
161	QL							
		0.00	-2.00	308.00	5.144E-01	51.19	-2.94	-1.14
		6.0E-01	-2.00	363.07	5.144E-01	51.19	-3.25	-196.96
		1.20	-2.00	528.26	5.144E-01	51.19	-3.55	-458.85
		1.80	-2.00	693.46	5.144E-01	51.19	-3.86	-830.87
		2.40	-2.00	748.52	5.144E-01	51.19	-4.17	-1268.97
162	QD							
		0.00	382.12	-2853.13	-9.32	23.90	-34.02	-3892.02
		3.62	93.25	-23.39	-9.32	23.90	-2.981E-01	1821.70
		7.24	-193.60	2786.55	-9.32	23.90	33.42	-3708.03
162	QL							
		0.00	109.21	-1253.50	-3.91	11.31	-14.41	-1685.38
		3.62	-21.15	23.44	-3.91	11.31	-2.480E-01	964.46
		7.24	-149.81	1283.88	-3.91	11.31	13.91	-1842.78
163	QD							
		0.00	354.71	-2679.80	-3.28	103.51	-17.00	-3420.38
		3.62	65.84	149.95	-3.28	103.51	-5.12	1666.09
		7.24	-221.01	2959.88	-3.28	103.51	6.76	-4490.90
163	QL							
		0.00	139.42	-1206.39	-2.05	50.90	-10.05	-1658.87
		3.62	9.07	70.55	-2.05	50.90	-2.62	820.50
		7.24	-119.60	1330.99	-2.05	50.90	4.82	-2157.22
164	QD							
		0.00	321.10	-8349.24	-19.04	1598.80	-3.18	-11713.81
		6.0E-01	321.10	-8000.85	-19.04	1598.80	8.24	-6795.57
		1.20	321.10	-7388.14	-19.04	1598.80	19.66	-2165.66
		1.80	321.10	-6775.44	-19.04	1598.80	31.09	2070.20
		2.40	321.10	-6427.05	-19.04	1598.80	42.51	6017.74
164	QL							
		0.00	156.62	-4054.61	-9.56	793.47	-1.91	-5721.33
		6.0E-01	156.62	-3944.48	-9.56	793.47	3.82	-3310.59
		1.20	156.62	-3614.09	-9.56	793.47	9.56	-1032.01
		1.80	156.62	-3283.70	-9.56	793.47	15.30	1026.32
		2.40	156.62	-3173.58	-9.56	793.47	21.04	2952.49

165	QD						
		0.00	-136.03	2402.57	50.05	-897.32	201.51	10244.16
		2.44	-451.83	4165.15	50.05	-897.32	79.48	2516.89
		4.88	-760.45	5887.68	50.05	-897.32	-42.55	-10036.36
165	QL						
		0.00	-73.49	1203.82	24.05	-443.28	97.48	4920.62
		2.44	-207.51	1951.85	24.05	-443.28	38.85	1306.44
		4.88	-335.56	2666.51	24.05	-443.28	-19.78	-4571.96
166	QD						
		0.00	-7.43	-3837.32	-25.57	-473.51	-68.76	-7560.94
		6.0E-01	-7.43	-3555.01	-25.57	-473.51	-53.42	-5336.64
		1.20	-7.43	-3140.54	-25.57	-473.51	-38.07	-3321.37
		1.80	-7.43	-2726.07	-25.57	-473.51	-22.73	-1567.99
		2.40	-7.43	-2443.76	-25.57	-473.51	-7.38	-23.65
166	QL						
		0.00	-3.65	-798.99	-12.45	-129.61	-33.54	-1401.77
		6.0E-01	-3.65	-743.92	-12.45	-129.61	-26.07	-933.39
		1.20	-3.65	-578.73	-12.45	-129.61	-18.59	-531.09
		1.80	-3.65	-413.54	-12.45	-129.61	-11.12	-238.92
		2.40	-3.65	-358.47	-12.45	-129.61	-3.65	-12.82
167	QD						
		0.00	-7.56	2328.52	1.30	290.09	-11.07	4.60
		6.0E-01	-7.56	2610.83	1.30	290.09	-11.85	-1470.60
		1.20	-7.56	3025.30	1.30	290.09	-12.62	-3154.83
		1.80	-7.56	3439.77	1.30	290.09	-13.40	-5100.95
		2.40	-7.56	3722.08	1.30	290.09	-14.18	-7256.11
167	QL						
		0.00	-3.69	301.71	5.850E-01	39.62	-5.42	1.24
		6.0E-01	-3.69	356.78	5.850E-01	39.62	-5.77	-190.80
		1.20	-3.69	521.97	5.850E-01	39.62	-6.13	-448.92
		1.80	-3.69	687.16	5.850E-01	39.62	-6.48	-817.17
		2.40	-3.69	742.23	5.850E-01	39.62	-6.83	-1251.49
168	QD						
		0.00	-434.92	-2950.05	-16.29	18.45	-62.81	-4258.25
		3.62	-723.79	-120.31	-16.29	18.45	-3.88	1806.21
		7.24	-1010.64	2689.62	-16.29	18.45	55.05	-3372.79
168	QL						
		0.00	-43.68	-1293.94	-7.79	8.44	-30.12	-1825.27
		3.62	-174.04	-17.00	-7.79	8.44	-1.93	970.92
		7.24	-302.71	1243.43	-7.79	8.44	26.27	-1689.96
169	QD						
		0.00	-1096.27	-2749.65	-17.38	72.40	-64.13	-3615.45
		3.62	-1385.14	80.10	-17.38	72.40	-1.23	1723.80
		7.24	-1671.99	2890.03	-17.38	72.40	61.68	-4180.42
169	QL						
		0.00	-448.27	-1251.67	-8.88	35.38	-32.69	-1793.72
		3.62	-578.62	25.27	-8.88	35.38	-5.729E-01	849.52
		7.24	-707.29	1285.70	-8.88	35.38	31.55	-1964.33
170	QD						
		0.00	-2786.63	-8009.48	-13.95	1551.10	28.29	-11463.74
		6.0E-01	-2786.63	-7661.09	-13.95	1551.10	36.66	-6749.36
		1.20	-2786.63	-7048.39	-13.95	1551.10	45.03	-2323.30
		1.80	-2786.63	-6435.69	-13.95	1551.10	53.40	1708.71
		2.40	-2786.63	-6087.30	-13.95	1551.10	61.78	5452.39
170	QL						
		0.00	-1415.93	-3900.59	-6.46	769.21	14.63	-5655.06
		6.0E-01	-1415.93	-3790.46	-6.46	769.21	18.51	-3336.74
		1.20	-1415.93	-3460.07	-6.46	769.21	22.39	-1150.57
		1.80	-1415.93	-3129.68	-6.46	769.21	26.26	815.35
		2.40	-1415.93	-3019.55	-6.46	769.21	30.14	2649.10
171	QD						
		0.00	-3271.30	2276.07	60.69	-852.53	230.00	9667.52
		2.44	-3587.10	4038.65	60.69	-852.53	90.03	2248.68
		4.88	-3895.72	5761.18	60.69	-852.53	-57.95	-9996.12
171	QL						
		0.00	-1655.90	1122.03	29.83	-420.59	116.75	4609.45
		2.44	-1789.92	1870.86	29.83	-420.59	44.01	1192.72
		4.88	-1917.97	2585.52	29.83	-420.59	-28.73	-4488.22
172	QD						
		0.00	-9.56	-3781.21	-17.51	-392.02	-53.91	-7411.47
		6.0E-01	-9.56	-3498.90	-17.51	-392.02	-43.40	-5220.82
		1.20	-9.56	-3084.43	-17.51	-392.02	-32.89	-3239.22
		1.80	-9.56	-2669.96	-17.51	-392.02	-22.39	-1519.51
		2.40	-9.56	-2387.65	-17.51	-392.02	-11.88	-8.83
172	QL						
		0.00	-4.78	-771.50	-8.56	-89.44	-26.51	-1328.22
		6.0E-01	-4.78	-716.44	-8.56	-89.44	-21.37	-876.33
		1.20	-4.78	-551.25	-8.56	-89.44	-16.24	-490.52
		1.80	-4.78	-386.05	-8.56	-89.44	-11.10	-214.84
		2.40	-4.78	-330.99	-8.56	-89.44	-5.96	-5.23
211	QD						
		0.00	20.52	-321.79	10.60	35.85	17.25	-70.94
		7.5E-01	20.52	-177.63	10.60	35.85	9.30	116.34
		1.50	20.52	-33.47	10.60	35.85	1.35	195.51
		2.25	20.52	110.68	10.60	35.85	-6.60	166.55
		3.00	20.52	254.84	10.60	35.85	-14.54	29.48
211	QL						
		0.00	-6.228E-01	-6.24	10.47	3.84	16.41	-10.46

	7.5E-01	-6.228E-01	-6.24	10.47	3.84	6.56	-3.78
	1.50	-6.228E-01	-6.24	10.47	3.84	7.026E-01	-1.10
	2.25	-6.228E-01	-6.24	10.47	3.84	-7.15	3.59
	3.00	-6.228E-01	-6.24	10.47	3.84	-15.00	8.27
212	QD						
	0.00	-85.01	-415.41	123.60	44.00	181.09	-327.30
	7.5E-01	-85.01	-271.25	123.60	44.00	88.39	-69.80
	1.50	-85.01	-127.09	123.60	44.00	-4.30	79.58
	2.25	-85.01	17.06	123.60	44.00	-97.00	120.84
	3.00	-85.01	161.22	123.60	44.00	-189.70	53.98
212	QL						
	0.00	-19.44	-51.70	50.04	6.77	72.97	-84.78
	7.5E-01	-19.44	-51.70	50.04	6.77	35.44	-46.01
	1.50	-19.44	-51.70	50.04	6.77	-2.08	-7.23
	2.25	-19.44	-51.70	50.04	6.77	-39.61	31.54
	3.00	-19.44	-51.70	50.04	6.77	-77.14	70.32
213	QD						
	0.00	143.53	-326.86	-32.90	34.22	-46.89	-127.40
	7.5E-01	143.53	-182.70	-32.90	34.22	-22.22	63.68
	1.50	143.53	-38.55	-32.90	34.22	2.46	146.65
	2.25	143.53	105.61	-32.90	34.22	27.14	121.50
	3.00	143.53	249.77	-32.90	34.22	51.81	-11.76
213	QL						
	0.00	92.52	-20.33	-36.07	12.72	-52.94	-3.12
	7.5E-01	92.52	-20.33	-36.07	12.72	-25.89	12.13
	1.50	92.52	-20.33	-36.07	12.72	1.16	27.37
	2.25	92.52	-20.33	-36.07	12.72	28.21	42.62
	3.00	92.52	-20.33	-36.07	12.72	55.26	57.87
214	QD						
	0.00	-45.36	-428.38	-169.41	-18.96	-254.96	-338.87
	7.5E-01	-45.36	-284.23	-169.41	-18.96	-127.91	-71.64
	1.50	-45.36	-140.07	-169.41	-18.96	-8.542E-01	87.47
	2.25	-45.36	4.09	-169.41	-18.96	126.20	138.46
	3.00	-45.36	148.24	-169.41	-18.96	253.25	81.34
214	QL						
	0.00	-12.55	-80.08	-101.44	-9.75	-152.31	-129.90
	7.5E-01	-12.55	-80.08	-101.44	-9.75	-76.23	-69.84
	1.50	-12.55	-80.08	-101.44	-9.75	-1.544E-01	-9.79
	2.25	-12.55	-80.08	-101.44	-9.75	75.92	50.27
	3.00	-12.55	-80.08	-101.44	-9.75	152.00	110.33
215	QD						
	0.00	-202.65	137.81	-40.16	88.40	-54.30	692.50
	7.5E-01	-202.65	281.96	-40.16	88.40	-24.18	535.09
	1.50	-202.65	426.12	-40.16	88.40	5.94	269.56
	2.25	-202.65	570.28	-40.16	88.40	36.05	-104.09
	3.00	-202.65	714.43	-40.16	88.40	66.17	-585.86
215	QL						
	0.00	-40.16	55.08	-41.22	6.42	-61.41	100.32
	7.5E-01	-40.16	55.08	-41.22	6.42	-30.50	59.01
	1.50	-40.16	55.08	-41.22	6.42	4.149E-01	17.70
	2.25	-40.16	55.08	-41.22	6.42	31.33	-23.61
	3.00	-40.16	55.08	-41.22	6.42	62.24	-64.92
216	QD						
	0.00	2.36	-971.94	7.56	-405.65	20.25	-2005.22
	7.5E-01	2.36	-827.78	7.56	-405.65	14.58	-1330.32
	1.50	2.36	-683.63	7.56	-405.65	8.91	-763.54
	2.25	2.36	-539.47	7.56	-405.65	3.24	-304.88
	3.00	2.36	-395.31	7.56	-405.65	-2.43	45.66
216	QL						
	0.00	-6.922E-01	-100.80	-4.82	-60.97	-13.15	-295.59
	7.5E-01	-6.922E-01	-100.80	-4.82	-60.97	-9.54	-220.00
	1.50	-6.922E-01	-100.80	-4.82	-60.97	-5.92	-144.40
	2.25	-6.922E-01	-100.80	-4.82	-60.97	-2.30	-68.80
	3.00	-6.922E-01	-100.80	-4.82	-60.97	1.32	6.80
219	QD						
	0.00	83.46	-3115.84	213.83	-716.04	283.71	-6095.17
	7.5E-01	83.46	-2639.05	213.83	-716.04	123.34	-3911.28
	1.50	83.46	-1766.72	213.83	-716.04	-37.03	-2238.17
	2.25	83.46	-939.35	213.83	-716.04	-197.41	-1246.94
	3.00	83.46	-513.96	213.83	-716.04	-357.78	-726.51
219	QL						
	0.00	40.71	-1523.33	103.26	-349.19	136.83	-2992.74
	7.5E-01	40.71	-1351.26	103.26	-349.19	59.38	-1893.26
	1.50	40.71	-849.56	103.26	-349.19	-18.06	-1050.51
	2.25	40.71	-385.33	103.26	-349.19	-95.50	-607.05
	3.00	40.71	-256.08	103.26	-349.19	-172.94	-386.98
221	QD						
	0.00	319.08	376.39	-48.76	-352.98	-87.29	1055.59
	7.5E-01	319.08	749.93	-48.76	-352.98	-50.72	646.13
	1.50	319.08	1313.44	-48.76	-352.98	-14.15	-119.27
	2.25	319.08	1858.60	-48.76	-352.98	22.42	-1319.42
	3.00	319.08	2206.44	-48.76	-352.98	58.99	-2856.09
221	QL						
	0.00	127.84	311.35	-22.43	-191.34	-40.41	560.10
	7.5E-01	127.84	397.39	-22.43	-191.34	-23.59	305.08
	1.50	127.84	641.74	-22.43	-191.34	-6.76	-77.62
	2.25	127.84	870.79	-22.43	-191.34	10.06	-653.69
	3.00	127.84	935.42	-22.43	-191.34	26.88	-1341.25

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222	QD						
	0.00	28.86	-2600.70	-6.47	37.16	-13.87	-147.29
	7.5E-01	28.86	-1325.03	-6.47	37.16	-9.02	1337.77
	1.50	28.86	140.62	-6.47	37.16	-4.16	1790.28
	2.25	28.86	1587.92	-6.47	37.16	6.894E-01	1131.43
	3.00	28.86	2837.90	-6.47	37.16	5.54	-540.53
222	QL						
	0.00	14.07	-258.71	-2.53	19.63	-5.82	53.84
	7.5E-01	14.07	-172.67	-2.53	19.63	-3.92	226.36
	1.50	14.07	71.68	-2.53	19.63	-2.02	271.20
	2.25	14.07	300.74	-2.53	19.63	-1.253E-01	122.67
	3.00	14.07	365.36	-2.53	19.63	1.77	-137.34
223	QD						
	0.00	-172.55	-706.89	-51.78	212.78	-42.97	310.48
	7.5E-01	-172.55	-230.11	-51.78	212.78	-4.14	687.66
	1.50	-172.55	642.23	-51.78	212.78	34.70	554.06
	2.25	-172.55	1469.59	-51.78	212.78	73.54	-261.42
	3.00	-172.55	1894.99	-51.78	212.78	112.37	-1547.70
223	QL						
	0.00	-91.46	-385.01	-20.26	105.68	-13.45	58.91
	7.5E-01	-91.46	-212.93	-20.26	105.68	1.75	304.64
	1.50	-91.46	288.77	-20.26	105.68	16.94	293.65
	2.25	-91.46	753.00	-20.26	105.68	32.13	-116.63
	3.00	-91.46	882.24	-20.26	105.68	47.33	-750.31
224	QD						
	0.00	-3.50	-1302.53	-79.37	-63.90	-123.84	-583.19
	7.5E-01	-3.50	-825.75	-79.37	-63.90	-64.31	240.72
	1.50	-3.50	46.59	-79.37	-63.90	-4.78	553.85
	2.25	-3.50	873.95	-79.37	-63.90	54.74	185.10
	3.00	-3.50	1299.35	-79.37	-63.90	114.27	-654.45
224	QL						
	0.00	-65.32	-630.11	-29.64	-17.87	-45.52	-290.14
	7.5E-01	-65.32	-458.03	-29.64	-17.87	-23.29	139.42
	1.50	-65.32	43.67	-29.64	-17.87	-1.06	312.26
	2.25	-65.32	507.90	-29.64	-17.87	21.16	85.80
	3.00	-65.32	637.15	-29.64	-17.87	43.39	-364.06
225	QD						
	0.00	4.04	-3332.89	-9.92	-14.65	-14.28	-379.05
	7.5E-01	4.04	-1740.90	-9.92	-14.65	-6.84	1536.53
	1.50	4.04	41.07	-9.92	-14.65	5.984E-01	2182.33
	2.25	4.04	1804.68	-9.92	-14.65	8.04	1479.54
	3.00	4.04	3370.97	-9.92	-14.65	15.47	-473.61
225	QL						
	0.00	6.957E-01	-311.08	-3.70	-5.02	-5.50	-21.49
	7.5E-01	6.957E-01	-225.04	-3.70	-5.02	-2.72	190.31
	1.50	6.957E-01	19.31	-3.70	-5.02	5.458E-02	274.43
	2.25	6.957E-01	248.36	-3.70	-5.02	2.83	165.19
	3.00	6.957E-01	312.99	-3.70	-5.02	5.61	-55.55
226	QD						
	0.00	-129.14	-923.62	-323.19	-6.79	-483.40	-3.78
	7.5E-01	-129.14	-446.63	-323.19	-6.79	-241.00	535.90
	1.50	-129.14	441.89	-323.19	-6.79	1.39	562.86
	2.25	-129.14	1277.14	-323.19	-6.79	243.79	-107.61
	3.00	-129.14	1702.68	-323.19	-6.79	486.18	-1249.63
226	QL						
	0.00	-85.43	-451.07	-150.59	-8.83	-225.73	-7.73
	7.5E-01	-85.43	-278.99	-150.59	-8.83	-112.79	287.55
	1.50	-85.43	235.71	-150.59	-8.83	1.490E-01	324.74
	2.25	-85.43	706.06	-150.59	-8.83	113.09	-49.93
	3.00	-85.43	835.31	-150.59	8.83	226.03	-648.41
227	QD						
	0.00	82.95	468.55	124.32	-705.58	224.18	-690.29
	7.5E-01	82.95	945.34	124.32	-705.58	130.94	-1194.68
	1.50	82.95	1817.67	124.32	-705.58	37.70	-2209.87
	2.25	82.95	2645.04	124.32	-705.58	-55.55	-3906.93
	3.00	82.95	3070.43	124.32	-705.58	-148.79	-6074.79
227	QL						
	0.00	40.37	221.14	69.55	-344.60	122.70	-360.21
	7.5E-01	40.37	393.22	69.55	-344.60	70.53	-569.09
	1.50	40.37	894.92	69.55	-344.60	18.36	-1034.69
	2.25	40.37	1359.14	69.55	-344.60	-33.80	-1899.58
	3.00	40.37	1488.39	69.55	-344.60	-85.97	-2987.87
228	QD						
	0.00	-147.78	-212.16	-87.46	-269.30	-142.58	697.88
	7.5E-01	-147.78	264.62	-87.46	-269.30	-76.99	704.02
	1.50	-147.78	1136.96	-87.46	-269.30	-11.39	199.37
	2.25	-147.78	1964.32	-87.46	-269.30	54.20	-987.16
	3.00	-147.78	2389.72	-87.46	-269.30	119.80	-2644.48
228	QL						
	0.00	-78.75	-120.00	-34.04	-136.54	-56.64	302.13
	7.5E-01	-78.75	52.07	-34.04	-136.54	-31.11	349.11
	1.50	-78.75	553.78	-34.04	-136.54	-5.58	139.37
	2.25	-78.75	1018.00	-34.04	-136.54	19.95	-469.67
	3.00	-78.75	1147.25	-34.04	-136.54	45.48	-1302.10
229	QD						
	0.00	30.79	-2262.10	7.566E-01	12.30	-3.40	-164.98
	7.5E-01	30.79	-1175.63	7.566E-01	12.30	-3.97	1137.08
	1.50	30.79	100.81	7.566E-01	12.30	-4.54	1548.50
	2.25	30.79	1358.90	7.566E-01	12.30	-5.10	990.46

	3.00	30.79	2419.67	7.566E-01	12.35	-5.67	-450.78
229	QL						
	0.00	15.00	-278.81	1.53	6.91	8.717E-02	20.52
	7.5E-01	15.00	-192.77	1.53	6.91	-1.06	208.12
	1.50	15.00	51.58	1.53	6.91	-2.21	268.03
	2.25	15.00	280.63	1.53	6.91	-3.36	134.58
	3.00	15.00	345.26	1.53	6.91	-4.51	-110.36
230	QD						
	0.00	-57.16	-554.33	6.06	98.94	45.64	497.57
	7.5E-01	-57.16	-77.55	6.06	98.94	41.10	760.34
	1.50	-57.16	794.79	6.06	98.94	36.55	512.31
	2.25	-57.16	1622.15	6.06	98.94	32.01	-417.59
	3.00	-57.16	2047.55	6.06	98.94	27.47	-1818.28
230	QL						
	0.00	-28.47	-303.84	12.26	47.62	36.19	162.42
	7.5E-01	-28.47	-131.76	12.26	47.62	27.00	347.28
	1.50	-28.47	369.94	12.26	47.62	17.81	275.41
	2.25	-28.47	834.17	12.26	47.62	8.62	-195.75
	3.00	-28.47	963.42	12.26	47.62	-5.743E-01	-890.31
231	QD						
	0.00	-3.042E-01	-1169.96	-1.29	-1.98	-4.02	-381.91
	7.5E-01	-3.042E-01	-693.18	-1.29	-1.98	-3.05	342.57
	1.50	-3.042E-01	179.16	-1.29	-1.98	-2.09	556.27
	2.25	-3.042E-01	1006.52	-1.29	-1.98	-1.12	88.09
	3.00	-3.042E-01	1431.92	-1.29	-1.98	-1.568E-01	-850.88
231	QL						
	0.00	12.66	-596.76	-2.83	-2.72	-4.95	-259.40
	7.5E-01	12.66	-424.69	-2.83	-2.72	-2.83	145.15
	1.50	12.66	77.01	-2.83	-2.72	-7.022E-01	292.98
	2.25	12.66	541.24	-2.83	-2.72	1.42	41.51
	3.00	12.66	670.49	-2.83	-2.72	3.55	-433.35
232	QD						
	0.00	1.77	-2340.54	-1.609E-01	-5.045E-01	2.148E-02	-275.00
	7.5E-01	1.77	-1254.07	-1.609E-01	-5.045E-01	1.422E-01	1085.88
	1.50	1.77	22.37	-1.609E-01	-5.045E-01	2.628E-01	1556.13
	2.25	1.77	1280.46	-1.609E-01	-5.045E-01	3.835E-01	1056.92
	3.00	1.77	2341.23	-1.609E-01	-5.045E-01	5.042E-01	-313.49
232	QL						
	0.00	6.349E-01	-315.60	-3.541E-01	-1.55	-4.273E-01	-31.61
	7.5E-01	6.349E-01	-229.56	-3.541E-01	-1.55	-1.617E-01	183.57
	1.50	6.349E-01	14.79	-3.541E-01	-1.55	1.039E-01	271.08
	2.25	6.349E-01	243.84	-3.541E-01	-1.55	3.695E-01	165.23
	3.00	6.349E-01	308.47	-3.541E-01	-1.55	6.351E-01	-52.12
233	QD						
	0.00	33.84	-831.55	-105.03	-12.95	-156.45	88.66
	7.5E-01	33.84	-354.57	-105.03	-12.95	-77.68	559.30
	1.50	33.84	533.96	-105.03	-12.95	1.09	517.20
	2.25	33.84	1369.21	-105.03	-12.95	79.86	-222.32
	3.00	33.84	1794.75	-105.03	-12.95	158.63	-1433.39
233	QL						
	0.00	23.80	-413.30	-52.36	-4.55	-78.18	15.07
	7.5E-01	23.80	-241.22	-52.36	-4.55	-38.91	282.02
	1.50	23.80	273.48	-52.36	-4.55	3.641E-01	290.89
	2.25	23.80	743.83	-52.36	-4.55	39.64	-112.11
	3.00	23.80	873.08	-52.36	-4.55	78.91	-738.92
234	QD						
	0.00	73.62	454.47	70.91	-719.58	137.06	-718.19
	7.5E-01	73.62	931.26	70.91	-719.58	83.88	-1212.03
	1.50	73.62	1803.60	70.91	-719.58	30.70	-2216.66
	2.25	73.62	2630.96	70.91	-719.58	-22.48	-3903.17
	3.00	73.62	3056.35	70.91	-719.58	-75.66	-6060.47
234	QL						
	0.00	35.85	214.03	38.78	-351.19	73.17	-374.28
	7.5E-01	35.85	386.11	38.78	-351.19	44.08	-577.82
	1.50	35.85	887.81	38.78	-351.19	15.00	-1038.09
	2.25	35.85	1352.04	38.78	-351.19	-14.08	-1897.66
	3.00	35.85	1481.29	38.78	-351.19	-43.17	-2980.62
236	QD						
	0.00	-14.08	-420.08	-29.34	-250.58	-52.19	352.94
	7.5E-01	-14.08	56.71	-29.34	-250.58	-30.18	515.02
	1.50	-14.08	929.04	-29.34	-250.58	-8.18	166.31
	2.25	-14.08	1756.41	-29.34	-250.58	13.83	-864.28
	3.00	-14.08	2181.80	-29.34	-250.58	35.83	-2365.67
236	QL						
	0.00	-5.35	-227.45	-11.80	-126.74	-21.75	122.45
	7.5E-01	-5.35	-55.38	-11.80	-126.74	-12.90	250.02
	1.50	-5.35	446.32	-11.80	-126.74	-4.05	120.86
	2.25	-5.35	910.55	-11.80	-126.74	4.80	-407.59
	3.00	-5.35	1039.80	-11.80	-126.74	13.65	-1159.43
237	QD						
	0.00	28.24	-2245.12	3.408E-01	18.57	-3.64	-138.64
	7.5E-01	28.24	-1158.65	3.408E-01	18.57	-3.89	1150.68
	1.50	28.24	117.79	3.408E-01	18.57	-4.15	1549.37
	2.25	28.24	1375.88	3.408E-01	18.57	-4.40	978.60
	3.00	28.24	2436.65	3.408E-01	18.57	-4.66	-463.38
237	QL						
	0.00	13.75	-268.97	5.148E-01	10.51	-1.25	35.65
	7.5E-01	13.75	-182.93	5.148E-01	10.51	-1.63	215.87
	1.50	13.75	61.42	5.148E-01	10.51	-2.02	268.40

	2.25	13.75	290.47	5.148E-01	10.51	-2.41	127.58
	3.00	13.75	355.09	5.148E-01	10.51	-2.79	-124.74
238	QD						
	0.00	-68.05	-512.54	2.73	132.64	37.67	565.27
	7.5E-01	-68.05	-35.75	2.73	132.64	35.62	796.69
	1.50	-68.05	836.58	2.73	132.64	33.58	517.32
	2.25	-68.05	1663.95	2.73	132.64	31.53	-443.93
	3.00	-68.05	2089.34	2.73	132.64	29.48	-1875.97
238	QL						
	0.00	-33.21	-278.91	4.12	67.05	22.53	201.95
	7.5E-01	-33.21	-106.83	4.12	67.05	19.44	368.11
	1.50	-33.21	394.87	4.12	67.05	16.35	277.55
	2.25	-33.21	859.10	4.12	67.05	13.26	-212.31
	3.00	-33.21	988.35	4.12	67.05	10.17	-925.57
239	QD						
	0.00	-21.61	-1156.71	35.20	-1.68	51.30	-367.95
	7.5E-01	-21.61	-679.92	35.20	-1.68	24.90	346.60
	1.50	-21.61	192.41	35.20	-1.68	-1.50	550.35
	2.25	-21.61	1019.78	35.20	-1.68	-27.90	72.23
	3.00	-21.61	1445.17	35.20	-1.68	-54.30	-876.68
239	QL						
	0.00	-11.62	-592.15	16.03	-9.989E-01	23.40	-251.16
	7.5E-01	-11.62	-420.07	16.03	-9.989E-01	11.37	149.93
	1.50	-11.62	81.63	16.03	-9.989E-01	-6.504E-01	294.30
	2.25	-11.62	545.85	16.03	-9.989E-01	-12.67	39.37
	3.00	-11.62	675.10	16.03	-9.989E-01	-24.70	-438.95
240	QD						
	0.00	1.20	-2339.88	4.40	-2.765E-01	6.76	-275.04
	7.5E-01	1.20	-1253.41	4.40	-2.765E-01	3.46	1085.35
	1.50	1.20	23.04	4.40	-2.765E-01	1.629E-01	1555.10
	2.25	1.20	1281.12	4.40	-2.765E-01	-3.14	1055.40
	3.00	1.20	2341.89	4.40	-2.765E-01	-6.43	-315.51
240	QL						
	0.00	5.144E-01	-316.06	2.00	-1.14	3.07	-32.08
	7.5E-01	5.144E-01	-230.03	2.00	-1.14	1.57	183.45
	1.50	5.144E-01	14.32	2.00	-1.14	6.781E-02	271.31
	2.25	5.144E-01	243.38	2.00	-1.14	-1.43	165.81
	3.00	5.144E-01	308.00	2.00	-1.14	-2.94	-51.19
241	QD						
	0.00	-10.15	-802.26	27.05	1.20	41.15	139.00
	7.5E-01	-10.15	-325.28	27.05	1.20	20.86	587.66
	1.50	-10.15	563.25	27.05	1.20	5.753E-01	523.60
	2.25	-10.15	1398.50	27.05	1.20	-19.71	-237.90
	3.00	-10.15	1824.04	27.05	1.20	-40.00	-1470.93
241	QL						
	0.00	-6.81	-402.75	12.60	2.775E-01	19.09	36.22
	7.5E-01	-6.81	-230.67	12.60	2.775E-01	9.64	295.26
	1.50	-6.81	284.03	12.60	2.775E-01	1.894E-01	296.22
	2.25	-6.81	754.37	12.60	2.775E-01	-9.26	-114.69
	3.00	-6.81	883.62	12.60	2.775E-01	-18.71	-749.40
243	QD						
	0.00	71.42	440.32	28.01	-743.11	69.45	-734.65
	7.5E-01	71.42	917.10	28.01	-743.11	48.44	-1217.87
	1.50	71.42	1789.44	28.01	-743.11	27.42	-2211.88
	2.25	71.42	2616.80	28.01	-743.11	6.41	-3887.77
	3.00	71.42	3042.19	28.01	-743.11	-14.60	-6034.45
243	QL						
	0.00	34.76	206.84	15.07	-362.32	35.98	-382.84
	7.5E-01	34.76	378.91	15.07	-362.32	24.68	-580.99
	1.50	34.76	880.61	15.07	-362.32	13.38	-1035.86
	2.25	34.76	1344.84	15.07	-362.32	2.08	-1890.03
	3.00	34.76	1474.09	15.07	-362.32	-9.22	-2967.59
244	QD						
	0.00	-40.06	-459.30	26.22	-253.91	33.59	298.84
	7.5E-01	-40.06	17.48	26.22	-253.91	13.93	490.33
	1.50	-40.06	889.82	26.22	-253.91	-5.73	171.03
	2.25	-40.06	1717.18	26.22	-253.91	-25.40	-830.14
	3.00	-40.06	2142.58	26.22	-253.91	-45.06	-2302.11
244	QL						
	0.00	-19.81	-248.12	14.04	-128.92	18.21	94.24
	7.5E-01	-19.81	-76.04	14.04	-128.92	7.68	237.31
	1.50	-19.81	425.66	14.04	-128.92	-2.85	123.65
	2.25	-19.81	889.89	14.04	-128.92	-13.38	-389.30
	3.00	-19.81	1019.14	14.04	-128.92	-23.90	-1125.65
245	QD						
	0.00	25.57	-2238.01	-7.43	23.65	-14.91	-127.46
	7.5E-01	25.57	-1151.54	-7.43	23.65	-9.34	1156.53
	1.50	25.57	124.90	-7.43	23.65	-3.76	1549.89
	2.25	25.57	1382.98	-7.43	23.65	1.81	973.79
	3.00	25.57	2443.76	-7.43	23.65	7.38	-473.51



LAPORAN PENYELIDIKAN TANAH
UNTUK

GEDUNG CENTRAL OPERATING THEATRE (COT)
RSUP DR. SARDJITO
YOGYAKARTA

DILAKSANAKAN OLEH :

LABORATORIUM MEKANIKA
JURUSAN TEKNIK SIPIL FAKULTAS TEKNIK
UNIVERSITAS GADJAH MADA
YOGYAKARTA

1998

LAPORAN PENYELIDIKAN TANAH

GEDUNG CENTRAL OPERATING THEATRE (COT) RSUP DR. SARDJITO YOGYAKARTA

I. PENDAHULUAN

1.1. Latar Belakang

Fondasi merupakan struktur bawah bangunan yang berfungsi untuk meneruskan beban dari bangunan ke tanah dasar. Jenis dan dimensi fondasi harus sedemikian sehingga tanah dasar mampu mendukung beban dan penurunan yang mungkin terjadi masih dalam toleransi yang aman bagi bangunan.

Data mengenai kondisi dan sifat tanah dasar merupakan salah satu faktor yang menentukan dalam perancangan jenis dan kapasitas dukung fondasi. Untuk keperluan tersebut, Laboratorium Mekanika Tanah, Jurusan Teknik Sipil Fakultas Teknik UGM telah diminta untuk melakukan serangkaian penyelidikan tanah di lokasi rencana Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sardjito di Kompiek RSUP Dr. Sardjito Yogyakarta.

Hasil penyelidikan tanah yang telah dilaksanakan diharapkan dapat menyajikan data yang dipeilukan.

1.2. Tujuan Penyelidikan

Penyelidikan tanah yang dilaksanakan mempunyai tujuan untuk mengetahui keadaan, jenis, sifat indeks, dan parameter-parameter teknis tanah dasar bangunan. Data tersebut digunakan untuk analisis penentuan kedalaman, daya dukung dan perkiraan penurunan yang mungkin terjadi.

1.3. Waktu Penyelidikan

Pekerjaan penyelidikan tanah yang terdiri atas pekerjaan lapangan dan laboratorium telah dilaksanakan dalam bulan Juli-Agustus 1998

II. UMUM

2.1. Lokasi Rencana

Areal rencana untuk Gedung Central Operating Theatre (COT) RSUP Dr. Sardjito terletak di dalam kompleks RSUP Dr. Sardjito Yogyakarta. Lokasi tepatnya yaitu di tepi jalan masuk rumah sakit pintu selatan (masuk kira-kira 75 m). Pada saat penyelidikan, lahan dipenuhi dengan bangunan yang sedang dibongkar sehingga penyelidikan terpaksa dilakukan di luar rencana denah, di bagian tengah tidak bisa diselidiki pada waktu itu.

Walaupun tidak terlalu dekat dengan bangunan di sekitarnya, namun bangunan ini bisa mengganggu bangunan di sekitarnya jika tidak dirancang dengan sebaik-baiknya. Di sebelah barat lokasi rencana terdapat Paviliun Kusuma, di sebelah selatan terdapat ruang makan, di sebelah timur terdapat jalan dan gedung Radiologi Baru, sedangkan di utara terdapat jalan dan Pangsal Perawatan. Muka tanah setempat agak miring ke selatan dengan selisih elevasi maksimum sekitar 1.40 meter.

Mengingat di sekitar lokasi banyak yang tertanam di bawah tanah, seperti : kabel listrik, pipa-pipa air, saluran drainasi, septick tank dsb., maka kehati-hatian dan koordinasi yang baik dari semua fihak yang terkait sangatlah penting terutama untuk menghindari kecelakaan kerja.

2.2. Rencana Bangunan

Gedung untuk Central Operating Theatre (COT) RSUP Dr. Sardjito Yogyakarta seluruhnya direncanakan berlantai 5 (lima), sebagian berlantai 5 ditambah lantai semi-basement dan sebagian lagi masih ditambah basement. Elevasi basement pada - 6.10 m, semi basement pada - 3.10 m. Menurut informasi yang diberikan, elevasi ±0.00 diperkirakan sama dengan muka tanah di sekitar titik sondir SB1. Bangunan direncanakan dari rangka beton bertulang dengan jarak kolom sekitar 7.20 m dan denah pokok sekitar 64.60 m x 28.80 m.

2.3. Lingkup Pekerjaan

Pekerjaan penyelidikan yang telah dilaksanakan meliputi pekerjaan lapangan dan pekerjaan laboratorium, yang terdiri atas :

a) 6 (enam) titik pengujian sondir berkapasitas 10 ton sampai kedalaman mencapai lapisan dengan nilai konis lebih dari 600 kg/cm^2 atau sampai kemampuan maksimum alat sondir 10 ton.

b) 2 (dua) titik pemboran manual disertai pengambilan sampel-sample tanah untuk diperiksa di laboratorium.

c) Pengujian sifat-sifat tanah di laboratorium atas sampel-sample yang diambil. Jenis pengujian laboratorium yang dilaksanakan disesuaikan dengan jenis tanah dan aplikasinya, yang meliputi : kadar air lapangan, berat satuan, berat jenis, angka pori, gradasi butir, dan besarnya parameter kuat geser tanah. Karena jenis tanah berupa pasir, maka pengujian-pengujian seperti batas-batas Atterberg dan konsolidasi tidak dilaksanakan.

Denah lokasi dan situasi titik-titik penyelidikan lapangan, hasil pengujian sondir dan pemboran, serta hasil pemeriksaan laboratorium dapat dilihat pada gambar-gambar yang terlampir di laporan ini.

2.4. Elevasi Dasar

Pada penyelidikan ini telah digunakan permukaan lantai-1 Bangsal Perawatan yang berada di sebelah utara lahan yang diselidiki sebagai elevasi + 100.00 m (periksa situasi titik-titik penyelidikan tanah). Elevasi permukaan tanah yang tercantum pada gambar-gambar hasil penyelidikan dikaitkan dengan elevasi dasar tersebut. Sedangkan kedalaman lapisan-lapisan tanah diukur terhadap permukaan tanah di masing-masing titik penyelidikan yang bersangkutan.

III. HASIL PENYELIDIKAN

3.1. Lapisan-lapisan Tanah

Kondisi tanah di lokasi penyelidikan ini secara garis besarnya berupa material non-kohesif dari ukuran pasir kasar berkerikil sampai lanau dengan berbagai variasi campurannya. Sebagaimana umumnya sifat endapan vulkanis, lapisan-lapisan tanah di lokasi ini tidak merata baik ketebalan maupun kepadatannya.

Dari hasil penyelidikan tanah terlampir, lapisan tanah atas di sebagian areal berupa lanau berpasir yang tidak padat. Kondisi ini tampaknya hanya terdapat di sebagian kecil area saja, sedangkan sebagian besar titik-titik penyelidikan menunjukkan adanya lapisan cukup keras dari dekat permukaan tanah sampa kedalaman sekitar 5.50 meter dengan nilai perlawan konis rata-rata lebih dari 50 kg/cm2. Di titik sondir SB-2 dan SB-3, lapisan di bawahnya relatif tidak padat dengan nilai kon

bisa kurang dari 30 kg/cm2, dengan tebal lapisan tidak lebih dari 2.0 meter. Lapisan selanjutnya umumnya lebih padat sampai kedalaman sekitar 14.0 meter.

Di titik-titik sondir yang lain menunjukkan adanya lapisan yang umumnya cukup padat dari dekat dengan muka tanah sampai kedalaman sekitar 14.0 meter.

Di bawah 14.0 meter tercatat adanya lapisan-lapisan dengan kepadatan yang tidak beraturan, namun umumnya masih mempunyai nilai konis (qc) lebih dari 60 kg/cm2.

3.2. Muka Air Tanah

Pada saat penyelidikan lapangan (Juli-Agustus 1998, masih sering turun hujan) kondisi muka air tanah tidak dapat disimpulkan dengan pasti, karena di titik bor B-1 terdapat air tanah pada kedalaman 3.80 m sedangkan di titik bor B-2 tidak dijumpai air tanah. Muka air sumur di luar kompleks RSUP Dr. Sardjito juga cukup dalam. Diharapkan muka air tanah pada B-1 tersebut terjadi secara lokal dan bisa diatasi.

IV. PEMBAHASAN FONDASI

4.1. Umum

Hasil penyelidikan tanah menunjukkan adanya lapisan keras yang relatif dangkal namun terdapat lapisan kurang padat pada kedalaman antara 5.50 - 7.0 m (SB-2 dan SB-3, untuk bangunan ringan sampai sedang sebenarnya lapisan atas dengan kedalaman kurang dari 2 meter telah mampu mendukung dengan baik.

Untuk bangunan yang lebih berat sebagaimana yang dirancang disini, ditambah dengan adanya [illegible]

sebagian lantai di atas timbunan, maka penyelesaian fondasi agak berbeda.

Mengingat kondisi tanah yang cukup baik dan bangunan yang mempunyai level bawah berbeda-beda maka fondasi yang dianggap paling cocok adalah fondasi sumuran dengan beberapa penyesuaian. Kedalaman dari sumuran merupakan hal yang perlu mendapat perhatian karena adanya basement dan semi-basement mengakibatkan panjang tiang/sumuran berbeda-beda yang tentunya mengakibatkan kapasitas dukung tanah dasarnya berbeda pula. Dengan kondisi tersebut maka fondasi bisa diuraikan sebagai berikut.

Secara umum dasar fondasi sumuran disarankan pada elevasi + 88.50 m terhadap elevasi dasar yang digunakan pada penyelidikan ini. Jika diukur terhadap muka tanah setempat kedalamannya

antara 7.50 - 8.90 m. Kedalaman tersebut bisa untuk dasar analisis kapasitas dukung tanah dasar sumuran untuk bangunan yang tanpa basement/semi-basement. Untuk bagian dengan semi-basement, kedalaman tiang/sumuran bisa tinggal sekitar 4.0 meter. Di bagian basement, kedalaman sumuran bisa tinggal 1.50 meter atau kurang sehingga tidak efektif lagi.

Dengan kondisi tersebut, maka untuk lantai basement disarankan menggunakan fondasi plat menerus yang dasarnya sama dengan dasar lantai basement. Kapasitas dukung ijin (netto) untuk plat menerus basement ini bisa diambil :

$$q_a \text{ (net)} = 2.0 - 2.50 \text{ kg/cm}^2$$

Untuk bangunan dengan lantai semi-basement, bisa digunakan fondasi sumuran dengan kedalaman sekitar 4.0 m terhadap muka lantai semi-basement (dasar sumuran pada − 8.50 m terhadap elevasi dasar penyelidikan). Kapasitas dukung ijin netto tanah dasar sumuran di daerah yang berhubungan dengan semi-basement dapat diambil :

$$q_a \text{ (net)} = 8.0 - 10.0 \text{ kg/cm}^2$$

Untuk bangunan tanpa lantai basement/semi-basement, bisa digunakan fondasi sumuran dengan kedalaman sekitar 8.00 - 8.90 m terhadap muka tanah setempat (dasar sumuran pada − 8.50 m terhadap elevasi dasar penyelidikan). Kapasitas dukung ijin netto tanah dasar sumuran di daerah yang tak berhubungan dengan basement/semi-basement dapat diambil :

$$q_a \text{ (net)} = 15.0 \text{ kg/cm}^2$$

CATATAN :

Jika fondasi baru dibuat sangat dekat dengan fondasi bangunan lain, maka perlu pengamanan galian agar tidak mengganggu stabilitas bangunan yang telah ada. Untuk fondasi sumuran, hal ini lebih sederhana, dengan menggunakan buis beton pada penggalian untuk mencegah kelongsoran tanah di sekitar bangunan yang telah ada.

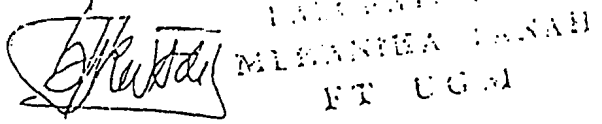
V. PENUTUP

Apabila dalam pelaksanaan pekerjaan nanti, ternyata dijumpai hal-hal yang menyimpang, meragukan, atau tak terduga, maka perlu diadakan penyesuaian dengan keadaan tersebut. Keputusan hendaknya diambil oleh fihak-fihak yang menguasai permasalahan

Yogyakarta, Agustus 1998

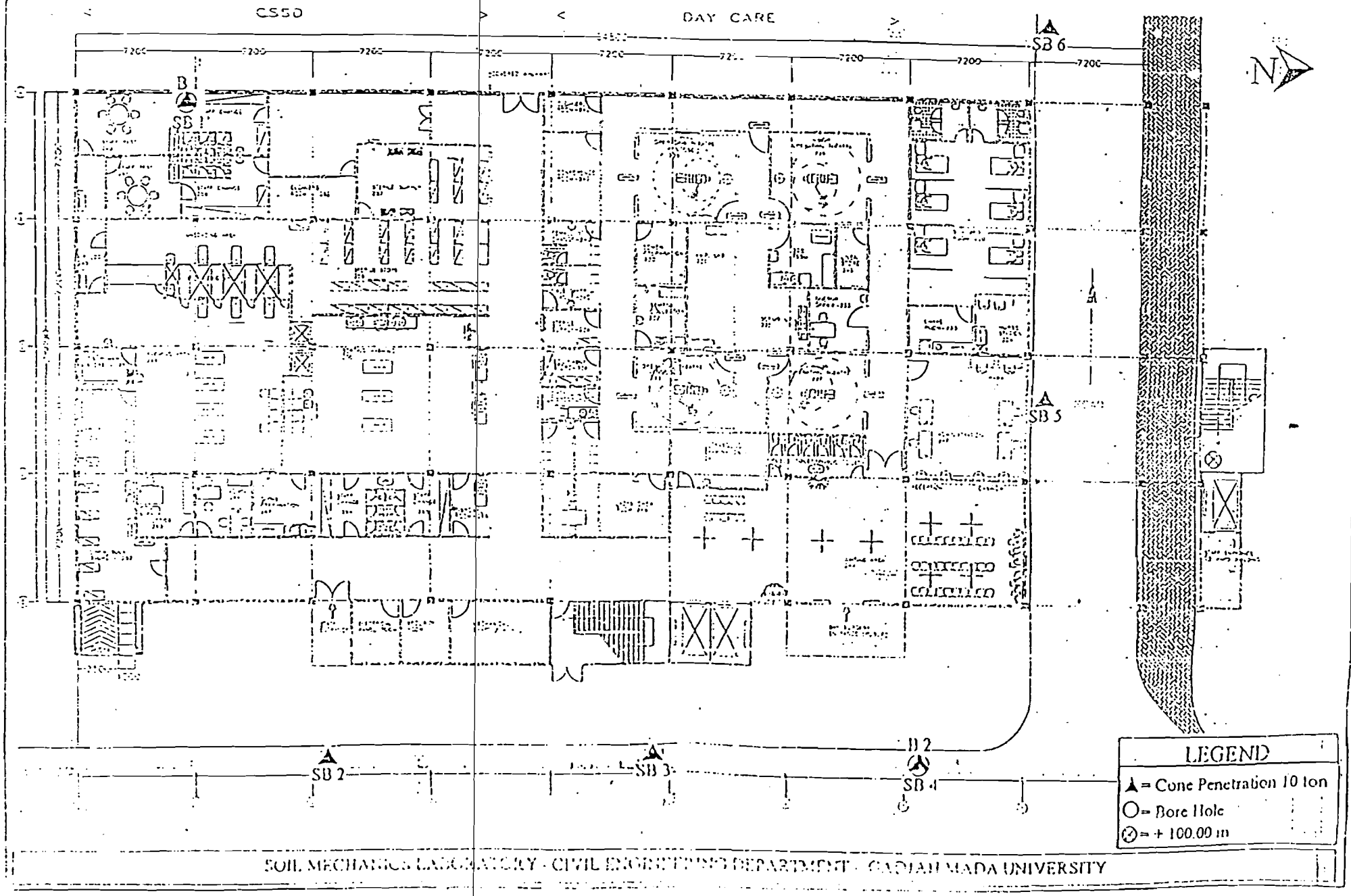
Laboratorium Mekanika Tanah

Jurusan Teknik Sipil FT UGM



Agus Darmawan Adi (Ir.,M.Sc.,Ph.D)

Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP dr. Sardjito
Location : RSUP dr. Sardjito, Yogyakarta

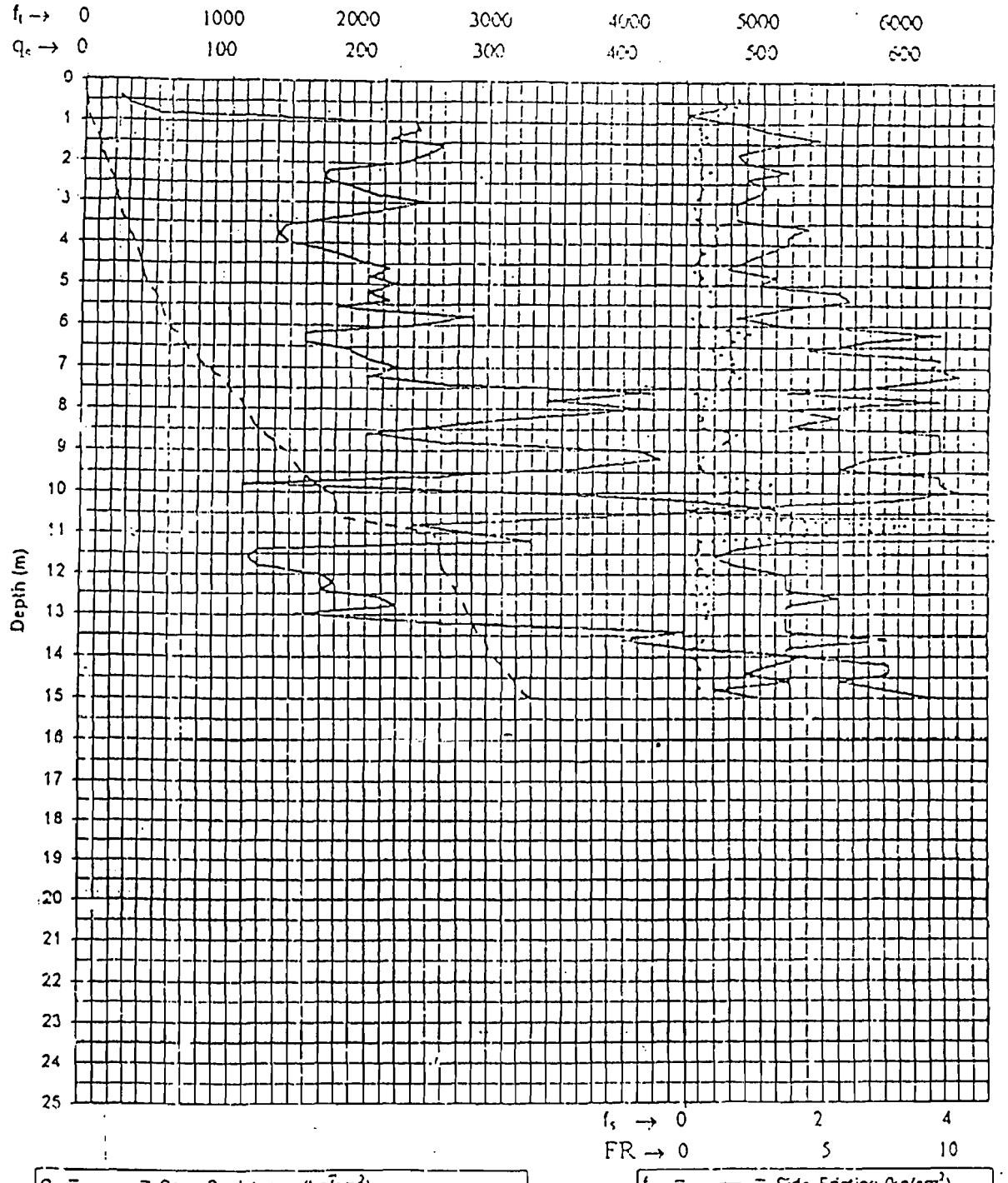


SOIL MECHANICS LABORATORY - CIVIL ENGINEERING DEPARTMENT - GADJAH MADA UNIVERSITY

CONE PENETRATION TEST (10 TON)

Project : Rencana Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr..Sarjito
Location : RSUP Dr. Sarjito, Yogyakarta
Test no. : SB ;
Elevation : + 95.99 m

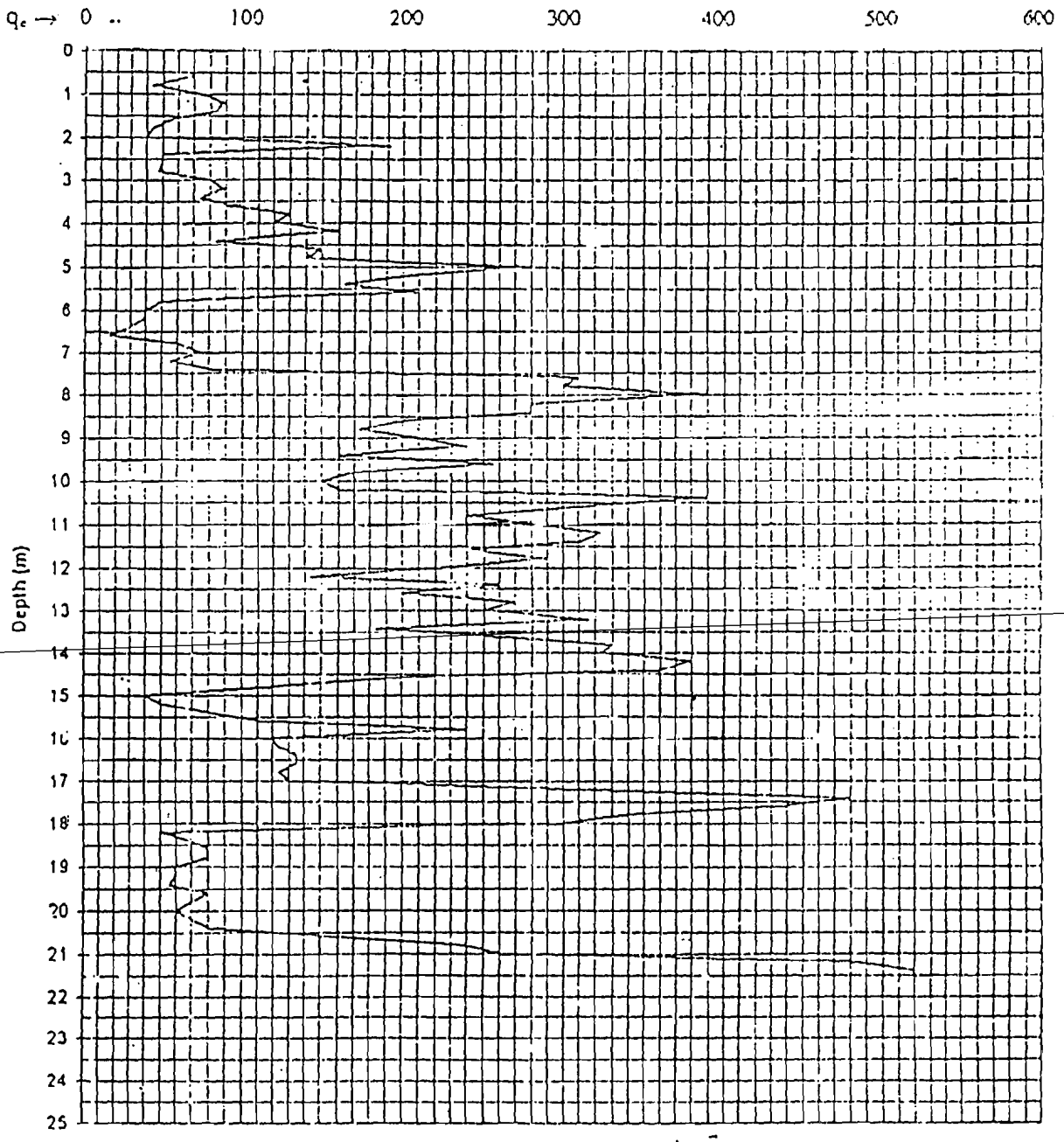
Weather : Sunny
Date : 27 Juli 1998
Tested by : Kwo



CONE PENETRATION TEST (10 TON)

Project : Rencana Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito
Location : RSUP Dr. Sarjito - Yogyakarta
Test no. : SB 2
Elevation : + 96.15 m

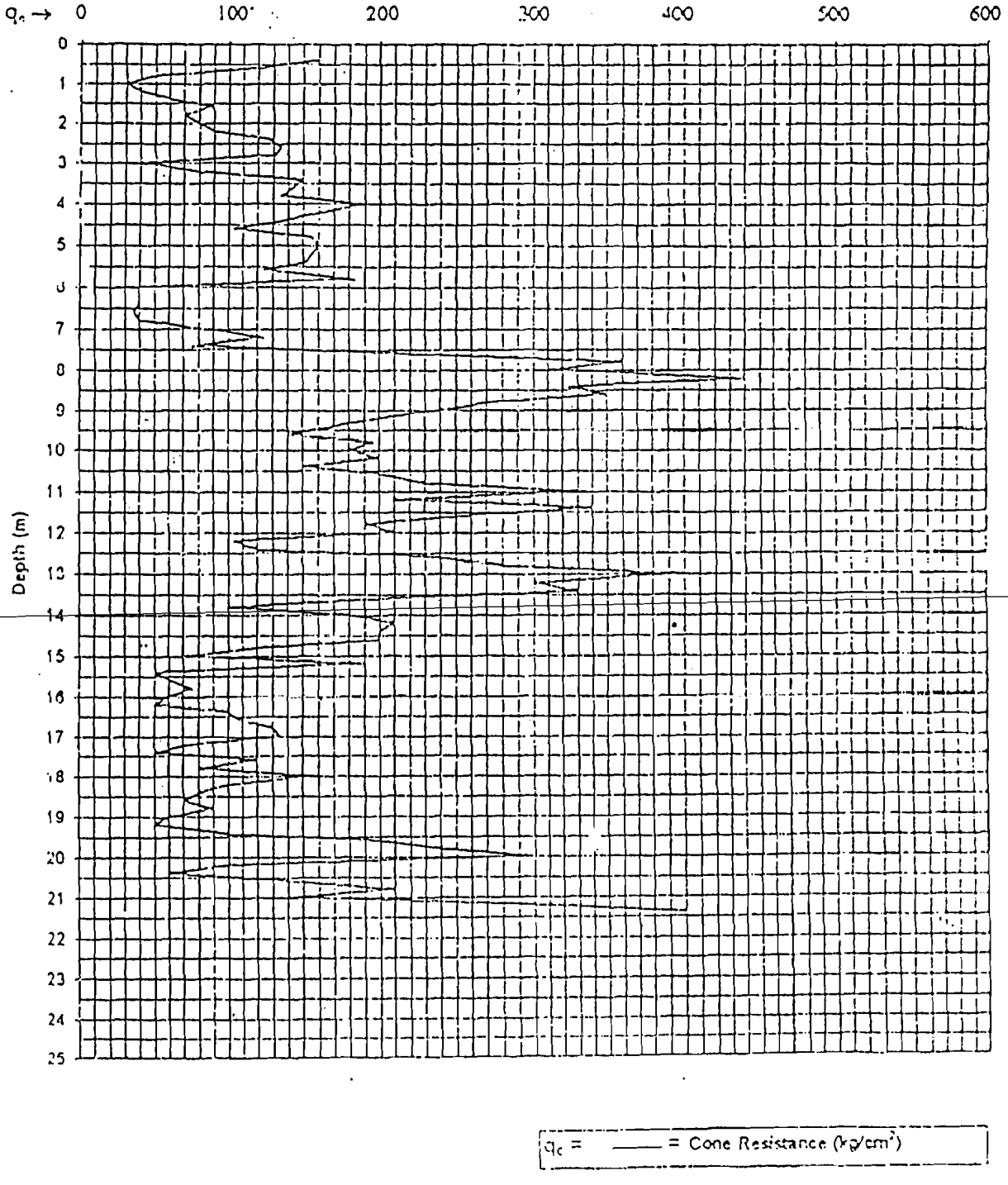
Weather : Sunny
Date : 29 Juli 1998
Tested by : Kwo



q_c = ——— = Cone Resistance (kg/cm²)

CONE PENETRATION TEST (10 TON)

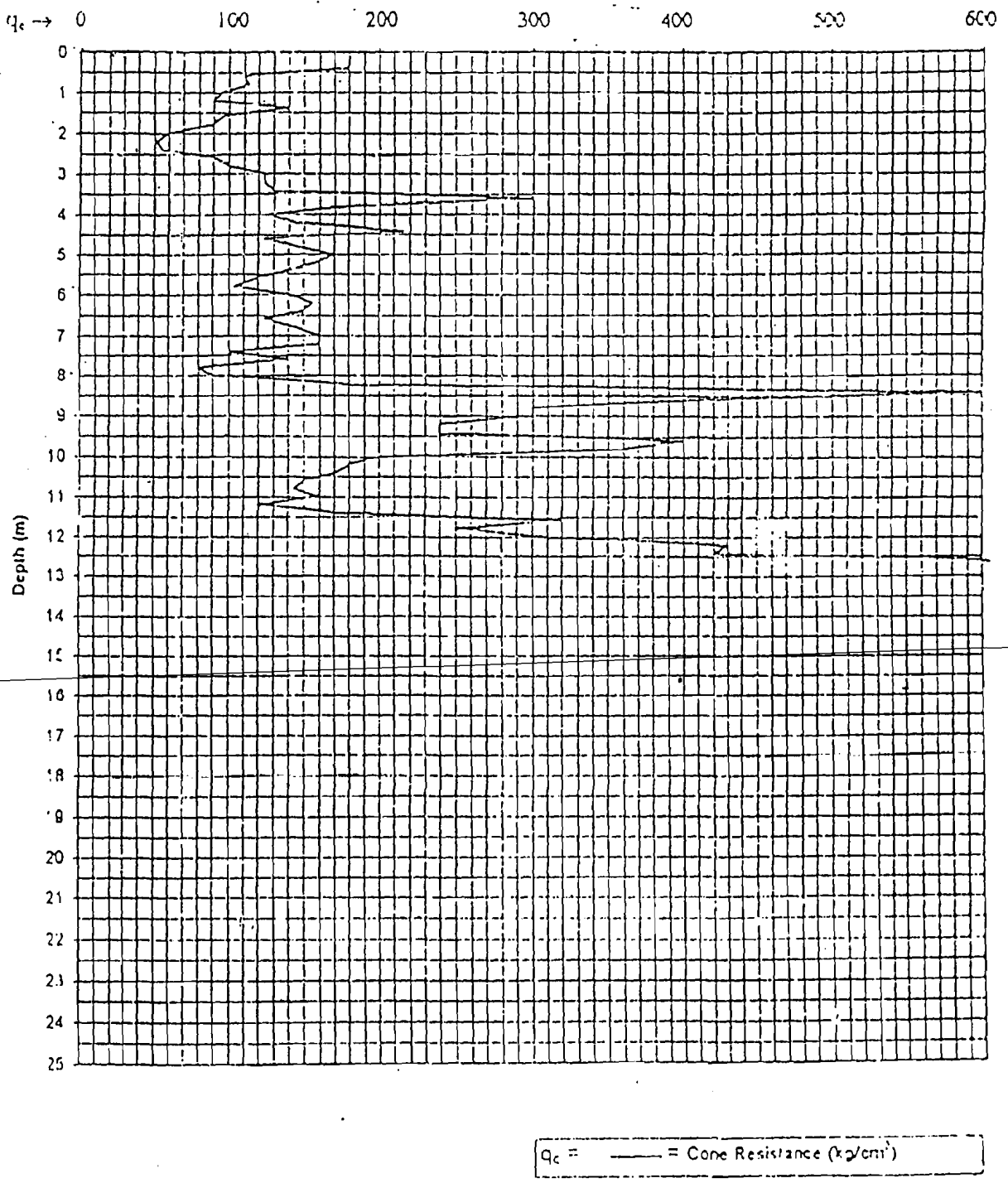
Project	: Rencana Pembanguan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito	Weather	: Sunny
		Date	: 31 Juli 1998
Location	: RSUP Dr. Sarjito - Yogyakarta	Tested by	: Kwo
Test no.	: SB 3		
Elevation	: + 96.63 m		



CONE PENETRATION TEST (10 TON)

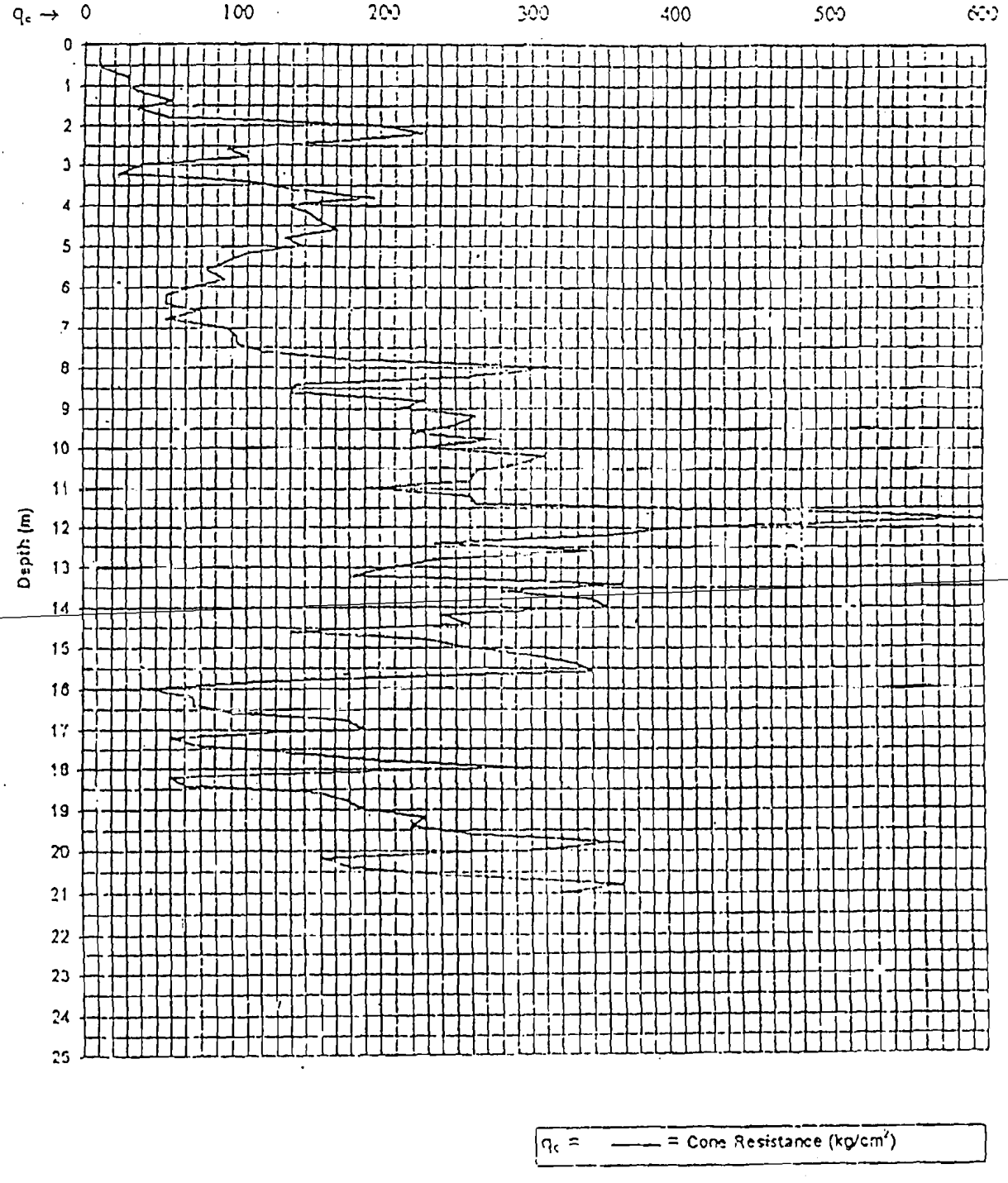
Project : Rencana Pembanguan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito
Location : RSUP Dr. Sarjito - Yogyakarta
Test no. : SB 4
Elevation : + 97.29 m

Weather : Sunny
Date : 1 Agustus 1998
Tested by : Kwo



CONE PENETRATION TEST (10 TON)

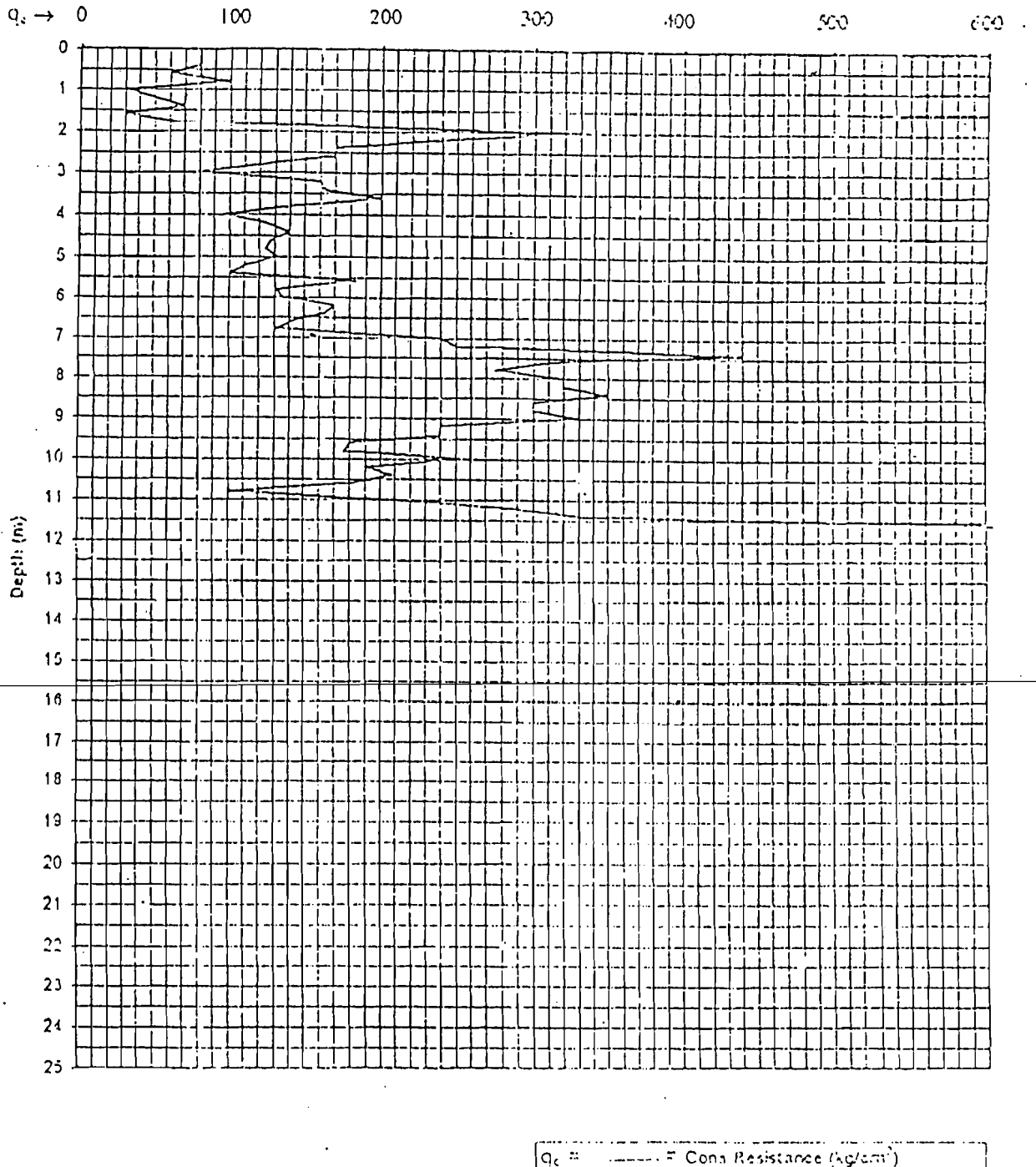
Project	: Rencana Pembanguan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito	Weather	: Sunny
		Date	: 1 Agustus 1998
Location	: RSUP Dr. Sarjito - Yogyakarta	Tested by	: Kwo
Test no.	: SB 5		
Elevation	: + 97.38 m		



CONE PENETRATION TEST (10 TON)

bject : Rencana Pembanguan Gedung Central
Operating Theatre (COT) RSUP Dr. Sarjito
cation : RSUP Dr. Sarjito - Yogyakarta
st no. : SB 6
evatio : + 97.25 m

Weather : Sunny
Date : 3 Agustus 1998
Tested by : Kwo



BORE-HOLE LOG
(HAND AUGER)

Test point no. : B I (SB I)
Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sardjito
Location : RSUP Dr. Sardjito, Yogyakarta

Elevation : + 95.99 m
Date : 04-Aug-98
Made by : Kasih W

Depth (m)	Log	Description of Soil	Sample	Water Table (m)	Note
0.30		Lapis perkerasan (aspal)			
1.00		Lanau, pasir halus dan sedang, coklat			
1.50		Pasir halus dan sedang, berlanau, berkerikil, coklat kekuningan (sangat padat)	U		
2.00		Pasir sedang-kasar, berlanau, berkerikil, coklat (sangat padat)			
3.00		Pasir halus, sedikit berlanau, abu-abu kecoklatan (sangat padat)		-3.80 m	
4.20		Pasir sedang kasar, sedikit berlanau, kerikil, coklat abu-abu			
		Pasir sedang kasar, sedikit berlanau, kerikil, coklat (sangat padat)			
5.80		Pasir halus sedang, sedikit berlanau, berkerikil, coklat (sangat padat)			
7.00		Pasir sedang kasar, sedikit berlanau, berkerikil, coklat (sangat padat)			
7.50		Akhir Pemboran			

SOIL MECHANICS LABORATORY - CIVIL ENGINEERING DEPT. - GADJAH MADA UNIVERSITY

KLS

BORE-HOLE LOG
(HAND AUGER)

Test point no. : B 2 (SB 4)
Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sardjito
Location : RSUP Dr. Sardjito, Yogyakarta

Elevation : + 97.29 m
Date : 04-Aug-98
Made by : Kasih W

Depth (m)	Log	Description of Soil	Sample	Water Table (m)	Note
0.30		Lapis perkerasan (aspal)			
		Pasir sedang kasar, sedikit berlanau, kerikil, coklat			
1.50		Pasir kasar, sedikit berlanau, kerikil, kerakal,			
2.00		Pasir halus-sedang, berlanau, berkerikil, coklat kekuningan			
2.60					
3.00		Pasir sedang-kasar, berlanau, berkerikil, kerakal, coklat			
4.00		Pasir sedang-kasar, berkerikil, kerakal, coklat			
4.40		Pasir halus, sedikit berlanau, coklat			
5.20		Pasir sedang kasar, sedikit berlanau, kerikil, coklat			
		Pasir halus-sedang, berlanau, berkerikil, coklat			
6.00		Pasir halus sedang, berlanau, berkerikil, coklat			
7.50		Akhir Pemboran			

SOIL MECHANICS LABORATORY - CIVIL ENGINEERING DEPARTMENT - GADJAH MADA UNIVERSITY - YOGYAKARTA

SUMMARY OF LABORATORY TEST RESULTS

Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito

Location : RSUP Dr. Sarjito, Yogyakarta

Made by : Gde

Checked by : ada

Boring No	Depth m	Bulk density, ρ_b g/cm^3	Dry density, ρ_d g/cm^3	Moisture content w_N, %	Specific Gravity G_s	Void Ratio e	Degree of Saturation S_r, %	Finer # 200 %	Coef. of gradation			Strength Parameters *	
									Cz	Cu	Symbol	φ °	c kg/cm^2
B1 (SB1)	3.50	1.98	1.69	17.61	2.78	0.65	75.49	14.28	1.49	12.50	SM	38.66	0.00
	4.50	1.92	1.57	22.45	2.75	0.75	81.90	42.97	-	-	SM	40.03	0.00
	6.50	1.86	1.37	36.37	2.66	0.95	100.00	87.86	-	-	ML	37.23	0.00
B2 (SB4)	2.00	1.40	1.19	17.76	2.76	1.32	37.25	30.30	-	-	SM	33.43	0.00
	4.00	1.48	1.22	21.17	2.73	1.24	46.79	29.60	-	-	SM	34.99	0.00
	6.50	1.85	1.63	13.18	2.71	0.66	53.99	37.94	-	-	SM	37.23	0.00

Note :

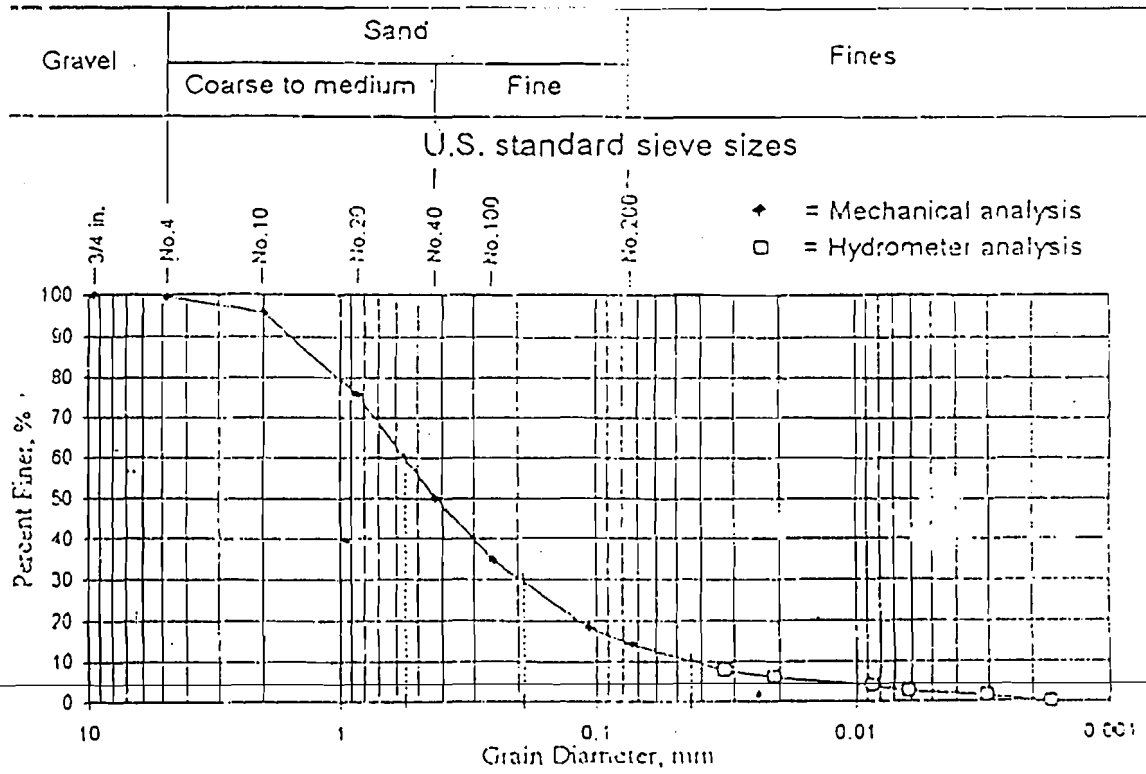
* = from direct shear test

GRAIN SIZE ANALYSIS

ject	Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito		
t/Boring no.	B1 (SB 1)	Location	RSUP Dr. Sarjito, Yogyakarta
pth	3.50 m	Date	10 Agustus 1998
		Made by	Ris

ecific Gravity 2.78

scription of soil



Finer # 200 = 14.28 %

Gravel = 0.58 %
Sand = 85.14 %
Silt/Clay = 14.28 %

D_{10}	D_{30}	D_{50}	C_u	C_c
0.044	0.19	0.55	12.50	1.49

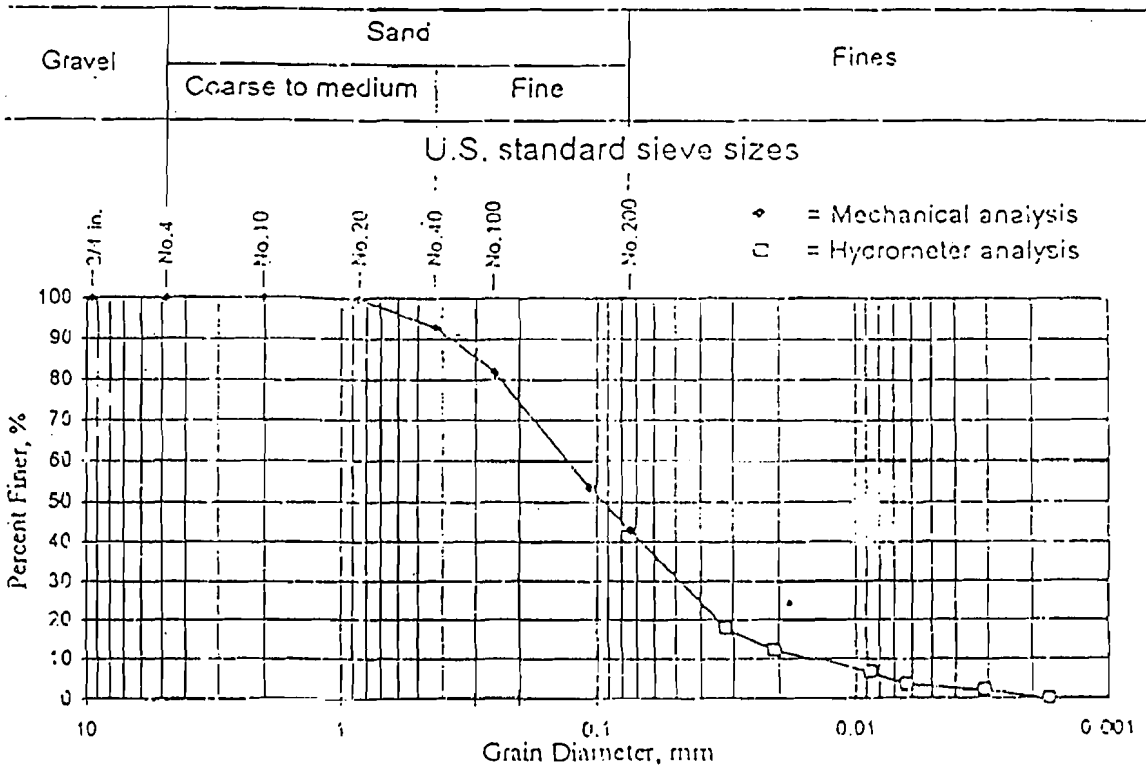
phic

GRAIN SIZE ANALYSIS

ct	Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito		
Boring no.	B1 (SB 1)	Location	RSUP Dr. Sarjito, Yogyakarta
	4.50 m	Date	10 Agustus 1998
		Made by	Ris

fic Gravity 2.75

iption of soil



Finer # 200	=	42.97 %
Gravel	=	0.00 %
Sand	=	57.03 %
Silt/Clay	=	42.97 %

D_{10}	D_{30}	D_{60}	C_c	C_u

GRAIN SIZE ANALYSIS

oject: Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito

Location: RSUP Dr. Sarjito, Yogyakarta

st/Boring no.: B1 (SB 1)

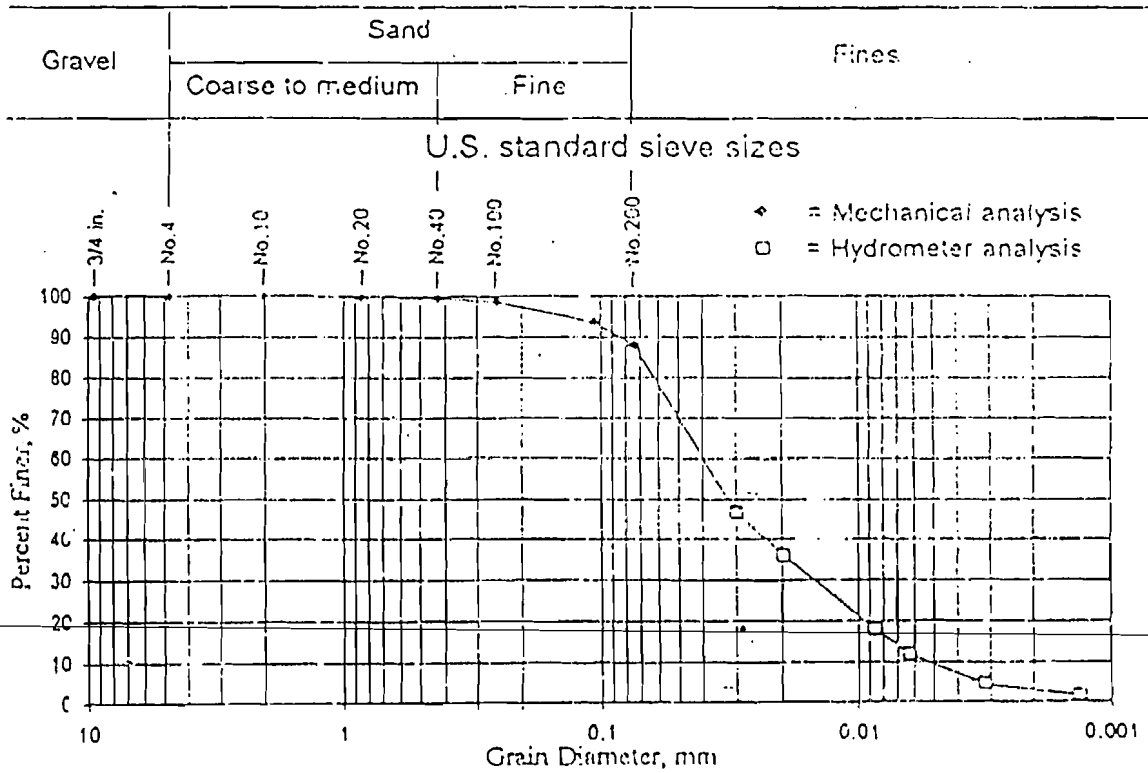
Date: 10 Agustus 1998

epth: 6.50 m

Made by: Ris

pecific Gravity: 2.66

escription of soil:



Finer # 200 = 87.86 %

Gravel = 0.00 %
Sand = 12.14 %
Silt/Clay = 87.86 %

D_{10}	D_{30}	D_{60}	C_u	C_c

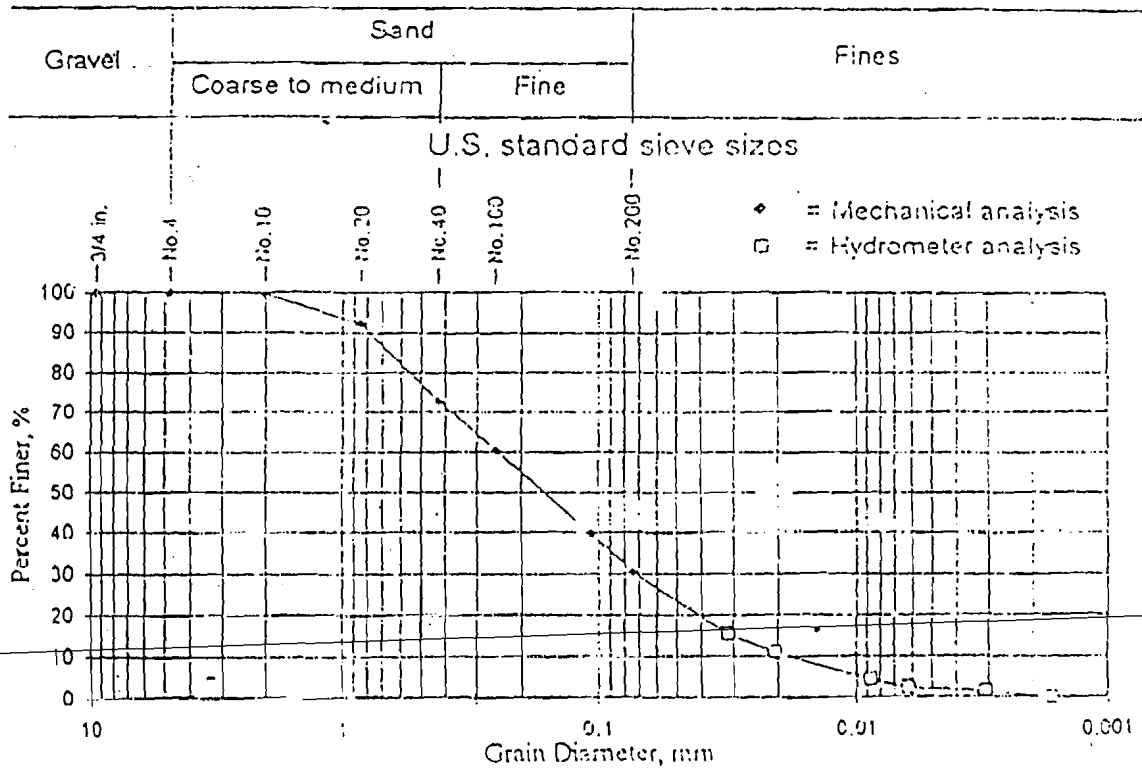
raphic

GRAIN SIZE ANALYSIS

oject	Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito	Location	RSUP Dr. Sarjito, Yogyakarta
t/Boring no.	B2 (SB 4)	Date	10 Agustus 1998
pth	2.00 m	Made by	Ris

cific Gravity 2.76

cription of soil



Finer # 200 = 30.30 %

Gravel = 0.00 %
Sand = 69.70 %
Silt/Clay = 30.30 %

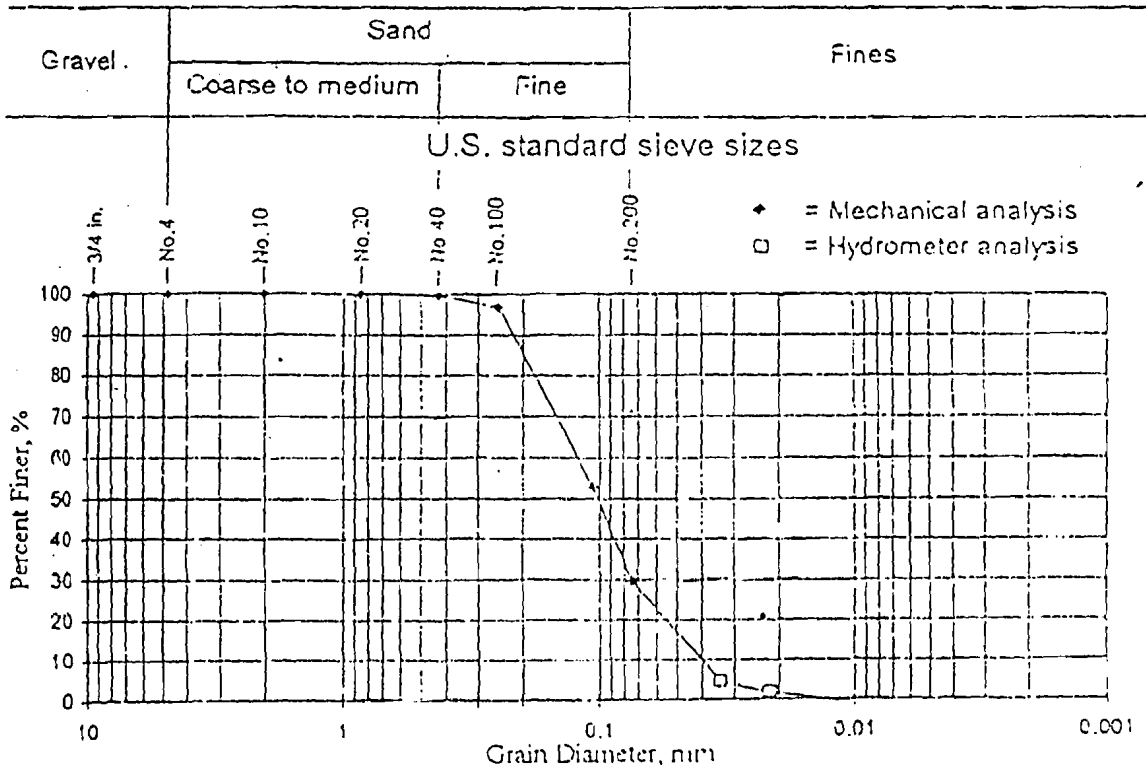
D_{10}	D_{30}	D_{60}	C_u	C_z

GRAIN SIZE ANALYSIS

oject	Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito	Location	RSUP Dr. Sarjito, Yogyakarta
st/Boring no.	B2 (SB 4)	Date	19 Agustus 1998
pth	4.00 m	Made by	Ris

ecific Gravity 2.73

scription of soil



Finer # 200 = 29.60 %

Gravel = 0.00 %
Sand = 70.40 %
Silt/Clay = 29.60 %

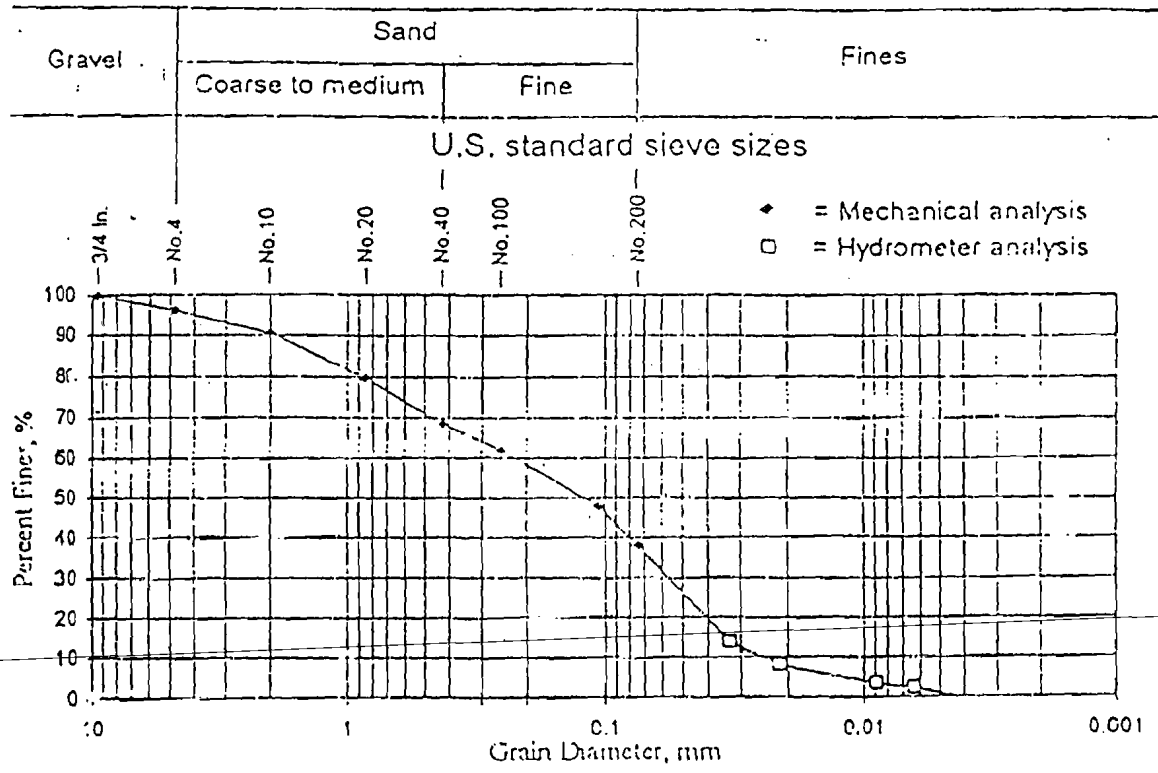
D_{10}	D_{30}	D_{60}	C_u	C_z

GRAIN SIZE ANALYSIS

roject	Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito		
est/Boring no.	B2 (SB 4)	Location	RSUP Dr. Sarjito, Yogyakarta
epth	6.50 m	Date	10 Agustus 1998
		Made by	Ris

pecific Gravity 2.72

escription of soil



Finer # 200	=	37.94 %
Gravel	=	3.99 %
Sand	=	58.07 %
Silt/Clay	=	37.94 %

D_{10}	D_{30}	D_{60}	C_u	C_z

raphic

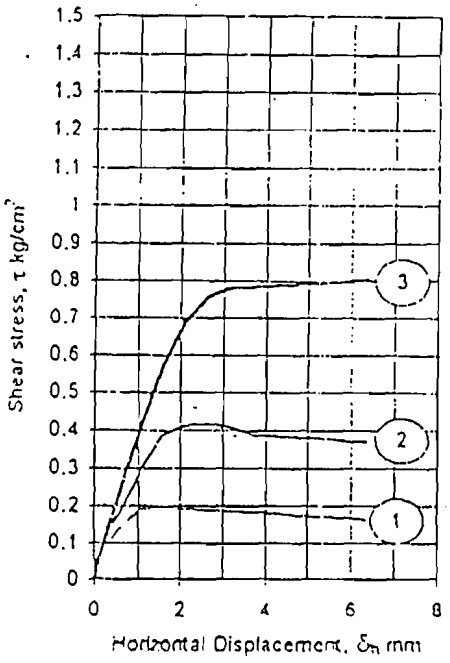
DIRECT SHEAR TEST

Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B1 (SB1)

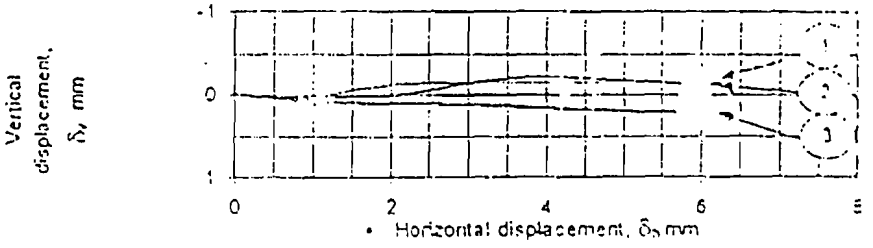
Depth : 3.50 m
Date : 7 Aug 1998
Made by : Kwo

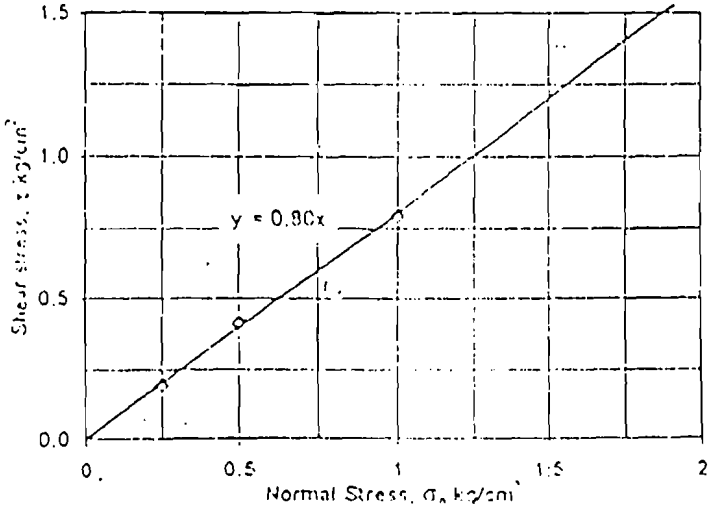
Description of soil : *Pasir sedang kasar, berkerikil, sedikit berlanau, cokiat*

Dimensions of sample :
Diameter = 6.35 cm
Area = 31.65 cm^2
Ht = 2.00 cm
Volume = 63.31 cm^3



Specimen no.		1	2	3
Mass of soil + ring	gr	210.40	214.35	221.55
Mass of ring	gr	88.84	86.65	144.50
Mass of soil	gr	121.46	127.70	127.05
Initial water content	w_{in} (%)		17.61	
Bulk density	γ_b (gr/cm³)	1.92	2.02	2.01
Dry density	γ_d (gr/cm³)	1.63	1.72	1.71
Final water content	w_{in} (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	τ (kg/cm²)	0.19	0.47	0.78
Shear displacement at failure	δ_h (%)	2.50	4.17	10.00





Angle of Internal Friction	ϕ	=	38.66 °
Cohesion	c	=	0.00 kg/cm²

DIRECT SHEAR TEST

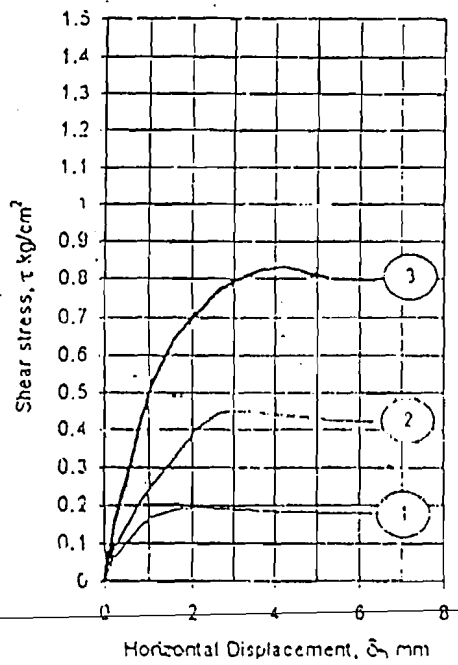
Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP Dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B1 (SB1)

Depth : 4.50 m
Date : 7 Aug 1998
Made by : Kwo

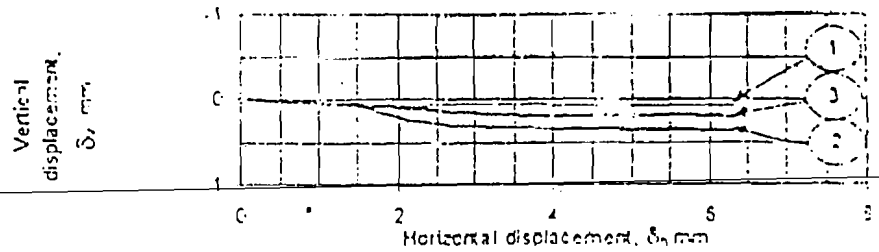
Description of soil : *Pasir halus-sedang, sedikit berlanau, berkerikil, coklat*

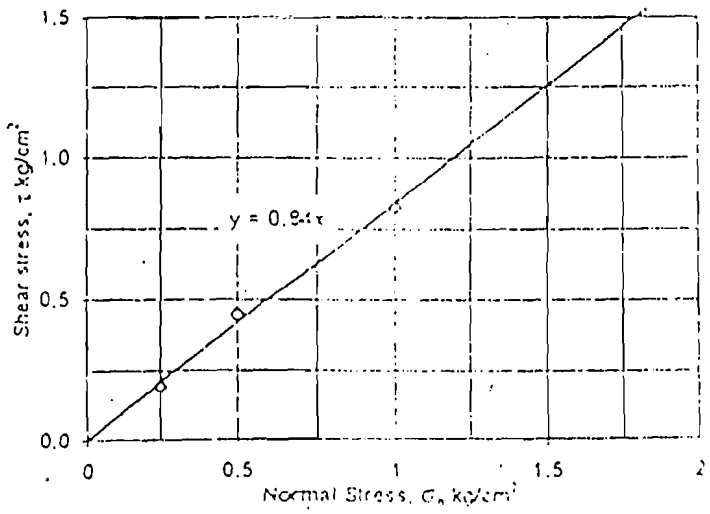
Dimensions of sample :

Diameter = 6.35 cm
Area = 31.65 cm^2
Ht. = 2.00 cm
Volume = 63.31 cm^3



Specimen no.		1	2	3
Mass of soil + ring	gr	255.30	202.50	216.62
Mass of ring	gr	144.60	86.65	88.94
Mass of soil	gr	120.7	115.85	127.68
Initial water content	w_N (%)		22.45	
Bulk density	γ_b (gr/cm³)	1.91	1.83	2.02
Dry density	γ_d (gr/cm³)	1.56	1.49	1.65
Final water content	w_N (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	: (kg/cm²)	0.19	0.45	0.93
Shear displacement at failure	δ_h (%)	3.24	5.01	8.69





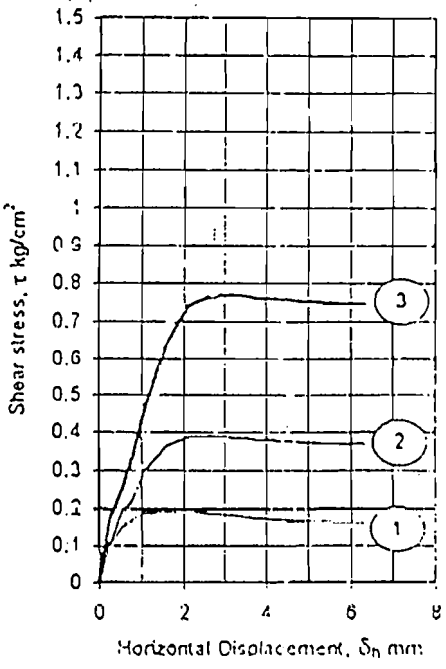
Angle of Internal Friction	ϕ	=	40.03°
Cohesion	c	=	0.00 kg/cm²

DIRECT SHEAR TEST

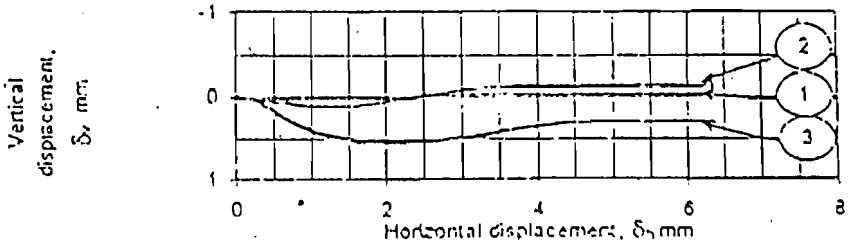
Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B1 (SB1)

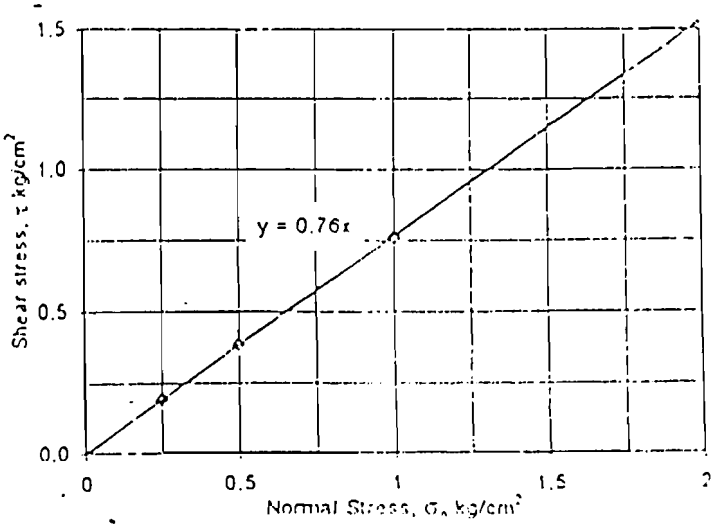
Depth : 6.50 m
Date : 7 Aug 1998
Made by : Kwo

Description of soil : *Pasir halus-sedang, sedikit berlanau, coklat*
Dimensions of sample :
Diameter = 6.35 cm
Area = 31.65 cm^2
Ht. = 2.00 cm
Volume = 63.31 cm^3.



Specimen no.		1	2	3
Mass of soil + ring	gr	263.64	207.63	264.86
Mass of ring	gr	144.60	86.65	144.60
Mass of soil	gr	119.04	120.98	120.26
Initial water content	w_N (%)		36.67	
Bulk density	γ_b (gr/cm³)	1.88	1.91	1.90
Dry density	γ_d (gr/cm³)	1.38	1.40	1.39
Final water content	w_N (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	τ (kg/cm²)	0.19	0.38	0.76
Shear displacement at failure	δ_h (%)	3.34	4.17	5.01





Angle of Internal Friction	ϕ	=	37.23 °
Cohesion	c	=	0.00 kg/cm²

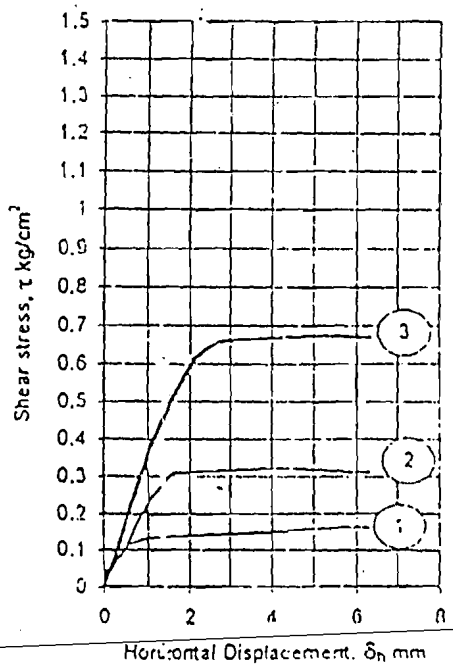
DIRECT SHEAR TEST

Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B2 (SB4)

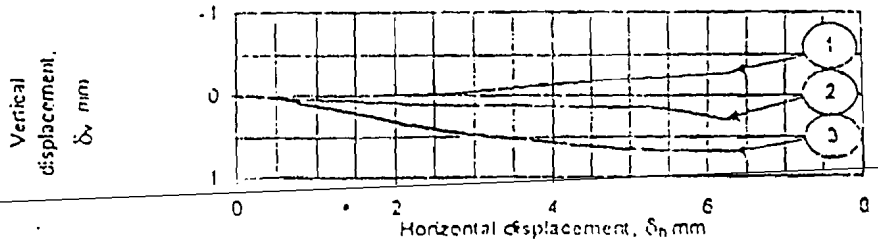
Depth : 2.00 m
Date : 7 Aug 1998
Made by : Kwo

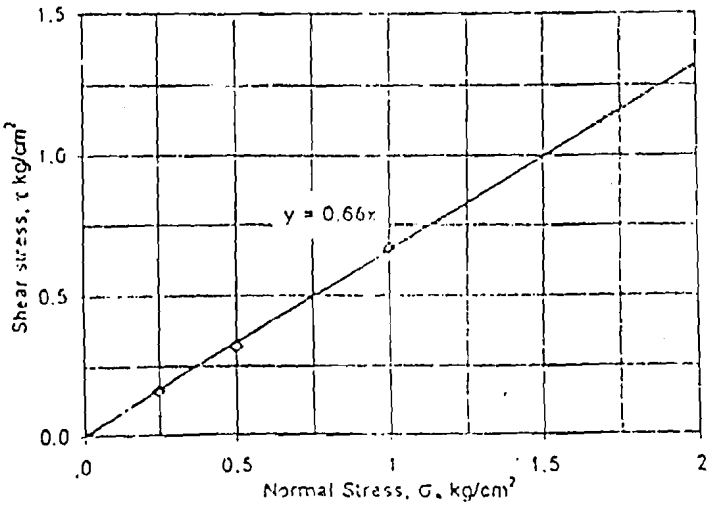
Description of soil : *Lanau, pasir halus, coklat, sangat padat*

Dimensions of sample :
Diameter = 6.35 cm
Area = 31.65 cm^2
Ht. = 2.00 cm
Volume = 63.31 cm^3



Specimen no.		1	2	3
Mass of soil + ring	gr	176.97	235.14	231.75
Mass of ring	gr	86.65	144.60	146.21
Mass of soil	gr	90.32	90.54	85.54
Initial water content	w_N (%)		17.76	
Bulk density	γ_b (gr/cm³)	1.43	1.43	1.35
Dry density	γ_d (gr/cm³)	1.21	1.21	1.15
Final water content	w_N (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	τ (kg/cm²)	0.16	0.32	0.67
Shear displacement at failure	δ_h (%)	9.18	6.69	8.35





Angle of Internal Friction	ϕ	=	33.42 °
Cohesion	c	=	0.00 kg/cm²

DIRECT SHEAR TEST

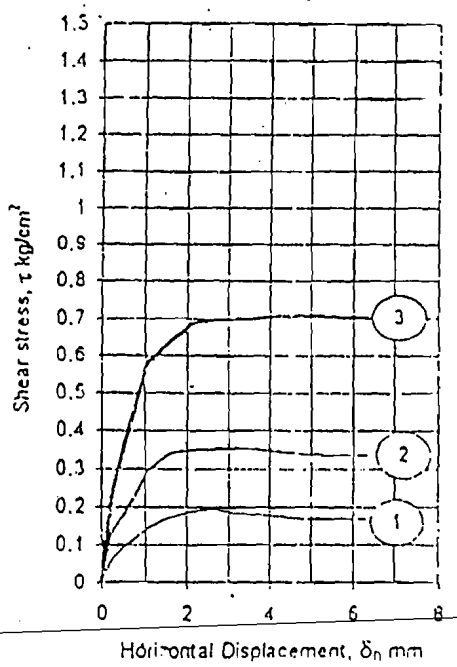
Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B2 (SB4)

Depth : 4.00 m
Date : 7 Aug 1998
Made by : Kiwo

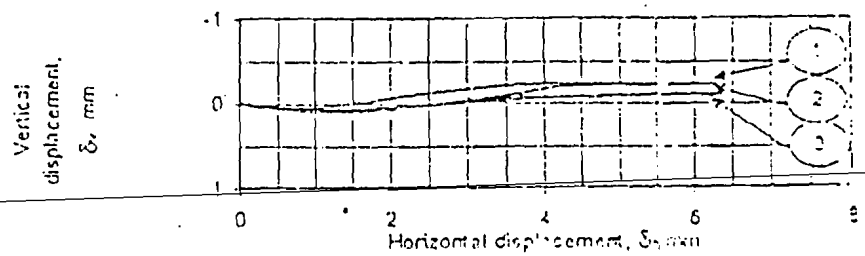
Description of soil : *Pasir halus-sedang, sedikit berlanau, coklat*

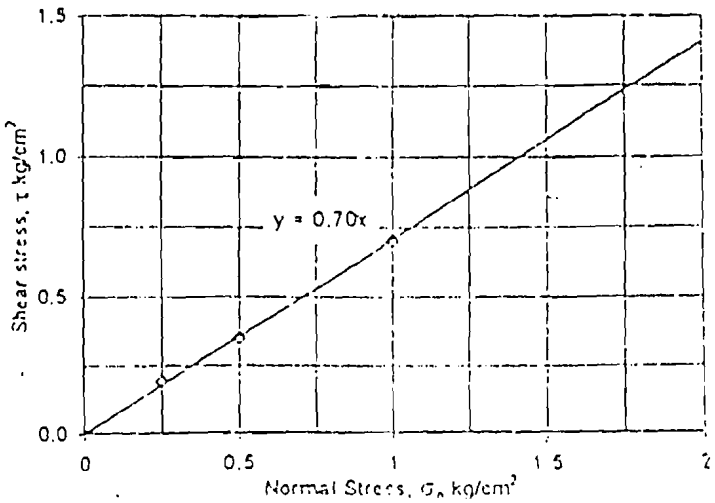
Dimensions of sample :

Diameter = 6.35 cm
Area = 31.65 cm^2
Ht. = 2.00 cm
Volume = 63.31 cm^3



Specimen no.		1	2	3
Mass of soil + ring	gr	178.47	243.07	193.40
Mass of ring	gr	88.65	145.21	88.54
Mass of soil	gr	89.82	98.66	84.45
Initial water content	w_0 (%)		21.17	
Bulk density	γ_b (gr/cm³)	1.42	1.53	1.45
Dry density	γ_d (gr/cm³)	1.17	1.26	1.23
Final water content	w_f (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	τ (kg/cm²)	0.19	0.35	0.72
Shear displacement at failure	δ_h (%)	5.01	5.01	7.51





Angle of Internal Friction	ϕ	=	34.99 °
Cohesion	c	=	0.00 kg/cm²

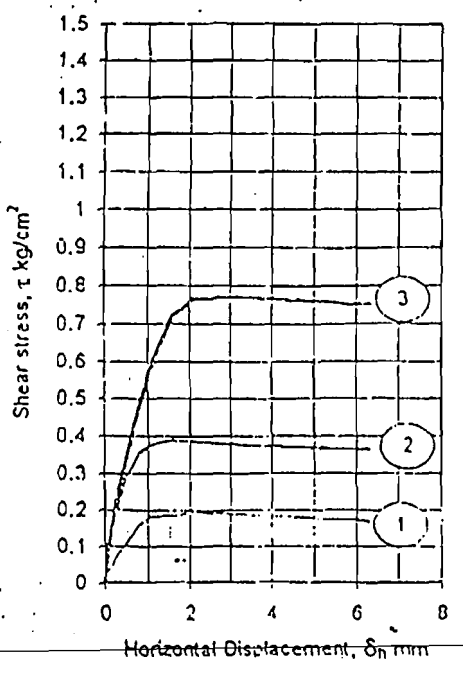
DIRECT SHEAR TEST

Project : Pembangunan Gedung Central Operating Theatre (COT) RSUP dr. Sarjito
Location : RSUP dr. Sarjito, Yogyakarta
Test point : B2 (SB4)

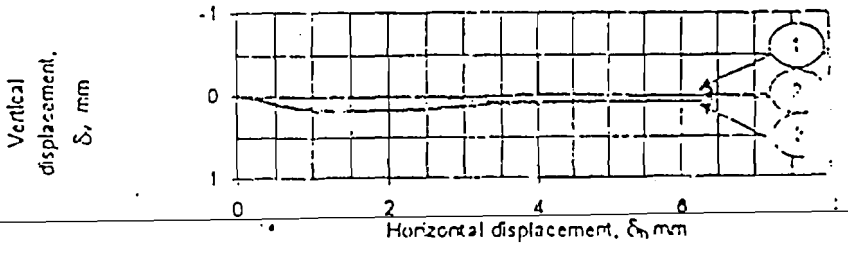
Depth : 6.50 m
Date : 7 Aug 1998
Made by : Kwo

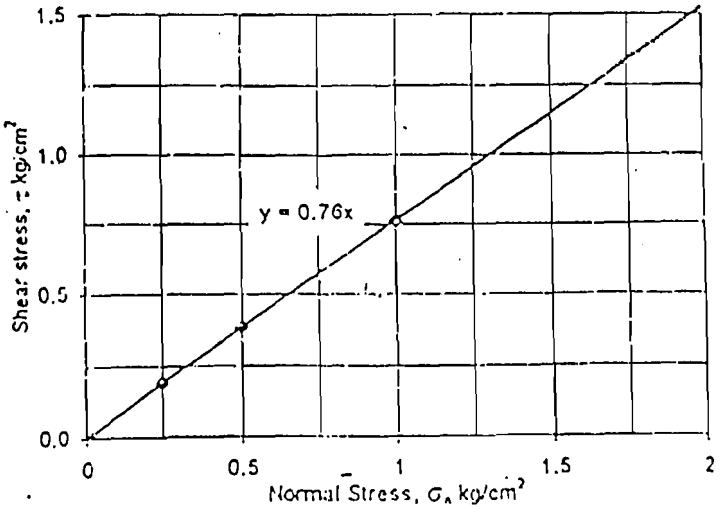
Description of soil : *Pasir sedang, sedikit berlanau, berkerikil, coklat*

Dimensions of sample :
Diameter = 6.35 cm
Area = 31.65 cm^2
Ht. = 2.00 cm
Volume = 63.31 cm^3.



Specimen no.		1	2	3
Mass of soil + ring	gr	206.21	206.64	258.85
Mass of ring	gr	86.65	88.94	144.60
Mass of soil	gr	119.56	117.70	114.25
Initial water content	w_N (%)		13.18	
Bulk density	γ_b (gr/cm³)	1.89	1.86	1.80
Dry density	γ_d (gr/cm³)	1.67	1.64	1.59
Final water content	w_N (%)			
Normal stress	σ_n (kg/cm²)	0.25	0.50	1.00
Shear stress at failure	τ (kg/cm²)	0.19	0.38	0.76
Shear displacement at failure	δ_h (%)	3.34	2.50	5.01





Angle of Internal Friction	ϕ	=	37.23 °
Cohesion	c	=	0.00 kg/cm²

Tabel 1 Pembebanan KK1

no	join	Beban Mati				B.Hidup	B.Angin		B.Angin	
		B.Gording	B.Atap	B.Plafond	B.Kuda-kuda		A.Tekan	A.Hisap	A.Tekan	A.Hisap
1	1	19.8	127.26	32.4	19.8	-	31.815	-	-	31.815
2	2	19.8	311.85	-	-	100	77.963	-	-	77.963
3	3	19.8	369.18	-	-	100	92.295	-	-	92.295
4	4	32.472	369.18	-	-	100	92.295	25.452	25.452	92.295
5	5	19.8	369.18	-	-	100		62.37	62.37	-
6	6	19.8	311.85	-	-	-	-	73.836	73.836	-
7	7	19.8	127.26	32.4	19.8	-	-	73.836	73.836	-
8	8	-	-	84.24	51.4801	-	-	-	-	-
9	9	-	-	103.68	63.3601	-	-	-	-	-
10	10	-	-	103.68	63.3601	-	-	-	-	-
11	11	-	-	103.68	63.3601	-	-	-	-	-
12	12	-	-	84.24	51.4801	-	-	-	-	-

dalam kg

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Tabel 3 Perhitungan dimensi batang tarik

BATANG TARIK		Btg Atas no 1=6	Btg Bawah no 9=10	Btg Vertikal no 15	Btg Diagonal no 18=21
Gaya tarik	kg	382.0317	1031.51	1076.369	1167.341
Panjang	m	1.414	1.6	2.548	1.486
	cm	141.4	160	254.8	148.6
Fy	kg/cm^2	2400	2400	2400	2400
Fu	kg/cm^2	3700	3700	3700	3700
r min	cm	0.589166667	0.666666667	1.061666667	0.619166667
d baut	cm	0.9525	0.9525	0.9525	0.9525
tp	cm	1	1	1	1
n		2	2	2	2
Ag1	cm^2	0.265299792	0.716326389	0.747478472	0.810653472
Ag2	cm^2	2.782945437	3.195968203	3.22449539	3.282347218
trial Profil		2L 40x40x5	2L 40x40x5	2L 40x40x5	2L 40x40x5
A	cm^2	3.79	3.79	3.79	3.79
w	kg/m	2.97	2.97	2.97	2.97
r	cm	1.2	1.2	1.2	1.2
r pakai	cm	1.2	1.2	1.2	1.2
A bruto	cm^2	7.58	7.58	7.58	7.58
A lubang	cm^2	2.54	2.54	2.54	2.54
A netto	cm^2	5.04	5.04	5.04	5.04
A efektif	cm^2	4.284	4.284	4.284	4.284
Kontrol Tegangan					
T/Aprofil	kg/cm^2	50.39996042	136.0831135	142.0011873	154.0027704
0,6.Fy	kg/cm^2	1440	1440	1440	1440
T/Aprofil<0,6.Fy		OK	OK	OK	OK
T/Aefektif	kg/cm^2	89.17640056	240.7819795	251.253268	272.4885621
0,5.Fu	kg/cm^2	1850	1850	1850	1850
T/Aefektif<0,5.Fu		OK 2L 40x40x5	OK 2L 40x40x5	OK 2L 40x40x5	OK 2L 40x40x5

Tabel 4 Perhitungan dimensi batang desak

BATANG DESAK		Btg Atas no 2 = 5	Btg Bawah no 8	Btg Vertikal no 13 = 17	Btg Diagonal no 20
Gaya tekan	kg	1226.5	537.61	1960.78	179.89
Pajang	m	2.051	1.6	1	1.819
	cm	205.1	160	100	181.9
Fy	kg/cm^2	2400	2400	2400	2400
Fu	kg/cm^2	3700	3700	3700	3700
E	Mpa	2100000	2100000	2100000	2100000
K (sendi-sendi)		1	1	1	1
r min	cm	1.0255	0.8	0.5	0.9095
tp	cm	1	1	1	1
trial Profil		2L 40x40x5	2L 40x40x5	2L 40x40x6	2L 40x40x5
A	cm^2	3.79	3.79	4.48	3.79
A total	cm^2	7.58	7.58	8.96	7.58
r	cm	1.2	1.2	1.19	1.2
w	kg/cm	2.97	2.97	3.52	2.97
Ix=Iy	cm^4	5.43	5.43	6.33	5.43
ix=iy	cm^4	1.2	1.2	1.19	1.2
e		1.16	1.16	1.2	1.16
x	cm	1.66	1.66	1.7	1.66
Ix gabungan	cm^4	10.86	10.86	12.66	10.86
Iy gabungan	cm^4	23.4428	23.4428	27.892	23.4428
Ix gabungan	cm^4	1.196961853	1.196961853	1.188674231	1.196961853
Iy gabungan	cm^4	1.75861243	1.75861243	1.764354394	1.75861243
r pakai	cm	1.2	1.2	1.19	1.2
KL/r		170.9166667	133.3333333	84.03361345	151.5833333
Cc		130.6394529	130.6394529	130.6394529	130.6394529
Cek		KL/r>Cc	KL/r>Cc	KL/r<Cc	KL/r>Cc
Fs		0	0	1.874615316	0
Fa	kg/cm^2	370.1720479	193.6177212	1015.396516	149.8027105
P	kg	2805.904123	1467.622327	9097.952788	1135.504546
		2L 40x40x5	2L 40x40x5	2L 40x40x6	2L 40x40x5

Tabel 5 Rekapitulasi perhitungan tegangan batang

no	l(m)	Gaya batang (kg)		Tegangan Terjadi (kg/cm^2)		Tegangan Ijin (kg/cm2)	
		b. tetap	b.smtr	b.tetap	b.smtr	b.tetap	b.smtr
1	1.414	382.5745	323.29	89.302054	75.4645	1440	1440
2	2.051	-1226.5	-1001.15	161.80731	132.0778	370.17205	370.172505
3	2.051	-1145.85	-944.38	151.16731	124.588939	370.17205	370.172505
4	2.051	-1145.85	-1027.47	151.16731	135.55013	370.17205	370.17205
5	2.051	-1226.5	-1022.47	161.81	135.55013	370.17205	370.17205
6	1.414	382.5745	317.51	89.302	73.996265	1440	1440
7	1	-272.903	-253.67	36.00299	33.4656	1020.4378	1020.4678
8	1.6	-313.441	-537.61	41.351069	70.9248	608.26801	608.26801
9	1.6	941.3341	1031.61	219.73252	240.80532	1440	1440
10	1.6	941.3341	853.87	219.73	199.31606	1440	1440
11	1.6	-313.441	-282.12	41.351069	37.203166	608.268	608.268
12	1	-272.903	-248.45	36.002995	32.777	1020.4378	1020.4378
13	1	-1960.78	-1617.06	258.67798	213.33245	1020.4378	1020.4378
14	1.774	-569.346	-449.15	75.111662	59.254617	497.03665	497.03665
15	2.548	1076.369	978.62	251.25327	228.43604	1440	1440
16	1.774	-569.346	-497.33	75.111662	59.254617	497.03665	497.03665
17	1	-1960.78	-1507.11	198.82718	213.33245	1020.4378	1020.4378
18	1.486	1167.341	907.75	272.48856	211.89309	1440	1440
19	1.819	-53.8916	-118.02	7.1097	15.567	470.10207	470.10207
20	1.819	-53.8916	-179.89	7.1097	23.73219	470.10207	470.10207
21	1.486	1167.341	980.04	272.48856	228.76751	1440	1440

Tabel 6 Rekapitulasi perhitungan sambungan batang KK-1

Join	Batang	Profil	Ø (cm)	Gaya Btg (Kg)	Fa (Kg)	Jml baut
1	1	2L 40x40x5	1.27	381.03	1440	3
	7	2L 40x40x5	1.27	271.43	7734.92	3
2	1	2L 40x40x5	1.27	381.03	1440	3
	13	2L 40x40x6	1.27	1696	9097.55	3
	18	2L 40x40x5	1.27	1055.93	1440	3
	2	2L 40x40x5	1.27	1063.2	2805.9	3
3	2	2L 40x40x5	1.27	1063.2	2805.9	3
	14	2L 40x40x5	1.27	493.63	3750.57	3
	19	2L 40x40x5	1.27	87.64	3567.29	3
	3	2L 40x40x5	1.27	1042.2	2805.9	3
4	3	2L 40x40x5	1.27	1042.2	2805.9	3
	15	2L 40x40x5	1.27	929.896	1440	3
	4	2L 40x40x5	1.27	1042.2	2805.9	3
5	4	2L 40x40x5	1.27	1042.2	2805.9	3
	20	2L 40x40x5	1.27	114.26	1135.5	3
	16	2L 40x40x5	1.27	493.63	3750.57	3
	5	2L 40x40x5	1.27	1063.2	2805.9	3
6	5	2L 40x40x5	1.27	1063.2	2805.9	3
	21	2L 40x40x5	1.27	1055.93	1440	3
	17	2L 40x40x6	1.27	1696	1440	3
	6	2L 40x40x5	1.27	381.032	1440	3
7	6	2L 40x40x5	1.27	381.032	1440	3
	17	2L 40x40x6	1.27	1696	9097.55	3
	12	2L 40x40x5	1.27	271.43	7734.92	3
8	7	2L 40x40x5	1.27	271.43	7734.92	3
	13	2L 40x40x6	1.27	1696	9097.55	3
	8	2L 40x40x5	1.27	535.11	1467.62	3
9	8	2L 40x40x5	1.27	535.11	1467.62	3
	18	2L 40x40x5	1.27	1055.93	1440	3
	14	2L 40x40x5	1.27	493.63	3750.57	3
	9	2L 40x40x5	1.27	824.919	1440	3
10	9	2L 40x40x5	1.27	824.919	1440	3
	19	2L 40x40x5	1.27	87.64	3567.29	3
	15	2L 40x40x5	1.27	929.896	1440	3
	20	2L 40x40x5	1.27	114.26	1135.5	3
	10	2L 40x40x5	1.27	824.919	1440	3
11	10	2L 40x40x5	1.27	824.919	1440	3
	16	2L 40x40x5	1.27	493.63	3750.57	3
	21	2L 40x40x5	1.27	1055.93	1440	3
	11	2L 40x40x5	1.27	310.12	4610.67	3
12	11	2L 40x40x5	1.27	310.12	4610.67	3
	17	2L 40x40x6	1.27	1969	1440	3
	12	2L 40x40x5	1.27	271.43	1440	3

Tabel 7 Pembebanan Kuda-kuda KK-2; KK-3; KK-4

No	join	kuda-kuda	Beban Mati				B.Hidup	B.Angin kanan		B.Angin kiri	
			B.Gording	B.Atap	B.Plafond	B.Kuda2		A.Tekan	A.Hisap	A.Tekan	A.Hisap
1	1	KK 2	20.625	128.1438	32.625	19.8	-	32.64	-	-	25.23
2	2	KK 2	17.857	276.6586	-	-	100	69.16	-	-	55.33
3	3	KK 2	13.8075	258.9388	-	-	100	64.73	-	-	51.79
4	4	KK 2	9.9	240.3514	-	-	-	25.4	20.32	25.4	20.32
5	5	KK 2	13.8075	258.9388	-	-	100	-	51.79	64.73	-
6	6	KK 2	17.857	276.6586	-	-	100	-	55.33	69.16	-
7	7	KK 2	20.625	128.1438	32.625	19.8		-	25.23	32.64	-
8	8	KK 2	-	-	74.7338	51.4801	-	-	-	-	-
9	9	KK 2	-	-	72.72	63.3601	-	-	-	-	-
10	10	KK 2	-	-	67.5	144.9157	-	-	-	-	-
11	11	KK 2	-	-	72.72	63.3601	-	-	-	-	-
12	12	KK 2	-		74.7338	51.4801	-	-	-	-	-
13	13	KK 3	21.45	129.0275	-	-	-	-	-	-	-
14	14	KK 3	15.95	241.4672	-	-	100	-	-	-	-
15	15	KK 3	7.975	148.6975	-	-	100	-	-	-	-
16	16	KK 3	-	-	65.2275	51.4801	-	-	-	-	-
17	17	KK 3	-	-	41.76	63.3601	-	-	-	-	-
18	18	KK 4	21.45	129.0275	-	-	-	-	-	-	-
19	19	KK 4	15.95	241.4672	-	-	100	-	-	-	-
20	20	KK 4	7.975	148.6975	-	-	100	-	-	-	-
21	21	KK 4	-	-	65.2375	70.7489	-	-	-	-	-
22	22	KK 4	-	-	41.76	92.623	-	-	-	-	-
23	23	KK 4	21.45	129.0275	-	-	-	-	-	-	-
24	24	KK 4	15.95	241.4672	-	-	100	-	-	-	-
25	25	KK 4	7.975	148.6975	-	-	100	-	-	-	-
26	26	KK 4	-	-	65.2375	70.7489	-	-	-	-	-
27	27	KK 4	-	-	41.76	92.623	-	-	-	-	-

dalam kg

Tabel 8 Gaya batang dan beban rencana KK-2;KK-3; KK-4

	No	l(m)	B.Mati	B.Hidup	B.A Kiri	B.A Kanan	B.Tetap =B.mati+B.hidup	B. Sementara =B.Tetap+B.A.Kiri	B. Sementara =B.Tetap+B.A.Kanan	1,33.B.Tetap	B.Rencana	Ket
Kuda-kuda penuh tipe 2 (KK 2)	1	1.414	280.19	-0.3839	32.82	-25.47	279.8061	312.6261	254.3361	372.142113	372.14211	tarik
	2	2.051	-408.78	-113.11	-8.11	-1.83	-521.89	-530	-523.72	-694.1137	-694.1137	desak
	3	2.051	-348.97	-76.8	11.26	-20.82	-425.77	-414.51	-446.59	-566.2741	-566.2741	desak
	4	2.051	-348.97	-76.8	-20.49	11.29	-425.77	-446.26	-414.48	-566.2741	-566.2741	desak
	5	2.051	-408.78	-113.11	-1.23	-8.09	-521.89	-523.12	-529.98	-694.1137	-694.1137	desak
	6	1.414	280.19	-0.3839	-20.61	32.82	279.8061	259.1961	312.6261	372.142113	372.14211	tarik
	7	1	-197.72	-0.2752	-46.35	35.92	-197.9952	-244.3452	-162.0752	-263.333616	-263.3336	desak
	8	1.6	-809.56	-180.4	58.23	-70.04	-989.96	-931.73	-1060	-1316.6468	-1316.647	desak
	9	1.6	-275.14	-92.74	37.33	-46.38	-367.88	-330.55	-414.26	-489.2804	-489.2804	tarik
	10	1.6	-275.14	-92.74	-46.54	37.3	-367.88	-414.42	-330.58	-489.2804	-489.2804	tarik
	11	1.6	-809.56	-180.4	-70.75	58.21	-989.96	-1060.71	-931.75	-1316.6468	-1316.647	desak
	12	1	-197.72	-0.27528	29.02	-46.35	-197.99528	-168.97528	-244.34528	-263.333722	-263.3337	desak
	13	1	-891.48	-197.76	-73.6	51.01	-1089.24	-1162.84	-1038.23	-1448.6892	-1448.689	desak
	14	1.774	-199.25	-55.12	12.92	-14.68	-254.37	-241.45	-269.05	-338.3121	-338.3121	desak
	15	2.548	245.45	108.7	2.98	3.18	354.15	357.13	357.33	471.0195	471.0195	tarik
	16	1.774	-199.25	-55.12	-15.02	12.93	-254.37	-269.39	-241.44	-338.3121	-338.3121	desak
	17	1	-891.48	-197.76	45.38	-73.59	-1089.24	-1043.86	-1162.83	-1448.6892	-1448.689	desak
	18	1.486	496.95	81.61	-19.37	21.95	578.56	559.19	600.51	769.4848	769.4848	tarik
	19	1.819	-51.64	-31.79	-74.48	62.69	-83.43	-157.91	-20.74	-110.9619	-157.91	desak
	20	1.819	-51.64	-31.79	62.93	-74.49	-83.43	-20.5	-157.92	-110.9619	-157.92	desak
	21	1.486	496.95	81.61	22.46	-19.39	578.56	601.02	559.17	769.4848	769.4848	tarik

dalam kg

lanjutan tabel 8

	No	l(m)	B.Mati	B.Hidup	B.A Kiri	B.A Kanan	B.Tetap =B.mati+B.hidup	B. Sementara =B.Tetap+B.A.Kiri	B. Sementara =B.Tetap+B.A.Kanan	1,33.B.Tetap	B.Rencana	Ket
Setengah kuda-kuda (KK 3)	22	1.414	286.13	0.758	0.03489	0.03358	286.888	286.92289	286.92158	381.56104	381.56104	tarik
	23	2.0506	-126.83	-67.79	0.001572	0.002154	-194.62	-194.618428	-194.617846	-258.8446	-258.8446	desak
	24	2.0506	-79.38	-15.91	-0.01776	-0.01622	-95.29	-95.30776	-95.30622	-126.7357	-126.7357	desak
	25	1	-202.42	-0.731	-0.03115	-0.0299	-203.151	-203.18215	-203.1809	-270.19083	-270.1908	desak
	26	1.5948	-300.92	8.59	-0.09162	-0.08792	-292.33	-292.42162	-292.41792	-388.7989	-388.7989	desak
	27	1.5948	21.81	63.05	-0.04877	-0.04717	84.86	84.81123	84.81283	112.8638	112.8638	tarik
	28	1	-615.85	-159.58	-0.03903	-0.03701	-775.43	-775.46903	-775.46701	-1031.3219	-1031.322	desak
	29	1.774	-97.95	-34.97	-0.03612	-0.03445	-132.92	-132.95612	-132.95445	-176.7836	-176.7836	desak
	30	1.4857	300.11	50.4	0.04826	0.04598	350.51	350.55826	350.55598	466.1783	466.1783	tarik
	31	1.4857	-42.37	-46.34	0.03061	0.02943	-88.71	-88.67939	-88.68057	-117.9843	-177.9843	desak
Jurai kiri (KK 4)	32	1.732	363.83	0.3813	0.1817	0.1468	364.2113	364.393	364.3581	484.401029	484.40103	tarik
	33	2.5115	-68.57	-62.9	6.34	-6.21	-131.47	-125.13	-137.68	-174.8551	-174.8551	desak
	34	2.5115	47.01	9.64	8.45	-8.29	56.65	65.1	48.36	75.3445	75.3445	tarik
	35	1.4142	-296.86	-0.3829	-0.1741	0.1406	-297.2429	-297.417	-297.1023	-395.333057	-395.3331	desak
	36	2.5192	-263.86	-8.87	31.36	-31.28	-272.73	-241.37	-304.01	-362.7309	-362.7309	desak
	37	2.5192	107.66	46.29	26.43	-26.41	153.95	180.38	127.54	204.7535	204.7535	tarik
	38	1	-563.7	-144.86	4.33	-4.27	-708.56	-704.23	-712.83	-942.3848	-942.3848	desak
	39	1.774	-38.72	-25.91	2.18	-2.16	-64.63	-62.45	-66.79	-85.9579	-85.9579	desak
	40	2.3261	357.28	52.93	-4.77	4.73	410.21	405.44	414.94	545.5793	545.5793	tarik
	41	2.3261	-106.72	-67.31	-1.91	1.9	-174.03	-175.94	-172.13	-231.4599	-231.4599	desak
Jurai kanan (KK 4)	42	1.732	363.83	0.3813	0.1473	0.18	364.2113	364.3586	364.3913	484.401029	484.40103	tarik
	43	2.5115	-68.57	-62.9	-6.36	6.19	-131.47	-137.83	-125.28	-174.8551	-174.8551	desak
	44	2.5115	47.01	9.64	-8.5	8.25	56.65	48.15	64.9	75.3445	75.3445	tarik
	45	1.4142	-296.86	-0.3829	0.141	-0.1724	-297.2429	-297.1019	-297.4153	-395.333057	-395.3331	desak
	46	2.5192	-263.86	-8.87	-31.47	31.18	-272.73	-304.2	-241.55	-362.7309	-362.7309	desak
	47	2.5192	107.66	46.29	-26.47	26.37	153.95	127.48	180.32	204.7535	204.7535	tarik
	48	1	-563.7	-144.86	-4.37	4.22	-708.56	-712.93	-704.34	-942.3848	-942.3848	desak
	49	1.774	-38.72	-25.91	-2.22	2.12	-64.63	-66.85	-62.51	-85.9579	-85.9579	desak
	50	2.3261	357.28	52.93	4.85	-4.65	410.21	415.06	405.56	545.5793	545.5793	tarik
	51	2.3261	-106.72	-67.31	1.95	-1.86	-174.03	-172.08	-175.89	-231.4599	-231.4599	desak

dalam kg

Tabel 9 Perhitungan dimensi batang tarik **KK-2**

BATANG TARIK		Btg Atas no 1=6	Btg Bawah	Btg Vertikal no 15	Btg Diagonal no 18=21
Gaya tarik	kg	372.65	0	471.0195	769.4848
Panjang	m	1.414	0	2.548	1.486
	cm	141.4	0	254.8	148.6
Fy	kg/cm^2	2400	0	2400	2400
Fu	kg/cm^2	3700	0	3700	3700
r min	cm	0.589166667	0	1.061666667	0.61916667
d baut	cm	0.9525	0	0.9525	0.9525
tp	cm	1	0	1	1
n		2	0	2	2
Ag1	cm^2	0.258784722	0	0.327096875	0.53436444
Ag2	cm^2	2.776979332	0	2.839535453	3.02933851
trial Profil		2L 40x40x5	0	2L 40x40x5	2L 40x40x5
A	cm^2	3.79	0	3.79	3.79
w	kg/cm^2	2.97	0	2.97	2.97
r	cm	1.2	0	1.2	1.2
r pakai	cm	1.2	0	1.2	1.2
A bruto	cm^2	7.58	0	7.58	7.58
A lubang	cm^2	2.54	0	2.54	2.54
A netto	cm^2	5.04	0	5.04	5.04
A efektif	cm^2	4.284	0	4.284	4.284
Kontrol Tegangan					
T/Aprofil	kg/cm^2	49.16226913	0	62.13977573	101.515145
0,6.Fy	kg/cm^2	1440	0	1440	1440
T/Aprofil<0,6.Fy		OK	0	OK	OK
T/Aefektif	kg/cm^2	86.98646125	0	109.9485294	179.618301
0,5.Fu	kg/cm^2	1850	0	1850	1850
T/Aefektif<0,5.Fu		OK	0	OK	OK
		2L 40x40x5	-	2L 40x40x5	2L 40x40x5

Tabel 10 Perhitungan dimensi batang desak **KK-2**

BATANG DESAK		Btg Atas no 2 = 5	Btg Bawah no 8	Btg Vertikal no 13 = 17	Btg Diagonal no 19=20
Gaya tekan	kg	694.1137	1316.647	1448.689	157.91
Pajang	m	2.051	1.6	1	1.819
	cm	205.1	160	100	181.9
Fy	kg/cm^2	2400	2400	2400	2400
Fu	kg/cm^2	3700	3700	3700	3700
E	Mpa	2100000	2100000	2100000	2100000
K (sendi-sendi)		1	1	1	1
r min	cm	1.0255	0.8	0.5	0.9095
tp	cm	1	1	1	1
trial Profil		2L 40x40x5	2L 40x40x5	2L 40x40x5	2L 40x40x5
A	cm^2	3.79	3.79	3.79	3.79
A total	cm^2	7.58	7.58	7.58	7.58
r	cm	1.2	1.2	1.2	1.2
w	kg/cm	2.97	2.97	2.97	2.97
Ix=Iy	cm^4	5.43	5.43	5.43	5.43
ix=iy	cm^4	1.2	1.2	1.2	1.2
e		1.16	1.16	1.16	1.16
x	cm	1.66	1.66	1.66	1.66
Ix gabungan	cm^4	10.86	10.86	10.86	10.86
Iy gabungan	cm^4	23.4428	23.4428	23.4428	23.4428
Ix gabungan	cm^4	1.19696185	1.19696185	1.19696185	1.19696185
Iy gabungan	cm^4	1.75861243	1.75861243	1.75861243	1.75861243
r pakai	cm	1.2	1.2	1.2	1.2
KL/r		170.916667	133.333333	83.3333333	151.583333
Cc		130.639453	130.639453	130.639453	130.639453
Cek		KL/r>Cc	KL/r>Cc	KL/r<Cc	KL/r>Cc
Fs		0	0	1.87342999	0
Fa	kg/cm^2	370.172048	608.268011	1020.43779	470.619095
P		2805.90412	4610.67152	7734.91841	3567.29274
		2L 40x40x5	2L 40x40x5	2L 40x40x5	2L 40x40x5

Tabel 11 Rekapitulasi perhitungan tegangan batang KK-2; KK-3; KK-4

No Btg	l(m)	Gaya batang = B.Rencana (kg)	Tipe Btg	Tegangan Terjadi (kg/cm^2)			Teg ijin (kg/cm^2)		
				Teg tarik		Teg desak	Teg tarik		Fa
				T/A.Profil	T/A$_{effektif}$		0,6.Fy	0,5.Fu	
1	1.414	372.14211	tarik	49.162269	86.986461	-	1440	1850	-
2	2.051	-694.1137	desak	-	-	91.57173	-	-	370.172
3	2.051	-566.2741	desak	-	-	74.70635	-	-	370.172
4	2.051	-566.2741	desak	-	-	74.70635	-	-	370.172
5	2.051	-694.1137	desak	-	-	91.57173	-	-	370.172
6	1.414	372.14211	tarik	49.162269	86.986461	-	1440	1850	-
7	1	-263.3336	desak	-	-	34.74058	-	-	1020.4377
8	1.6	-1316.647	desak	-	-	173.7004	-	-	608.268
9	1.6	-489.2804	desak	-	-	64.54887	-	-	608.268
10	1.6	-489.2804	desak	-	-	64.54887	-	-	608.268
11	1.6	-1316.647	desak	-	-	173.7004	-	-	608.268
12	1	-263.3337	desak	-	-	34.74058	-	-	1020.4377
13	1	-1448.689	desak	-	-	191.119	-	-	1020.4378
14	1.774	-338.3121	desak	-	-	44.6322	-	-	494.7977
15	2.548	471.0195	tarik	62.139776	109.94853	-	1440	1850	-
16	1.774	-338.3121	desak	-	-	44.6322	-	-	494.7977
17	1	-1448.689	desak	-	-	191.119	-	-	1020.4378
18	1.486	769.4848	tarik	101.51515	179.6183	-	1440	1850	-
19	1.819	-157.91	desak	-	-	20.83245	-	-	470.6191
20	1.819	-157.92	desak	-	-	20.83245	-	-	470.6191
21	1.486	769.4848	tarik	101.51515	179.6183	-	1440	1850	-
22	1.414	381.56104	tarik	50.337863	89.066527	-	1440	1850	-
23	2.0506	-258.8446	desak	-	-	34.14836	-	-	774.1703
24	2.0506	-126.7357	desak	-	-	16.71975	-	-	370.3165
25	1	-270.1908	desak	-	-	35.64522	-	-	1020.438
26	1.5948	-388.7989	desak	-	-	51.29273	-	-	612.2411
27	1.5948	112.8638	tarik	14.88968	26.34542	-	1440	1850	-
28	1	-1031.322	desak	-	-	136.0583	-	-	1020.438
29	1.774	-176.7836	desak	-	-	23.32237	-	-	494.7977
30	1.4857	466.1783	tarik	61.50109	108.81846	-	1440	1850	-
31	1.4857	-177.9843	desak			23.48078			690.2139
32	1.732	484.40103	tarik	63.905145	113.07213	-	1440	1850	-
33	2.5115	-174.8551	desak	-	-	23.06796	-	-	246.8701
34	2.5115	75.3445	tarik	9.9399	17.58741	-	1440	1850	-
35	1.4142	-395.3331	desak	-	-	52.15467	-	-	744.0225
36	2.5192	-362.7309	desak	-	-	47.85368	-	-	245.3633
37	2.5192	204.7535	tarik	27.012335	47.794935	-	1440	1850	-
38	1	-942.3848	desak	-	-	124.3252	-	-	1020.438
39	1.774	-85.9579	desak	-	-	23.7321	-	-	470.6191
40	2.3261	545.5793	tarik	71.976161	127.35278	-	1440	1850	-
41	2.3261	-231.4599	desak	-	-	30.53561	-	-	287.7916
42	1.732	484.40103	tarik	63.905145	113.07213	-	1440	1850	-
43	2.5115	-174.8551	desak	-	-	23.06796	-	-	246.8701
44	2.5115	75.3445	tarik	9.9399	17.58741	-	1440	1850	-
45	1.4142	-395.3331	desak	-	-	52.15467	-	-	744.0225
46	2.5192	-362.7309	desak	-	-	47.85368	-	-	245.3633
47	2.5192	204.7535	tarik	27.012335	47.794935	-	1440	1850	-
48	1	-942.3848	desak	-	-	124.3252	-	-	1020.438
49	1.774	-85.9579	desak	-	-	23.7321	-	-	470.6191
50	2.3261	545.5793	tarik	71.976161	127.35278	-	1440	1850	-
51	2.3261	-231.4599	desak	-	-	30.53561	-	-	287.7916

Tabel 14 Perhitungan tulangan pelat lantai 2

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	8.97707347	8.97707347	8.97707347	8.97707347
ly	m	4.8	4.8	4.8	4.8
lx	m	2.5	2.5	2.5	2.5
ly/lx		1.92	1.92	1.92	1.92
c		61.2	61.2	35	35
Mu	KNm	3.4337306	3.4337306	1.96373482	1.96373482
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	4.29216325	4.29216325	2.45466853	2.45466853
Rn	MPa	0.47558596	0.47558596	0.27198543	0.33974651
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00200429	0.00200429	0.00114062	0.00142711
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		0.00266571	0.00266571	0.00151702	0.00189806
		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
ρ terpakai		0.00266571	0.00266571	0.00151702	0.00189806
As perlu	mm^2	253.24248	253.24248	144.117278	161.334957
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	310.136816	310.136816	544.971551	486.812143
S terpakai	mm	200	200	200	200
As ada	mm^2	392.699082	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	4.43518963	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	8.74453568	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 15 Perhitungan tulangan pelat lantai 3

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.12	9.12	9.12	9.12
ly	m	2.5	2.5	2.5	2.5
lx	m	2.4	2.4	2.4	2.4
ly/lx		1.04166667	1.04166667	1.04166667	1.04166667
c		38.4	38.4	36.4	36.4
Mu	KNm	2.01719808	2.01719808	1.91213568	1.91213568
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	2.5214976	2.5214976	2.3901696	2.3901696
Rn	MPa	0.27939032	0.27939032	0.26483874	0.33081932
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00117188	0.00117188	0.00111046	0.00138931
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		0.0015586	0.0015586	0.00147691	0.00184779
		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
ρ terpakai		0.0015586	0.0015586	0.00147691	0.00184779
As perlu	mm^2	148.067222	148.067222	140.306397	157.06192
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	530.43351	530.43351	559.773597	500.056389
S terpakai	mm	240	200	200	200
As ada	mm^2	327.249235	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	3.69599136	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	7.31614131	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 16 Perhitungan tulangan pelat lantai 4

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.07284846	9.07284846	9.07284846	9.07284846
ly	m	7.2	7.2	7.2	7.2
lx	m	2.5	2.5	2.5	2.5
ly/lx		2.88	2.88	2.88	2.88
c		63	63	38	13
Mu	KNm	3.57243408	3.57243408	2.15480151	0.73716894
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	4.4655426	4.4655426	2.69350189	0.92146117
Rn	MPa	0.49479696	0.49479696	0.29844896	0.12753788
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00208623	0.00208623	0.00125239	0.00053301
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.00277469	0.00277469	0.00166568	0.00070891
ρ terpakai		0.00248866	0.00248866	0.00149472	0.00060625
As perlu	mm^2	236.42251	236.42251	141.9984	51.531165
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	332.201093	332.201093	553.10353	1524.12266
S terpakai	mm	200	200	200	200
As ada	mm^2	392.699082	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	4.43518963	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	8.74453568	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 17 Perhitungan tulangan pelat lantai 5

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.069941639	9.069941639	9.069941639	9.069941639
ly	m	7.2	7.2	7.2	7.2
lx	m	2.5	2.5	2.5	2.5
ly/lx		2.88	2.88	2.88	2.88
c		63	63	38	13
Mu	KNm	3.57128952	3.57128952	2.154111139	0.736932758
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	4.4641119	4.4641119	2.692638924	0.921165948
Rn	MPa	0.494638438	0.494638438	0.298353343	0.127497017
m		11.29411765	11.29411765	11.29411765	11.29411765
ρ perlu		0.002085556	0.002085556	0.001251991	0.000532841
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.005833333	0.005833333	0.005833333	0.005833333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.002773789	0.002773789	0.001665147	0.000708678
ρ terpakai		0.001512194	0.001512194	0.001512194	0.001512194
As perlu	mm^2	143.65843	143.65843	143.65843	128.53649
A1Ø	mm^2	78.53981635	78.53981635	78.53981635	78.53981635
S	mm	546.7122003	546.7122003	546.7122003	611.0312826
S terpakai	mm	200	200	200	200
As ada	mm^2	392.6990818	392.6990818	392.6990818	392.6990818
kontrol		OK	OK	OK	OK
a	mm	4.435189629	4.435189629	4.435189629	4.435189629
Mn akhir	KNm	8.744535677	8.744535677	8.744535677	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.28571429	50.28571429	50.28571429	50.28571429
s	mm	209.5238095	209.5238095	209.5238095	209.5238095
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 18 Perhitungan tulangan pelat lantai 6

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	8.97707347	8.97707347	8.97707347	8.97707347
ly	m	7.2	7.2	7.2	7.2
lx	m	2.5	2.5	2.5	2.5
ly/lx		2.88	2.88	2.88	2.88
c		63	63	38	13
Mu	KNm	3.53472268	3.53472268	2.13205495	0.72938722
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	4.41840335	4.41840335	2.66506869	0.91173402
Rn	MPa	0.48957378	0.48957378	0.29529847	0.12619156
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00206395	0.00206395	0.00123908	0.00052737
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.00274505	0.00274505	0.00164798	0.0007014
ρ terpakai		0.00288845	0.00288845	0.00173363	0.00070272
As perlu	mm^2	274.402655	274.402655	164.695135	59.731285
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	286.221051	286.221051	476.880002	1314.88576
S terpakai	mm	200	200	200	200
As ada	mm^2	392.699082	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	4.43518963	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	8.74453568	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 19 Perhitungan tulangan pelat lantai 7

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.12	9.12	9.12	9.12
ly	m	2.4	2.4	2.4	2.4
lx	m	2.4	2.4	2.4	2.4
ly/lx		1	1	1	1
c		36	36	36	36
Mu	KNm	1.8911232	1.8911232	1.8911232	1.8911232
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	2.363904	2.363904	2.363904	2.363904
Rn	MPa	0.26192842	0.26192842	0.26192842	0.32718394
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00109818	0.00109818	0.00109818	0.00137393
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.00146058	0.00146058	0.00146058	0.00182732
ρ terpakai		0.00151219	0.00151219	0.00151219	0.00151219
As perlu	mm^2	143.65843	143.65843	143.65843	128.53649
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	546.7122	546.7122	546.7122	611.031283
S terpakai	mm	200	200	200	200
As ada	mm^2	392.699082	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	4.43518963	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	8.74453568	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 20 Perhitungan tulangan pelat lantai 8

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.08362404	9.08362404	9.08362404	9.08362404
ly	m	2.5	2.5	2.5	2.5
lx	m	2.4	2.4	2.4	2.4
ly/lx		1.04166667	1.04166667	1.04166667	1.04166667
c		38.4	38.4	36.4	36.4
Mu	KNm	2.0091523	2.0091523	1.90450895	1.90450895
h	KNm	120	120	120	120
d	mm	95	95	95	85
0	KNm	2.51144037	2.51144037	2.38063619	2.38063619
Rn	MPa	0.27827594	0.27827594	0.2637824	0.32949982
m		11.2941176	11.2941176	11.2941176	11.2941176
ρ perlu		0.00116718	0.00116718	0.001106	0.00138373
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.00583333	0.00583333	0.00583333	0.00583333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.00155234	0.00155234	0.00147098	0.00184036
ρ terpakai		0.00151219	0.00151219	0.00151219	0.00151219
As perlu	mm^2	143.65843	143.65843	143.65843	128.53649
A1Ø	mm^2	78.5398164	78.5398164	78.5398164	78.5398164
S	mm	546.7122	546.7122	546.7122	611.031283
S terpakai	mm	200	200	200	200
As ada	mm^2	392.699082	392.699082	392.699082	392.699082
kontrol		OK	OK	OK	OK
a	mm	4.43518963	4.43518963	4.43518963	4.43518963
Mn akhir	KNm	8.74453568	8.74453568	8.74453568	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.2857143	50.2857143	50.2857143	50.2857143
s	mm	209.52381	209.52381	209.52381	209.52381
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 21 Perhitungan tulangan pelat lantai 9

Data-data		tul Tx	tul Lx	tul Ty	tul Ly
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
b	mm	1000	1000	1000	1000
pb	mm	20	20	20	20
Ø	mm	10	10	10	10
qD	KN/m^2	3.6	3.6	3.6	3.6
qL	KN/m^2	3	3	3	3
qu	KN/m^2	9.069941639	9.069941639	9.069941639	9.069941639
ly	m	2.5	2.5	2.5	2.5
lx	m	2.4	2.4	2.4	2.4
ly/lx		1.041666667	1.041666667	1.041666667	1.041666667
c		38.4	38.4	36.4	36.4
Mu	KNm	2.006125971	2.006125971	1.901640244	1.901640244
h	KNm	120	120	120	120
d	mm	95	95	95	85
Mn	KNm	2.507657464	2.507657464	2.377050305	2.377050305
Rn	MPa	0.277856783	0.277856783	0.263385075	0.329003502
m		11.29411765	11.29411765	11.29411765	11.29411765
ρ perlu		0.001165406	0.001165406	0.001104325	0.001381628
ρb		0.05375744	0.05375744	0.05375744	0.05375744
ρ maks		0.04031808	0.04031808	0.04031808	0.04031808
ρ min		0.005833333	0.005833333	0.005833333	0.005833333
1,33.ρ perlu		1,33rperlu	1,33rperlu	1,33rperlu	1,33rperlu
		0.00154999	0.00154999	0.001468752	0.001837565
ρ terpakai		0.00139142	0.00139142	0.00131854	0.001570864
As perlu	mm^2	132.1849	132.1849	125.2613	133.52344
A1Ø	mm^2	78.53981635	78.53981635	78.53981635	78.53981635
S	mm	594.1663257	594.1663257	627.0078336	588.2099529
S terpakai	mm	200	200	200	200
As ada	mm^2	392.6990818	392.6990818	392.6990818	392.6990818
kontrol		OK	OK	OK	OK
a	mm	4.435189629	4.435189629	4.435189629	4.435189629
Mn akhir	KNm	8.744535677	8.744535677	8.744535677	7.80205788
		aman	aman	aman	aman
		P10-200	**P10-200**	**P10-200**	**P10-200**
Tulangan bagi					
As	mm^2	240	240	240	240
Ø	mm	8	8	8	8
A1Ø	mm^2	50.28571429	50.28571429	50.28571429	50.28571429
s	mm	209.5238095	209.5238095	209.5238095	209.5238095
s pakai	mm	200	200	200	200
		P8-200	**P8-200**	**P8-200**	**P8-200**

Tabel 22 Perhitungan tulangan balok portal A/atap

		A/1-2		A/2-4			A/4-7			A/7-8			A/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	22.5	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58
pb		0.02438	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
pmaks		0.01829	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
pmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
prencana		0.00914	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		20.915	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.30789	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	17.38	37.47	35.01	22.38	28.67	26.36	22.74	27.01	28.45	22.55	34.74	37.42	17.38
mn	KNm	21.725	46.8375	43.7625	27.975	35.8375	32.95	28.425	33.7625	35.5625	28.1875	43.425	46.775	21.725
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	300	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	147.96	252.422	243.995	195.081	220.8	211.718	196.644	214.313	219.951	195.821	243.053	252.254	171.914
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.61914	2.00222	1.87077	1.19588	1.53199	1.40855	1.21512	1.44329	1.52023	1.20496	1.85634	1.99955	0.9287
ρ baru		0.00171	0.00553	0.00517	0.00331	0.00423	0.00389	0.00336	0.00399	0.0042	0.00333	0.00513	0.00553	0.00257
As	mm^2	175.6	378.581	353.726	226.118	289.67	266.33	229.755	272.898	287.447	227.836	350.998	378.076	175.6
n		2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	28.0461	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	52.7762	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 23 Perhitungan tulangan balok portal A/lantai 4

		A/1-2		A/2-4			A/4-7			A/7-8			A/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	53.4	144.48	137.52	78.28	132.38	112.08	45.96	116.54	135.09	73.75	156.19	177.71	65.74
mn	KNm	66.75	180.6	171.9	97.85	165.475	140.1	57.45	145.675	168.863	92.1875	195.238	222.138	82.175
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	246.043	404.71	394.842	297.896	387.392	356.454	228.26	363.477	391.338	289.148	420.791	448.844	272.995
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	rangkap	sebelah
TUL SEBELAH														
Rn baru	MPa	1.14667	3.10245	2.953	1.68092	2.84262	2.40672	0.98691	2.50249	2.90082	1.58365	3.3539	0	1.41165
ρ baru		0.00317	0.00858	0.00816	0.00465	0.00786	0.00665	0.00273	0.00692	0.00802	0.00438	0.00927	0	0.0039
As	mm^2	418.887	1133.35	1078.75	614.054	1038.43	879.192	360.525	914.178	1059.69	578.519	1225.21	0	515.686
n		2	4	4	3	4	3	2	4	4	3	5	0	2
As ada	mm^2	567.286	1134.57	1134.57	850.929	1134.57	850.929	567.286	1134.57	1134.57	850.929	1418.21	0	567.286
a	mm	35.5944	71.1888	71.1888	53.3916	71.1888	53.3916	35.5944	71.1888	71.1888	53.3916	88.986	0	35.5944
mn	KNm	95.9173	183.758	183.758	140.847	183.758	140.847	95.9173	183.758	183.758	140.847	224.649	0	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	-	aman
TUL RANGKAP														
p 1		0	0	0	0	0	0	0	0	0	0	0	0.01016	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	1342.66	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	84.2456	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	213.955	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	8.18271	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	239.803	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	89.5607	0
n		0	0	0	0	0	0	0	0	0	0	0	2	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	567.286	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	1432.23	0
n		0	0	0	0	0	0	0	0	0	0	0	5	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	1418.21	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0.01073	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0.00429	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0.00644	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	31.6521	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	86.1694	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	225.153	0
		-	-	-	-	-	-	-	-	-	-	-	aman	-

Tabel 24 Perhitungan tulangan balok portal A/lantai 3

		A/1-2		A/2-4			A/4-7			A/7-8			A/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	48.08	130.45	123.56	63.33	120.13	101.9	44.86	103.17	119.35	63.69	125.03	130.45	48.08
mn	KNm	60.1	163.063	154.45	79.1625	150.163	127.375	56.075	128.963	149.188	79.6125	156.288	163.063	60.1
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	233.465	384.558	374.265	267.944	369.033	339.881	225.512	341.993	367.833	268.705	376.484	384.558	233.465
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	1.03243	2.80118	2.65323	1.3599	2.57958	2.18812	0.96329	2.21539	2.56283	1.36763	2.6848	2.80118	1.03243
ρ baru		0.00285	0.00774	0.00733	0.00376	0.00713	0.00605	0.00266	0.00612	0.00708	0.00378	0.00742	0.00774	0.00285
As	mm^2	377.155	1023.29	969.245	496.781	942.339	799.337	351.896	809.299	936.22	499.605	980.776	1023.29	377.155
n		2	4	4	2	4	3	2	3	4	2	4	4	2
As ada	mm^2	567.286	1134.57	1134.57	567.286	1134.57	850.929	567.286	850.929	1134.57	567.286	1134.57	1134.57	567.286
a	mm	35.5944	71.1888	71.1888	35.5944	71.1888	53.3916	35.5944	53.3916	71.1888	35.5944	71.1888	71.1888	35.5944
mn	KNm	95.9173	183.758	183.758	95.9173	183.758	140.847	95.9173	140.847	183.758	95.9173	183.758	183.758	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 25 Perhitungan tulangan balok portal A/lantai 2

		A/1-2		A/2-4			A/4-7			A/7-8			A/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	48.14	130.58	124.52	63.35	119.3	102.82	44.02	102.65	119.48	63.43	125.41	130.69	48.2
mn	KNm	60.175	163.225	155.65	79.1875	149.125	128.525	55.025	128.313	149.35	79.2875	156.763	163.363	60.25
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	233.611	384.75	375.716	267.987	367.756	341.412	223.391	341.13	368.034	268.156	377.056	384.912	233.756
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	1.03372	2.80397	2.67384	1.36033	2.56175	2.20788	0.94525	2.20422	2.56562	1.36205	2.69296	2.80633	1.03501
ρ baru		0.00286	0.00775	0.00739	0.00376	0.00708	0.0061	0.00261	0.00609	0.00709	0.00377	0.00744	0.00776	0.00286
As	mm^2	377.626	1024.31	976.775	496.938	935.828	806.553	345.307	805.22	937.24	497.566	983.757	1025.17	378.096
n		2	4	4	2	4	3	2	3	4	2	4	4	2
As ada	mm^2	567.286	1134.57	1134.57	567.286	1134.57	850.929	567.286	850.929	1134.57	567.286	1134.57	1134.57	567.286
a	mm	35.5944	71.1888	71.1888	35.5944	71.1888	53.3916	35.5944	53.3916	71.1888	35.5944	71.1888	71.1888	35.5944
mn	KNm	95.9173	183.758	183.758	95.9173	183.758	140.847	95.9173	140.847	183.758	95.9173	183.758	183.758	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 26 Perhitungan tulangan balok portal A/lantai 1

		A/1-2		A/2-4			A/4-7			A/7-8			A/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	48.27	130.8	125.3	63.55	118.46	103.37	43.58	102.92	118.13	63.57	126.28	131.07	48.39
mn	KNm	60.3375	163.5	156.625	79.4375	148.075	129.213	54.475	128.65	147.663	79.4625	157.85	163.838	60.4875
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	233.926	385.074	376.891	268.409	366.459	342.324	222.271	341.578	365.949	268.452	378.362	385.471	234.217
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	1.03651	2.8087	2.69059	1.36462	2.54372	2.21969	0.9358	2.21002	2.53663	1.36505	2.71164	2.81449	1.03909
ρ baru		0.00287	0.00776	0.00744	0.00377	0.00703	0.00614	0.00259	0.00611	0.00701	0.00377	0.0075	0.00778	0.00287
As	mm^2	378.646	1026.04	982.894	498.507	929.239	810.868	341.856	807.338	926.65	498.664	990.581	1028.16	379.587
n		2	4	4	2	4	3	2	3	4	2	4	4	2
As ada	mm^2	567.286	1134.57	1134.57	567.286	1134.57	850.929	567.286	850.929	1134.57	567.286	1134.57	1134.57	567.286
a	mm	35.5944	71.1888	71.1888	35.5944	71.1888	53.3916	35.5944	53.3916	71.1888	35.5944	71.1888	71.1888	35.5944
mn	KNm	95.9173	183.758	183.758	95.9173	183.758	140.847	95.9173	140.847	183.758	95.9173	183.758	183.758	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 27 Perhitungan tulangan balok portal B/atap

		B/1-2		B/2-4			B/4-7			B/7-8			B/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
ρb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	17.16	38.11	16.24	3.08	7	9.53	5.22	9.53	7.15	2.98	16.2	38.16	17.16
mn	KNm	21.45	47.6375	20.3	3.85	8.75	11.9125	6.525	11.9125	8.9375	3.725	20.25	47.7	21.45
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	170.822	254.569	166.18	72.3704	109.102	127.301	94.2152	127.301	110.265	71.1859	165.975	254.736	170.822
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.91695	2.03642	0.86779	0.16458	0.37405	0.50924	0.27893	0.50924	0.38206	0.15924	0.86565	2.03909	0.91695
ρ baru		0.00253	0.00563	0.0024	0.00045	0.00103	0.00141	0.00077	0.00141	0.00106	0.00044	0.00239	0.00564	0.00253
As	mm^2	173.377	385.048	164.082	31.119	70.7251	96.2871	52.7407	96.2871	72.2406	30.1087	163.678	385.553	173.377
n		2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 a	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 28 Perhitungan tulangan balok portal B/lantai 4

		B/1-2		B/2-4			B/4-7			B/7-8			B/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	49.61	113.8	86.07	42.37	84.12	89.92	46.62	90.34	80.31	41.08	93.83	135.78	60.83
mn	KNm	62.0125	142.25	107.588	52.9625	105.15	112.4	58.275	112.925	100.388	51.35	117.288	169.725	76.0375
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	237.151	359.179	312.367	219.164	308.809	319.277	229.893	320.022	301.734	215.802	326.145	392.336	262.602
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	1.06529	2.44365	1.8482	0.90982	1.80633	1.93087	1.00108	1.93989	1.72451	0.88212	2.01483	2.91563	1.30622
ρ baru		0.00294	0.00676	0.00511	0.00252	0.00499	0.00534	0.00277	0.00536	0.00477	0.00244	0.00557	0.00806	0.00361
As	mm^2	389.157	892.684	675.161	332.364	659.865	705.362	365.702	708.656	629.978	322.245	736.033	1065.1	477.17
n		2	4	3	2	3	3	2	3	3	2	3	4	2
As ada	mm^2	567.286	1134.57	850.929	567.286	850.929	850.929	567.286	850.929	850.929	567.286	850.929	1134.57	567.286
a	mm	35.5944	71.1888	53.3916	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	35.5944	53.3916	71.1888	35.5944
mn	KNm	95.9173	183.758	140.847	95.9173	140.847	140.847	95.9173	140.847	140.847	95.9173	140.847	183.758	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
p 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad:	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
p		0	0	0	0	0	0	0	0	0	0	0	0	0
p'		0	0	0	0	0	0	0	0	0	0	0	0	0
p1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 29 Perhitungan tulangan balok portal B/lantai 3

		B/1-2		B/2-4			B/4-7			B/7-8			B/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	45.17	104.99	85.27	42.73	84.19	89.68	46.16	91.08	83.15	43.38	86.43	104.99	45.17
mn	KNm	56.4625	131.238	106.588	53.4125	105.238	112.1	57.7	113.85	103.938	54.225	108.038	131.238	56.4625
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	226.29	344.996	310.912	220.093	308.937	318.851	228.756	321.33	307.023	221.761	313.02	344.996	226.29
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.96994	2.25447	1.83102	0.91755	1.80783	1.92572	0.9912	1.95578	1.7855	0.93151	1.85593	2.25447	0.96994
ρ baru		0.00268	0.00623	0.00506	0.00254	0.005	0.00532	0.00274	0.00541	0.00494	0.00258	0.00513	0.00623	0.00268
As	mm^2	354.328	823.576	668.886	335.188	660.414	703.479	362.094	714.461	652.256	340.287	677.985	823.576	354.328
n		2	3	3	2	3	3	2	3	3	3	3	3	2
As ada	mm^2	567.286	850.929	850.929	567.286	850.929	850.929	567.286	850.929	850.929	850.929	850.929	850.929	567.286
a	mm	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	53.3916	53.3916	53.3916	35.5944
mn	KNm	95.9173	140.847	140.847	95.9173	140.847	140.847	95.9173	140.847	140.847	140.847	140.847	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 a	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 30 Perhitungan tulangan balok portal B/lantai 2

		B/1-2		B/2-4			B/4-7			B/7-8			B/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	45.12	104.86	86.12	42.75	83.52	90.58	46.38	90.29	83.51	42.98	86.88	104.75	45.06
mn	KNm	56.4	131.075	107.65	53.4375	104.4	113.225	57.975	112.863	104.388	53.725	108.6	130.938	56.325
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	226.165	344.782	312.458	220.145	307.705	320.447	229.301	319.934	307.687	220.736	313.834	344.601	226.014
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.96887	2.25168	1.84927	0.91798	1.79344	1.94504	0.99593	1.93882	1.79323	0.92292	1.86559	2.24932	0.96758
ρ baru		0.00268	0.00622	0.00511	0.00254	0.00496	0.00538	0.00275	0.00536	0.00496	0.00255	0.00516	0.00622	0.00267
As	mm^2	353.936	822.556	675.553	335.345	655.158	710.539	363.82	708.264	655.08	337.149	681.515	821.693	353.465
n		2	3	3	2	3	3	2	3	3	3	3	3	2
As ada	mm^2	567.286	850.929	850.929	567.286	850.929	850.929	567.286	850.929	850.929	850.929	850.929	850.929	567.286
a	mm	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	53.3916	53.3916	53.3916	35.5944
mn	KNm	95.9173	140.847	140.847	95.9173	140.847	140.847	95.9173	140.847	140.847	140.847	140.847	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 31 Perhitungan tulangan balok portal B/lantai 1

		B/1-2		B/2-4			B/4-7			B/7-8			B/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	44.98	104.64	87.1	42.37	83.4	90.07	46.24	90.18	82.95	42.78	87.83	104.37	44.87
mn	KNm	56.225	130.8	108.875	52.9625	104.25	112.588	57.8	112.725	103.688	53.475	109.788	130.463	56.0875
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	225.813	344.42	314.231	219.164	307.484	319.544	228.954	319.739	306.654	220.222	315.545	343.976	225.537
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.96586	2.24696	1.87032	0.90982	1.79087	1.93409	0.99292	1.93645	1.7812	0.91862	1.88599	2.24116	0.9635
ρ baru		0.00267	0.00621	0.00517	0.00252	0.00495	0.00535	0.00274	0.00535	0.00492	0.00254	0.00521	0.0062	0.00266
As	mm^2	352.838	820.83	683.241	332.364	654.217	706.538	362.722	707.401	650.687	335.58	688.967	818.712	351.975
n		2	3	3	2	3	3	2	3	3	3	3	3	2
As ada	mm^2	567.286	850.929	850.929	567.286	850.929	850.929	567.286	850.929	850.929	850.929	850.929	850.929	567.286
a	mm	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	35.5944	53.3916	53.3916	53.3916	53.3916	53.3916	35.5944
mn	KNm	95.9173	140.847	140.847	95.9173	140.847	140.847	95.9173	140.847	140.847	140.847	140.847	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 a	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^4	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 32 Perhitungan tulangan balok portal C/atap

		C/1-2		C/2-4			C/4-7			C/7-8			C/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	16.74	36.57	15.84	2.64	2.2	11.92	3.82	2.42	10.94	2.73	5.59	36.31	16.51
mn	KNm	20.925	45.7125	19.8	3.3	2.75	14.9	4.775	3.025	13.675	3.4125	6.9875	45.3875	20.6375
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	137.758	203.612	134.004	54.7069	49.9403	116.246	65.8069	52.3778	111.365	55.6316	79.606	202.886	136.809
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.59634	1.30275	0.56428	0.09405	0.07837	0.42463	0.13608	0.08621	0.38972	0.09725	0.19914	1.29349	0.58814
ρ baru		0.00165	0.0036	0.00156	0.00026	0.00022	0.00117	0.00038	0.00024	0.00108	0.00027	0.00055	0.00358	0.00163
As	mm^2	169.134	369.488	160.041	26.6735	22.2279	120.435	38.5957	24.4507	110.533	27.5828	56.479	366.861	166.81
n		2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415
mn	KNm	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 33 Perhitungan tulangan balok portal C/lantai 5

		C/1-2		C/2-4		
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)
f'c	Mpa	25	25	25	25	25
fy	Mpa	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	44.62	105.64	76.21	24.87	25.45
mn	KNm	55.775	132.05	95.2625	31.0875	31.8125
∅	mm	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300
h	mm	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5
d perlu	mm	224.908	346.062	293.931	167.91	169.857
tipe		sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH						
Rn baru	MPa	0.95813	2.26843	1.63647	0.53404	0.54649
ρ baru		0.00265	0.00627	0.00452	0.00148	0.00151
As	mm^2	350.014	828.674	597.816	195.088	199.638
n		2	3	3	2	2
As ada	mm^2	567.286	850.929	850.929	567.286	567.286
a	mm	35.5944	53.3916	53.3916	35.5944	35.5944
mn	KNm	95.9173	140.847	140.847	95.9173	95.9173
		aman	aman	aman	aman	aman
TUL RANGKAP						
ρ 1		0	0	0	0	0
As 1	mm^2	0	0	0	0	0
a	mm	0	0	0	0	0
mn 1	KNm	0	0	0	0	0
mn 2	KNm	0	0	0	0	0
fs '	MPa	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0
n		0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0
As	mm^2	0	0	0	0	0
n		0	0	0	0	0
As ada	mm^2	0	0	0	0	0
ρ		0	0	0	0	0
ρ'		0	0	0	0	0
ρ1		0	0	0	0	0
fs '	MPa	0	0	0	0	0
a	mm	0	0	0	0	0
mn	KNm	0	0	0	0	0
		-	-	-	-	-

Tabel 34 Perhitungan tulangan balok portal C/lantai 4

		C/1-2		C/2-4			C/4-7			C/7-8			C/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	40.56	96.82	63.77	18.16	48.87	68.24	37.35	63.94	69.7	32.64	71.9	131.81	58.02
mn	KNm	50.7	121.025	79.7125	22.7	61.0875	85.3	46.6875	79.925	87.125	40.8	89.875	164.763	72.525
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	214.432	331.301	268.874	143.482	235.375	278.137	205.771	269.232	281.097	192.36	285.499	386.557	256.465
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.87095	2.07904	1.36935	0.38995	1.0494	1.46533	0.80202	1.373	1.49668	0.70089	1.54392	2.83038	1.24588
p baru		0.00241	0.00575	0.00379	0.00108	0.0029	0.00405	0.00222	0.0038	0.00414	0.00194	0.00427	0.00782	0.00344
As	mm^2	318.166	759.488	500.233	142.453	383.352	535.297	292.986	501.566	546.749	256.039	564.007	1033.96	455.128
n		2	3	2	2	2	2	2	2	2	2	2	4	2
As ada	mm^2	567.286	850.929	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	1134.57	567.286
a	mm	35.5944	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	71.1888	35.5944
mn	KNm	95.9173	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	183.758	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 35 Perhitungan tulangan balok portal C/lantai 3

		C/1-2		C/2-4			C/4-7			C/7-8			C/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
ρb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	39.47	94.84	62.34	20.23	46.6	68.85	35.97	66.09	69.03	34.85	68.15	102.49	43.41
mn	KNm	49.3375	118.55	77.925	25.2875	58.25	86.0625	44.9625	82.6125	86.2875	43.5625	85.1875	128.113	54.2625
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	211.531	327.896	265.842	151.439	229.844	279.378	201.934	273.721	279.743	198.766	277.954	340.864	221.837
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.84755	2.03652	1.33864	0.4344	1.00065	1.47843	0.77239	1.41916	1.4823	0.74834	1.4634	2.20079	0.93215
ρ baru		0.00234	0.00563	0.0037	0.0012	0.00277	0.00409	0.00214	0.00392	0.0041	0.00207	0.00405	0.00608	0.00258
As	mm^2	309.615	743.956	489.015	158.691	365.546	540.082	282.16	518.431	541.494	273.375	534.591	803.965	340.522
n		2	3	2	2	2	2	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 36 Perhitungan tulangan balok portal C/lantai 2

		C/1-2		C/2-4			C/4-7			C/7-8			C/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	39.04	94.14	63.86	20.21	47.72	68.83	36.14	65.76	68.86	34.45	69.11	102.46	43.45
mn	KNm	48.8	117.675	79.825	25.2625	59.65	86.0375	45.175	82.2	86.075	43.0625	86.3875	128.075	54.3125
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	210.375	326.683	269.063	151.364	232.59	279.337	202.411	273.037	279.398	197.622	279.905	340.814	221.94
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.83831	2.02149	1.37128	0.43397	1.0247	1.478	0.77604	1.41208	1.47865	0.73975	1.48401	2.20014	0.93301
ρ baru		0.00232	0.00559	0.00379	0.0012	0.00283	0.00409	0.00215	0.0039	0.00409	0.00204	0.0041	0.00608	0.00258
As	mm^2	306.242	738.465	500.939	158.534	374.331	539.925	283.494	515.843	540.16	270.237	542.121	803.73	340.836
n		2	3	2	2	2	2	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad:	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
p		0	0	0	0	0	0	0	0	0	0	0	0	0
p'		0	0	0	0	0	0	0	0	0	0	0	0	0
p1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 37 Perhitungan tulangan balok portal C/lantai 1

		C/1-2		C/2-4			C/4-7			C/7-8			C/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	40.96	97.6	64.75	18.66	44.78	66.6	36.36	67.55	66.81	34.1	71.88	103.11	43.84
mn	KNm	51.2	122	80.9375	23.325	55.975	83.25	45.45	84.4375	83.5125	42.625	89.85	128.888	54.8
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	215.486	332.633	270.932	145.444	225.311	274.775	203.026	276.728	275.208	196.615	285.459	341.893	222.933
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.87954	2.09579	1.39039	0.40069	0.96157	1.43012	0.78077	1.45052	1.43463	0.73224	1.54349	2.2141	0.94139
ρ baru		0.00243	0.00579	0.00384	0.00111	0.00266	0.00395	0.00216	0.00401	0.00397	0.00202	0.00427	0.00612	0.0026
As	mm^2	321.304	765.606	507.92	146.375	351.269	522.432	285.22	529.884	524.079	267.491	563.85	808.828	343.895
n		2	3	2	2	2	2	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	7	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	1985.5	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0.01502	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0.01502	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	124.58	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	300.374	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 38 Perhitungan tulangan balok portal D/atap

		D/1-2		D/2-4			D/4-7			D/7-8			D/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	17.18	36.17	37.32	20.4	22.83	17.77	19.8	22.86	34.5	22.21	22.02	36.43	17.42
mn	KNm	21.475	45.2125	46.65	25.5	28.5375	22.2125	24.75	28.575	43.125	27.7625	27.525	45.5375	21.775
∅	mm	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	139.557	202.495	205.689	152.074	160.877	141.933	149.821	160.982	197.765	158.677	157.997	203.221	140.528
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.61201	1.2885	1.32947	0.72672	0.81328	0.63303	0.70535	0.81435	1.22901	0.7912	0.78443	1.29776	0.62056
ρ baru		0.00169	0.00356	0.00368	0.00201	0.00225	0.00175	0.00195	0.00225	0.0034	0.00219	0.00217	0.00359	0.00172
As	mm^2	173.58	365.447	377.066	206.113	230.665	179.541	200.051	230.968	348.574	224.401	222.481	368.073	176.004
n		2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415	25.2415
mn	KNm	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018	53.0018
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 39 Perhitungan tulangan balok portal D/lantai 5

		D/1-2		D/2-4		
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)
f'c	Mpa	25	25	25	25	25
fy	Mpa	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40
d'	mm	59.5	59.5	61	61	61
ρb		0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	52.04	118.45	200.14	211.58	165.46
mn	KNm	65.05	148.063	250.175	264.475	206.825
Ø	mm	19	19	22	22	22
A 1Ø	mm^2	283.643	283.643	380.286	380.286	380.286
b	mm	300	300	300	300	300
h	mm	500	500	500	500	500
d ada	mm	440.5	440.5	439	439	439
d perlu	mm	242.889	366.444	476.329	489.753	433.098
tipe		sebelah	sebelah	rangkap	rangkap	sebelah
TUL SEBELAH						
Rn baru	MPa	1.11747	2.5435	0	0	3.57728
ρ baru		0.00309	0.00703	0	0	0.00989
As	mm^2	408.219	929.16	0	0	1302.36
n		2	4	0	0	4
As ada	mm^2	567.286	1134.57	0	0	1521.14
a	mm	35.5944	71.1888	0	0	95.4443
mn	KNm	95.9173	183.758	0	0	238.076
		aman	aman	-	-	aman
TUL RANGKAP						
ρ 1		0	0	0.01016	0.01016	0
As 1	mm^2	0	0	1338.09	1338.09	0
a	mm	0	0	83.9588	83.9588	0
mn 1	KNm	0	0	212.5	212.5	0
mn 2	KNm	0	0	37.6749	51.9749	0
fs '	MPa	0	0	229.461	229.461	0
As'=As2	mm^2	0	0	374.006	515.965	0
n		0	0	2	2	0
As' = As2 ad	mm^2	0	0	760.571	760.571	0
As	mm^2	0	0	1712.1	1854.06	0
n		0	0	5	5	0
As ada	mm^2	0	0	1901.43	1901.43	0
ρ		0	0	0.01444	0.01444	0
ρ'		0	0	0.00578	0.00578	0
ρ1		0	0	0.00866	0.00866	0
fs '	MPa	0	0	165.401	165.401	0
a	mm	0	0	99.5721	99.5721	0
mn	KNm	0	0	294.614	294.614	0
		-	-	aman	aman	-

Tabel 40 Perhitungan tulangan balok portal D/lantai 4

		D/1-2		D/2-4			D/4-7			D/7-8			D/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	45.41	105.89	194.71	200.15	203.46	84.16	31.23	60.26	70.59	32.54	71.21	129.97	56.5
mn	KNm	56.7625	132.363	243.388	250.188	254.325	105.2	39.0375	75.325	88.2375	40.675	89.0125	162.463	70.625
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	226.89	346.471	469.823	476.341	480.263	308.882	188.159	261.369	282.886	192.065	284.126	383.85	253.084
tipe		sebelah	sebelah	rangkap	rangkap	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.9751	2.2738	0	0	0	1.80719	0.67061	1.29398	1.51579	0.69874	1.52911	2.79087	1.21324
p baru		0.0027	0.00629	0	0	0	0.005	0.00185	0.00358	0.00419	0.00193	0.00423	0.00771	0.00335
As	mm^2	356.211	830.636	0	0	0	660.178	244.978	472.699	553.731	255.254	558.594	1019.53	443.204
n		2	3	0	0	0	3	2	2	2	2	2	4	2
As ada	mm^2	567.286	850.929	0	0	0	850.929	567.286	567.286	567.286	567.286	567.286	1134.57	567.286
a	mm	35.5944	53.3916	0	0	0	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	71.1888	35.5944
mn	KNm	95.9173	140.847	0	0	0	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	183.758	95.9173
		aman	aman	-	-	-	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0.01016	0.01016	0.01016	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	1342.66	1342.66	1342.66	0	0	0	0	0	0	0	0
a	mm	0	0	84.2456	84.2456	84.2456	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	213.955	213.955	213.955	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	29.4327	36.2327	40.3702	0	0	0	0	0	0	0	0
fs '	MPa	0	0	239.803	239.803	239.803	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	322.144	396.571	441.856	0	0	0	0	0	0	0	0
n		0	0	2	2	2	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	567.286	567.286	567.286	0	0	0	0	0	0	0	0
As	mm^2	0	0	1664.81	1739.24	1784.52	0	0	0	0	0	0	0	0
n		0	0	6	6	6	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	1701.86	1701.86	1701.86	0	0	0	0	0	0	0	0
ρ		0	0	0.01288	0.01288	0.01288	0	0	0	0	0	0	0	0
ρ'		0	0	0.00429	0.00429	0.00429	0	0	0	0	0	0	0	0
ρ1		0	0	0.00859	0.00859	0.00859	0	0	0	0	0	0	0	0
fs '	MPa	0	0	173.739	173.739	173.739	0	0	0	0	0	0	0	0
a	mm	0	0	91.3228	91.3228	91.3228	0	0	0	0	0	0	0	0
mn	KNm	0	0	267.42	267.42	267.42	0	0	0	0	0	0	0	0
		-	-	aman	aman	aman	-	-	-	-	-	-	-	-

Tabel 41 Perhitungan tulangan balok portal D/lantai 3

		D/1-2		D/2-4			D/4-7			D/7-8			D/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	tum(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	46.49	107.88	184.13	196.57	203.05	82.86	30.21	63.61	68.45	35.06	68.32	100.25	42.52
mn	KNm	58.1125	134.85	230.163	245.713	253.813	103.575	37.7625	79.5125	85.5625	43.825	85.4	125.313	53.15
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	229.572	349.712	456.88	472.061	479.779	306.487	185.061	268.536	278.565	199.364	278.3	337.118	219.552
tipe		sebelah	sebelah	rangkap	rangkap	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.99829	2.31653	0	0	0	1.77927	0.64871	1.36591	1.46984	0.75285	1.46705	2.15269	0.91304
p baru		0.00276	0.0064	0	0	0	0.00492	0.00179	0.00378	0.00406	0.00208	0.00406	0.00595	0.00252
As	mm^2	364.683	846.246	0	0	0	649.981	236.977	498.977	536.944	275.022	535.924	786.394	333.541
n		2	3	0	0	0	3	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	0	0	0	850.929	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	0	0	0	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	0	0	0	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	-	-	-	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
p 1		0	0	0.01016	0.01016	0.01016	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	1342.66	1342.66	1342.66	0	0	0	0	0	0	0	0
a	mm	0	0	84.2456	84.2456	84.2456	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	213.955	213.955	213.955	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	16.2077	31.7577	39.8577	0	0	0	0	0	0	0	0
fs '	MPa	0	0	239.803	239.803	239.803	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	177.395	347.592	436.247	0	0	0	0	0	0	0	0
n		0	0	2	2	2	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	567.286	567.286	567.286	0	0	0	0	0	0	0	0
As	mm^2	0	0	1520.06	1690.26	1778.91	0	0	0	0	0	0	0	0
n		0	0	6	6	6	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	1701.86	1701.86	1701.86	0	0	0	0	0	0	0	0
ρ		0	0	0.01288	0.01288	0.01288	0	0	0	0	0	0	0	0
ρ'		0	0	0.00429	0.00429	0.00429	0	0	0	0	0	0	0	0
ρ1		0	0	0.00859	0.00859	0.00859	0	0	0	0	0	0	0	0
fs '	MPa	0	0	173.739	173.739	173.739	0	0	0	0	0	0	0	0
a	mm	0	0	91.3228	91.3228	91.3228	0	0	0	0	0	0	0	0
mn	KNm	0	0	267.42	267.42	267.42	0	0	0	0	0	0	0	0
		-	-	aman	aman	aman	-	-	-	-	-	-	-	-

Tabel 42 Perhitungan tulangan balok portal D/lantai 2

		D/1-2		D/2-4			D/4-7			D/7-8			D/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	46.9	108.57	181.49	196.97	205.38	85.58	30.1	61.11	67.48	34.64	70.12	100.25	42.52
mn	KNm	58.625	135.713	226.863	246.213	256.725	106.975	37.625	76.3875	84.35	43.3	87.65	125.313	53.15
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	230.582	350.828	453.593	472.542	482.524	311.477	184.724	263.206	276.584	198.166	281.943	337.118	219.552
tipe		sebelah	sebelah	rangkap	rangkap	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	1.00709	2.33135	0	0	0	1.83768	0.64634	1.31223	1.44901	0.74383	1.5057	2.15269	0.91304
ρ baru		0.00278	0.00644	0	0	0	0.00508	0.00179	0.00363	0.00401	0.00206	0.00416	0.00595	0.00252
As	mm^2	367.899	851.658	0	0	0	671.317	236.114	479.367	529.335	271.727	550.044	786.394	333.541
n		2	3	0	0	0	3	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	0	0	0	850.929	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	0	0	0	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	0	0	0	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	-	-	-	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0.01016	0.01016	0.01016	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	1342.66	1342.66	1342.66	0	0	0	0	0	0	0	0
a	mm	0	0	84.2456	84.2456	84.2456	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	213.955	213.955	213.955	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	12.9077	32.2577	42.7702	0	0	0	0	0	0	0	0
fs '	MPa	0	0	239.803	239.803	239.803	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	141.276	353.064	468.124	0	0	0	0	0	0	0	0
n		0	0	2	2	2	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	567.286	567.286	567.286	0	0	0	0	0	0	0	0
As	mm^2	0	0	1483.94	1695.73	1810.79	0	0	0	0	0	0	0	0
n		0	0	6	6	6	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	1701.86	1701.86	1701.86	0	0	0	0	0	0	0	0
ρ		0	0	0.01288	0.01288	0.01288	0	0	0	0	0	0	0	0
ρ'		0	0	0.00429	0.00429	0.00429	0	0	0	0	0	0	0	0
ρ1		0	0	0.00858	0.00859	0.00859	0	0	0	0	0	0	0	0
fs '	MPa	0	0	173.739	173.739	173.739	0	0	0	0	0	0	0	0
a	mm	0	0	91.3228	91.3228	91.3228	0	0	0	0	0	0	0	0
mn	KNm	0	0	267.42	267.42	267.42	0	0	0	0	0	0	0	0
		-	-	aman	aman	aman	-	-	-	-	-	-	-	-

Tabel 43 Perhitungan tulangan balok portal D/lantai 1

		D/1-2		D/2-4			D/4-7			D/7-8			D/8-9	
data-data		lap(-)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)	tum(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5	59.5
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	45	105.12	181.23	186.21	202.12	78.27	31.27	66.08	61.47	34.54	76.33	99.61	42.13
mn	KNm	56.25	131.4	226.538	232.763	252.65	97.8375	39.0875	82.6	76.8375	43.175	95.4125	124.513	52.6625
Ø	mm	19	19	19	19	19	19	19	19	19	19	19	19	19
A 1Ø	mm^2	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643	283.643
b	mm	300	300	300	300	300	300	300	300	300	300	300	300	300
h	mm	500	500	500	500	500	500	500	500	500	500	500	500	500
d ada	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d perlu	mm	225.864	345.209	453.268	459.453	478.679	297.877	188.28	273.7	263.98	197.88	294.163	336.04	218.542
tipe		sebelah	sebelah	rangkap	rangkap	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH														
Rn baru	MPa	0.96629	2.25726	0	0	0	1.68071	0.67147	1.41895	1.31996	0.74168	1.63905	2.13895	0.90467
p baru		0.00267	0.00624	0	0	0	0.00465	0.00186	0.00392	0.00365	0.00205	0.00453	0.00591	0.0025
As	mm^2	352.995	824.595	0	0	0	613.975	245.292	518.353	482.191	270.943	598.757	781.373	330.481
n		2	3	0	0	0	3	2	2	2	2	2	3	2
As ada	mm^2	567.286	850.929	0	0	0	850.929	567.286	567.286	567.286	567.286	567.286	850.929	567.286
a	mm	35.5944	53.3916	0	0	0	53.3916	35.5944	35.5944	35.5944	35.5944	35.5944	53.3916	35.5944
mn	KNm	95.9173	140.847	0	0	0	140.847	95.9173	95.9173	95.9173	95.9173	95.9173	140.847	95.9173
		aman	aman	-	-	-	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP														
ρ 1		0	0	0.01016	0.01016	0.01016	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	1342.66	1342.66	1342.66	0	0	0	0	0	0	0	0
a	mm	0	0	84.2456	84.2456	84.2456	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	213.955	213.955	213.955	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	12.5827	18.8077	38.6952	0	0	0	0	0	0	0	0
fs '	MPa	0	0	239.803	239.803	239.803	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	137.719	205.852	423.523	0	0	0	0	0	0	0	0
n		0	0	2	2	2	0	0	0	0	0	0	0	0
As' = As2 ad	mm^2	0	0	567.286	567.286	567.286	0	0	0	0	0	0	0	0
As	mm^2	0	0	1480.38	1548.52	1766.19	0	0	0	0	0	0	0	0
n		0	0	6	6	6	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	1701.86	1701.86	1701.86	0	0	0	0	0	0	0	0
ρ		0	0	0.01288	0.01288	0.01288	0	0	0	0	0	0	0	0
ρ'		0	0	0.00429	0.00429	0.00429	0	0	0	0	0	0	0	0
ρ1		0	0	0.00859	0.00859	0.00859	0	0	0	0	0	0	0	0
fs '	MPa	0	0	173.739	173.739	173.739	0	0	0	0	0	0	0	0
a	mm	0	0	91.3228	91.3228	91.3228	0	0	0	0	0	0	0	0
mn	KNm	0	0	267.42	267.42	267.42	0	0	0	0	0	0	0	0
		-	-	aman	aman	aman	-	-	-	-	-	-	-	-

Tabel 44 Perhitungan tulangan balok portal A-B/atap

		1/A-B		2/A-B		4/A-B		7/A-B		8/A-B		9/A-B	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	0.69	1.49	8.12	11.21	0.96	3.91	1.47	4.55	10.42	13.48	0.62	1.5
mn	KNm	0.8625	1.8625	10.15	14.0125	1.2	4.8875	1.8375	5.6875	13.025	16.85	0.775	1.875
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	150	150	150	150	150	150	150	150	150	150	150	150
h	mm	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	39.553	58.123	135.685	159.425	46.6542	94.155	57.7316	101.569	153.705	174.824	37.493	58.3177
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH													
Rn baru	MPa	0.04916	0.10616	0.57853	0.79868	0.0684	0.27858	0.10473	0.32417	0.74239	0.96041	0.04417	0.10687
ρ baru		0.00014	0.00029	0.0016	0.00221	0.00019	0.00077	0.00029	0.0009	0.00205	0.00265	0.00012	0.0003
As	mm^2	6.97147	15.0543	82.0411	113.261	9.69944	39.505	14.8523	45.9713	105.279	136.196	6.26422	15.1554
n		2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829
mn	KNm	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP													
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 :	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-

Tabel 45 Perhitungan tulangan balok portal A-B/lantai 4

		1/A-B		2/A-B		4/A-B		5/A-B		6/A-B		7/A-B		8/A-B		9/A-B	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271
ρmaks		0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102
m		18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824
r n	MPa	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754
mu	KNm	7.93	22.25	22.37	10.26	14.92	10.07	4.02	16.89	3.94	16.9	15.5	10.13	23.02	11.1	10.22	27.05
mn	KNm	9.9125	27.813	27.963	12.825	18.65	12.588	5.025	21.113	4.925	21.125	19.375	12.663	28.775	13.875	12.775	33.813
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	116.12	194.51	195.04	132.09	159.28	130.86	82.68	169.47	81.853	169.52	162.35	131.25	197.85	137.39	131.83	214.47
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH																	
Rn baru	MPa	0.4237	1.1889	1.1953	0.5482	0.7973	0.5381	0.2148	0.9025	0.2105	0.9031	0.8282	0.5413	1.2301	0.5931	0.5461	1.4454
ρ baru		0.0012	0.0033	0.0033	0.0015	0.0022	0.0015	0.0006	0.0025	0.0006	0.0025	0.0023	0.0015	0.0034	0.0016	0.0015	0.004
As	mm^2	80.121	224.8	226.02	103.66	150.75	101.74	40.616	170.65	39.808	170.75	156.61	102.35	232.58	112.15	103.26	273.3
n		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29
a	mm	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862
mn	KNm	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP																	
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 a	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 46 Perhitungan tulangan balok portal A-B/lantai 3

		1/A-B		2/A-B		4/A-B		5/A-B		6/A-B		7/A-B		8/A-B		9/A-B	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
ρb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271
ρmaks		0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102
m		18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824
r n	MPa	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754
mu	KNm	7.3	20.02	20.64	9.32	16.86	9.25	4.16	16.63	4.23	16.62	17.13	9.23	20.82	9.25	7.33	20
mn	KNm	9.125	25.025	25.8	11.65	21.075	11.563	5.2	20.788	5.2875	20.775	21.413	11.538	26.025	11.563	9.1625	25
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	111.42	184.51	187.34	125.89	169.32	125.42	84.107	168.16	84.812	168.11	170.67	125.28	188.16	125.42	111.64	184.42
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH																	
Rn baru	MPa	0.3901	1.0698	1.1029	0.498	0.9009	0.4943	0.2223	0.8886	0.226	0.8881	0.9153	0.4932	1.1125	0.4943	0.3917	1.0687
ρ baru		0.0011	0.003	0.003	0.0014	0.0025	0.0014	0.0006	0.0025	0.0006	0.0025	0.0025	0.0014	0.0031	0.0014	0.0011	0.003
As	mm^2	73.756	202.27	208.54	94.165	170.35	93.458	42.031	168.02	42.738	167.92	173.07	93.256	210.36	93.458	74.059	202.07
n		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29
a	mm	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862
mn	KNm	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP																	
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 :	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 47 Perhitungan tulangan balok portal A-B/lantai 2

		1/A-B		2/A-B		4/A-B		5/A-B		6/A-B		7/A-B		8/A-B		9/A-B	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271
ρmaks		0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102
m		18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824
r n	MPa	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754
mu	KNm	7.21	20.02	19.69	9.32	17.7	9.27	4.2	16.64	4.24	16.24	17.66	9.29	19.45	9.45	7.11	20.06
mn	KNm	9.0125	25.025	24.613	11.65	22.125	11.588	5.25	20.8	5.3	20.3	22.075	11.613	24.313	11.813	8.8875	25.075
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	110.73	184.51	182.98	125.89	173.49	125.55	84.51	168.21	84.912	166.18	173.29	125.69	181.86	126.77	109.96	184.69
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH																	
Rn baru	MPa	0.3853	1.0698	1.0521	0.498	0.9458	0.4953	0.2244	0.8892	0.2266	0.8678	0.9437	0.4964	1.0393	0.505	0.3799	1.0719
p baru		0.0011	0.003	0.0029	0.0014	0.0026	0.0014	0.0006	0.0025	0.0006	0.0024	0.0026	0.0014	0.0029	0.0014	0.0011	0.003
As	mm^2	72.847	202.27	198.94	94.165	178.83	93.66	42.435	168.12	42.839	164.08	178.43	93.862	196.51	95.479	71.836	202.68
n		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29
a	mm	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862
mn	KNm	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP																	
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 a	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 48 Perhitungan tulangan balok portal A-B/lantai 1

		1/A-B		2/A-B		4/A-B		5/A-B		6/A-B		7/A-B		8/A-B		9/A-B	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271	0.0271
ρmaks		0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203	0.0203
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102	0.0102
m		18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824	18.824
r n	MPa	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754	3.6754
mu	KNm	6.83	20.29	19.02	10.18	17.52	9.97	3.9	16.85	3.9	16.82	17.1	9.88	17.68	9.84	6.75	20.19
mn	KNm	8.5375	25.363	23.775	12.725	21.9	12.463	4.875	21.063	4.875	21.025	21.375	12.35	22.1	12.3	8.4375	25.238
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14	201.14
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	107.77	185.75	179.84	131.57	172.6	130.21	81.436	169.27	81.436	169.12	170.52	129.62	173.39	129.35	107.14	185.29
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH																	
Rn baru	MPa	0.365	1.0842	1.0163	0.544	0.9362	0.5327	0.2084	0.9004	0.2084	0.8988	0.9137	0.5279	0.9447	0.5258	0.3607	1.0789
ρ baru		0.001	0.003	0.0028	0.0015	0.0026	0.0015	0.0006	0.0025	0.0006	0.0025	0.0025	0.0015	0.0026	0.0015	0.001	0.003
As	mm^2	69.007	205	192.17	102.85	177.01	100.73	39.404	170.25	39.404	169.94	172.77	99.823	178.63	99.419	68.199	203.99
n		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29	402.29
a	mm	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862	37.862
mn	KNm	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986	51.986
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP																	
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As' = As2 :	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tabel 49 Perhitungan tulangan balok portal C-D/atap

		1/C-D		2/C-D		4/C-D		7/C-D		8/C-D		9/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
prencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	0.56	1.77	7.53	4.88	2.42	5.23	4.03	1.4	13.31	9.97	0.63	1.74
mn	KNm	0.7	2.2125	9.4125	6.1	3.025	6.5375	5.0375	1.75	16.6375	12.4625	0.7875	2.175
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	150	150	150	150	150	150	150	150	150	150	150	150
h	mm	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	35.6327	63.3493	130.663	105.188	74.0735	108.894	95.5889	56.3403	173.718	150.35	37.7942	62.8101
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH													
Rn baru	MPa	0.0399	0.12611	0.53649	0.34769	0.17242	0.37262	0.28713	0.09975	0.9483	0.71033	0.04489	0.12397
ρ baru		0.00011	0.00035	0.00148	0.00096	0.00048	0.00103	0.00079	0.00028	0.00262	0.00196	0.00012	0.00034
As	mm^2	5.65801	17.8833	76.08	49.3055	24.4507	52.8417	40.7174	14.145	134.479	100.733	6.36526	17.5802
n		2	2	2	2	2	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829	50.4829
mn	KNm	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971	50.971
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP													
ρ 1		0	0	0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0
As' = As2	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-	-	-

Tabel 50 Perhitungan tulangan balok portal C-D/lantai 5

		1/C-D		2/C-D		3/C-D		4/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(-)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	9.51	23.7	15.9	9.57	106.7	30.26	61.15	29.15
mn	KNm	11.8875	29.625	19.875	11.9625	133.375	37.825	76.4375	36.4375
Ø	mm	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342
d perlu	mm	127.167	200.752	164.431	127.568	425.959	226.84	322.466	222.641
tipe		sebelah	sebelah	sebelah	sebelah	rangkap	sebelah	sebelah	sebelah
TUL SEBELAH									
Rn baru	MPa	0.50817	1.26642	0.84962	0.51138	0	1.61695	3.26757	1.55764
ρ baru		0.0014	0.0035	0.00235	0.00141	0	0.00447	0.00903	0.00431
As	mm^2	96.0851	239.455	160.647	96.6913	0	305.734	617.834	294.519
n		2	2	2	2	0	2	4	2
As ada	mm^2	402.286	402.286	402.286	402.286	0	402.286	804.571	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	0	37.8622	75.7244	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	0	51.9864	97.8802	51.9864
		aman	aman	aman	aman	-	aman	aman	aman
TUL RANGKAP									
ρ 1		0	0	0	0	0.01016	0	0	0
As 1	mm^2	0	0	0	0	694.955	0	0	0
a	mm	0	0	0	0	65.4075	0	0	0
mn 1	KNm	0	0	0	0	85.9788	0	0	0
mn 2	KNm	0	0	0	0	47.3962	0	0	0
fs '	MPa	0	0	0	0	147.758	0	0	0
As'=As2	mm^2	0	0	0	0	1129.47	0	0	0
n		0	0	0	0	2	0	0	0
As' = As2	mm^2	0	0	0	0	402.286	0	0	0
As	mm^2	0	0	0	0	1097.24	0	0	0
n		0	0	0	0	6	0	0	0
As ada	mm^2	0	0	0	0	1206.86	0	0	0
ρ		0	0	0	0	0.01764	0	0	0
ρ'		0	0	0	0	0.00588	0	0	0
ρ1		0	0	0	0	0.01176	0	0	0
fs '	MPa	0	0	0	0	209.373	0	0	0
a	mm	0	0	0	0	93.7683	0	0	0
mn	KNm	0	0	0	0	141.529	0	0	0
		-	-	-	-	aman	-	-	-

Tabel 51 Perhitungan tulangan balok portal C-D/lantai 4

		1/C-D		2/C-D		3/C-D		4/C-D		7/C-D		8/C-D		9/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(-)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	8.23	20.92	25.06	9.04	86.71	15	55.94	18.87	18.96	10.31	23.3	11.27	7.35	28.68
mn	KNm	10.2875	26.15	31.325	11.3	108.388	18.75	69.925	23.5875	23.7	12.8875	29.125	14.0875	9.1875	35.85
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	118.3	188.611	206.432	123.985	383.99	159.71	308.423	179.131	179.558	132.408	199.051	138.436	111.797	220.839
tipe		sebelah	sebelah	sebelah	sebelah	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH															
Rn baru	MPa	0.43977	1.11787	1.33909	0.48305	0	0.80153	2.98917	1.00832	1.01313	0.55092	1.24504	0.60222	0.39275	1.53252
ρ baru		0.00122	0.00309	0.0037	0.00134	0	0.00222	0.00826	0.00279	0.0028	0.00152	0.00344	0.00166	0.00109	0.00424
As	mm^2	83.1525	211.367	253.196	91.3364	0	151.554	565.194	190.655	191.564	104.168	235.413	113.867	74.2613	289.771
n		2	2	2	2	0	2	3	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	0	402.286	603.429	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	0	37.8622	56.7933	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	0	51.9864	75.6949	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	-	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP															
ρ 1		0	0	0	0	0.01016	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	694.955	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	65.4075	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	85.9788	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	22.4087	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	147.758	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	534.008	0	0	0	0	0	0	0	0	0
n		0	0	0	0	2	0	0	0	0	0	0	0	0	0
As' = As2	mm^2	0	0	0	0	402.286	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	1097.24	0	0	0	0	0	0	0	0	0
n		0	0	0	0	5	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	1005.71	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0.0147	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0.00586	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0.00882	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	79.1637	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	87.1622	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	119.59	0	0	0	0	0	0	0	0	0
		-	-	-	-	aman	-	-	-	-	-	-	-	-	-

Tabel 52 Perhitungan tulangan balok portal C-D/lantai 3

		1/C-D		2/C-D		3/C-D		4/C-D		7/C-D		8/C-D		9/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(-)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	9.34	20.93	28.13	10.56	86.11	15	48.38	10.58	22.06	9.41	18.74	9.27	5.33	21.13
mn	KNm	11.675	26.1625	35.1625	13.2	107.638	18.75	60.475	13.225	27.575	11.7625	23.425	11.5875	6.6625	26.4125
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	126.026	188.656	218.711	134.004	382.659	159.71	286.826	134.131	193.682	126.497	178.513	125.553	95.2027	189.555
tipe		sebelah	sebelah	sebelah	sebelah	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH															
Rn baru	MPa	0.49909	1.1184	1.50313	0.56428	0	0.80153	2.5852	0.56534	1.17878	0.50283	1.00138	0.49534	0.28481	1.12909
ρ baru		0.00138	0.00309	0.00416	0.00156	0	0.00222	0.00715	0.00156	0.00326	0.00139	0.00277	0.00137	0.00079	0.00312
As	mm^2	94.3675	211.468	284.214	106.694	0	151.554	488.811	106.896	222.885	95.0747	189.341	93.6602	53.8521	213.489
n		2	2	2	2	0	2	3	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	0	402.286	603.429	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	0	37.8622	56.7933	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	0	51.9864	75.6949	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	-	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP															
ρ 1		0	0	0	0	0.01016	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	694.955	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	65.4075	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	85.9788	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	21.6587	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	147.758	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	516.135	0	0	0	0	0	0	0	0	0
n		0	0	0	0	2	0	0	0	0	0	0	0	0	0
As' = As2	mm^2	0	0	0	0	402.286	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	1097.24	0	0	0	0	0	0	0	0	0
n		0	0	0	0	5	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	1005.71	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0.0147	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0.00588	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0.00802	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	79.1637	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	87.1622	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	119.59	0	0	0	0	0	0	0	0	0
		-	-	-	-	aman	-	-	-	-	-	-	-	-	-

Tabel 53 Perhitungan tulangan balok portal C-D/lantai 2

		1/C-D		2/C-D		3/C-D		4/C-D		7/C-D		8/C-D		9/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(-)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	9.7	20.95	28.15	10.64	85.2	15	45.99	9.52	21.84	9.56	16.51	9.93	5.19	21.2
mn	KNm	12.125	26.1875	35.1875	13.3	106.5	18.75	57.4875	11.9	27.3	11.95	20.6375	12.4125	6.4875	26.5
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	128.431	188.746	218.789	134.511	380.632	159.71	279.652	127.234	192.713	127.501	167.556	129.945	93.944	189.869
tipe		sebelah	sebelah	sebelah	sebelah	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH															
Rn baru	MPa	0.51832	1.11947	1.5042	0.56855	0	0.80153	2.45749	0.5087	1.16703	0.51084	0.88222	0.53061	0.27733	1.13283
ρ baru		0.00143	0.00309	0.00416	0.00157	0	0.00222	0.00679	0.00141	0.00323	0.00141	0.00244	0.00147	0.00077	0.00313
As	mm^2	98.0047	211.67	284.416	107.502	0	151.554	464.664	96.1861	220.662	96.5902	166.81	100.329	52.4376	214.196
n		2	2	2	2	0	2	3	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	0	402.286	603.429	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	0	37.8622	56.7933	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	0	51.9864	75.6949	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	-	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP															
ρ 1		0	0	0	0	0.01016	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	694.955	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	65.4075	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	85.9788	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	20.5212	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	147.758	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	489.028	0	0	0	0	0	0	0	0	0
n		0	0	0	0	2	0	0	0	0	0	0	0	0	0
As' = As2	mm^2	0	0	0	0	402.286	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	1097.24	0	0	0	0	0	0	0	0	0
n		0	0	0	0	5	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	1005.71	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0.0147	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0.00580	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0.00882	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	79.1637	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	87.1622	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	119.59	0	0	0	0	0	0	0	0	0
		-	-	-	-	aman	-	-	-	-	-	-	-	-	-

Tabel 54 Perhitungan tulangan balok portal C-D/lantai 1

		1/C-D		2/C-D		3/C-D		4/C-D		7/C-D		8/C-D		9/C-D	
data-data		tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(-)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)	tum(-)	lap(+)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	7.81	20.88	23.22	8.94	87.95	15	44.58	8.97	19.16	9.71	15.25	10.34	5.37	21.33
mn	KNm	9.7625	26.1	29.025	11.175	109.938	18.75	55.725	11.2125	23.95	12.1375	19.0625	12.925	6.7125	26.6625
Ø	mm	16	16	16	16	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342	342	342	342	342
d perlu	mm	115.242	188.43	198.709	123.298	386.726	159.71	275.331	123.504	180.503	128.498	161.035	132.601	95.5592	190.45
tipe		sebelah	sebelah	sebelah	sebelah	rangkap	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH															
Rn baru	MPa	0.41733	1.11573	1.24077	0.47771	0	0.80153	2.38214	0.47931	1.02382	0.51886	0.81489	0.55252	0.28695	1.13977
ρ baru		0.00115	0.00308	0.00343	0.00132	0	0.00222	0.00659	0.00132	0.00283	0.00143	0.00225	0.00153	0.00079	0.00315
As	mm^2	78.909	210.963	234.605	90.326	0	151.554	450.418	90.6291	193.585	98.1058	154.08	104.471	54.2562	215.509
n		2	2	2	2	0	2	3	2	2	2	2	2	2	2
As ada	mm^2	402.286	402.286	402.286	402.286	0	402.286	603.429	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	37.8622	37.8622	37.8622	37.8622	0	37.8622	56.7933	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	51.9864	51.9864	51.9864	51.9864	0	51.9864	75.6949	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	-	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP															
ρ 1		0	0	0	0	0.01016	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	694.955	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	65.4075	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	85.9788	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	23.9587	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	147.758	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	570.945	0	0	0	0	0	0	0	0	0
n		0	0	0	0	2	0	0	0	0	0	0	0	0	0
As' = As2	mm^2	0	0	0	0	402.286	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	1097.24	0	0	0	0	0	0	0	0	0
n		0	0	0	0	5	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	1005.71	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0.0147	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0.00588	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0.00882	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	79.1637	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	87.1622	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	119.59	0	0	0	0	0	0	0	0	0
		-	-	-	-	aman	-	-	-	-	-	-	-	-	-

Tabel 55 Perhitungan tulangan geser balok portal A/Atap

Data		balok				
		A/1-2	A/2-4	A/4-7	A/7-8	A/8-9
Vu	KN	18.1	36.23	17.89	36.23	18.06
fy	MPa	240	240	350	350	350
f'c	MPa	25	25	25	25	25
l	mm	2400	7200	7200	7200	2400
h	mm	400	400	400	400	400
b	mm	200	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	16.98685	33.75428333	16.66751667	33.75428333	16.94685
Vc	KN	57	57	57	57	57
Vs1	KN	114	114	114	114	114
Vs2	KN	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	171	171	171	171	171
		Vu<1	1<Vu<2	Vu<1	1<Vu<2	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	3398.288711	0	3398.288711	0
s	mm	0	565.7142857	0	825	0
smaks	mm	0	d/2 atau 600 mm	0	d/2 atau 600 mm	0
hasil		-	P10-170	-	P10-170	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 56 Perhitungan tulangan geser balok portal A/lantai 4

Data		balok						
		A/1-2	A/2-4	A/4-5	A/5-6	A/6-7	A/7-8	A/8-9
Vu	KN	89.08	107.5	93.82	10.5	95.36	116.98	109.86
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	74.27567292	89.86701389	78.41533125	5.333125	79.96763333	97.79203056	85.94721042
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		2<Vu<3	2<Vu<3	2<Vu<3	Vu<1	2<Vu<3	2<Vu<3	2<Vu<3
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	1780.197575	2212.744186	1690.257941	0	1662.961409	2033.424517	1443.473512
θ Vs =Vu - θVc	KN	8.200672917	23.79201389	12.34033125	0	13.89263333	31.71703056	19.87221042
Vs	KN	13.66778819	39.65335648	20.56721875	0	23.15438889	52.86171759	33.12035069
s	mm	1215.496072	418.9593097	807.7486343	0	717.494335	314.2755025	501.5992436
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-70**	**P10-70**	**P10-70**	-	**P10-70**	**P10-70**	**P10-70**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	890.0987876	1106.372093	845.1289704	3775.714286	831.4807047	1016.712259	721.7367559
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 57 Perhitungan tulangan geser balok portal A/lantai 3

Data		balok						
		A/1-2	A/2-4	A/4-5	A/5-6	A/6-7	A/7-8	A/8-9
Vu	KN	80.42	95.98	83.29	10.96	83.33	96.37	80.42
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	63.75067708	80.23661389	70.623775	5.566766667	70.67607708	80.56264306	63.75067708
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		2<Vu<3	2<Vu<3	2<Vu<3	Vu<1	2<Vu<3	2<Vu<3	2<Vu<3
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	1971.897538	2478.328819	1903.950054	0	1903.036121	2468.299263	1971.897538
θ Vs =Vu - θVc	KN	132.15	132.15	132.15	0	132.15	132.15	132.15
Vs	KN	220.25	220.25	220.25	0	220.25	220.25	220.25
s	mm	75.42857143	75.42857143	75.42857143	0	75.42857143	75.42857143	75.42857143
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-70**	**P10-70**	**P10-70**	-	**P10-70**	**P10-70**	**P10-70**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	985.948769	1239.184409	951.975027	3617.244526	951.5180607	1234.149632	985.948769
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 58 Perhitungan tulangan geser balok portal A/lantai 2

Data		balok						
		A/1-2	A/2-4	A/4-5	A/5-6	A/6-7	A/7-8	A/8-9
Vu	KN	80.49	96.14	83.42	10.79	83.32	96.41	80.53
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	63.80345417	80.37036944	70.753775	5.480420833	70.66607708	80.59608194	63.8336125
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		2<Vu<3	2<Vu<3	2<Vu<3	Vu<1	2<Vu<3	2<Vu<3	2<Vu<3
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	1970.182631	2474.204285	1900.982978	0	1903.264522	2467.275179	1969.204023
θ Vs =Vu - θVc	KN	132.15	132.15	132.15	0	132.15	132.15	132.15
Vs	KN	220.25	220.25	220.25	0	220.25	220.25	220.25
s	mm	75.42857143	75.42857143	75.42857143	0	75.42857143	75.42857143	75.42857143
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-70**	**P10-70**	**P10-70**	-	**P10-70**	**P10-70**	**P10-70**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	985.0913157	1237.102143	950.4914889	3674.235403	951.6322612	1233.637589	984.6020117
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 60 Perhitungan tulangan geser balok portal B/atap

Data		balok				
		B/1-2	B/2-4	B/4-7	B/7-8	B/8-9
Vu	KN	18.82	9.43	8.17	9.4	18.86
fy	MPa	240	240	350	350	350
f'c	MPa	25	25	25	25	25
l	mm	2400	3600	3600	3600	2400
h	mm	400	400	400	400	400
b	mm	200	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	17.70685	8.141233333	7.053433333	8.115333333	17.74685
Vc	KN	57	57	57	57	57
Vs1	KN	114	114	114	114	114
Vs2	KN	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	171	171	171	171	171
		1<Vu<2	Vu<1	Vu<1	Vu<1	1<Vu<2
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	6528.101803	0	6548.93617	0
s	mm	0	565.7142857	0	825	0
smaks	mm	0	d/2 atau 600 mm	0	d/2 atau 600 mm	0
hasil		-	P10-170	-	P10-170	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 61 Perhitungan tulangan geser balok portal B/lantai4

Data		balok						
		B/1-2	B/2-4	B/4-5	B/5-6	B/6-7	B/7-8	B/8-9
Vu	KN	57.72	63.91	67.65	15.4	67.39	65.59	66.68
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	52.48669375	53.42698472	64.73345	7.821916667	59.95954167	54.83141806	61.44423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1373.700624	1860.976373	1172.062084	0	1176.584063	1813.309956	1189.112178
s	mm	377.1428571	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	-	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 62 Perhitungan tulangan geser balok portal B/lantai 3

Data		balok						
		B/1-2	B/2-4	B/4-5	B/5-6	B/6-7	B/7-8	B/8-9
Vu	KN	54.07	63.79	67.47	15.55	67.49	64.18	54.07
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	48.83669375	53.32666806	60.0297	7.898104167	60.06200208	53.65269722	48.83669375
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1466.432402	1864.477191	1175.188973	0	1174.840717	1853.147398	1466.432402
s	mm	377.1428571	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	P10-200	-	P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 63 Perhitungan tulangan geser balok portal B/lantai 2

Data		balok						
		B/1-2	B/2-4	B/4-5	B/5-6	B/6-7	B/7-8	B/8-9
Vu	KN	54.01	63.37	67.68	15.17	67.45	64.2	53.97
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	48.77423333	52.97555972	60.24216042	7.705095833	60.02200208	53.66941667	48.73423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1468.06147	1876.834464	1171.542553	0	1175.537435	1852.570093	1469.149528
s	mm	377.1428571	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	-	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 64 Perhitungan tulangan geser balok portal B/lantai 1

Data		balok						
		B/1-2	B/2-4	B/4-5	B/5-6	B/6-7	B/7-8	B/8-9
Vu	KN	53.93	64.03	67.58	15.34	67.27	64.4	53.81
fy	MPa	240	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25	25
l	mm	2400	3600	2400	1200	2400	3600	2400
h	mm	500	500	500	500	500	500	500
b	mm	300	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	48.69669375	53.52730139	60.1397	7.791441667	59.84200208	53.83661111	48.57423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0	0
s	mm	0	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0	0
hasil		-	-	-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1470.239199	1857.488677	1173.276117	0	1178.68292	1846.81677	1473.517933
s	mm	377.1428571	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	P10-200	-	P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 65 Perhitungan tulangan geser balok portal C/atap

Data		balok				
		C/1-2	C/2-4	C/4-7	C/7-8	C/8-9
Vu	KN	17.54	8	7.43	6.85	17.52
fy	MPa	240	240	350	350	350
f'c	MPa	25	25	25	25	25
l	mm	2400	7200	7200	7200	2400
h	mm	400	400	400	400	400
b	mm	200	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	16.70565	7.453333333	6.922283333	6.381916667	16.68565
Vc	KN	57	57	57	57	57
Vs1	KN	114	114	114	114	114
Vs2	KN	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	68.4	68.4	68.4	68.4	68.4
θ (Vc+Vs1)	KN	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	171	171	171	171	171
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 66 Perhitungan tulangan geser balok portal C/lantai 5

Data		balok C/1-2	balok C/2-3	balok C/3-4
Vu	KN	55.08	49.85	28.41
fy	MPa	240	240	240
f'c	MPa	25	25	25
l	mm	2400	3600	2400
h	mm	500	500	500
b	mm	300	300	300
d	mm	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25
Vu kritis	KN	49.84423333	41.67321528	23.17669375
Vc	KN	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5
teta		0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15
θ (Vc+Vs1)	KN	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375
		1<Vu<2	2<Vu<3	1<Vu<2
Ø		10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0
Vs	KN	0	0	0
s	mm	0	0	0
smaks	mm	0	0	0
hasil		-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0
θ Vs =Vu - θVc	KN	0	0	0
Vs	KN	0	0	0
s	mm	0	0	0
smaks	mm	0	0	0
hasil		-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1439.542484	2385.857573	2790.918691
s	mm	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser

Tabel 67 Perhitungan tulangan geser balok portal C/lantai 4

Data		balok					
		C/1-2	C/2-3	C/3-4	C/4-7	C/7-8	C/8-9
Vu	KN	51.11	46.15	33.78	50.83	50.14	65.75
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	45.87669375	38.58011806	28.54669375	42.49246806	41.91564722	60.51423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	Vu<1	3<Vu<4	1<Vu<2	1<Vu<2
Θ		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1551.359812	2577.139762	2347.246892	2339.858351	2372.058237	1205.931559
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 68 Perhitungan tulangan geser balok portal C/lantai 3

Data		balok					
		C/1-2	C/2-3	C/3-4	C/4-7	C/7-8	C/8-9
Vu	KN	50.36	46.19	33.25	50.61	50.35	53.45
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	45.12669375	38.61355694	28.01669375	42.30855417	42.09120139	48.21669375
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	Vu<1	3<Vu<4	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	-	-	-	-	-	-
hasil		**P10-94**	**P10-70**	**P10-94**	**P10-94**	**P10-94**	**P10-94**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1574.46386	2574.907989	0	2350.029638	2362.164846	1483.44247
s	mm	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	-	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 69 Perhitungan tulangan geser balok portal C/lantai 2

Data		balok					
		C/1-2	C/2-3	C/3-4	C/4-7	C/7-8	C/8-9
Vu	KN	50.12	46.86	34.3	50.66	50.2	53.41
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	44.6874	39.17365833	29.06423333	42.35035278	41.96580556	48.17423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	Vu<1	3<Vu<4	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1582.003192	2538.09219	0	2347.710225	2369.223108	1484.553454
s	mm	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	-	P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 70 Perhitungan tulangan geser balok portal C/lantai 1

Data		balok					
		C/1-2	C/2-3	C/3-4	C/4-7	C/7-8	C/8-9
Vu	KN	51.42	46.58	32.25	50.1	50.54	53.61
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	46.18423333	38.93958611	27.01669375	41.88220833	42.25003611	48.37915417
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs1	KN	220.25	220.25	220.25	220.25	220.25	220.25
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	1<Vu<2	Vu<1	3<Vu<4	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1542.007001	2553.349077	0	2373.952096	2353.284527	1479.015109
s	mm	377.1428571	377.1428571	0	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	-	P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 71 Perhitungan tulangan geser balok portal D/atap

Data		balok				
		D/1-2	D/2-4	D/4-7	D/7-8	D/8-9
Vu	KN	16.84	35.33	14.9	31.58	16.86
fy	MPa	240	240	350	350	350
f'c	MPa	25	25	25	25	25
l	mm	2400	7200	7200	7200	2400
h	mm	400	400	400	400	400
b	mm	200	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	16.00565	32.91578333	13.88183333	29.42203333	16.02565
Vc	KN	57	57	57	57	57
Vs2	KN	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	171	171	171	171	171
		Vu<1	1<Vu<2	Vu<1	1<Vu<2	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	3484.857062	0	3898.670044	0
s	mm	0	565.7142857	0	825	0
smaks	mm	0	d/2 atau 600 mm	0	d/2 atau 600 mm	0
hasil		-	**P10-170**	-	**P10-170**	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 72 Perhitungan tulangan geser balok portal D/lantai 5

Data		balok		
		D/1-2	D/2-4	D/2-4
Vu	KN	59.57	113.07	130
fy	MPa	240	240	240
f'c	MPa	25	25	25
l	mm	2400	3600	2400
h	mm	500	500	500
b	mm	300	300	300
d	mm	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25
Vu kritis	KN	54.33423333	103.3005056	121.5337063
Vc	KN	110.125	110.125	110.125
Vs2	KN	440.5	440.5	440.5
teta		0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375
		1<Vu<2	2<Vu<3	2<Vu<3
Ø		10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0
θ Vs =Vu - θVc		0	0	0
Vs	KN	0	0	0
s	mm	0	0	0
smaks	mm	0	0	0
hasil		-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	2103.741045	1219.846154
θ Vs =Vu - θVc	KN	0	132.15	132.15
Vs	KN	0	220.25	220.25
s	mm	0	75.42857143	75.42857143
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	P10-75	P10-75
area 3		1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1331.039114	1051.870523	609.9230769
s	mm	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser

Tabel 73 Perhitungan tulangan geser balok portal D/lantai 4

Data		balok					
		D/1-2	D/2-3	D/3-4	D/4-7	D/7-8	D/8-9
Vu	KN	54.63	159.64	141.92	53.14	50.32	63.79
fy	MPa	240	240	240	240	240	240
fc	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	49.25852083	142.9813389	133.4561667	44.42356389	42.06612222	58.55423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	3<Vu<4	3<Vu<4	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	1490.04009	1117.390079	0	0	0
θ Vs =Vu - θVc	KN	0	132.15	132.15	0	0	0
Vs	KN	0	220.25	220.25	0	0	0
s	mm	0	75.42857143	75.42857143	0	0	0
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	0	0	0
hasil		-	**P10-75**	**P10-75**	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1451.400329	745.0200451	558.6950395	2238.144524	2363.573132	1242.984794
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**	**P10-200**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 74 Perhitungan tulangan geser balok portal D/lantai 3

Data		balok					
		D/1-2	D/2-3	D/3-4	D/4-7	D/7-8	D/8-9
Vu	KN	55.38	107.45	140.33	52.5	50.21	52.29
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	50.14423333	97.63949861	131.8637063	43.88854167	41.97416528	47.05423333
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	3<Vu<4	3<Vu<4	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	2213.773848	1130.050595	0	0	0
θ Vs =Vu - θVc	KN	0	132.15	132.15	0	0	0
Vs	KN	0	220.25	220.25	0	0	0
s	mm	0	75.42857143	75.42857143	0	0	0
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	0	0	0
hasil		-	P10-75	P10-75	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	1431.744312	1106.886924	565.0252975	2265.428571	2368.751245	1516.351119
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	P10-200	P10-200	P10-200	P10-200
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 75 Perhitungan tulangan geser balok portal D/lantai 2

Data		balok					
		D/1-2	D/2-3	D/3-4	D/4-7	D/7-8	D/8-9
Vu	KN	55.62	107.21	141.5	53.22	50.6	52.33
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2400	3600	2400	3600	3600	2400
h	mm	500	500	500	500	500	500
b	mm	300	300	300	300	300	300
d	mm	440.5	440.5	440.5	440.5	440.5	440.5
d/4	mm	110.125	110.125	110.125	110.125	110.125	110.125
d/2	mm	220.25	220.25	220.25	220.25	220.25	220.25
Vu kritis	KN	51.38669375	97.38637639	133.0337063	44.49044167	42.30019444	32.01752708
Vc	KN	110.125	110.125	110.125	110.125	110.125	110.125
Vs2	KN	440.5	440.5	440.5	440.5	440.5	440.5
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	66.075	66.075	66.075	66.075	66.075	66.075
θ 1/2Vc	KN	33.0375	33.0375	33.0375	33.0375	33.0375	33.0375
θ Vs1	KN	132.15	132.15	132.15	132.15	132.15	132.15
θ Vs2	KN	264.3	264.3	264.3	264.3	264.3	264.3
θ (Vc+Vs1)	KN	198.225	198.225	198.225	198.225	198.225	198.225
θ (Vc+Vs2)	KN	330.375	330.375	330.375	330.375	330.375	330.375
		1<Vu<2	3<Vu<4	3<Vu<4	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	2218.729596	1120.706714	0	0	0
θ Vs =Vu - θVc	KN	0	132.15	132.15	0	0	0
Vs	KN	0	220.25	220.25	0	0	0
s	mm	0	75.42857143	75.42857143	0	0	0
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	0	0	0
hasil		-	P10-75	P10-75	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1425.566343	1109.364798	560.3533569	2234.780158	2350.494071	1515.19205
s	mm	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571	377.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		P10-200	P10-200	P10-200	P10-200	P10-200	P10-200
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 76 Perhitungan tulangan geser balok portal A-B/as 1

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	2.18	36.45	32.8	32.73	32.66
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	1.321952	22.10328	19.88992	19.847472	25.091072
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	1<Vu<2
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0	981.7054501
s	mm	0	0	0	0	377.1428571
smaks	mm	-	-	-	-	d/2 atau 600 mm
hasil		**P10-170**	**P10-170**	**P10-280**	**P10-280**	**P10-280**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 77 Perhitungan tulangan geser balok portal A-B/as 2

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	9.13	30.52	28.68	28.62	28.15
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	5.536432	18.507328	17.391552	17.355168	22.356208
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 78 Perhitungan tulangan geser balok portal A-B/as 4

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	4.08	25.25	26.62	26.62	26.97
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	2.474112	15.3116	16.142368	16.142368	21.640656
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 79 Perhitungan tulangan geser balok portal A-B/as 5

Data		balok			
		Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	22.42	22.94	22.37	22.31
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
l	mm	1250	1250	1250	1250
h	mm	400	400	400	400
b	mm	300	300	300	300
d	mm	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171
Vu kritis	KN	13.595488	13.910816	13.565168	18.814832
Vc	KN	85.5	85.5	85.5	85.5
Vs1	KN	171	171	171	171
Vs2	KN	342	342	342	342
teta		0.6	0.6	0.6	0.6
θ Vc	KN	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	25.65	25.65	25.65	25.65
θ Vs1	KN	102.6	102.6	102.6	102.6
θ Vs2	KN	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0
Vs	KN	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0
Vs	KN	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 80 Perhitungan tulangan geser balok portal A-B/as 6

Data		Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	22.37	22.38	22.39	22.29
fy	MPa	240	240	240	240
f'c	MPa	25	25	25	25
l	mm	1250	1250	1250	1250
h	mm	400	400	400	400
b	mm	300	300	300	300
d	mm	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171
Vu kritis	KN	13.565168	13.571232	13.577296	18.802704
Vc	KN	85.5	85.5	85.5	85.5
Vs1	KN	171	171	171	171
Vs2	KN	342	342	342	342
teta		0.6	0.6	0.6	0.6
θ Vc	KN	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	25.65	25.65	25.65	25.65
θ Vs1	KN	102.6	102.6	102.6	102.6
θ Vs2	KN	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0
Vs	KN	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0
Vs	KN	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0
s	mm	0	0	0	0
smaks	mm	0	0	0	0
hasil		-	-	-	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 81 Perhitungan tulangan geser balok portal A-B/as 7

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	4.54	25.69	26.19	26.6	26.12
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	2.753056	15.578416	15.881616	16.13024	21.125216
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 82 Perhitungan tulangan geser balok portal A-B/as 8

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	10.7	31.27	28.75	27.94	27
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	6.48848	18.962128	17.434	16.942816	21.658848
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 83 Perhitungan tulangan geser balok portal A-B/as 9

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	2.69	45.4	32.8	32.69	32.53
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	1250	1250	1250	1250	1250
h	mm	400	400	400	400	400
b	mm	150	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	1.631216	27.53056	19.88992	19.823216	25.01224
Vc	KN	42.75	85.5	85.5	85.5	85.5
Vs1	KN	85.5	171	171	171	171
Vs2	KN	171	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	12.825	25.65	25.65	25.65	25.65
θ Vs1	KN	51.3	102.6	102.6	102.6	102.6
θ Vs2	KN	102.6	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	76.95	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	128.25	256.5	256.5	256.5	256.5
		Vu<1	1<Vu<2	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	706.222467	0	0	0
s	mm	0	377.1428571	0	0	0
smaks	mm	0	d/2 atau 600 mm	0	0	0
hasil		-	P10-170	-	-	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 84 Perhitungan tulangan geser balok portal C-D/as 1

Data		balok					
		atap	Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	2.26	38.29	33.35	34.1	34.35	33.05
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400	400
b	mm	150	200	200	200	200	200
d	mm	342	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171	171
Vu kritis	KN	1.815232	30.754528	26.78672	27.38912	27.58992	26.54576
Vc	KN	42.75	57	57	57	57	57
Vs1	KN	85.5	114	114	114	114	114
Vs2	KN	171	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171	171
		Vu<1	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	1116.479499	1281.85907	1253.665689	1244.541485	1293.494705
s	mm	0	565.7142857	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	**P10-170**	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 85 Perhitungan tulangan geser balok portal C-D/as 2

Data		balok					
		atap	Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	6.68	24.32	29.98	32.07	32.11	28.69
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400	400
b	mm	150	200	200	200	200	200
d	mm	342	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171	171
Vu kritis	KN	5.365376	19.533824	24.079936	25.758624	25.790752	23.043808
Vc	KN	42.75	57	57	57	57	57
Vs1	KN	85.5	114	114	114	114	114
Vs2	KN	171	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171	171
		Vu<1	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	1757.8125	1425.950634	1333.021515	1331.360947	1490.066225
s	mm	0	565.7142857	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	P10-170	P10-170	P10-170	P10-170	P10-170
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 86 Perhitungan tulangan geser balok portal C-D/as 3

Data		balok				
		Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	47.19	46.18	45.61	45.17	46.79
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400
b	mm	150	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	40.553904	39.742672	39.284848	36.280544	40.232624
Vc	KN	42.75	57	57	57	57
Vs1	KN	85.5	114	114	114	114
Vs2	KN	171	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171
		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	1358.868404	1851.450845	1874.588906	1892.849236	1827.313529
θ Vs =Vu - θVc	KN	51.3	68.4	68.4	68.4	68.4
Vs	KN	85.5	114	114	114	114
s	mm	150.8571429	113.1428571	113.1428571	113.1428571	113.1428571
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-85**	**P10-85**	**P10-85**	**P10-85**	**P10-85**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	679.4342022	925.7254223	937.294453	946.4246181	913.6567643
s	mm	754.2857143	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		**P10-170**	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 87 Perhitungan tulangan geser balok portal C-D/as 4

Data		balok					
		atap	Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	5.09	42.18	46.59	41.07	39.54	38.67
fy	MPa	240	240	240	240	240	240
f'c	MPa	25	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400	400
b	mm	150	200	200	200	200	200
d	mm	342	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171	171
Vu kritis	KN	4.088288	36.529872	40.071984	32.987424	31.758528	31.059744
Vc	KN	42.75	57	57	57	57	57
Vs1	KN	85.5	114	114	114	114	114
Vs2	KN	171	228	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171	171
		Vu<1	2<Vu<3	2<Vu<3	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0	0
Vs	KN	0	0	0	0	0	0
s	mm	0	0	0	0	0	0
smaks	mm	0	0	0	0	0	0
hasil		-	-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	2027.027027	1835.157759	0	0	0
θ Vs =Vu - θVc	KN	0	68.4	68.4	0	0	0
Vs	KN	0	114	114	0	0	0
s	mm	0	113.1428571	113.1428571	0	0	0
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	0	0	0
hasil		-	**P10-110**	**P10-110**	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	1013.513514	917.5788796	1040.905771	1081.183612	1105.508146
s	mm	0	565.7142857	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	**P10-170**	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 88 Perhitungan tulangan geser balok portal C-D/as 7

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	4.32	28.38	28.24	28.2	26.51
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400
b	mm	150	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	3.469824	22.794816	22.682368	22.65024	21.292832
Vc	KN	42.75	57	57	57	57
Vs1	KN	85.5	114	114	114	114
Vs2	KN	171	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171
		Vu<1	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	1506.342495	1513.810198	1515.957447	1612.599019
s	mm	0	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 89 Perhitungan tulangan geser balok portal C-D/as 8

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	10.3	31.54	27.48	26.13	25.57
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400
b	mm	150	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	10.923856	25.332928	22.071936	20.987616	20.537824
Vc	KN	42.75	57	57	57	57
Vs1	KN	85.5	114	114	114	114
Vs2	KN	171	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171
		Vu<1	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	0	1355.421687	1555.676856	1636.050517	1671.881111
s	mm	0	565.7142857	565.7142857	565.7142857	565.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 90 Perhitungan tulangan geser balok portal C-D/as 9

Data		balok				
		atap	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	2.85	44.47	32.18	32.13	32.34
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	2500	2500	2500	2500	2500
h	mm	400	400	400	400	400
b	mm	150	200	200	200	200
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	2.28912	35.718304	25.846976	25.806816	25.975488
Vc	KN	42.75	57	57	57	57
Vs1	KN	85.5	114	114	114	114
Vs2	KN	171	228	228	228	228
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	25.65	34.2	34.2	34.2	34.2
θ 1/2Vc	KN	12.825	17.1	17.1	17.1	17.1
θ Vs1	KN	51.3	68.4	68.4	68.4	68.4
θ Vs2	KN	102.6	136.8	136.8	136.8	136.8
θ (Vc+Vs1)	KN	76.95	102.6	102.6	102.6	102.6
θ (Vc+Vs2)	KN	128.25	171	171	171	171
		Vu<1	2<Vu<3	1<Vu<2	1<Vu<2	1<Vu<2
∅		10	10	10	10	10
A 1Ø	mm^2	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	1922.644479	0	0	0
θ Vs =Vu - θVc	KN	0	68.4	0	0	0
Vs	KN	0	114	0	0	0
s	mm	0	113.1428571	0	0	0
smaks	mm	0	d/2 atau 600 mm	0	0	0
hasil		-	P10-110	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	961.3222397	1328.464885	1330.532213	1321.892393
s	mm	0	585.7142857	585.7142857	585.7142857	585.7142857
smaks	mm	0	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm	d/2 atau 600 mm
hasil		-	P10-170	P10-170	P10-170	P10-170
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 91 Perhitungan tulangan balok D-E/as 2'

		lantai 5		lantai 4		lantai 3		lantai 2		lantai 1	
data-data		tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	42.24	6.21	41.23	5.92	41.17	5.88	41.16	5.84	40.89	5.86
mn	KNm	52.8	7.7625	51.5375	7.4	51.4625	7.35	51.45	7.3	51.1125	7.325
Ø	mm	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342
d perlu	mm	268.008	102.762	264.784	100.334	264.592	99.9941	264.559	99.6534	263.69	99.8239
tipe		sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah	sebelah
TUL SEBELAH											
Rn baru	MPa	2.2571	0.33183	2.20314	0.31634	2.19993	0.3142	2.19939	0.31206	2.18497	0.31313
ρ baru		0.00624	0.00092	0.00609	0.00087	0.00608	0.00087	0.00608	0.00086	0.00604	0.00087
As	mm^2	426.775	62.7432	416.571	59.8132	415.964	59.4091	415.863	59.0049	413.135	59.207
n		3	2	2	2	2	2	2	2	2	2
As ada	mm^2	603.429	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286	402.286
a	mm	56.7933	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622	37.8622
mn	KNm	75.6949	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864	51.9864
		aman	aman	aman	aman	aman	aman	aman	aman	aman	aman
TUL RANGKAP											
ρ 1		0	0	0	0	0	0	0	0	0	0
As 1	mm^2	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0
mn 1	KNm	0	0	0	0	0	0	0	0	0	0
mn 2	KNm	0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0
As'=As2	mm^2	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0
As' = As2 ada	mm^2	0	0	0	0	0	0	0	0	0	0
As	mm^2	0	0	0	0	0	0	0	0	0	0
n		0	0	0	0	0	0	0	0	0	0
As ada	mm^2	0	0	0	0	0	0	0	0	0	0
ρ		0	0	0	0	0	0	0	0	0	0
ρ'		0	0	0	0	0	0	0	0	0	0
ρ1		0	0	0	0	0	0	0	0	0	0
fs '	MPa	0	0	0	0	0	0	0	0	0	0
a	mm	0	0	0	0	0	0	0	0	0	0
mn	KNm	0	0	0	0	0	0	0	0	0	0
		-	-	-	-	-	-	-	-	-	-

Tabel 92 Perhitungan tulangan balok D-E/as 3

		lantai 5		lantai 4		lantai 3		lantai 2		lantai 1	
data-data		tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58
pb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	106.7	30.26	107.11	30.09	106.88	29.94	106.41	29.71	107.92	30.28
mn	KNm	133.375	37.825	133.888	37.6125	133.6	37.425	133.013	37.1375	134.9	37.85
Ø	mm	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342
d perlu	mm	425.959	226.84	426.777	226.202	426.318	225.638	425.38	224.769	428.387	226.915
tipe		rangkap	sebelah	rangkap	sebelah	rangkap	sebelah	rangkap	sebelah	rangkap	sebelah
TUL SEBELAH											
Rn baru	MPa	0	1.61695	0	1.60787	0	1.59985	0	1.58756	0	1.61802
p baru		0	0.00447	0	0.00444	0	0.00442	0	0.00439	0	0.00447
As	mm^2	0	305.734	0	304.017	0	302.501	0	300.177	0	305.936
n		0	2	0	2	0	2	0	2	0	2
As ada	mm^2	0	402.286	0	402.286	0	402.286	0	402.286	0	402.286
a	mm	0	37.8622	0	37.8622	0	37.8622	0	37.8622	0	37.8622
mn	KNm	0	51.9864	0	51.9864	0	51.9864	0	51.9864	0	51.9864
		-	aman	-	aman	-	aman	-	aman	-	aman
TUL RANGKAP											
ρ 1		0.01016	0	0.01016	0	0.01016	0	0.01016	0	0.01016	0
As 1	mm^2	694.955	0	694.955	0	694.955	0	694.955	0	694.955	0
a	mm	65.4075	0	65.4075	0	65.4075	0	65.4075	0	65.4075	0
mn 1	KNm	85.9788	0	85.9788	0	85.9788	0	85.9788	0	85.9788	0
mn 2	KNm	47.3962	0	47.9087	0	47.6212	0	47.0337	0	48.9212	0
fs '	MPa	147.758	0	147.758	0	147.758	0	147.758	0	147.758	0
As'=As2	mm^2	1129.47	0	1141.68	0	1134.83	0	1120.83	0	1165.81	0
n		2	0	2	0	2	0	2	0	2	0
As' = As2 ada	mm^2	402.286	0	402.286	0	402.286	0	402.286	0	402.286	0
As	mm^2	1097.24	0	1097.24	0	1097.24	0	1097.24	0	1097.24	0
n		6	0	6	0	6	0	6	0	6	0
As ada	mm^2	1206.86	0	1206.86	0	1206.86	0	1206.86	0	1206.86	0
ρ		0.01764	0	0.01764	0	0.01764	0	0.01764	0	0.01764	0
ρ'		0.00588	0	0.00588	0	0.00588	0	0.00588	0	0.00588	0
ρ1		0.01176	0	0.01176	0	0.01176	0	0.01176	0	0.01176	0
fs '	MPa	209.373	0	209.373	0	209.373	0	209.373	0	209.373	0
a	mm	93.7683	0	93.7683	0	93.7683	0	93.7683	0	93.7683	0
mn	KNm	141.529	0	141.529	0	141.529	0	141.529	0	141.529	0
		aman	-	aman	-	aman	-	aman	-	aman	-

Tabel 93 Perhitungan tulangan balok D-E/as 4

		lantai 5		lantai 4		lantai 3		lantai 2		lantai 1	
data-data		tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)	tum(-)	lap(-)
f'c	Mpa	25	25	25	25	25	25	25	25	25	25
fy	Mpa	400	400	400	400	400	400	400	400	400	400
Φ		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
β		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
pb	mm	40	40	40	40	40	40	40	40	40	40
d'	mm	58	58	58	58	58	58	58	58	58	58
ρb		0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709	0.02709
ρmaks		0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032	0.02032
ρmin		0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035
ρrencana		0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016	0.01016
m		18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235	18.8235
r n	MPa	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544	3.67544
mu	KNm	102.73	44.22	103.32	44.87	103.62	45.07	104.09	45.33	102.86	44.75
mn	KNm	128.413	55.275	129.15	56.0875	129.525	56.3375	130.113	56.6625	128.575	55.9375
Ø	mm	16	16	16	16	16	16	16	16	16	16
A 1Ø	mm^2	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143	201.143
b	mm	200	200	200	200	200	200	200	200	200	200
h	mm	400	400	400	400	400	400	400	400	400	400
d ada	mm	342	342	342	342	342	342	342	342	342	342
d perlu	mm	417.959	274.217	419.158	276.225	419.766	276.84	420.717	277.638	418.224	275.856
tipe		rangkap	sebelah	rangkap	sebelah	rangkap	sebelah	rangkap	sebelah	rangkap	sebelah
TUL SEBELAH											
Rn baru	MPa	0	2.36291	0	2.39764	0	2.40833	0	2.42222	0	2.39123
ρ baru		0	0.00653	0	0.00663	0	0.00666	0	0.0067	0	0.00661
As	mm^2	0	446.78	0	453.348	0	455.368	0	457.995	0	452.135
n		0	3	0	3	0	3	0	3	0	3
As ada	mm^2	0	603.429	0	603.429	0	603.429	0	603.429	0	603.429
a	mm	0	56.7933	0	56.7933	0	56.7933	0	56.7933	0	56.7933
mn	KNm	0	75.6949	0	75.6949	0	75.6949	0	75.6949	0	75.6949
		-	aman	-	aman	-	aman	-	aman	-	aman
TUL RANGKAP											
ρ 1		0.01016	0	0.01016	0	0.01016	0	0.01016	0	0.01016	0
As 1	mm^2	694.955	0	694.955	0	694.955	0	694.955	0	694.955	0
a	mm	65.4075	0	65.4075	0	65.4075	0	65.4075	0	65.4075	0
mn 1	KNm	85.9788	0	85.9788	0	85.9788	0	85.9788	0	85.9788	0
mn 2	KNm	42.4337	0	43.1712	0	43.5462	0	44.1337	0	42.5962	0
fs '	MPa	147.758	0	147.758	0	147.758	0	147.758	0	147.758	0
As'=As2	mm^2	1011.21	0	1028.78	0	1037.72	0	1051.72	0	1015.08	0
n		2	0	2	0	2	0	2	0	2	0
As' = As2 ada	mm^2	402.286	0	402.286	0	402.286	0	402.286	0	402.286	0
As	mm^2	1097.24	0	1097.24	0	1097.24	0	1097.24	0	1097.24	0
n		6	0	6	0	6	0	6	0	6	0
As ada	mm^2	1206.86	0	1206.86	0	1206.86	0	1206.86	0	1206.86	0
ρ		0.01764	0	0.01764	0	0.01764	0	0.01764	0	0.01764	0
ρ'		0.00588	0	0.00588	0	0.00588	0	0.00588	0	0.00588	0
ρ1		0.01176	0	0.01176	0	0.01176	0	0.01176	0	0.01176	0
fs '	MPa	209.373	0	209.373	0	209.373	0	209.373	0	209.373	0
a	mm	93.7683	0	93.7683	0	93.7683	0	93.7683	0	93.7683	0
mn	KNm	141.529	0	141.529	0	141.529	0	141.529	0	141.529	0
		aman	-	aman	-	aman	-	aman	-	aman	-

Tabel 94 Perhitungan tulangan geser balok D-E/as 2'

Data		balok				
		Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	28.49	28.01	28	28.02	27.82
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	3000	3000	3000	3000	3000
h	mm	400	400	400	400	400
b	mm	300	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	23.81764	23.41636	23.408	23.42472	23.25752
Vc	KN	85.5	85.5	85.5	85.5	85.5
Vs1	KN	171	171	171	171	171
Vs2	KN	342	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	51.3	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	25.65	25.65	25.65	25.65	25.65
θ Vs1	KN	102.6	102.6	102.6	102.6	102.6
θ Vs2	KN	205.2	205.2	205.2	205.2	205.2
θ (Vc+Vs1)	KN	153.9	153.9	153.9	153.9	153.9
θ (Vc+Vs2)	KN	256.5	256.5	256.5	256.5	256.5
		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
Ø		10	10	10	10	10
A 1Ø	mm^2	157.14286	157.14286	157.14286	157.14286	157.14286
area 1		3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4	3<Vu<4
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
x	mm	0	0	0	0	0
θ Vs =Vu - θVc	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
x	mm	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 4		Vu<1	Vu<1	Vu<1	Vu<1	Vu<1
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 95 Perhitungan tulangan geser balok D-E/as 3

		balok				
Data		Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	59.44	59.83	59.78	59.62	60.24
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	3000	3000	3000	3000	3000
h	mm	400	400	400	400	400
b	mm	300	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	52.22564	52.614	52.56564	52.404	53.024
Vc	KN	85.5	85.5	85.5	85.5	85.5
Vs1	KN	171	171	171	171	171
Vs2	KN	342	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	51.3	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	25.65	25.65	25.65	25.65	25.65
θ Vs1	KN	102.6	102.6	102.6	102.6	102.6
θ Vs2	KN	205.2	205.2	205.2	205.2	205.2
θ (Vc+Vs1	KN	153.9	153.9	153.9	153.9	153.9
θ (Vc+Vs2	KN	256.5	256.5	256.5	256.5	256.5
		2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3	2<Vu<3
Ø		10	10	10	10	10
A 1Ø	mm^2	157.14286	157.14286	157.14286	157.14286	157.14286
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	2589.1655	2572.2881	2574.4396	2581.3485	2554.7809
θ Vs =Vu -	KN	102.6	102.6	102.6	102.6	102.6
Vs	KN	171	171	171	171	171
s	mm	75.428571	75.428571	75.428571	75.428571	75.428571
smaks	mm	tau 600 mm	tau 600 mm	tau 600 mm	tau 600 mm	tau 600 mm
hasil		**P10-75**	**P10-75**	**P10-75**	**P10-75**	**P10-75**
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1294.5828	1286.1441	1287.2198	1290.6743	1277.3904
s	mm	377.14286	377,14286	377,14286	377.14286	377,14286
smaks	mm	tau 600 mm	tau 600 mm	tau 600 mm	tau 600 mm	tau 600 mm
hasil		**P10-170**	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 96 Perhitungan tulangan geser balok D-E/as 4

		balok				
Data		Lt 5	Lt 4	Lt 3	Lt 2	Lt 1
Vu	KN	43.97	44.06	44.12	44.27	43.83
fy	MPa	240	240	240	240	240
f'c	MPa	25	25	25	25	25
l	mm	3000	3000	3000	3000	3000
h	mm	400	400	400	400	400
b	mm	300	300	300	300	300
d	mm	342	342	342	342	342
d/4	mm	85.5	85.5	85.5	85.5	85.5
d/2	mm	171	171	171	171	171
Vu kritis	KN	39.80604	39.89604	39.95604	40.10604	39.66604
Vc	KN	85.5	85.5	85.5	85.5	85.5
Vs1	KN	171	171	171	171	171
Vs2	KN	342	342	342	342	342
teta		0.6	0.6	0.6	0.6	0.6
θ Vc	KN	51.3	51.3	51.3	51.3	51.3
θ 1/2Vc	KN	25.65	25.65	25.65	25.65	25.65
θ Vs1	KN	102.6	102.6	102.6	102.6	102.6
θ Vs2	KN	205.2	205.2	205.2	205.2	205.2
θ (Vc+Vs1	KN	153.9	153.9	153.9	153.9	153.9
θ (Vc+Vs2	KN	256.5	256.5	256.5	256.5	256.5
		1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2	1<Vu<2
Ø		10	10	10	10	10
A 1Ø	mm^2	157.14286	157.14286	157.14286	157.14286	157.14286
area 1		**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**	**3<Vu<4**
x	mm	0	0	0	0	0
θ Vs =Vu - θVc		0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 2		**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**	**2<Vu<3**
x	mm	0	0	0	0	0
θ Vs =Vu -	KN	0	0	0	0	0
Vs	KN	0	0	0	0	0
s	mm	0	0	0	0	0
smaks	mm	0	0	0	0	0
hasil		-	-	-	-	-
area 3		**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**	**1<Vu<2**
x	mm	1750.0569	1746.4821	1744.107	1738.1974	1755.6468
s	mm	377.14286	377.14286	377.14286	377.14286	377.14286
smaks	mm	atau 600 mm	atau 600 mm	atau 600 mm	atau 600 mm	atau 600 mm
hasil		**P10-170**	**P10-170**	**P10-170**	**P10-170**	**P10-170**
area 4		**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**	**Vu<1**
		tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser	tnp tul geser

Tabel 97 Perhitungan tulangan kolom as A lantai 4

		A-2				A-4				A-7				A-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	36.52	36.52	56.31	56.31	42.05	42.05	63.15	63.15	41.94	41.94	64.74	64.74	35.55	35.55	61.67	61.67
Pl	KN	3.94	3.94	3.94	3.94	3.52	3.52	3.52	3.52	3.43	3.43	3.43	3.43	3.66	3.66	3.66	3.66
Pu	KN	50.128	50.128	73.876	73.876	56.092	56.092	81.412	81.412	55.816	55.816	83.176	83.176	48.516	48.516	79.86	79.86
Md	KNm	4.17	-	2.75	-	0.1808	-	1.5	-	0.564	-	0.9863	-	5.58	-	4.64	-
Ml	KNm	1.66	-	0.655	-	0.2103	-	0.9818	-	0.3272	-	0.769	-	2.11	-	1.39	-
Mux	KNm	7.66	-	4.348	-	0.55344	-	3.37088	-	1.20032	-	2.41396	-	10.072	-	7.792	-
Md	KNm	-	2.27	-	4.24	-	2.1	-	5.38	-	1.51	-	5.76	-	2.64	-	9.29
Ml	KNm	-	0.1844	-	1.34	-	0.09699	-	0.07274	-	0.2309	-	0.07349	-	0.07864	-	1.24
Muy	KNm	-	3.01904	-	7.232	-	2.675184	-	6.572384	-	2.18144	-	7.029584	-	3.293824	-	13.132
L	m	5.25	5.25	5.25	5.25	5.56	5.56	5.56	5.56	6.05	6.05	6.05	6.05	6.93	6.93	6.93	6.93
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	77.12	77.12	113.65538	113.65538	86.295385	86.295385	125.24923	125.24923	85.870769	85.870769	127.96308	127.96308	74.64	74.64	122.86154	122.86154
Mux/O	KNm	11.784615	-	6.6892308	-	0.8514462	-	5.1859692	-	1.8466462	-	3.7137846	-	15.495385	-	11.987692	-
Muy/O	KNm	-	4.6446769	-	11.126154	-	4.1156677	-	10.11136	-	3.3560615	-	10.814745	-	5.0674215	-	20.203077
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.1528088	0.0602266	0.0588554	0.0978938	0.0098666	0.0476928	0.0414052	0.0807299	0.0215049	0.0390827	0.0290223	0.0845146	0.2076016	0.0678915	0.0975707	0.1644378
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p tarik	p desak	p desak	p desak
e	m	0.1528088	0.0602266	0.0588554	0.0978938	0.0098666	0.0476928	0.0414052	0.0807299	0.0215049	0.0390827	0.0290223	0.0845146	0.2076016	0.0678915	0.0975707	0.1644378
Pn	KN	1831.4785	2745.6396	2766.1106	2281.9843	3771.9219	2944.8868	3056.1843	2472.1665	3471.7154	3099.461	3302.0641	2427.5494	1530.2364	2636.586	2285.2924	1758.0139
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 98 Perhitungan tulangan kolom as A lantai 3

		A-2				A-4				A-7				A-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	199.85	199.85	215.68	215.68	205.37	205.37	221.21	221.21	212.09	212.09	227.93	227.93	229.94	229.94	245.77	245.77
Pl	KN	27.93	27.93	27.93	27.93	34.27	34.27	34.27	34.27	33.94	33.94	33.94	33.94	27.68	27.68	27.68	27.68
Pu	KN	284.508	284.508	303.504	303.504	301.276	301.276	320.284	320.284	308.812	308.812	327.82	327.82	320.216	320.216	339.212	339.212
Md	KNm	1.3	-	0.4805	-	2.04	-	2.62	-	1.97	-	2.42	-	2.1	-	0.6966	-
Ml	KNm	1.2	-	0.6863	-	2.01	-	1.79	-	2.02	-	1.74	-	1.5	-	0.6821	-
Mux	KNm	3.48	-	1.67468	-	5.664	-	6.008	-	5.596	-	5.688	-	4.92	-	1.92728	-
Md	KNm	-	7.87	-	7.49	-	10.93	-	9.51	-	8.96	-	6.23	-	15.01	-	6.96
Ml	KNm	-	3.17	-	2.59	-	0.04903	-	0.07417	-	0.1217	-	0.009084	-	3.37	-	2.67
Muy	KNm	-	14.516	-	13.132	-	13.19444	-	11.530672	-	10.94672	-	7.4905344	-	23.404	-	12.624
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	437.70462	437.70462	466.92923	466.92923	463.50154	463.50154	492.74462	492.74462	475.09538	475.09538	504.33846	504.33846	492.64	492.64	521.86462	521.86462
Mux/O	KNm	5.3538462	-	2.5764308	-	8.7138462	-	9.2430769	-	8.6092308	-	8.7507692	-	7.5692308	-	2.9650462	-
Muy/O	KNm	-	22.332308	-	20.203077	-	20.299151	-	17.739495	-	16.841108	-	11.523899	-	36.006154	-	19.421538
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0122316	0.0510214	0.0055178	0.043268	0.0188	0.0437952	0.0187584	0.0360014	0.0181211	0.0354478	0.017351	0.0228495	0.0153646	0.0730882	0.0056816	0.0372157
%Ast	mm²	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm²	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm²	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm²	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm²	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0122316	0.0510214	0.0055178	0.043268	0.0188	0.0437952	0.0187584	0.0360014	0.0181211	0.0354478	0.017351	0.0228495	0.0153646	0.0730882	0.0056816	0.0372157
Pn	KN	3706.7662	2889.1966	3897.9441	3022.3409	3537.125	3012.8977	3538.1524	3158.8122	3553.9346	3169.7173	3573.1947	3440.0967	3623.8571	2567.4606	3893.0436	3135.153
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 99 Perhitungan tulangan kolom as A lantai 2

		A-2				A-4				A-7				A-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	343.07	343.07	358.38	358.38	344.65	344.65	360.49	360.49	351.53	351.53	367.36	367.36	374.16	374.16	389.99	389.99
Pl	KN	52.49	52.49	3.94	3.94	64.76	64.76	64.76	64.76	64.32	64.32	64.32	64.32	52.25	52.25	52.25	52.25
Pu	KN	495.668	495.668	436.36	436.36	517.196	517.196	536.204	536.204	524.748	524.748	543.744	543.744	532.592	532.592	551.588	551.588
Md	KNm	0.1604	-	0.8736	-	0.6521	-	1.97	-	0.5824	-	1.89	-	0.1584	-	0.7903	-
Ml	KNm	0.8552	-	0.6958	-	1.22	-	1.32	-	1.21	-	1.3	-	0.807	-	0.6643	-
Mux	KNm	1.5608	-	2.1616	-	2.73452	-	4.476	-	2.63488	-	4.348	-	1.48128	-	2.01124	-
Md	KNm	-	4.85	-	5.53	-	5.51	-	6.4	-	7.13	-	6.63	-	4.3	-	4.96
Ml	KNm	-	2.24	-	2.27	-	0.009417	-	0.007796	-	0.01341	-	0.009144	-	2.26	-	2.34
Muy	KNm	-	9.404	-	10.268	-	6.7470672	-	7.6924736	-	8.577456	-	7.9706304	-	8.776	-	9.696
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	762.56615	762.56615	671.32308	671.32308	795.68615	795.68615	824.92923	824.92923	807.30462	807.30462	836.52923	836.52923	819.37231	819.37231	848.59692	848.59692
Mux/O	KNm	2.4012308	-	3.3255385	-	4.2069538	-	6.8861538	-	4.0536615	-	6.6892308	-	2.2788923	-	3.0942154	-
Muy/O	KNm	-	14.467692	-	15.796923	-	10.380103	-	11.834575	-	13.196086	-	12.262508	-	13.501538	-	14.916923
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0031489	0.0189724	0.0049537	0.023531	0.0052872	0.0130455	0.0083476	0.0143462	0.0050212	0.0163459	0.0079964	0.0146588	0.0027813	0.0164779	0.0036463	0.0175783
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0031489	0.0189724	0.0049537	0.023531	0.0052872	0.0130455	0.0083476	0.0143462	0.0050212	0.0163459	0.0079964	0.0146588	0.0027813	0.0164779	0.0036463	0.0175783
Pn	KN	3970.2211	3532.8837	3914.9143	3424.2909	3904.8638	3684.8652	3815.0009	3650.397	3912.8752	3598.6515	3825.1004	3642.209	3981.6794	3595.2864	3954.8229	3567.4866
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 100 Perhitungan tulangan kolom as A lantai 1

		A-2				A-4				A-7				A-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	486.53	486.53	502.17	502.17	483.75	483 75	499.58	499.58	490.7	490.7	506.53	506.53	518.5	518.5	534.34	534.34
Pl	KN	77.14	77.14	77.14	77.14	95.16	95.16	95.16	95.16	94.58	94.58	3.43	3.43	77.06	77.06	77.06	77.06
Pu	KN	707.26	707.26	726.028	726.028	732.756	732.756	751.752	751.752	740.168	740.168	613.324	613.324	745.496	745.496	764.504	764.504
Md	KNm	0.3988	-	2.46	-	0.7171	-	2.7	-	0.7456	-	2.58	-	0.4012	-	1.81	-
Ml	KNm	1.1	-	1.3	-	1.46	-	1.75	-	1.46	-	1.67	-	1.1	-	1.01	-
Mux	KNm	2.23856	-	5.032	-	3.79652	-	6.04	-	3.23072	-	5.768	-	2.24144	-	3.788	-
Md	KNm	-	6	-	6.85	-	7.1	-	7.68	-	7.13	-	8.08	-	6.02	-	6.66
Ml	KNm	-	2.47	-	2.73	-	0.006763	-	0.1488	-	0.05157	-	0.02908	-	2.46	-	2.66
Muy	KNm	-	11.152	-	12.588	-	8 5308208	-	9.45408	-	8.638512	-	9.742528	-	11.16	-	12.248
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1088.0923	1088.0923	1116.9662	1116.9662	1127.3169	1127.3169	1156.5415	1156.5415	1138.72	1138.72	943.57538	943.57538	1146.9169	1146.9169	1176.16	1176.16
Mux/O	KNm	3.4439385	-	7.7415385	-	4.9177231	-	9.2923077	-	4.9703385	-	8.8738462	-	3.4483692	-	5.8276923	-
Muy/O	KNm	-	17.156923	-	19.366154	-	13.12434	-	14.544738	-	13.290018	-	14.988505	-	17.169231	-	18.843077
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0031651	0.0157679	0.0069309	0.0173382	0.0043623	0.0116421	0.0080346	0.0125761	0.0043648	0.011671	0.0094045	0.0158848	0.0030066	0.0149699	0.0049548	0.0160208
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5 6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	257.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0031651	0.0157679	0.0069309	0.0173382	0.0043623	0.0116421	0.0080346	0.0125761	0.0043648	0.011671	0.0094045	0.0158848	0.0030066	0.0149699	0.0049548	0.0160208
Pn	KN	3969.7166	3613.4553	3856.0779	3573.5168	3932 8651	3722.7955	3824.0005	3697.4657	3932.7882	3722.0061	3784.9242	3610.4511	3974.6467	3634.0972	3914.8799	3606.9612
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 101 Perhitungan tulangan kolom as A lantai dasar

		A-2				A-4				A-7				A-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	630.33	630.33	653.1	653.1	622.31	622.31	643.06	643.06	629.61	629.61	648.66	648.66	664.14	664.14	679.86	679.86
Pl	KN	101.81	101.81	101.81	101.81	125.55	125.55	125.55	125.55	124.93	124.93	124.93	124.93	101.94	101.94	101.94	101.94
Pu	KN	919.292	919.292	946.616	946.616	947.652	947.652	972.552	972.552	955.42	955.42	978.28	978.28	960.072	960.072	978.936	978.936
Md	KNm	1.86	-	3.04	-	0.6782	-	1.56	-	0.2366	-	1.13	-	0.08144	-	1.55	-
Ml	KNm	0.233	-	1.07	-	0.671	-	0.6222	-	0.8512	-	0.4875	-	0.978	-	0.978	-
Mux	KNm	2.6048	-	5.36	-	1.88744	-	2.86752	-	1.64584	-	2.136	-	1.662528	-	3.4248	-
Md	KNm	-	3.93	-	1.9	-	4.6	-	2.24	-	4.11	-	1.7	-	3.52	-	1.17
Ml	KNm	-	1.75	-	1.09	-	0.2602	-	0.3982	-	0.1547	-	0.2306	-	1.81	-	1.81
Muy	KNm	-	7.516	-	4.024	-	5.93632	-	3.32512	-	5.17952	-	2.40896	-	7.12	-	4.3
L	m	6.04	6.04	6.04	6.04	5.5	5.5	5.5	5.5	5.05	5.05	5.05	5.05	4.17	4.17	4.17	4.17
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1414.2954	1414.2954	1456.3323	1456.3323	1457.9262	1457.9262	1496.2338	1496.2338	1469.8769	1469.8769	1505.0462	1505.0462	1477.0338	1477.0338	1506.0554	1506.0554
Mux/O	KNm	4.0073846	-	8.2461538	-	2.9037538	-	4.4115692	-	2.5320615	-	3.2861538	-	2.5577354	-	5.2689231	-
Muy/O	KNm	-	11.563077	-	6.1907692	-	9.1328	-	5.1155692	-	7.9684923	-	3.7060923	-	10.953846	-	6.6153846
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0028335	0.0081759	0.0056623	0.00425C9	0.0019917	0.0062642	0.0029484	0.003419	0.0017226	0.0054212	0.0021834	0.0024624	0.0017317	0.0074161	0.0034985	0.0043925
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0028335	0.0081759	0.0056623	0.00425C9	0.0019917	0.0062642	0.0029484	0.003419	0.0017226	0.0054212	0.0021834	0.0024624	0.0017317	0.0074161	0.0034985	0.0043925
Pn	KN	3980.0477	3819.9327	3893.6222	3936.2648	4006.5159	3875.7156	3976.4602	3961.845	4015.0509	3900.8403	4000.4565	3991.6709	4014.7637	3841.9085	3959.3853	3931.9444
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 102 Perhitungan tulangan kolom as B lantai 4

		B-2				B-4				B-7				B-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	27	27	46.89	46.89	15.82	15.82	36.92	36.92	16.12	16.12	38.92	38.92	28	28	61.67	61.67
Pl	KN	3.03	3.03	3.03	3.03	0.0811	0.0811	0.0811	0.0811	0.1213	0.1213	0.1213	0.1213	3.35	3.35	3.66	3.66
Pu	KN	37.248	37.248	61.116	61.116	19.11376	19.11376	44.43376	44.43376	19.53808	19.53808	46.89808	46.89808	38.96	38.96	79.86	79.86
Md	KNm	6.69	-	8.53	-	2.23	-	2.92	-	2.58	-	3.26	-	8.08	-	10.09	-
Ml	KNm	2.06	-	2.99	-	0.6203	-	1.53	-	0.7366	-	1.61	-	2.51	-	3.34	-
Mux	KNm	11.324	-	15.02	-	3.66848	-	5.952	-	4.27456	-	6.488	-	13.712	-	17.452	-
Md	KNm	-	14.77	-	12.96	-	1.51	-	2.54	-	1.31	-	1.87	-	14.93	-	17.89
Ml	KNm	-	2.24	-	0.5142	-	0.477	-	0.1951	-	0.3927	-	0.0539	-	2.14	-	0.2215
Muy	KNm	-	21.308	-	16.37472	-	2.5752	-	3.36016	-	2.20032	-	2.33024	-	21.34	-	21.8224
L	m	5.25	5.25	5.25	5.25	5.56	5.56	5.56	5.56	6.05	6.05	6.05	6.05	6.93	6.93	6.93	6.93
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	57.304615	57.304615	94.024615	94.024615	29.405785	29.405785	68.359631	68.359631	30.058585	30.058585	72.150892	72.150892	59.938462	59.938462	122.86154	122.86154
Mux/O	KNm	17.421538	-	23.107692	-	5.6438154	-	9.1569231	-	6.5762462	-	9.9815385	-	21.095385	-	26.849231	-
Muy/O	KNm	-	32.781538	-	25.191877	-	3.9618462	-	5.1694769	-	3.3851077	-	3.5849846	-	32.830769	-	33.572923
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.3040163	0.5720576	0.2457622	0.2679285	0.1919287	0.1347302	0.1339522	0.0756218	0.218781	0.112617	0.1383426	0.0496873	0.3519507	0.5477413	0.2185324	0.2732582
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p tarik	p tarik	p tarik	p tarik	p tarik	p desak	p desak	p desak	p tarik	p desak	p desak	p desak	p tarik	p tarik	p tarik	p tarik
e	m	0.3040163	0.5720576	0.2457622	0.2679285	0.1919287	0.1347302	0.1339522	0.0756218	0.218781	0.112617	0.1383426	0.0496873	0.3519507	0.5477413	0.2185324	0.2732582
Pn	KN	1186.8804	731.05479	1373.0052	1295.6847	1605.7726	1958.7496	1964.6252	2535.06	1480.5625	2140.7597	1931.9219	2911.2611	1067.7931	757.44053	1481.6317	1278.3761
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 103 Perhitungan tulangan kolom as B lantai 3

		B-2				B-4				B-7				B-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	136.68	136.68	152.21	152.21	124.39	124.39	140.22	140.22	125.86	125.86	141.7	141.7	152.93	152.93	168.76	168.76
Pl	KN	30.76	30.76	30.76	30.76	32.29	32.29	32.29	32.29	32.19	32.19	32.19	32.19	31.75	31.75	31.75	31.75
Pu	KN	213.232	213.232	231.868	231.868	200.932	200.932	219.928	219.928	202.536	202.536	221.544	221.544	234.316	234.316	253.312	253.312
Md	KNm	8.53	-	8.03	-	5.91	-	4.41	-	6.12	-	4.63	-	9.22	-	8.32	-
Ml	KNm	3.35	-	3.32	-	3.27	-	2.76	-	3.33	-	2.86	-	3.37	-	3.41	-
Mux	KNm	15.596	-	14.948	-	12.324	-	9.708	-	12.672	-	10.132	-	16.456	-	15.44	-
Md	KNm	-	14.65	-	12.7	-	1.52	-	1.01	-	5.92	-	4.73	-	21.52	-	12.59
Ml	KNm	-	3.09	-	2.38	-	0.0165	-	0.1333	-	0.14	-	0.01054	-	3.29	-	2.43
Muy	KNm	-	22.524	-	19.048	-	1.8504	-	1.42528	-	7.328	-	5.692864	-	31.088	-	18.996
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	328.04923	328.04923	356.72	356.72	309.12615	309.12615	338.35077	338.35077	311.59385	311.59385	340.83692	340.83692	360.48615	360.48615	389.71077	389.71077
Mux/O	KNm	23.993846	-	22.996923	-	18.96	-	14.935385	-	19.495385	-	15.587692	-	25.316923	-	23.753846	-
Muy/O	KNm	-	34.652308	-	29.304615	-	2.8467692	-	2.1927385	-	11.273846	-	8.7582523	-	47.827692	-	29.224615
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
		atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas
e	m	0.073141	0.1056314	0.0644677	0.0821502	0.0613342	0.0092091	0.0441417	0.0064807	0.0625667	0.0361812	0.0457336	0.0256963	0.0702299	0.1326755	0.0609525	0.0749905
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.073141	0.1056314	0.0644677	0.0821502	0.0613342	0.0092091	0.0441417	0.0064807	0.0625667	0.0361812	0.0457336	0.0256963	0.0702299	0.1326755	0.0609525	0.0749905
Pn	KN	2566.7766	2205.5152	2684.2055	2455.2316	2729.3256	3790.4488	3006.724	3869.318	2711.3987	3155.2859	2978.6846	3375.0257	2605.0239	1974.3442	2734.9256	2543.0558
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 104 Perhitungan tulangan kolom as B lantai 2

		B-2				B-4				B-7				B-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	343.07	343.07	358.38	358.38	344.65	344.65	360.49	360.49	351.53	351.53	367.36	367.36	374.16	374.16	389.99	389.99
Pl	KN	52.49	52.49	3.94	3.94	64.76	64.76	64.76	64.76	64.32	64.32	64.32	64.32	52.25	52.25	52.25	52.25
Pu	KN	495.668	495.668	436.36	436.36	517.196	517.196	536.204	536.204	524.748	524.748	543.744	543.744	532.592	532.592	551.588	551.588
Md	KNm	0.1604	-	0.8736	-	0.6521	-	1.97	-	0.5824	-	1.89	-	0.1584	-	0.7903	-
Ml	KNm	0.8552	-	0.6958	-	1.22	-	1.32	-	1.21	-	1.3	-	0.807	-	0.6643	-
Mux	KNm	1.5608	-	2.1616	-	2.73452	-	4.476	-	2.63488	-	4.348	-	1.48128	-	2.01124	-
Md	KNm	-	4.85	-	5.53	-	5.61	-	6.4	-	7.13	-	6.63	-	4.3	-	4.96
Ml	KNm	-	2.24	-	2.27	-	0.009417	-	0.007796	-	0.01341	-	0.009144	-	2.26	-	2.43
Muy	KNm	-	9.404	-	10.268	-	6.7470672	-	7.6924736	-	8.577456	-	7.9706304	-	8.776	-	9.84
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	762.56615	762.56615	671.32308	671.32308	795.68615	795.68615	824.92923	824.92923	807.30462	807.30462	836.52923	836.52923	819.37231	819.37231	848.59692	848.59692
Mux/O	KNm	2.4012308	-	3.3255385	-	4.2069538	-	6.8861538	-	4.0536615	-	6.6892308	-	2.2788923	-	3.0942154	-
Muy/O	KNm	-	14.467692	-	15.796923	-	10.380103	-	11.834575	-	13.196086	-	12.262508	-	13.501538	-	15.138462
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.0031489	0.0189724	0.0049537	0.023531	0.0052872	0.0130455	0.0083476	0.0143462	0.0050212	0.0163459	0.0079964	0.0146588	0.0027813	0.0164779	0.0036463	0.0178394
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0031489	0.0189724	0.0049537	0.023531	0.0052872	0.0130455	0.0083476	0.0143462	0.0050212	0.0163459	0.0079964	0.0146588	0.0027813	0.0164779	0.0036463	0.0178394
Pn	KN	3970.2211	3532.8837	3914.9143	3424.2909	3904.8638	3684.8652	3815.0009	3650.397	3912.8752	3598.6515	3825.1004	3642.209	3981.6794	3595.2864	3954.8229	3560.9547
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 105 Perhitungan tulangan kolom as B lantai 1

		B-2				B-4				B-7				B-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	237.9	237.9	253.2	253.2	228.14	228.14	243.97	243.97	229.64	229.64	506.53	506.53	255.32	255.32	271.16	271.16
Pl	KN	58.29	58.29	58.29	58.29	64.59	64.59	64.59	64.59	64.42	64.42	3.43	3.43	59.37	59.37	59.37	59.37
Pu	KN	378.744	378.744	397.104	397.104	377.112	377.112	396.108	396.108	378.64	378.64	613.324	613.324	401.376	401.376	420.384	420.384
Md	KNm	7.39	-	6.68	-	5.55	-	4.24	-	5.58	-	4.34	-	7.36	-	6.74	-
Ml	KNm	2.69	-	2.85	-	2.71	-	2.64	-	2.71	-	2.68	-	2.67	-	2.9	-
Mux	KNm	13.172	-	12.576	-	10.996	-	9.312	-	11.032	-	9.496	-	13.104	-	12.728	-
Md	KNm	-	9.3	-	10.01	-	2.81	-	2.33	-	1.27	-	2.17	-	8.56	-	9.44
Ml	KNm	-	1.92	-	2	-	0.1891	-	0.1891	-	0.2376	-	0.181	-	1.96	-	2.07
Muy	KNm	-	14.232	-	15.212	-	3.67456	-	3.09856	-	1.90416	-	2.8936	-	13.408	-	14.64
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	582.68308	582.68308	610.92923	610.92923	580.17231	580.17231	609.39692	609.39692	582.52308	582.52308	943.57538	943.57538	617.50154	617.50154	646.74462	646.74462
Mux/O	KNm	20.264615	-	19.347692	-	16.916923	-	14.326154	-	16.972308	-	14.609231	-	20.16	-	19.581538	-
Muy/O	KNm	-	21.895385	-	23.403077	-	5.6531692	-	4.7670154	-	2.9294769	-	4.4516923	-	20.627692	-	22.523077
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
		atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas
e	m	0.0347781	0.0375768	0.0316693	0.0383073	0.0291584	0.0097439	0.0235087	0.0078225	0.0291359	0.0050289	0.0154828	0.0047179	0.0326477	0.0334051	0.0302771	0.0348253
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0347781	0.0375768	0.0316693	0.0383073	0.0291584	0.0097439	0.0235087	0.0078225	0.0291359	0.0050289	0.0154828	0.0047179	0.0326477	0.0334051	0.0302771	0.0348253
Pn	KN	3183.0126	3128.1843	3246.2231	3214.1339	3299.1452	3775.3651	3424.8055	3830.1217	3299.6292	3912.6423	3620.8016	3922.0522	3226.0594	3210.6224	3275.3548	3182.0721
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 106 Perhitungan tulangan kolom as B lantai dasar

		B-2				B-4				B-7				B-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	439.47	439.47	462.23	462.23	436.58	436.58	457.32	457.32	437.52	437.52	456.56	456.56	458.01	458.01	473.73	473.73
Pl	KN	112.92	112.92	112.92	112.92	129.63	129.63	129.63	129.63	129.11	129.11	129.11	129.11	113.97	113.97	113.97	113.97
Pu	KN	708.036	708.036	735.348	735.348	731.304	731.304	756.192	756.192	731.6	731.6	754.448	754.448	731.964	731.964	750.828	750.828
Md	KNm	6.98	-	5.58	-	5.21	-	3.81	-	4.99	-	3.49	-	6.35	-	4.72	-
Ml	KNm	2.18	-	2.27	-	2.22	-	2.06	-	2.19	-	1.99	-	2.06	-	2.11	-
Mux	KNm	11.864	-	10.328	-	9.804	-	7.868	-	9.492	-	7.372	-	10.916	-	9.04	-
Md	KNm	-	7.15	-	3.69	-	1.41	-	0.5463	-	2.77	-	1.95	-	7.03	-	2.59
Ml	KNm	-	1.55	-	0.9564	-	0.2859	-	0.3606	-	0.009651	-	0.09008	-	1.75	-	0.7774
Muy	KNm	-	11.06	-	5.95824	-	2.14944	-	1.23252	-	3.3394416	-	2.484128	-	11.236	-	4.35184
L	m	6.04	6.04	6.04	6.04	5.5	5.5	5.5	5.5	5.05	5.05	5.05	5.05	4.17	4.17	4.17	4.17
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1089.2862	1089.2862	1131.3046	1131.3046	1125.0831	1125.0831	1163.3723	1163.3723	1125.5385	1125.5385	1160.6892	1160.6892	1126.0985	1126.0985	1155.12	1155.12
Mux/O	KNm	18.252308	-	15.889231	-	15.083077	-	12.104615	-	14.603077	-	11.341538	-	16.793846	-	13.907692	-
Muy/O	KNm	-	17.015385	-	9.1665231	-	3.3068308	-	1.8961846	-	5.1376025	-	3.8217354	-	17.286154	-	6.6951385
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.0167562	0.0156207	0.0140451	0.0081026	0.0134062	0.0029392	0.0104048	0.0016299	0.0129743	0.0045646	0.0097714	0.0032926	0.0149133	0.0153505	0.01204	0.0057961
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0167562	0.0156207	0.0140451	0.0081026	0.0134062	0.0029392	0.0104048	0.0016299	0.0129743	0.0045646	0.0097714	0.0032926	0.0149133	0.0153505	0.01204	0.0057961
Pn	KN	3588.2146	3617.2457	3658.3189	3822.0403	3675.2409	3976.7489	3756.8952	4018.001	3686.7701	3926.7074	3774.5947	3965.7581	3635.5702	3624.2231	3711.9605	3889.6283
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 107 Perhitungan tulangan kolom as C lantai 5

		C-2				C-4			
		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y
Pd	KN	43.22	43.22	23.43	23.43	10.82	10.82	26.65	26.65
Pl	KN	2.57	2.57	2.57	2.57	0.8412	0.8412	0.8412	0.8412
Pu	KN	55.976	55.976	32.228	32.228	14.32992	14.32992	33.32592	33.32592
Md	KNm	14.57	-	14.62	-	3.84	-	5.32	-
Ml	KNm	2.45	-	1.55	-	1.37	-	2.33	-
Mux	KNm	21.404	-	20.024	-	6.8	-	10.112	-
Md	KNm	-	8.24	-	4.98	-	1.86	-	2.78
Ml	KNm	-	2.85	-	1.13	-	0.9638	-	1.87
Muy	KNm	-	14.448	-	7.784	-	3.77408	-	6.328
L	m	5.25	5.25	5.25	5.25	5.56	5.56	5.56	5.56
fy	MPa	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	86.116923	86.116923	49.581538	49.581538	22.046031	22.046031	51.270646	51.270646
Mux/O	KNm	32.929231	-	30.806154	-	10.461538	-	15.556923	-
Muy/O	KNm	-	22.227692	-	11.975385	-	5.8062769	-	9.7353846
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y
e	m	0.3823782	0.2581106	0.6213231	0.2415291	0.4745316	0.2633706	0.3034275	0.1898822
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6
cek									
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p tarik	p tarik	p tarik	p tarik	p tarik	p tarik	p tarik	p tarik
e	m	0.3823782	0.2581106	0.6213231	0.2415291	0.4745316	0.2633706	0.3034275	0.1898822
Pn	KN	1003.8623	1328.8287	682.86141	1388.8334	849.78693	1310.8634	1188.5088	1616.1906
cek		OK	OK	OK	OK	OK	OK	OK	OK

Tabel 108 Perhitungan tulangan kolom as C lantai 4

		C-2				C-4				C-7				C-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	116.81	116.81	132.64	132.64	32.52	32.52	48.35	48.35	11.38	11.38	40.28	40.28	28.83	28.83	49.95	49.95
Pl	KN	26.51	26.51	26.51	26.51	1.83	1.83	1.83	1.83	0.7836	0.7836	0.7836	0.7836	2.87	2.87	2.87	2.87
Pu	KN	182.588	182.588	201.584	201.584	41.952	41.952	60.948	60.948	14.90976	14.90976	49.58976	49.58976	39.188	39.188	64.532	64.532
Md	KNm	15.45	-	11.57	-	5.03	-	5.7	-	5.03	-	26.68	-	20.35	-	26.68	-
Ml	KNm	3.01	-	1.94	-	1.42	-	1.76	-	1.42	-	1.39	-	3.32	-	1.39	-
Mux	KNm	23.356	-	16.988	-	8.308	-	9.656	-	8.308	-	34.24	-	29.732	-	34.24	-
Md	KNm	-	3.27	-	4.69	-	0.04984	-	0.76243	-	0.04984	-	9.99	-	7.94	-	9.99
Ml	KNm	-	0.9353	-	1.56	-	0.5963	-	0.3192	-	0.5963	-	3.33	-	2.35	-	3.33
Muy	KNm	-	5.42048	-	8.124	-	1.013888	-	1.425636	-	1.013888	-	17.316	-	13.288	-	17.316
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	7.665	7.665	7.665	7.665	6.93	6.93	6.93	6.93
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	280.90462	280.90462	310.12923	310.12923	64.541538	64.541538	93.766154	93.766154	22.938092	22.938092	76.291938	76.291938	60.289231	60.289231	99.28	99.28
Mux/O	KNm	35.932308	-	26.135385	-	12.781538	-	14.855385	-	12.781538	-	52.676923	-	45.741538	-	52.676923	-
Muy/O	KNm	-	8.3392	-	12.498462	-	1.5598277	-	2.1932862	-	1.5598277	-	26.64	-	20.443077	-	26.64
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.1279164	0.0296869	0.0842726	0.0403008	0.1980359	0.0241678	0.1584301	0.023391	0.5572189	0.0680016	0.6904651	0.349185	0.7587016	0.3390834	0.5305895	0.268332
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p tarik	p desak	p desak	p desak	p tarik	p desak	p tarik	p tarik	p tarik	p tarik	p tarik	p tarik
e	m	0.1279164	0.0296869	0.0842726	0.0403008	0.1980359	0.0241678	0.1584301	0.023391	0.5572189	0.0680016	0.6904651	0.349185	0.7587016	0.3390834	0.5305895	0.268332
Pn	KN	2011.439	3287.8623	2430.354	3076.6107	1575.4681	3409.6534	1795.2139	3427.5261	746.93288	2635.0823	625.0351	1074.0104	576.8292	1097.3476	777.22789	1294.358
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 109 Perhitungan tulangan kolom as C lantai 3

		C-2				C-4				C-7				C-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	197.04	197.04	212.35	212.35	90.02	90.02	105.85	105.85	97.16	97.16	112.99	112.99	136.69	136.69	152.52	152.52
Pl	KN	48.55	48.55	48.55	48.55	23.07	23.07	23.07	23.07	29.74	29.74	29.74	29.74	30.03	30.03	30.03	30.03
Pu	KN	314.128	314.128	332.5	332.5	144.936	144.936	163.932	163.932	164.176	164.176	183.172	183.172	212.076	212.076	231.072	231.072
Md	KNm	19.3	-	17.02	-	4.84	-	4.3	-	3.85	-	1.24	-	26.11	-	18.83	-
Ml	KNm	1.22	-	1.75	-	4.61	-	3.36	-	0.3162	-	0.3162	-	3.63	-	2.2	-
Mux	KNm	25.112	-	23.224	-	13.184	-	10.536	-	5.12592	-	1.99392	-	37.14	-	26.116	-
Md	KNm	-	1.58	-	1.68	-	1.19	-	3.5	-	1.32	-	1.01	-	7.78	-	8.24
Ml	KNm	-	0.2725	-	0.2663	-	0.3804	-	1.37	-	0.9377	-	0.4677	-	2.96	-	3.2
Muy	KNm	-	2.332	-	2.44208	-	2.03664	-	6.392	-	3.08432	-	1.96032	-	14.072	-	15.008
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	483.27385	483.27385	511.53846	511.53846	222.97846	222.97846	252.20308	252.20308	252.57846	252.57846	281.80308	281.80308	326.27077	326.27077	355.49538	355.49538
Mux/O	KNm	38.633846	-	35.729231	-	20.283077	-	16.209231	-	7.8860308	-	3.0675692	-	57.138462	-	40.178462	-
Muy/O	KNm	-	3.5876923	-	3.7570462	-	3.1332923	-	9.8338462	-	4.7451077	-	3.0158769	-	21.649231	-	23.089231
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0799419	0.0074237	0.0698466	0.0073446	0.0909643	0.014052	0.0642706	0.0389918	0.0312221	0.0187867	0.0108855	0.0107021	0.1751259	0.0663536	0.113021	0.0649495
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0799419	0.0074237	0.0698466	0.0073446	0.0909643	0.014052	0.0642706	0.0389918	0.0312221	0.0187867	0.0108855	0.0107021	0.1751259	0.0663536	0.113021	0.0649495
Pn	KN	2481.6636	3841.6869	2610.1457	3843.99	2355.1223	3658.1358	2687.0003	3101.1802	3255.5234	3537.4544	3743.5722	3748.6446	1695.5123	2657.7648	2137.1306	2677.4012
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 110 Perhitungan tulangan kolom as C lantai 2

		C-2				C-4				C-7				C-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	275.66	275.66	291.31	291.31	149.75	149.75	165.58	165.58	171	171	186.83	186.83	225.35	225.35	241.18	241.18
Pl	KN	70.22	70.22	70.22	70.22	45.2	45.2	45.2	45.2	59.5	59.5	59.5	59.5	56.94	56.94	56.94	56.94
Pu	KN	443.144	443.144	461.924	461.924	252.02	252.02	271.016	271.016	300.4	300.4	319.396	319.396	361.524	361.524	380.52	380.52
Md	KNm	14.03	-	14.08	-	4.69	-	4.56	-	1.81	-	1.17	-	14.56	-	15.66	-
Ml	KNm	2.21	-	2.44	-	2.12	-	2.29	-	0.6961	-	0.7416	-	1.47	-	1.6	-
Mux	KNm	20.372	-	20.8	-	9.02	-	9.136	-	3.28576	-	2.59056	-	19.824	-	21.352	-
Md	KNm	-	1.42	-	0.3888	-	1.58	-	1.85	-	0.5422	-	0.2853	-	5.39	-	6.23
Ml	KNm	-	0.2121	-	0.358	-	0.9532	-	0.6559	-	0.2486	-	0.2295	-	2.15	-	2.46
Muy	KNm	-	2.04336	-	1.03936	-	3.42112	-	3.26944	-	1.0484	-	0.70956	-	9.908	-	11.412
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	681.76	681.76	710.65231	710.65231	387.72308	387.72308	416.94769	416.94769	462.15385	462.15385	491.37846	491.37846	556.19077	556.19077	585.41538	585.41538
Mux/O	KNm	31.341538	-	32	-	13.876923	-	14.055385	-	5.0550154	-	3.9854769	-	30.498462	-	32.849231	-
Muy/O	KNm	-	3.1436308	-	1.5990154	-	5.2632615	-	5.0299077	-	1.6129231	-	1.0916308	-	15.243077	-	17.556923
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0459715	0.0046111	0.0450291	0.0022501	0.0357908	0.0135748	0.0337102	0.0120636	0.0109379	0.00349	0.0081108	0.0022216	0.0548345	0.0274062	0.0561127	0.0299905
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0459715	0.0046111	0.0450291	0.0022501	0.0357908	0.0135748	0.0337102	0.0120636	0.0109379	0.00349	0.0081108	0.0022216	0.0548345	0.0274062	0.0561127	0.0299905
Pn	KN	2974.5386	3925.2951	2991.0293	3998.3545	3162.952	3670.7596	3204.4457	3711.3199	3742.1245	3959.6474	3821.8043	3999.2531	2827.9419	3337.1164	2807.9883	3281.4159
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 111 Perhitungan tulangan kolom as C lantai 1

		C-2				C-4				C-7				C-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	354.16	354.16	370	370	210.48	210.48	226.32	226.32	244.46	244.46	260.3	260.3	313.94	313.94	329.77	329.77
Pl	KN	91.7	91.7	91.7	91.7	67.92	67.92	67.92	67.92	89.38	89.38	89.38	89.38	83.49	83.49	83.97	83.97
Pu	KN	571.712	571.712	590.72	590.72	361.248	361.248	380.256	380.256	436.36	436.36	455.368	455.368	510.312	510.312	530.076	530.076
Md	KNm	15.29	-	16.56	-	4.4	-	4.94	-	0.2151	-	0.01108	-	16.84	-	18.32	-
Ml	KNm	1.79	-	1.31	-	2.48	-	3.18	-	0.5086	-	0.9103	-	1.96	-	1.57	-
Mux	KNm	21.212	-	21.968	-	9.248	-	11.016	-	1.07188	-	1.469776	-	23.344	-	24.496	-
Md	KNm	-	2.07	-	0.8358	-	1.92	-	1.99	-	1.32	-	0.4731	-	6.04	-	6.73
Ml	KNm	-	0.6112	-	0.9412	-	1.178	-	0.8027	-	0.7133	-	0.309	-	2.42	-	2.69
Muy	KNm	-	3.46192	-	2.50888	-	4.1888	-	3.67232	-	2.72528	-	1.06212	-	11.12	-	12.38
L	m	1.84	1.84	1.84	1.84	2.7	2.7	2.7	2.7	3.435	3.435	3.435	3.435	4.17	4.17	4.17	4.17
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	879.55692	879.55692	908.8	908.8	555.76615	555.76615	585.00923	585.00923	671.32308	671.32308	700.56615	700.56615	785.09538	785.09538	815.50154	815.50154
Mux/O	KNm	32.633846	-	33.796923	-	14.227692	-	16.947692	-	1.6490462	-	2.2611938	-	35.913846	-	37.686154	-
Muy/O	KNm	-	5.3260308	-	3.8598154	-	6.4443077	-	5.6497231	-	4.1927385	-	1.6340308	-	17.107692	-	19.046154
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0371026	0.0060554	0.0371885	0.0042472	0.0256001	0.0115954	0.02897	0.0096575	0.0024564	0.0062455	0.0032277	0.0023324	0.0457446	0.0217906	0.0462122	0.0233551
%Ast	mm²	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm²	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm²	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm²	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm²	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0371026	0.0060554	0.0371885	0.0042472	0.0256001	0.0115954	0.02897	0.0096575	0.0024564	0.0062455	0.0032277	0.0023324	0.0457446	0.0217906	0.0462122	0.0233551
Pn	KN	3137.341	3881.9105	3135.6781	3936.3802	3377.1836	3724.0724	3303.1881	3777.7951	3991.8604	3876.271	3967.774	3995.7594	2978.493	3464.9496	2970.3557	3428.3563
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 112 Perhitungan tulangan kolom as C lantai dasar

		C-2				C-4				C-7				C-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	435.32	435.32	442.26	442.26	270.6	270.6	280.78	280.78	318.65	318.65	331.6	331.6	402.2	402.2	417.92	417.92
Pl	KN	114.54	114.54	114.54	114.54	90.24	90.24	90.24	90.24	119.7	119.7	3.43	3.43	110.19	110.19	110.19	110.19
Pu	KN	705.648	705.648	713.976	713.976	469.104	469.104	481.32	481.32	573.9	573.9	403.408	403.408	658.944	658.944	677.808	677.808
Md	KNm	14.04	-	1.65	-	5.66	-	3.99	-	0.2943	-	0.6119	-	12.96	-	6.8	-
Ml	KNm	1.67	-	1.93	-	1.31	-	0.27137	-	0.806	-	0.9587	-	2.24	-	1.5	-
Mux	KNm	19.52	-	5.068	-	8.888	-	5.222192	-	1.64276	-	2.2682	-	19.136	-	10.56	-
Md	KNm	-	6.12	-	3.28	-	2.28	-	5.8	-	2.14	-	1.34	-	4.75	-	4.41
Ml	KNm	-	2.95	-	2.03	-	1.58	-	2.93	-	1.25	-	0.9243	-	1.98	-	1.51
Muy	KNm	-	12.064	-	7.184	-	5.264	-	11.648	-	4.568	-	3.08688	-	8.868	-	7.708
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1085.6123	1085.6123	1098.4246	1098.4246	721.69846	721.69846	740.49231	740.49231	882.92308	882.92308	620.62769	620.62769	1013.76	1013.76	1042.7815	1042.7815
Mux/O	KNm	30.030769	-	7.7969231	-	13.673846	-	8.0341415	-	2.5273231	-	3.4895385	-	29.44	-	16.246154	-
Muy/O	KNm	-	18.56	-	11.052308	-	8.0984615	-	17.92	-	7.0276923	-	4.7490462	-	13.643077	-	11.858462
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
e	m	0.0276625	0.0170963	0.0070983	0.010062	0.0189468	0.0112214	0.0108497	0.0242001	0.0028624	0.0079596	0.0056226	0.007652	0.0290404	0.0134579	0.0155796	0.011372
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0276625	0.0170963	0.0070983	0.010062	0.0189468	0.0112214	0.0108497	0.0242001	0.0028624	0.0079596	0.0056226	0.007652	0.0290404	0.0134579	0.0155796	0.011372
Pn	KN	3331.5074	3579.6097	3851.1774	3766.4539	3533.5135	3734.3198	3744.5604	3408.9141	3979.1432	3826.1629	3894.8084	3835.058	3301.6759	3673.8655	3618.3038	3730.1874
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 113 Perhitungan tulangan kolom as D lantai 5

		D-2				D-4			
		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y
Pd	KN	35.61	35.61	55.4	55.4	40.1	40.1	55.93	55.93
Pl	KN	4.91	4.91	4.91	4.91	3.03	3.03	40.1	40.1
Pu	KN	50.588	50.588	74.336	74.336	52.968	52.968	131.276	131.276
Md	KNm	1.1	-	0.79	-	2.21	-	37.18	-
Ml	KNm	1.11	-	8.21	-	1.75	-	17.47	-
Mux	KNm	3.096	-	14.084	-	5.452	-	72.568	-
Md	KNm	-	2.71	-	4.32	-	1.77	-	17.09
Ml	KNm	-	0.8732	-	1.48	-	0.6085	-	8.32
Muy	KNm	-	4.64912	-	7.552	-	3.0976	-	33.82
L	m	5.25	5.25	5.25	5.25	5.56	5.56	5.56	5.56
fy	MPa	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	77.827692	77.827692	114.36308	114.36308	81.489231	81.489231	201.96308	201.96308
Mux/O	KNm	4.7630769	-	21.667692	-	8.3876923	-	111.64308	-
Muy/O	KNm	-	7.1524923	-	11.618462	-	4.7655385	-	52.030769
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y
		atas	atas	atas	atas	atas	atas	atas	atas
e	m	0.0612003	0.0919016	0.1894641	0.1015928	0.1029301	0.0584806	0.5527895	0.2576252
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6
cek									
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p tarik	p desak	p desak	p desak	p tarik	p tarik
e	m	0.0612003	0.0919016	0.1894641	0.1015928	0.1029301	0.0584806	0.5527895	0.2576252
Pn	KN	2731.2875	2344.9553	1618.336	2244.776	2231.6215	2771.7591	751.80708	1330.5116
cek		OK	OK	OK	OK	OK	OK	OK	OK

Tabel 114 Perhitungan tulangan kolom as D lantai 4

		D-2				D-4				D-7				D-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	167.77	167.77	183.61	183.61	163.68	163.68	179.51	179.51	42.32	42.32	71.21	71.21	31.59	31.59	57.71	57.71
Pl	KN	49.11	49.11	49.11	49.11	57.5	57.5	57.5	57.5	4.1	4.1	4.1	4.1	3.33	3.33	3.33	3.33
Pu	KN	279.9	279.9	298.908	298.908	288.416	288.416	307.412	307.412	57.344	57.344	92.012	92.012	43.236	43.236	74.58	74.58
Md	KNm	25.75	-	24.77	-	49.77	-	30.89	-	6.35	-	7.95	-	9.93	-	23.98	-
Ml	KNm	22.79	-	18.8	-	28.77	-	19.5	-	2.66	-	3.11	-	2.17	-	1.67	-
Mux	KNm	67.364	-	59.804	-	105.756	-	68.268	-	11.876	-	14.516	-	15.388	-	31.448	-
Md	KNm	-	2.82	-	0.5724	-	22.8	-	17.19	-	2	-	2.36	-	5.39	-	4.18
Ml	KNm	-	1.78	-	0.8291	-	10.42	-	7.72	-	0.9539	-	1.35	-	1.95	-	1.29
Muy	KNm	-	6.232	-	2.01344	-	44.032	-	32.98	-	3.92624	-	4.992	-	9.588	-	7.08
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	430.61538	430.61538	459.85846	459.85846	443.71692	443.71692	472.94154	472.94154	88.221538	88.221538	141.55692	141.55692	66.516923	66.516923	114.73846	114.73846
Mux/O	KNm	103.63692	-	92.006154	-	162.70154	-	105.02769	-	18.270769	-	22.332308	-	23.673846	-	48.381538	-
Muy/O	KNm	-	9.5876923	-	3.0976	-	67.741538	-	50.738462	-	6.0403692	-	7.68	-	14.750769	-	10.892308
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.2406717	0.0222651	0.2000749	0.006736	0.3666787	0.1526684	0.2220733	0.1072827	0.207101	0.0684682	0.157762	0.0542538	0.3559071	0.2217596	0.421668	0.0949316
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p tarik	p desak	p tarik	p desak	p tarik	p desak	p tarik	p desak	p tarik	p desak	p desak	p desak	p tarik	p tarik	p tarik	p desak
e	m	0.2406717	0.0222651	0.2000749	0.006736	0.3666787	0.1526684	0.2220733	0.1072827	0.207101	0.0684682	0.157762	0.0542538	0.3559071	0.2217596	0.421668	0.0949316
Pn	KN	1392.0841	3453.7688	1565.6032	3861.7979	1035.8614	1832.4033	1466.543	2189.856	1532.539	2628.7313	1799.4485	2837.1022	1059.0233	1467.8672	931.82712	2312.6841
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 115 Perhitungan tulangan kolom as D lantai 3

		D-2				D-4				D-7				D-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	237.9	237.9	253.2	253.2	228.14	228.14	243.97	243.97	229.64	229.64	506.53	506.53	255.32	255.32	271.16	271.16
Pl	KN	58.29	58.29	58.29	58.29	64.59	64.59	64.59	64.59	64.42	64.42	3.43	3.43	59.37	59.37	59.37	59.37
Pu	KN	378.744	378.744	397.104	397.104	377.112	377.112	396.108	396.108	378.64	378.64	613.324	613.324	401.376	401.376	420.384	420.384
Md	KNm	7.39	-	6.68	-	5.55	-	4.24	-	5.58	-	4.34	-	7.36	-	6.74	-
Ml	KNm	2.69	-	2.85	-	2.71	-	2.64	-	2.71	-	2.68	-	2.67	-	2.9	-
Mux	KNm	13.172	-	12.576	-	10.996	-	9.312	-	11.032	-	9.496	-	13.104	-	12.728	-
Md	KNm	-	9.3	-	10.01	-	2.81	-	2.33	-	1.27	-	2.17	-	8.56	-	9.44
Ml	KNm	-	1.92	-	2	-	0.1891	-	0.1891	-	0.2376	-	0.181	-	1.96	-	2.07
Muy	KNm	-	14.232	-	15.212	-	3.67456	-	3.09856	-	1.90416	-	2.8936	-	13.408	-	14.64
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	582.68308	582.68308	610.92923	610.92923	580.17231	580.17231	609.39692	609.39692	582.52308	582.52308	943.57538	943.57538	617.50154	617.50154	646.74462	646.74462
Mux/O	KNm	20.264615	-	19.347692	-	16.916923	-	14.326154	-	16.972308	-	14.609231	-	20.16	-	19.581538	-
Muy/O	KNm	-	21.895385	-	23.403077	-	5.6531692	-	4.7670154	-	2.9294769	-	4.4516923	-	20.627692	-	22.523077
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
		atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas
e	m	0.0347781	0.0375768	0.0316693	0.0383073	0.0291584	0.0097439	0.0235087	0.0078225	0.0291359	0.0050289	0.0154828	0.0047179	0.0326477	0.0334051	0.0302771	0.0348253
%Ast	mm²	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm²	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm²	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm²	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm²	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0347781	0.0375768	0.0316693	0.0383073	0.0291584	0.0097439	0.0235087	0.0078225	0.0291359	0.0050289	0.0154828	0.0047179	0.0326477	0.0334051	0.0302771	0.0348253
Pn	KN	3183.0126	3128.1843	3246.2231	3114.1839	3299.1452	3775.3651	3424.8055	3830.1217	3299.6292	3912.6423	3620.8016	3922.0522	3226.0594	3210.6224	3275.3548	3182.0721
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 116 Perhitungan tulangan kolom as D lantai 2

		D-2				D-4				D-7				D-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	288.22	288.22	303.53	303.53	321	321	336.84	336.84	131.11	131.11	146.94	146.94	133.32	133.32	149.15	149.15
Pl	KN	91.49	91.49	91.49	91.49	129.55	129.55	129.55	129.55	36.79	36.79	36.79	36.79	26.68	26.68	26.68	26.68
Pu	KN	492.248	492.248	510.62	510.62	592.48	592.48	611.488	611.488	216.196	216.196	235.192	235.192	202.672	202.672	221.668	221.668
Md	KNm	5.74	-	10.78	-	35.74	-	34.33	-	3.76	-	0.2817	-	26.53	-	19	-
Ml	KNm	13.42	-	15.18	-	15.35	-	18.89	-	0.3485	-	1.19	-	3.97	-	2.14	-
Mux	KNm	28.36	-	37.224	-	67.448	-	71.42	-	5.0696	-	2.24204	-	38.188	-	26.224	-
Md	KNm	-	3.15	-	3.14	-	24	-	20.89	-	5.31	-	4.56	-	4.38	-	1.39
Ml	KNm	-	1.91	-	1.95	-	10.73	-	10.73	-	3.57	-	2.93	-	2.17	-	2.17
Muy	KNm	-	6.836	-	6.888	-	45.968	-	42.236	-	12.084	-	10.16	-	8.728	-	5.14
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	757.30462	757.30462	785.56923	785.56923	911.50769	911.50769	940.75077	940.75077	332.60923	332.60923	361.83385	361.83385	311.80308	311.80308	341.02769	341.02769
Mux/O	KNm	43.630769	-	57.267692	-	103.76615	-	109.87692	-	7.7993846	-	3.4492923	-	58.750769	-	40.344615	-
Muy/O	KNm	-	10.516923	-	10.596923	-	70.72	-	64.978462	-	18.590769	-	15.630769	-	13.427692	-	7.9076923
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.0576132	0.0138873	0.0728996	0.0134895	0.1138401	0.0775857	0.1167971	0.0690709	0.0234491	0.0558937	0.0095328	0.0431987	0.1884227	0.0430647	0.118303	0.0231878
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p tarik	p desak	p desak	p desak
e	m	0.0576132	0.0138873	0.0728996	0.0134895	0.1138401	0.0775857	0.1167971	0.0690709	0.0234491	0.0558937	0.0095328	0.0431987	0.1884227	0.0430647	0.118303	0.0231878
Pn	KN	2784.9204	3662.4825	2569.9051	3673.0257	2129.8114	2510.5029	2103.8015	2620.5729	3426.1835	2811.3865	3781.3051	3023.585	1623.7037	3025.998	2090.7976	3432.2324
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 117 Perhitungan tulangan kolom as D lantai 1

		D-2				D-4				D-7				D-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	531.51	531.51	547.34	547.34	628.97	628.97	644.8	644.8	286.12	286.12	301.96	301.96	299.34	299.34	315.17	315.17
Pl	KN	177.66	177.66	177.66	177.66	270.2	270.2	270.2	270.2	101.65	101.65	101.65	101.65	76.78	76.78	76.78	76.78
Pu	KN	922.068	922.068	941.064	941.064	1187.084	1187.084	1206.08	1206.08	505.984	505.984	524.992	524.992	482.056	482.056	501.052	501.052
Md	KNm	8.29	-	2.44	-	33.2	-	28.53	-	0.9023	-	2.93	-	16.01	-	18.83	-
Ml	KNm	13.41	-	10.42	-	16.39	-	13.68	-	1.07	-	2.41	-	2.32	-	1.28	-
Mux	KNm	31.404	-	19.6	-	66.064	-	56.124	-	2.79476	-	7.372	-	22.924	-	24.644	-
Md	KNm	-	2.61	-	5.22	-	26.14	-	22.08	-	3.95	-	5	-	2.85	-	2.75
Ml	KNm	-	1.53	-	2.95	-	11.83	-	9.79	-	2.74	-	3.27	-	1.67	-	1.7
Muy	KNm	-	5.58	-	10.984	-	50.296	-	42.16	-	9.124	-	11.232	-	6.092	-	6.02
L	m	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1418.5662	1418.5662	1447.7908	1447.7908	1826.2831	1826.2831	1855.5077	1855.5077	778.43692	778.43692	807.68	807.68	741.62462	741.62462	770.84923	770.84923
Mux/O	KNm	48.313846	-	30.153846	-	101.63692	-	86.344615	-	4.2996308	-	11.341538	-	35.267692	-	37.913846	-
Muy/O	KNm	-	8.5846154	-	16.898462	-	77.378462	-	64.861538	-	14.036923	-	17.28	-	9.3723077	-	9.2615385
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas	x atas	y atas
e	m	0.0340582	0.0060516	0.0208275	0.0116719	0.0556523	0.0423694	0.0465342	0.0349562	0.0055234	0.0180322	0.0140421	0.0213946	0.0475546	0.0126375	0.0491845	0.0120147
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	350.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0340582	0.0060516	0.0208275	0.0116719	0.0556523	0.0423694	0.0465342	0.0349562	0.0055234	0.0180322	0.0140421	0.0213946	0.0475546	0.0126375	0.0491845	0.0120147
Pn	KN	3197.4288	3882.0216	3487.8684	3721.9821	2815.1423	3038.5725	2964.7793	3179.4659	3897.7765	3556.1465	3658.3962	3474.3359	2947.2448	3695.8106	2919.6651	3712.648
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 118 Perhitungan tulangan kolom as D lantai dasar

		D-2				D-4				D-7				D-8			
		Atas		Bawah		Atas		Bawah		Atas		Bawah		Atas		Bawah	
Data-data		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
Pd	KN	654.82	654.82	661.76	661.76	780.24	780.24	790.41	790.41	361.62	361.62	374.57	374.57	383.45	383.45	399.17	399.17
Pl	KN	221.06	221.06	221.06	221.06	338.98	338.98	338.98	338.98	133.22	133.22	133.22	133.22	102.21	102.21	102.21	102.21
Pu	KN	1139.48	1139.48	1147.808	1147.808	1478.656	1478.656	1490.86	1490.86	647.096	647.096	662.636	662.636	623.676	623.676	642.54	642.54
Md	KNm	21.27	-	26.54	-	41.64	-	28.49	-	5.74	-	7.47	-	8.17	-	0.8733	-
Ml	KNm	18.81	-	14.13	-	22.29	-	16.3	-	3.44	-	4.88	-	4.55	-	4.37	-
Mux	KNm	55.62	-	54.456	-	85.632	-	60.268	-	12.392	-	16.772	-	17.084	-	8.03996	-
Md	KNm	-	0.5894	-	5.62	-	26.58	-	5.78	-	2.5	-	3.6	-	2.08	-	1.05
Ml	KNm	-	0.4245	-	3.11	-	12.27	-	2.16	-	1.76	-	2.39	-	1.19	-	0.05006
Muy	KNm	-	1.38648	-	11.72	-	51.528	-	10.392	-	5.816	-	8.144	-	4.4	-	1.340096
L	m	6.04	6.04	6.04	6.04	5.5	5.5	5.5	5.5	5.05	5.05	5.05	5.05	4.17	4.17	4.17	4.17
fy	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
fc'	MPa	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
d'	mm	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
teta		0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Pu/O	KN	1753.0462	1753.0462	1765.8585	1765.8585	2274.8554	2274.8554	2293.6308	2293.6308	995.53231	995.53231	1019.44	1019.44	959.50154	959.50154	988.52308	988.52308
Mux/O	KNm	85.569231	-	83.778462	-	131.74154	-	92.72	-	19.064615	-	25.803077	-	26.283077	-	12.369169	-
Muy/O	KNm	-	2.1330462	-	18.030769	-	79.273846	-	15.987692	-	8.9476923	-	12.529231	-	6.7692308	-	2.0616862
b1		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
tulangan		x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
		atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas	atas
e	m	0.0488117	0.0012168	0.0474435	0.0102108	0.057912	0.0348479	0.040425	0.0069705	0.0191502	0.0089878	0.025311	0.0122903	0.0273924	0.0070549	0.0125128	0.0020856
%Ast	mm^2	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Ast	mm^2	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Dtul	mm	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
A1o	mm^2	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286	283.64286
jml tul	btg	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965	5.6408965
tul pakai	btg	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
cek																	
Ast	mm^2	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571	1701.8571
As=As'=1/2.Ast	mm^2	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857	850.92857
Xb	mm	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
ab	mm	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5	178.5
fs'	MPa	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286	457.14286
fs' pakai	MPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Pnb	KN	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25	1517.25
Mnb	KNm	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453	267.43453
eb	m	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627	0.1762627
status		p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak	p desak
e	m	0.0488117	0.0012168	0.0474435	0.0102108	0.057912	0.0348479	0.040425	0.0069705	0.0191502	0.0089878	0.025311	0.0122903	0.0273924	0.0070549	0.0125128	0.0020856
Pn	KN	2925.9272	4031.1971	2949.1449	3762.2986	2780.372	3181.6227	3074.3004	3854.9173	3528.5189	3796.7235	3383.6874	3705.1788	3337.4184	3852.4446	3699.1711	4003.5452
cek		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Tabel 119 Perhitungan tulangan geser kolom as A/lantai 4-3

Data-data		Kolom Lantai 4				Kolom Lantai 3			
		A2	A-4	A-7	A-8	A2	A-4	A-7	A-8
Vu	KN	2.29	1.6	1.36	2.58	2.19	5.79	4.39	3.98
l	mm	5250	5560	6050	6930	4200	4200	4200	4200
b	mm	400	500	500	500	500	500	500	500
h	mm	400	500	500	500	500	500	500	500
d	mm	350	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	104.34984	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051
d/2	mm	175	225	225	225	225	225	225	225
d/4	mm	87.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	208.69968	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102
Vs2	KN	417.39936	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039
ΦVc	KN	62.609903	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306
Φ1/2Vc	KN	31.304952	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529
ΦVs1	KN	125.21981	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612
ΦVs2	KN	250.43961	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224
Φ(Vc+Vs1)	KN	187.82971	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918
Φ(Vc+Vs2)	KN	313.04952	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 121 Perhitungan tulangan geser kolom as A/lantai dasar

Data-data		Kolom Lantai Dasar			
		A2	A-4	A-7	A-8
Vu	KN	1.19	1.3	1.5	0.375
l	mm	2800	2800	2800	2800
b	mm	500	500	500	500
h	mm	500	500	500	500
d	mm	450	450	450	450
Φ		0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10
kaki sengkang		2	2	2	2
Fy	MPa	240	240	240	240
Vc	KN	167.7051	167.7051	167.7051	167.7051
d/2	mm	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5
Vs1	KN	335.4102	335.4102	335.4102	335.4102
Vs2	KN	670.82039	670.82039	670.82039	670.82039
ΦVc	KN	100.62306	100.62306	100.62306	100.62306
Φ1/2Vc	KN	50.311529	50.311529	50.311529	50.311529
ΦVs1	KN	201.24612	201.24612	201.24612	201.24612
ΦVs2	KN	402.49224	402.49224	402.49224	402.49224
Φ(Vc+Vs1)	KN	301.86918	301.86918	301.86918	301.86918
Φ(Vc+Vs2)	KN	503.11529	503.11529	503.11529	503.11529
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.14286	157.14286	157.14286	157.14286
Hasil		P10-250	P10-250	P10-250	P10-250

Tabel 122 Perhitungan tulangan geser kolom as B/lantai 4-3

Data-data		Kolom Lantai 4				Kolom Lantai 3			
		B-2	B-4	B-7	B-8	B-2	B-4	B-7	B-8
Vu	KN	6.86	1.72	1.78	6.13	7.27	5.24	5.42	7.57
l	mm	2800	2800	2800	2800	2800	2800	2800	2800
b	mm	500	500	500	500	500	500	500	500
h	mm	500	500	500	500	500	500	500	500
d	mm	450	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051
d/2	mm	225	225	225	225	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102
Vs2	KN	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039
ΦVc	KN	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306
Φ1/2Vc	KN	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529
ΦVs1	KN	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612
ΦVs2	KN	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224
Φ(Vc+Vs1)	KN	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918
Φ(Vc+Vs2)	KN	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 123 Perhitungan tulangan geser kolom as B/lantai 2-1

Data-data		Kolom Lantai 2				Kolom Lantai 1			
		B-2	B-4	B-7	B-8	B-2	B-4	B-7	B-8
Vu	KN	6.34	4.84	4.89	6.15	6.84	5.68	5.61	6.58
l	mm	2800	2800	2800	2800	2800	2800	2800	2800
b	mm	500	500	500	500	500	500	500	500
h	mm	500	500	500	500	500	500	500	500
d	mm	450	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki cengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051	167.7051
d/2	mm	225	225	225	225	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102	335.4102
Vs2	KN	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039	670.82039
ΦVc	KN	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306	100.62306
Φ1/2Vc	KN	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529	50.311529
ΦVs1	KN	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612	201.24612
ΦVs2	KN	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224	402.49224
Φ(Vc+Vs1)	KN	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918	301.86918
Φ(Vc+Vs2)	KN	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529	503.11529
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286	157.14286
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 124 Perhitungan tulangan geser kolom as B/lantai dasar

Data-data		Kolom Lantai Dasar			
		B-2	B-4	B-7	B-8
Vu	KN	3.68	3.21	3.34	4.79
l	mm	2800	2800	2800	2800
b	mm	500	500	500	500
h	mm	500	500	500	500
d	mm	450	450	450	450
Φ		0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10
kaki sengkang		2	2	2	2
Fy	MPa	240	240	240	240
Vc	KN	167.7051	167.7051	167.7051	167.7051
d/2	mm	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5
Vs1	KN	335.4102	335.4102	335.4102	335.4102
Vs2	KN	670.82039	670.82039	670.82039	670.82039
ΦVc	KN	100.62306	100.62306	100.62306	100.62306
Φ1/2Vc	KN	50.311529	50.311529	50.311529	50.311529
ΦVs1	KN	201.24612	201.24612	201.24612	201.24612
ΦVs2	KN	402.49224	402.49224	402.49224	402.49224
Φ(Vc+Vs1)	KN	301.86918	301.86918	301.86918	301.86918
Φ(Vc+Vs2)	KN	503.11529	503.11529	503.11529	503.11529
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.14286	157.14286	157.14286	157.14286
Hasil		P10-250	P10-250	P10-250	P10-250

Tabel 125 Perhitungan tulangan geser kolom as C/lantai 4-3

		Lantai 4				Lantai 3			
Data-data		C-2	C-4	C-7	C-8	C-2	C-4	C-7	C-8
Vu	KN	2.29	1.6	1.36	2.58	2.19	5.79	4.39	3.98
l	mm	5250	5560	6050	6930	4200	4200	4200	4200
b	mm	400	400	400	400	400	400	400	400
h	mm	400	400	400	400	400	400	400	400
d	mm	350	350	350	350	350	350	350	350
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	116.6666667	116.6666667	116.6666667	116.6666667	116.6666667	116.6666667	116.6666667	116.6666667
d/2	mm	175	175	175	175	175	175	175	175
d/4	mm	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
Vs1	KN	233.3333333	233.3333333	233.3333333	233.3333333	233.3333333	233.3333333	233.3333333	233.3333333
Vs2	KN	466.6666667	466.6666667	466.6666667	466.6666667	466.6666667	466.6666667	466.6666667	466.6666667
ΦVc	KN	70	70	70	70	70	70	70	70
Φ1/2Vc	KN	35	35	35	35	35	35	35	35
ΦVs1	KN	140	140	140	140	140	140	140	140
ΦVs2	KN	280	280	280	280	280	280	280	280
Φ(Vc+Vs1)	KN	210	210	210	210	210	210	210	210
Φ(Vc+Vs2)	KN	350	350	350	350	350	350	350	350
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
oVs=Vu-oVc	KN	-67710	-68400	-68640	-67420		-67810	-84210	-65610
Vsperlu	KN	-112850	-114000	-114400	-112366.6667		-113016.6667	-107016.6667	-109350
Jarak S	mm	-116.9694284	-115.7894737	-115.3846154	-117.4725601		-116.7969326	-123.3452733	-120.7133059
S maks	mm	87.5	87.5	87.5	87.5		87.5	87.5	87.5
	mm	300	300	300	300		300	300	300
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 126 Perhitungan tulangan geser kolom as C/lantai 2-1

		Lantai 2				Lantai 1			
Data-data		C-2	C-4	C-7	C-8	C-2	C-4	C-7	C-8
Vu	KN	1.29	3.72	3.84	0.8196	1.75	4.28	4.38	1.67
l	mm	2800	2800	2800	2800	2800	2800	2800	2800
b	mm	500	500	500	500	500	500	500	500
h	mm	500	500	500	500	500	500	500	500
d	mm	450	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983
d/2	mm	225	225	225	225	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966
Vs2	KN	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932
ΦVc	KN	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059
Φ1/2Vc	KN	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949
ΦVs1	KN	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118
ΦVs2	KN	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359
Φ(Vc+Vs1)	KN	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177
Φ(Vc+Vs2)	KN	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
oVs=Vu-oVc	KN	-99333.05899	-96903.05899	-96783.05899	-99803.45899	-98873.05899	-96343.05899	-96243.05899	-98953.05899
Vsperlu	KN	-165555.0983	-161505.0983	-161305.0983	-166339.0983	-164788.4316	-160571.765	-160405.0983	-164921.765
Jarak S	mm	-102.5122678	-105.0829277	-105.2132186	-102.0291005	-102.9891989	-105.6937287	-105.8035483	-102.9059359
S maks	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
	mm	300	300	300	300	300	300	300	300
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 127 Perhitungan tulangan geser kolom as C/lantai dasar

		Lantai Dasar			
Data-data		C-2	C-4	C-7	C-8
Vu	KN	1.19	1.3	1.5	0.375
l	mm	2800	2800	2800	2800
b	mm	500	500	500	500
h	mm	500	500	500	500
d	mm	450	450	450	450
Φ		0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10
kaki sengkang		2	2	2	2
Fy	MPa	240	240	240	240
Vc	KN	167.7050983	167.7050983	167.7050983	167.7050983
d/2	mm	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5
Vs1	KN	335.4101966	335.4101966	335.4101966	335.4101966
Vs2	KN	670.8203932	670.8203932	670.8203932	670.8203932
ΦVc	KN	100.623059	100.623059	100.623059	100.623059
Φ1/2Vc	KN	50.31152949	50.31152949	50.31152949	50.31152949
ΦVs1	KN	201.246118	201.246118	201.246118	201.246118
ΦVs2	KN	402.4922359	402.4922359	402.4922359	402.4922359
Φ(Vc+Vs1)	KN	301.869177	301.869177	301.869177	301.869177
Φ(Vc+Vs2)	KN	503.1152949	503.1152949	503.1152949	503.1152949
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571
oVs=Vu-oVc	KN	-99433.05899	-99323.05899	-99123.05899	-100248.059
Vsperlu	KN	-165721.765	-165538.4316	-165205.0983	-167080.0983
Jarak S	mm	-102.409171	-102.5225889	-102.7294481	-101.5766015
S maks	mm	112.5	112.5	112.5	112.5
	mm	300	300	300	300
Hasil		P10-250	P10-250	P10-250	P10-250

Tabel 128 Perhitungan tulangan geser kolom as D/4-3

		Lantai 4				Lantai 3			
Data-data		D-2	D-4	D-7	D-8	D-2	D-4	D-7	D-8
Vu	KN	6.86	1.72	1.78	6.13	7.27	5.24	5.42	7.57
l	mm	2800	2800	2800	2800	2800	2800	2800	2800
b	mm	500	500	500	500	500	500	500	500
h	mm	500	500	500	500	500	500	500	500
d	mm	450	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983
d/2	mm	225	225	225	225	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966
Vs2	KN	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932
ΦVc	KN	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059
Φ1/2Vc	KN	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949
ΦVs1	KN	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118
ΦVs2	KN	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359
Φ(Vc+Vs1)	KN	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177
Φ(Vc+Vs2)	KN	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 129 Perhitungan tulangan geser kolom as D/2-1

Data-data		Lantai 2				Lantai 1			
		D-2	D-4	D-7	D-8	D-2	D-4	D-7	D-8
Vu	KN	6.34	4.84	4.89	6.15	6.84	5.68	5.61	6.58
l	mm	2800	2800	2800	2800	2800	2800	2800	2800
b	mm	500	500	500	500	500	500	500	500
h	mm	500	500	500	500	500	500	500	500
d	mm	450	450	450	450	450	450	450	450
Φ		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10	10	10	10	10
kaki sengkang		2	2	2	2	2	2	2	2
Fy	MPa	240	240	240	240	240	240	240	240
Vc	KN	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983	167.7050983
d/2	mm	225	225	225	225	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Vs1	KN	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966	335.4101966
Vs2	KN	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932	670.8203932
ΦVc	KN	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059	100.623059
Φ1/2Vc	KN	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949	50.31152949
ΦVs1	KN	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118	201.246118
ΦVs2	KN	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359	402.4922359
Φ(Vc+Vs1)	KN	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177	301.869177
Φ(Vc+Vs2)	KN	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949	503.1152949
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571	157.1428571
Hasil		P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250	P10-250

Tabel 130 Perhitungan tulangan geser kolom as D/dasar

		Lantai Dasar			
Data-data		D-2	D-4	D-7	D-8
Vu	KN	3.68	3.21	3.34	4.79
l	mm	2800	2800	2800	2800
b	mm	500	500	500	500
h	mm	500	500	500	500
d	mm	450	450	450	450
Φ		0.6	0.6	0.6	0.6
Ø	mm	10	10	10	10
kaki sengkang		2	2	2	2
Fy	MPa	240	240	240	240
Vc	KN	167.7050983	167.7050983	167.7050983	167.7050983
d/2	mm	225	225	225	225
d/4	mm	112.5	112.5	112.5	112.5
Vs1	KN	335.4101966	335.4101966	335.4101966	335.4101966
Vs2	KN	670.8203932	670.8203932	670.8203932	670.8203932
ΦVc	KN	100.623059	100.623059	100.623059	100.623059
Φ1/2Vc	KN	50.31152949	50.31152949	50.31152949	50.31152949
ΦVs1	KN	201.246118	201.246118	201.246118	201.246118
ΦVs2	KN	402.4922359	402.4922359	402.4922359	402.4922359
Φ(Vc+Vs1)	KN	301.869177	301.869177	301.869177	301.869177
Φ(Vc+Vs2)	KN	503.1152949	503.1152949	503.1152949	503.1152949
Kondisi		Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc	Vu<Φ1/2Vc
Av	KN	157.1428571	157.1428571	157.1428571	157.1428571
Hasil		P10-250	P10-250	P10-250	P10-250

Tabel 129 Perhitungan Qu pondasi

no	depth	qc	
1	0.5	25	
2	1	220	
3	1.5	240	
4	2	200	
5	2.5	170	
6	3	230	
7	3.5	140	
8	4	140	
9	4.5	200	
10	5	210	
11	5.5	270	
12	6	220	
13	6.5	180	8Ø
14	7	210	
15	7.5	350	
16	8	370	
17	8.5	230	
18	9	370	
19	9.5	310	ujung
20	10	330	tiang
21	10.5	410	
22	11	250	
23	11.5	110	4Ø
24	12	160	
25	12.5	190	
26	13	150	
27	13.5	360	
28	14	490	

Tabel 130 Perhitungan tulangan pondasi bored pile

ø tiang bor	=	60	cm
	=	0.6	m
Qa dihitung dengan metode Meyerhof			
8ø	=	4.8	m
4ø	=	2.4	m
qc1	=	265.4545455	kg/cm^2
qc2	=	241.6666667	kg/cm^2
qb	=	253.5606061	kg/cm^2
Qb	=	716562.2727	kg
	=	716.5622727	ton
fs	=	1.26780303	kg/cm^2
Qs	=	178980	kg
	=	178.98	ton
Qu	=	895.5422727	ton
Qa	=	358.1740909	ton
Beban pondasi			
P aksial	=	146.94131	ton
Pile cap	=	4.8	ton
tie beam	=	3.024	ton
tanah	=	3.6	ton
Total	=	158.36531	ton
Mo	=	1445.79	kgm
	=	2409.65	kgm/m
Ho	=	6100.72	kg
	=	10167.86667	kg/m
panjang penunjangan tiang bulat			
R	=	3500	Kg/cm2/m
L	=	0.319585131	m
	9.5>L		

tiang panjang pada tanah berbutir			
γ	=	1.686667	gr/cm^3
	=	1686.667	kg/m^3
θ	=	38.66	
Kp	=	4.329	
$Ho/(Kp.\gamma.D^2)$	=	3.868214	
$Mo/(Kp.\gamma.D^3)$	=	1.1	
Mo	=	1734.855	kgm
P	=	146941	kg
eu	=	0.011806	m
	=	1.180648	cm
ht	=	60	cm
eu/ht	=	0.019677	
σ*au	=	51.94884	kg/cm^2
σ'bk	=	175	kg/cm^2
σ*au/(2.ko.σ'bk)	=	0.247375	
Grafik Reiforced Concrete Column di dapat qtot minimum jadi dipakai syarat tulangan minimum dari PPBBDSDBURDG'83			
dimana D<80 cm, r =			
Amin	=	37.60699	cm^2
0.01Ag	=	28.28571	cm^2
0.06Ag	=	169.7143	cm^2
A1Ø19	=	283.6429	mm^2
	=	2.836429	cm^2
n	=	13.25857	batang
	=	16	batang
A	=	45.38286	cm^2
A=42.5464>Amin=37.607			OK

tulangan spiral			
ø spiral	=	10	mm
daerah 1	=		
s maks	=	12	cm
	=	12.5	cm
	=	11.4	cm
pakai s	=	11	cm
daerah 2	=		
s maks	=	30	cm
	=	30	cm
	=	22.8	cm
pakai s	=	22	cm

perencanaan pile cap			
ditinjau tl I m bidang gambar			
ht	=	60	cm
b	=	120	cm
d	=	5	cm
h	=	115	
e	=	42.5	cm
M	=	0.4845	Tm
K175	=	175	kg/cm^2
U39	=	3390	kg/cm^2
Cu	=	62.54410209	
cu diluar chart maka digunakan			
qmin	=	0.0433	
A	=	30.57823009	cm^2
A1Ø19	=	283.6428571	mm^2
	=	2.836428571	cm^2
n	=	10.78053944	buah
pakai	=	10	buah
cek A	=	28.36428571	c
lebih besar dari A=25,4818584 -OK-			

BAGIAN PROYEK PENINGKATAN
RSUP Dr. SARDJITO, YOGYAKARTA
JL. KESEHATAN, SEKIP, YOGYAKARTA
T.A. 2002

PEKERJAAN

PERENCANAAN PEMBANGUNAN
GEDUNG COT DAN LKF (TAHAP AKHIR)
RSUP Dr. SARDJITO, YOGYAKARTA
TAHUN ANGGARAN 2002

MENYETUJUI :

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RSUP Dr. SARDJITO,YOGYAKARTA

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Ir. ACHMAD ZAIM, Dipl. HE
NIP. 110 016 591

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PERENCANA	NAMA	PARAF
ARSITEK	ARIE ADRIAN, Ir. (IAI : 05141)	
STRUKTUR	IRAWAN GUNADI, Ir. MT	
MEKANIKAL ELEKTRIKAL	LAUCK SUDHARMOJO, Ir.	
GAMBAR	SURYOTO	

REVISI

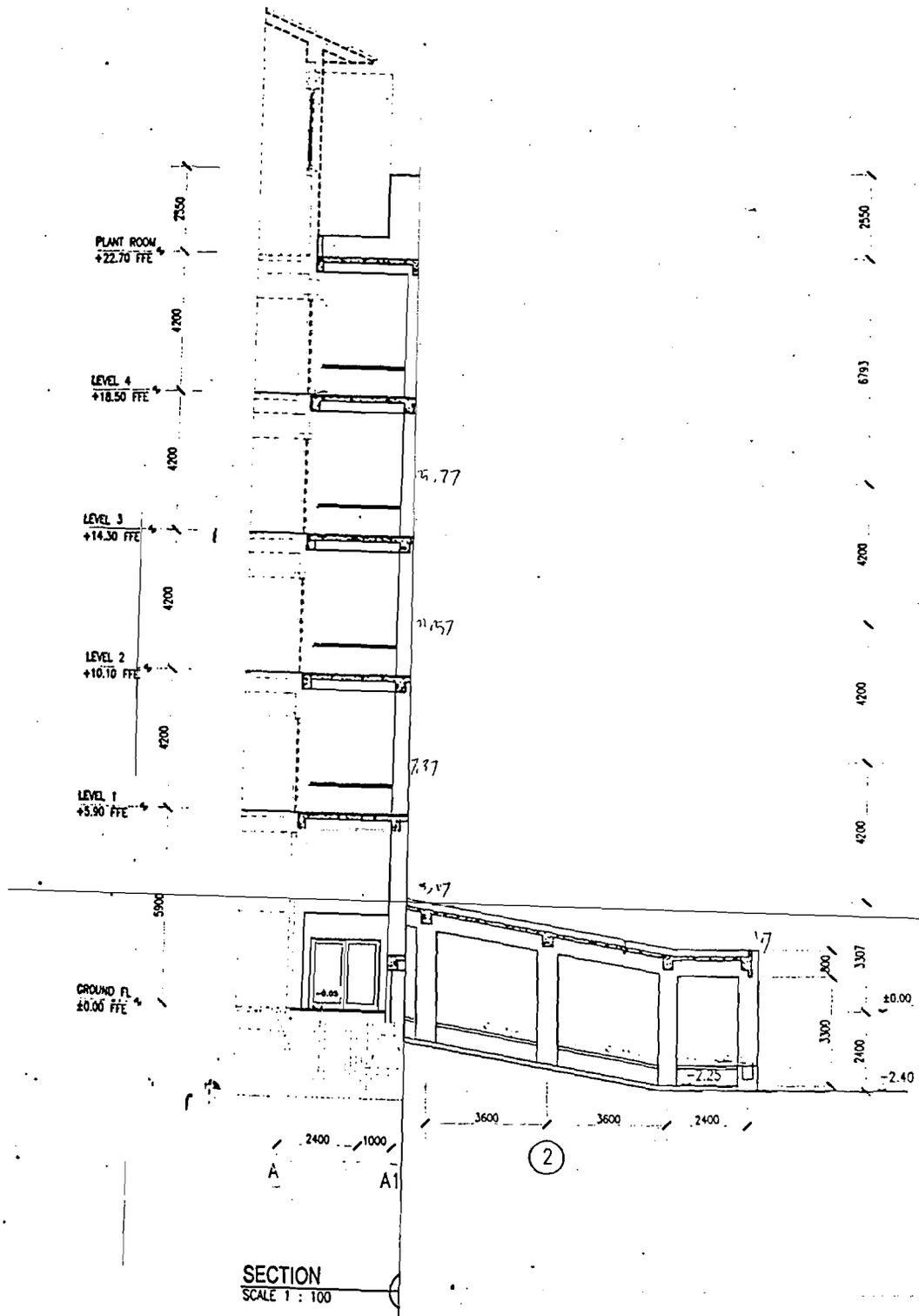
NO	TANGGAL	KETERANGAN	PARAF

TAHAP

JUDUL GAMBAR

RAMP FLOOR PLAN

SKALA	NOMOR LEMBAR	JUMLAH LEMBA
1 : 100	AR.2A-03	



SECTION
SCALE 1 : 100

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PERENCANA	NAMA	PARAF
ARSITEK	ARIE ADRIAN, Ir. (IAI : 05141)	
STRUKTUR	RAWAN GUNADI, Ir. MT	
MEKANIKAL ELEKTRIKAL	LILIEK SUDHARMADJO, Ir.	
JURU GAMBAR	SURYOTO	

REVISI

NO	TANGGAL	KETERANGAN	PARAF

TAHAP

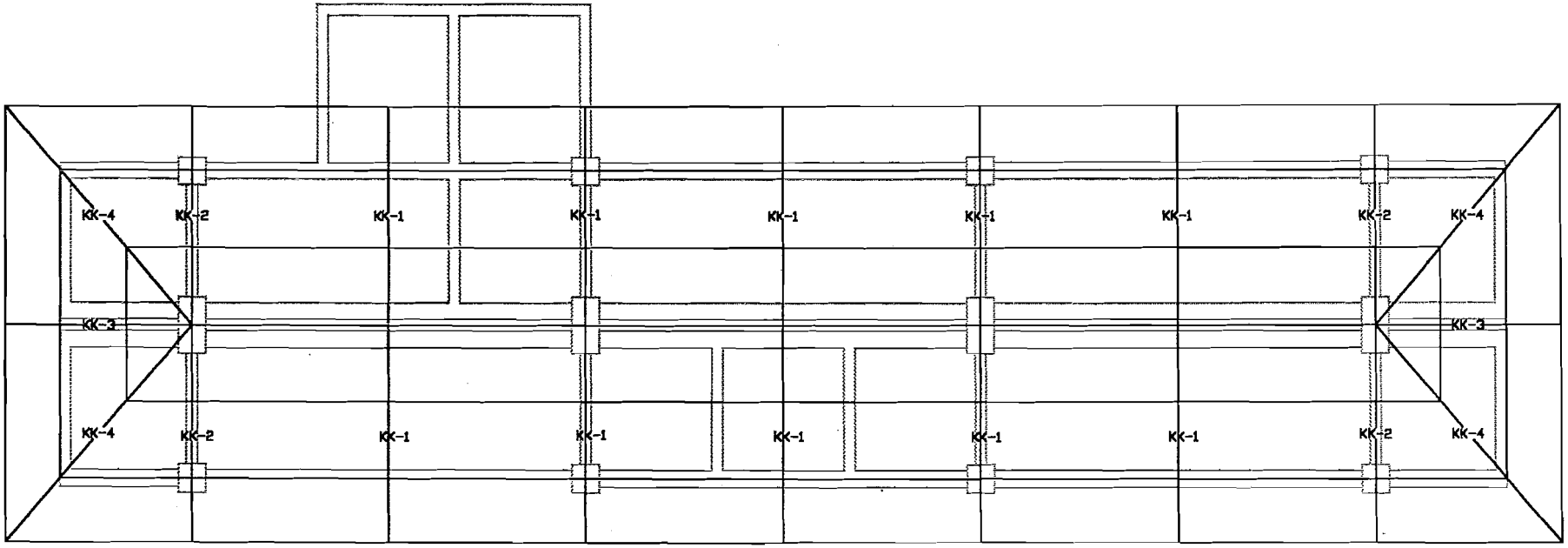
JUDUL GAMBAR

RAMP SECTION

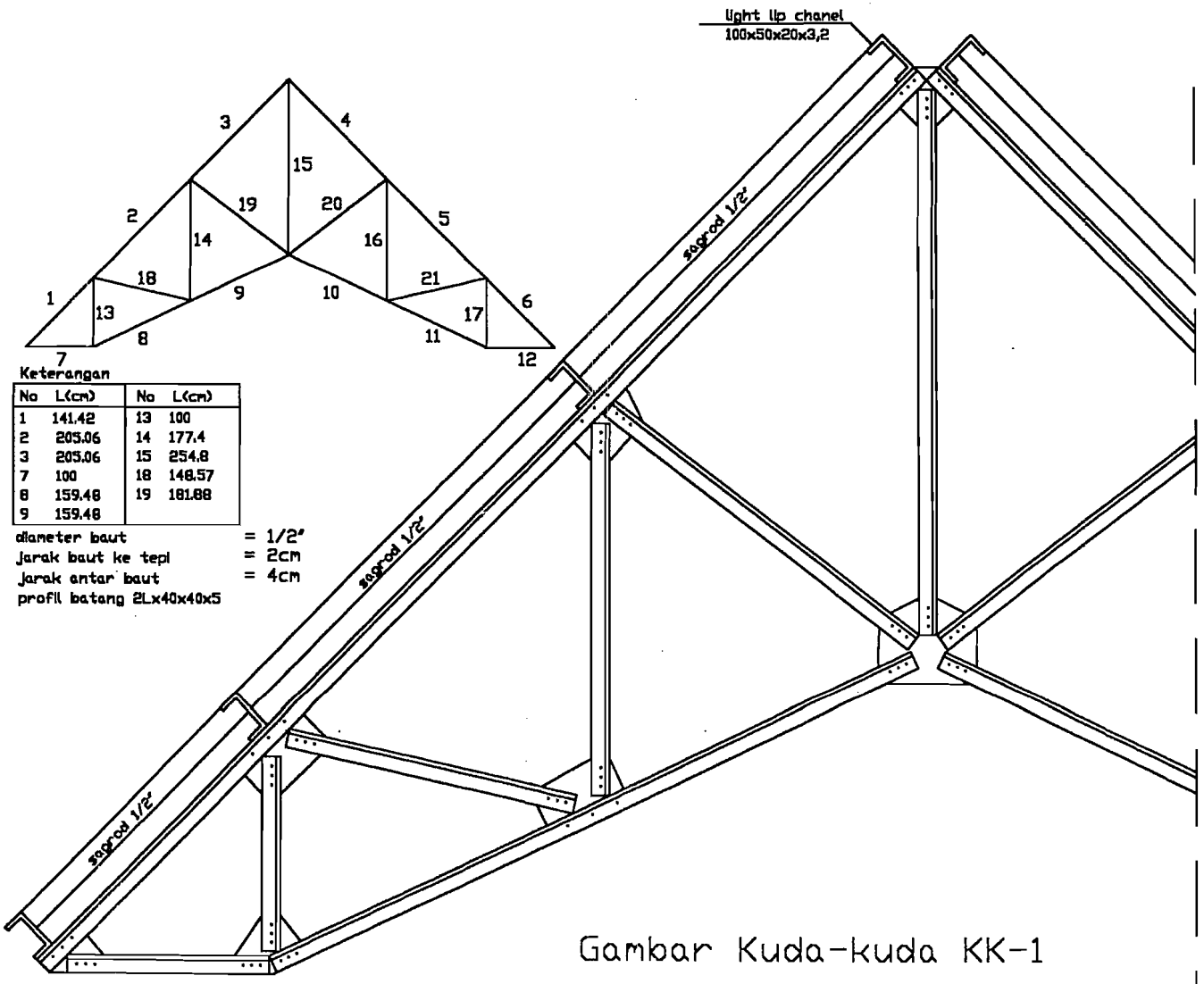
SKALA	NOMOR LEMBAR	JUMLAH LEMB.
1 : 100	AR.2A-06	



Gamoar Tampak samping Ramp RSUP dr. Sardjito



Gambar rencana kuda-kuda

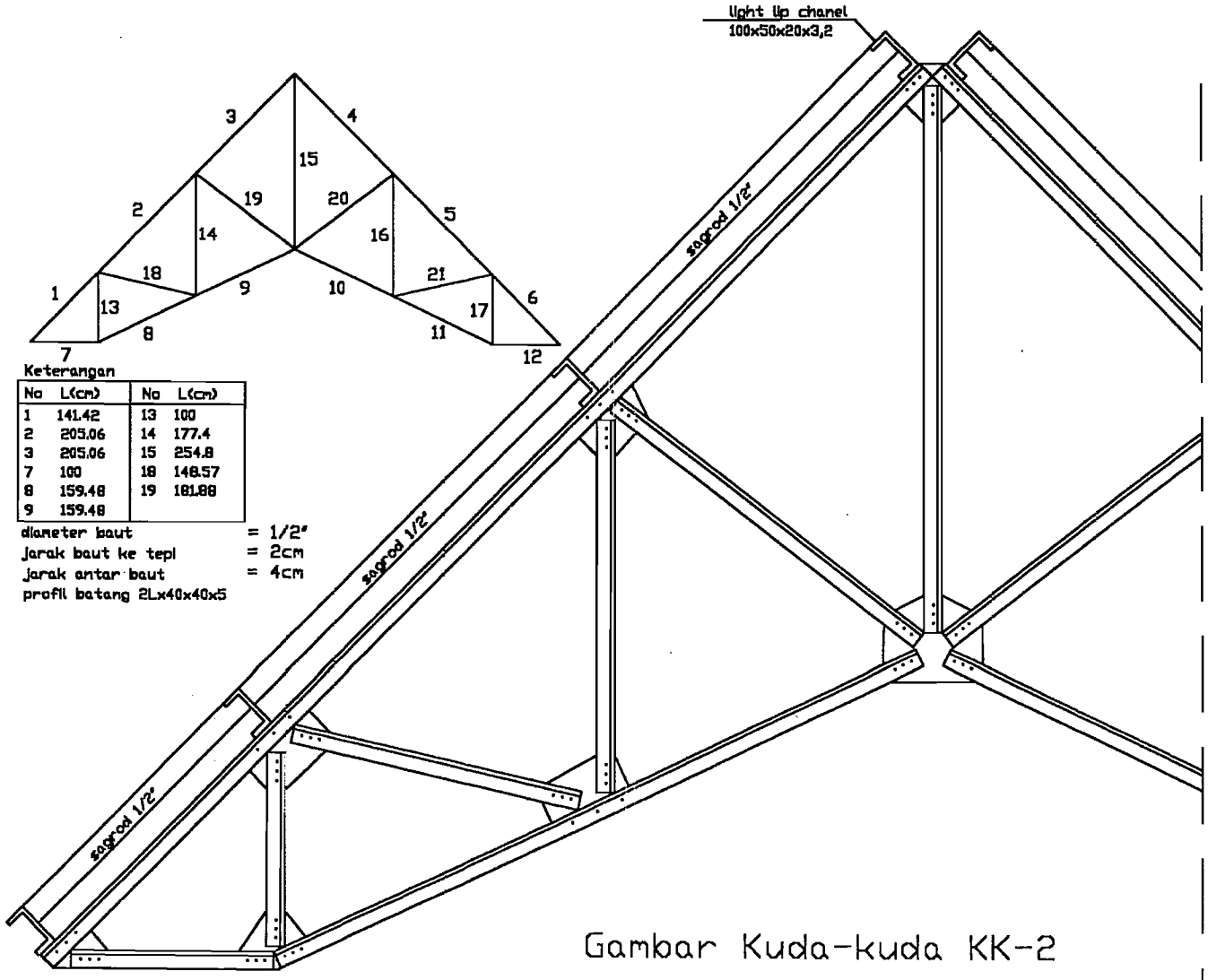


Keterangan

No	L(cm)	No	L(cm)
1	141.42	13	100
2	205.06	14	177.4
3	205.06	15	254.8
7	100	18	148.57
8	159.48	19	181.88
9	159.48		

diameter baut = 1/2"
jarak baut ke tepi = 2cm
jarak antar baut = 4cm
profil batang 2Lx40x40x5

Gambar Kuda-kuda KK-1

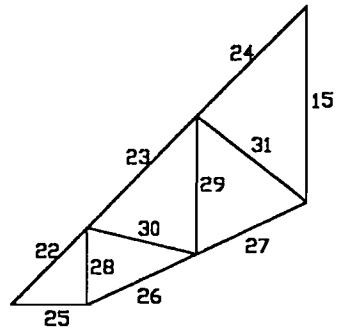


Keterangan

No	L(cm)	No	L(cm)
1	141.42	13	100
2	205.06	14	177.4
3	205.06	15	254.8
7	100	18	148.57
8	159.48	19	181.88
9	159.48		

diameter baut = 1/2"
jarak baut ke tepi = 2cm
jarak antar baut = 4cm
profil batang 2Lx40x40x5

Gambar Kuda-kuda KK-2

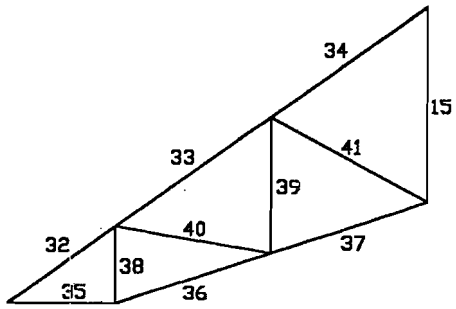


Keterangan

No	L(cm)	No	L(cm)
22	141.42	28	100
23	205.06	29	177.4
24	205.06	30	148.57
25	100	31	148.57
26	159.48		
27	159.48		

diameter baut = 1/2"
jarak baut ke tepi = 2cm
jarak antar baut = 4cm
profil batang 2Lx40x40x5

Gambar Kuda-kuda KK-3

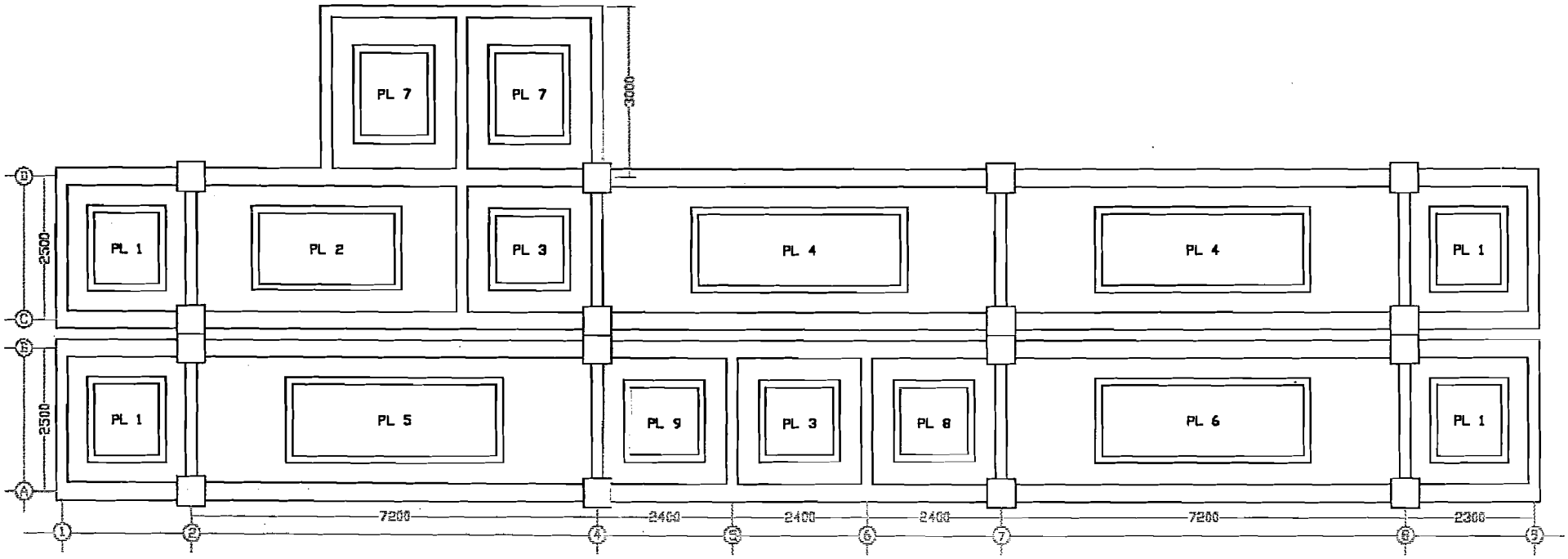


Keterangan

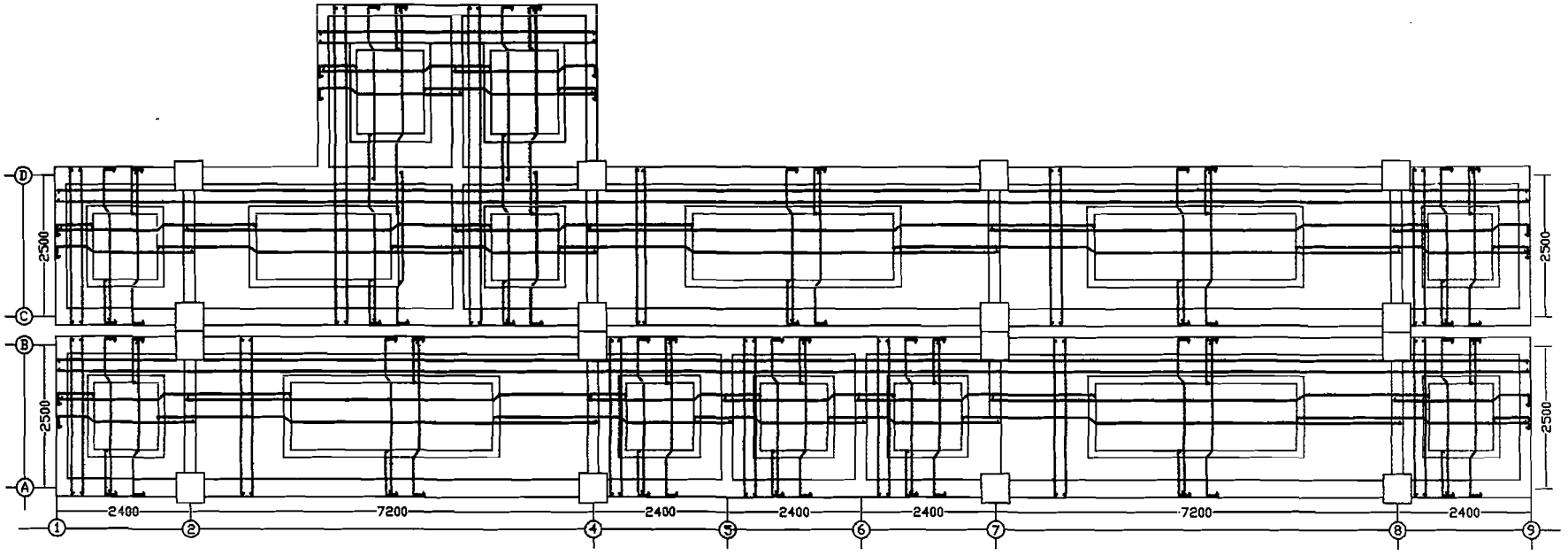
No	L(cm)	No	L(cm)
32	173.21	38	100
33	251.15	39	177.4
34	251.15	40	232.61
35	141.42	41	232.61
36	215.92		
37	215.92		

diameter baut = 1/2"
Jarak baut ke tepi = 2cm
Jarak antar baut = 4cm
profil batang 2L.x40x40x5

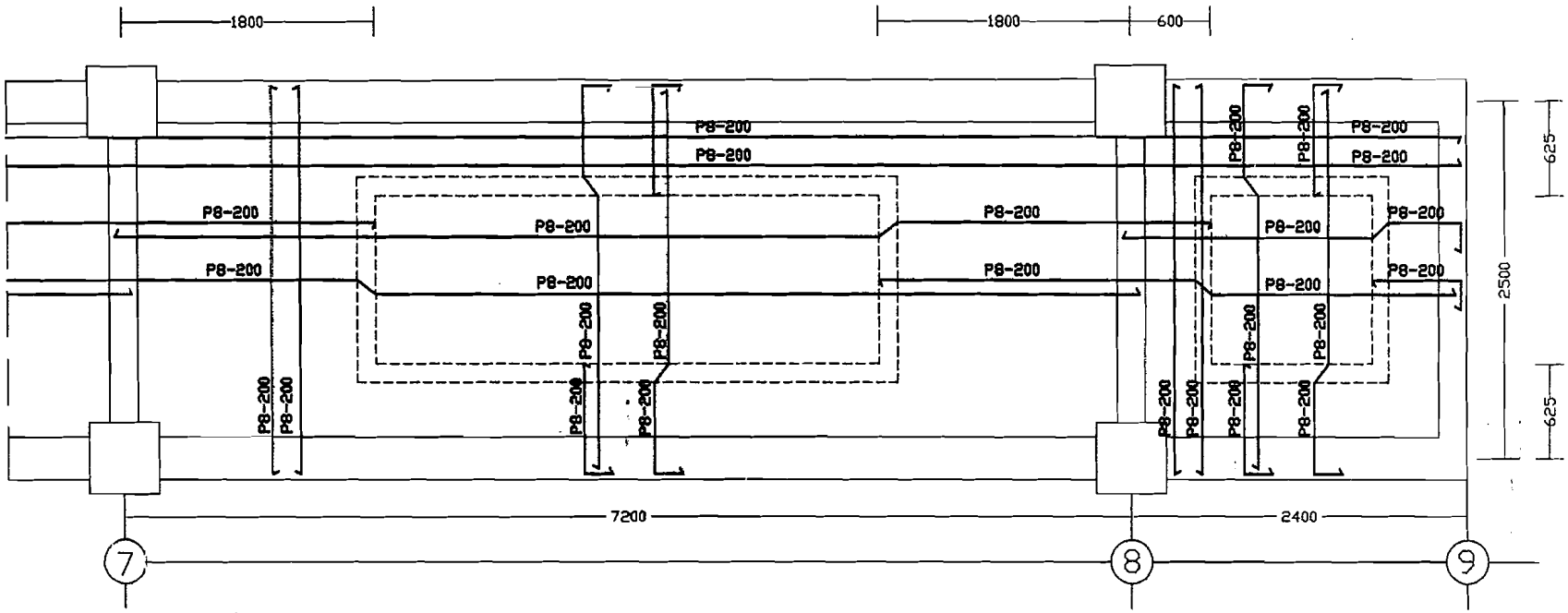
Gambar Kuda-kuda KK-4



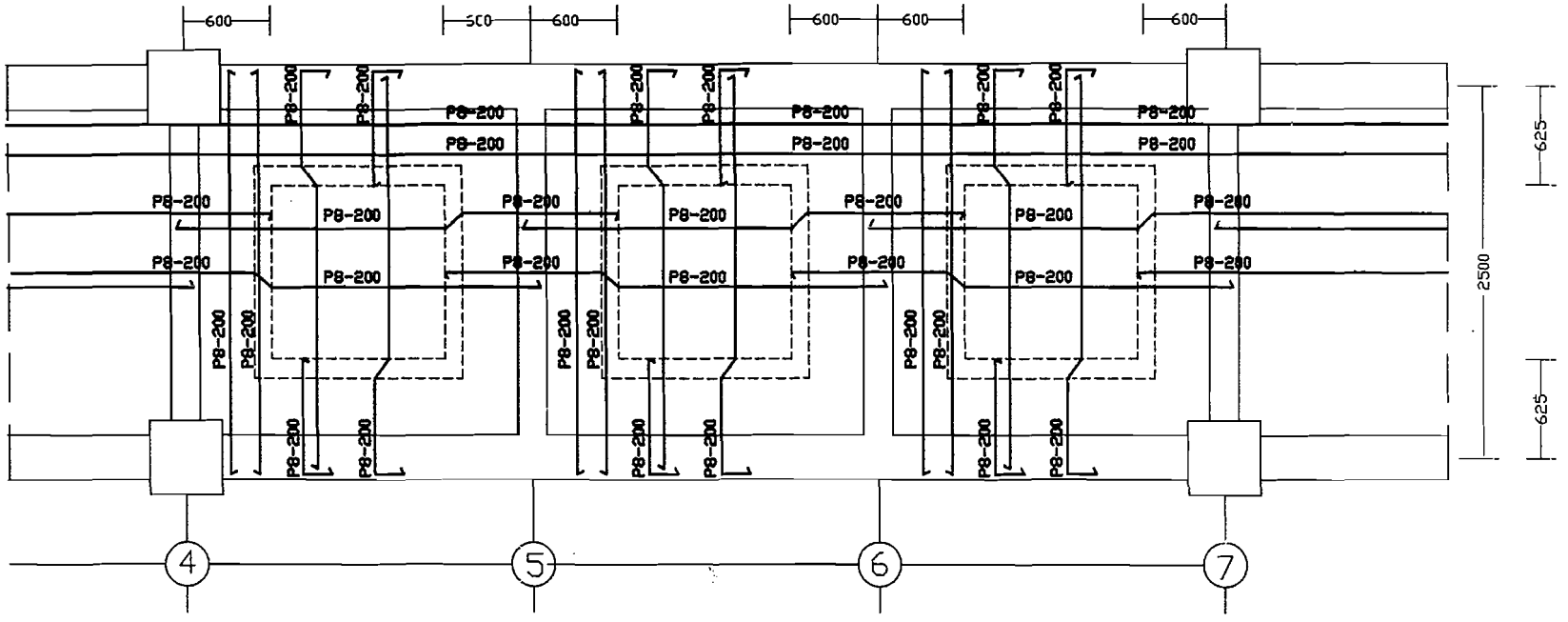
Gambar rencana pelat lantai 1-4



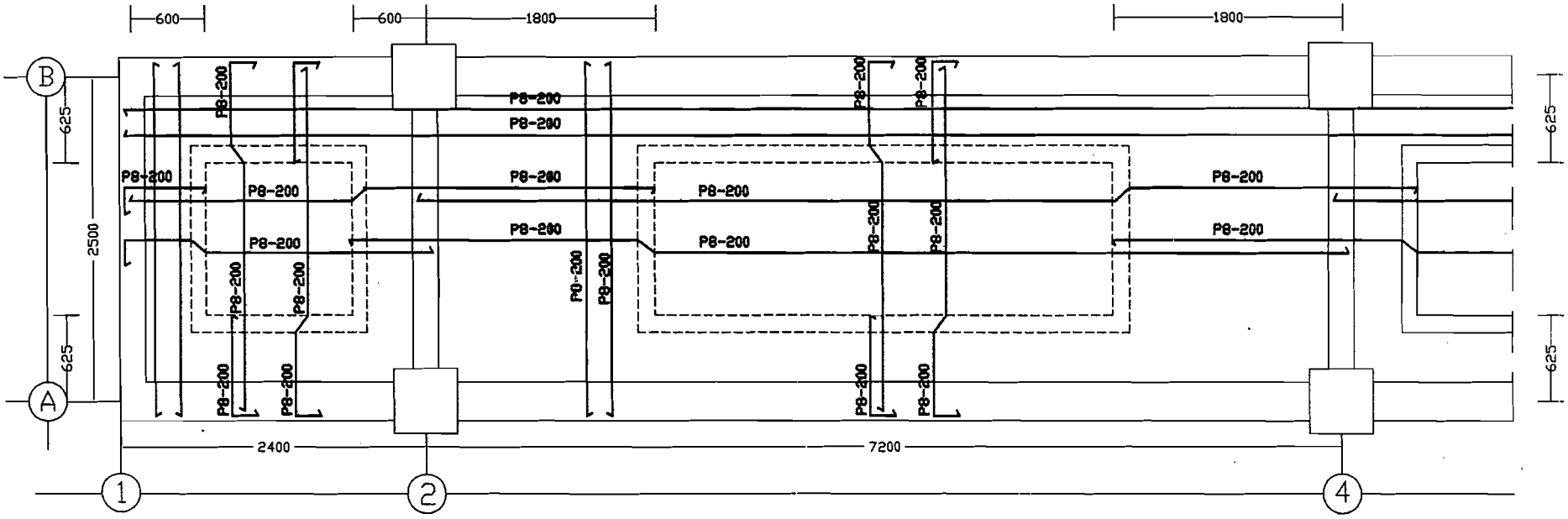
Gambar rencana penulangan pelat lantai 1-4



Gambar detail penulangan pelat lantai 1-4 as A-B/7-9
(PL 6 dan PL 1)

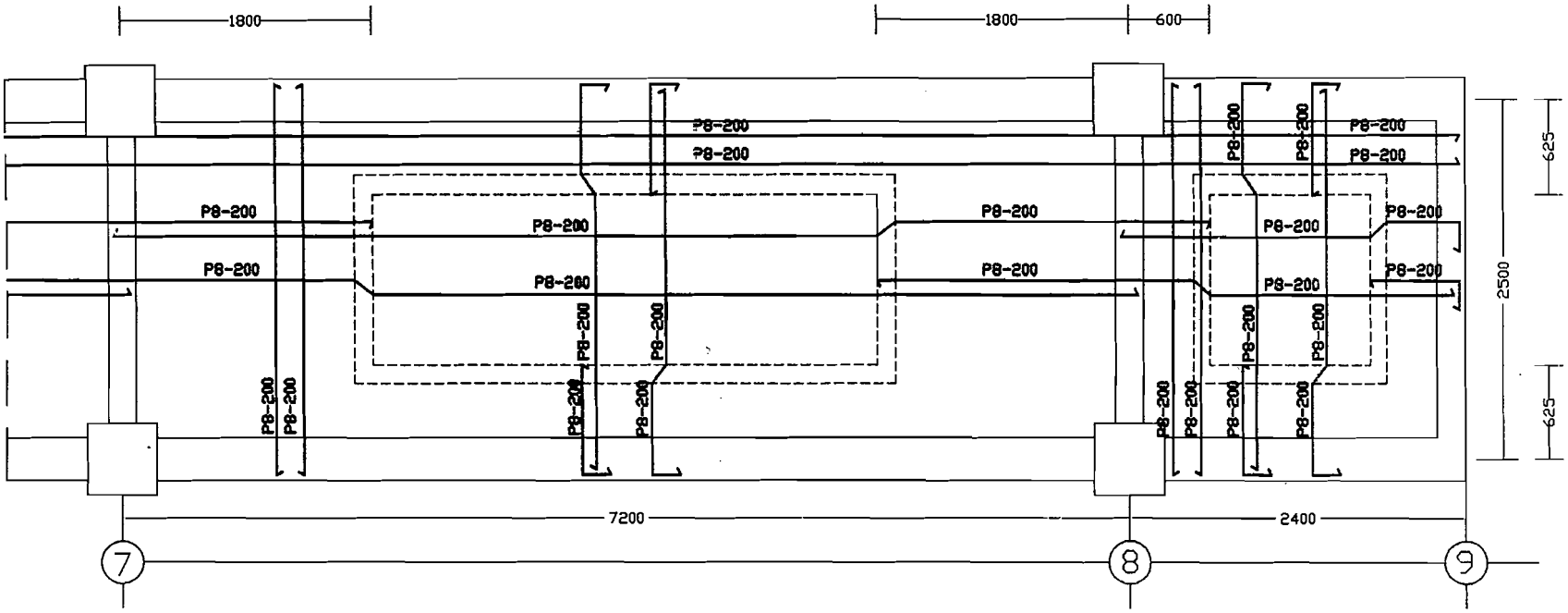


Gambar detail penulangan pelat lantai 1-4 as A-B/1-4
(PL 9, PL 3 dan PL 8)

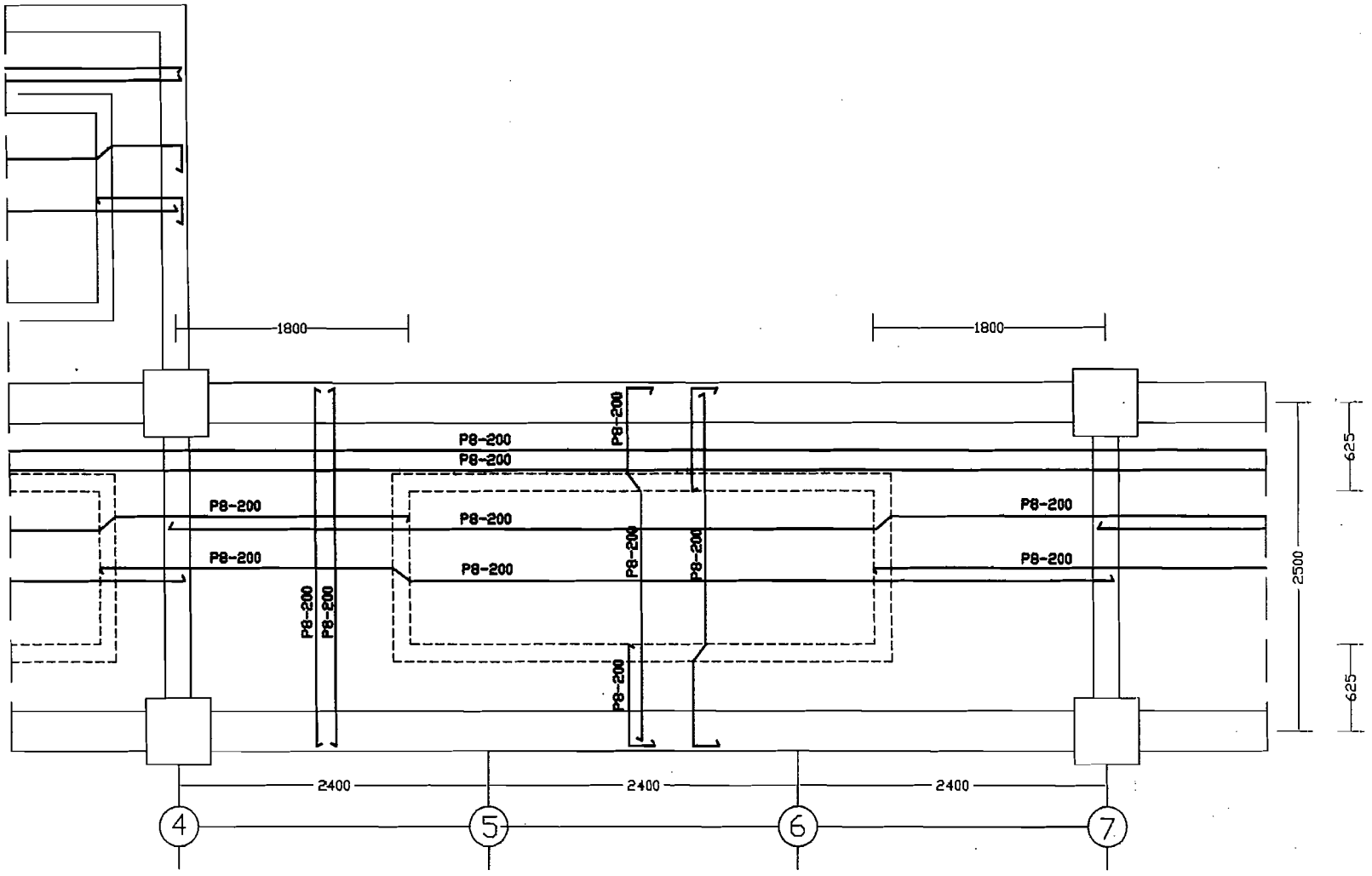


Gambar detail penulangan pelat lantai 1-4 as A-B/1-4

(PL 1 dan PL 5)

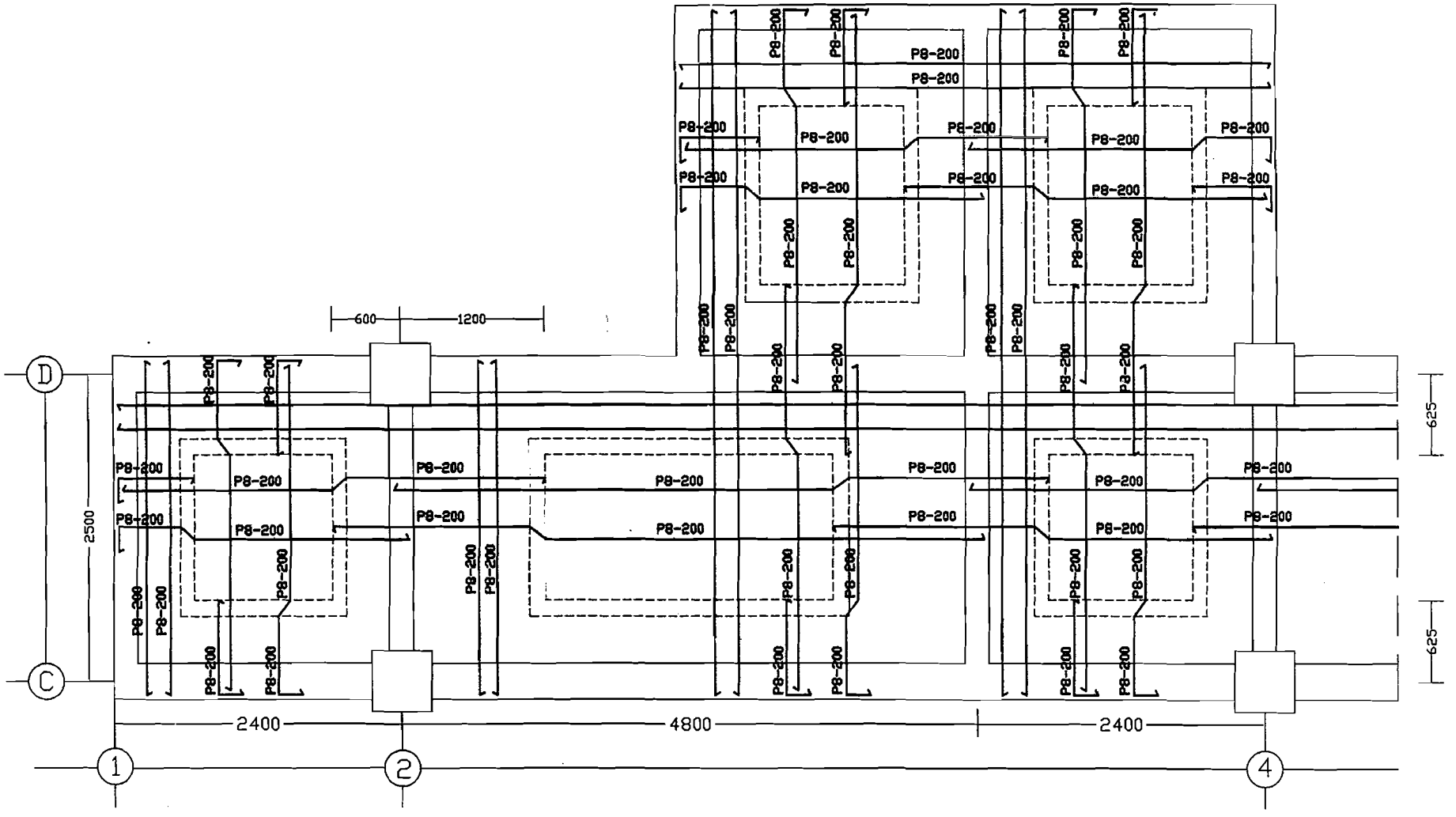


Gambar detail penulangan pelat lantai 1-4 as C-D/7-9
(PL 4 dan PL 1)

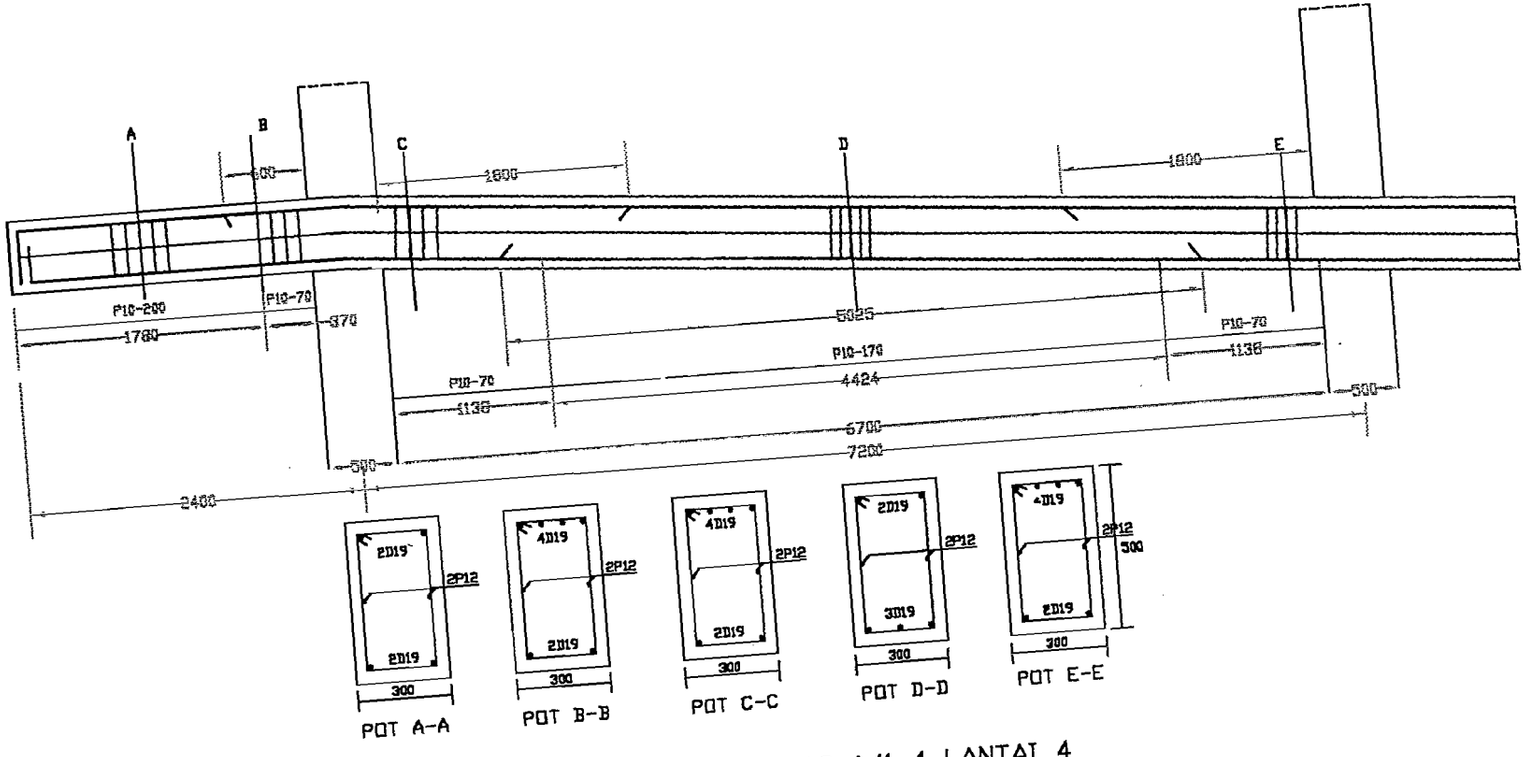


Gambar detail penulangan pelat lantai 1-4 as C-D/4-7

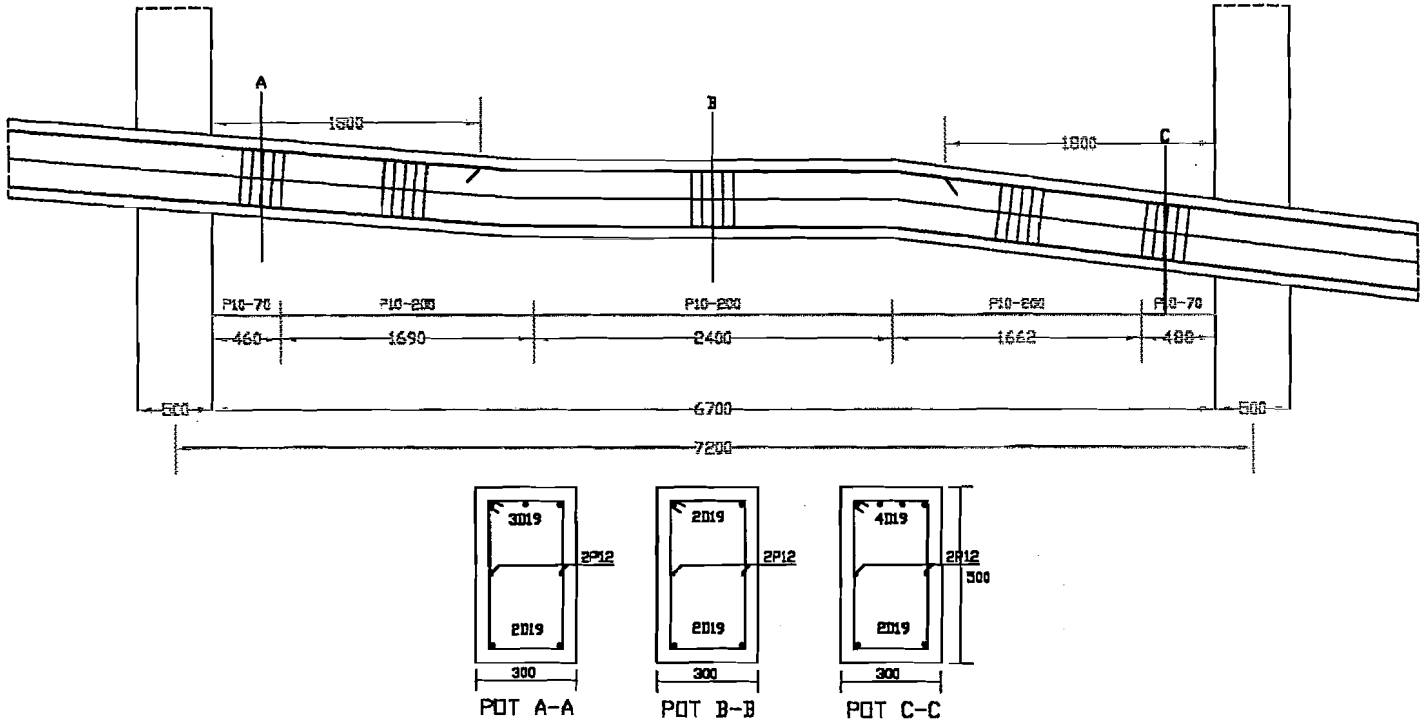
(PL 4)



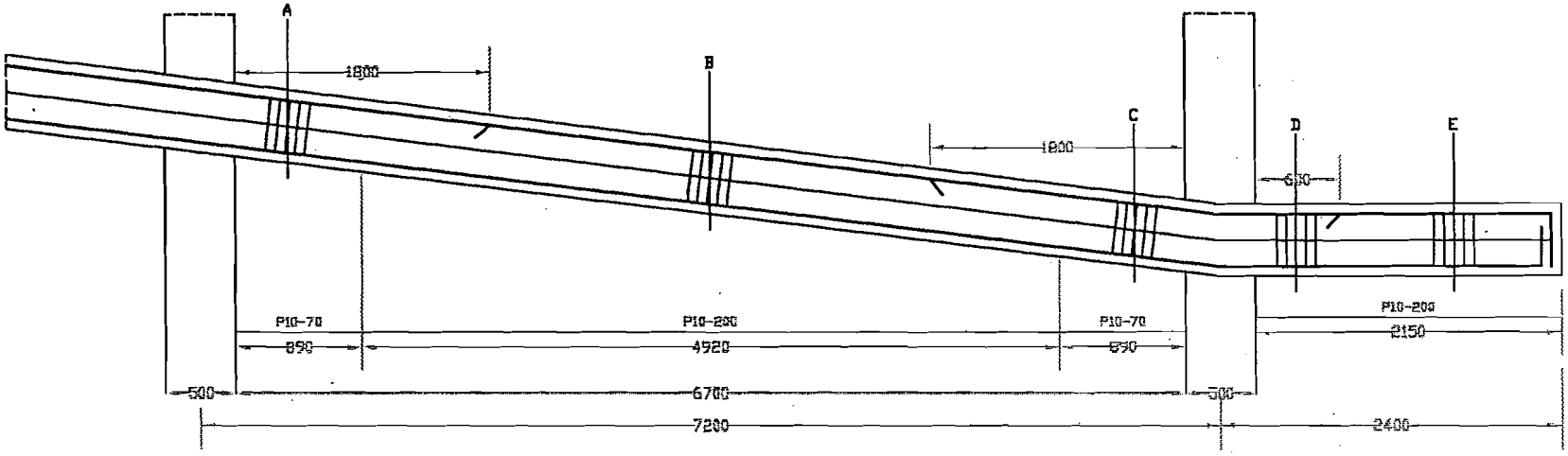
Gambar detail penulangan pelat lantai 1-4 as C-D/1-4
(PL 1,PL 2, dan PL 3)

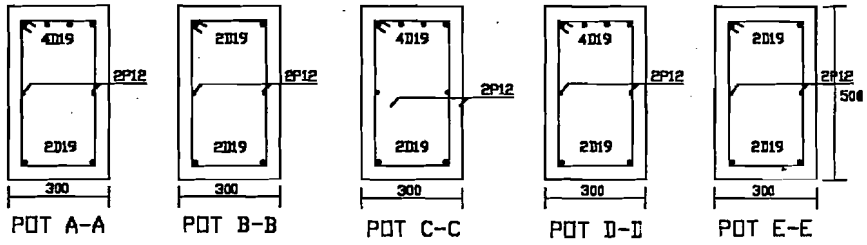


DETAIL PENULANGAN BALOK AS A/1-4 LANTAI 4

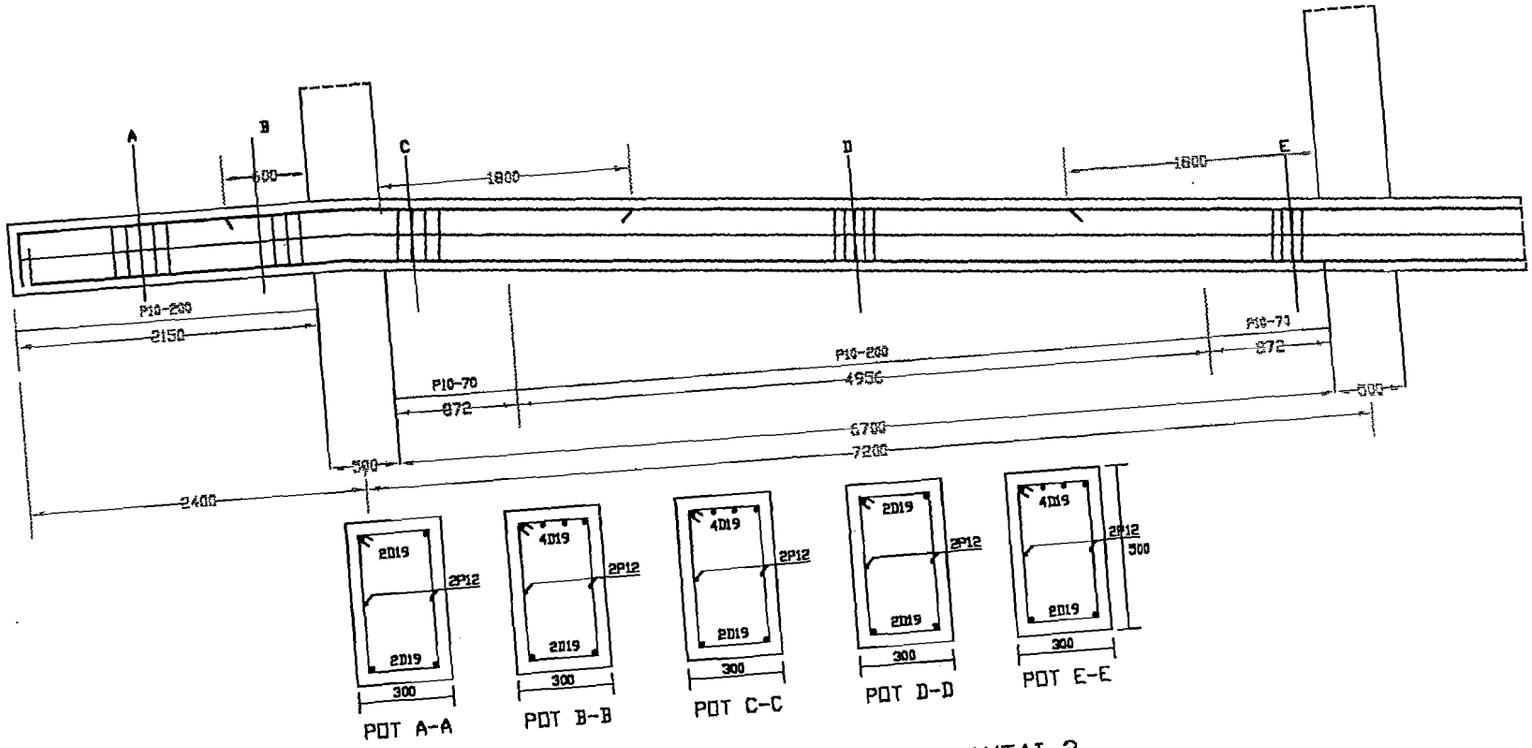


DETAIL PENULANGAN BALOK AS A/4-7 LANTAI 4

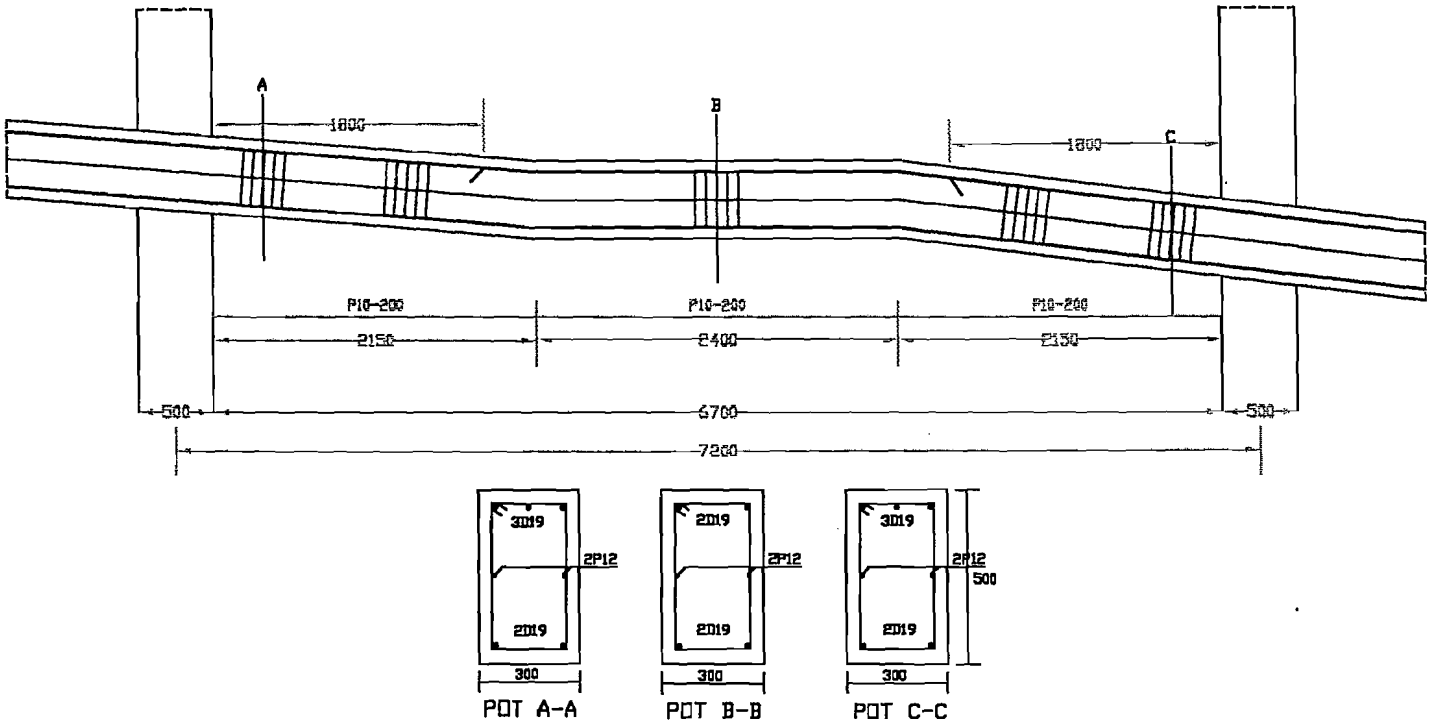




DETAIL PENULANGAN BALOK AS A/7-9 LANTAI 4

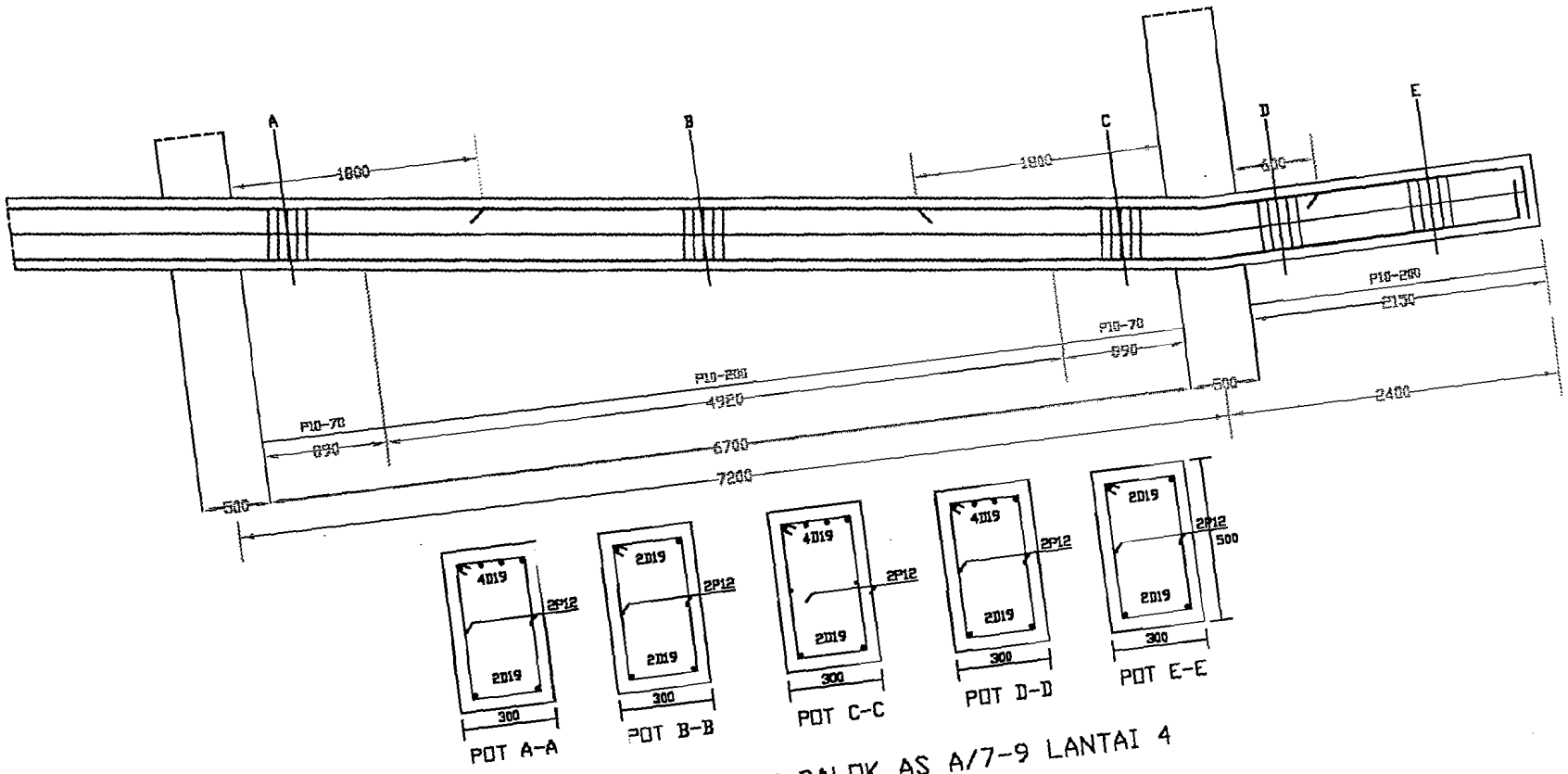


DETAIL PENULANGAN BALOK AS A/1-4 LANTAI 3
(tipikal lantai 2 dan 1)

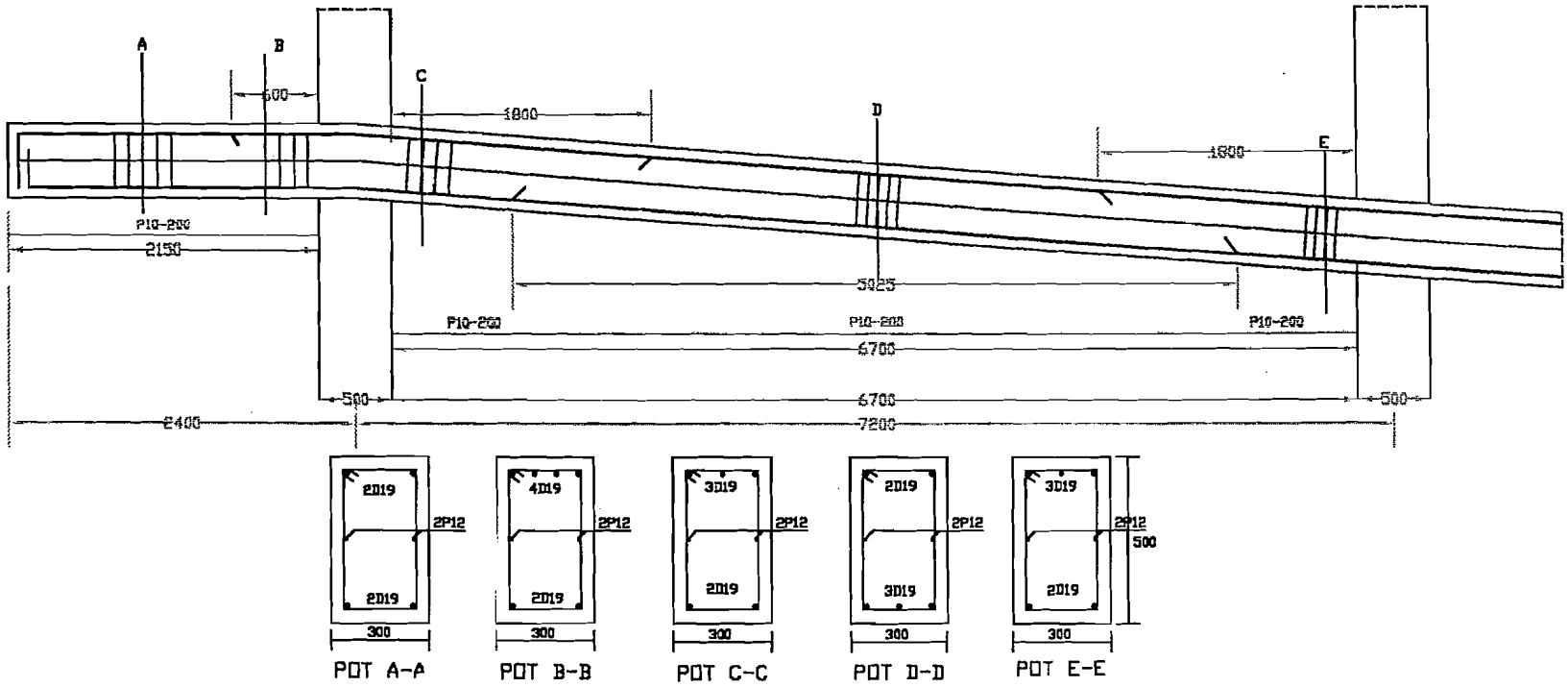


DETAIL PENULANGAN BALOK AS A/4-7 LANTAI 3

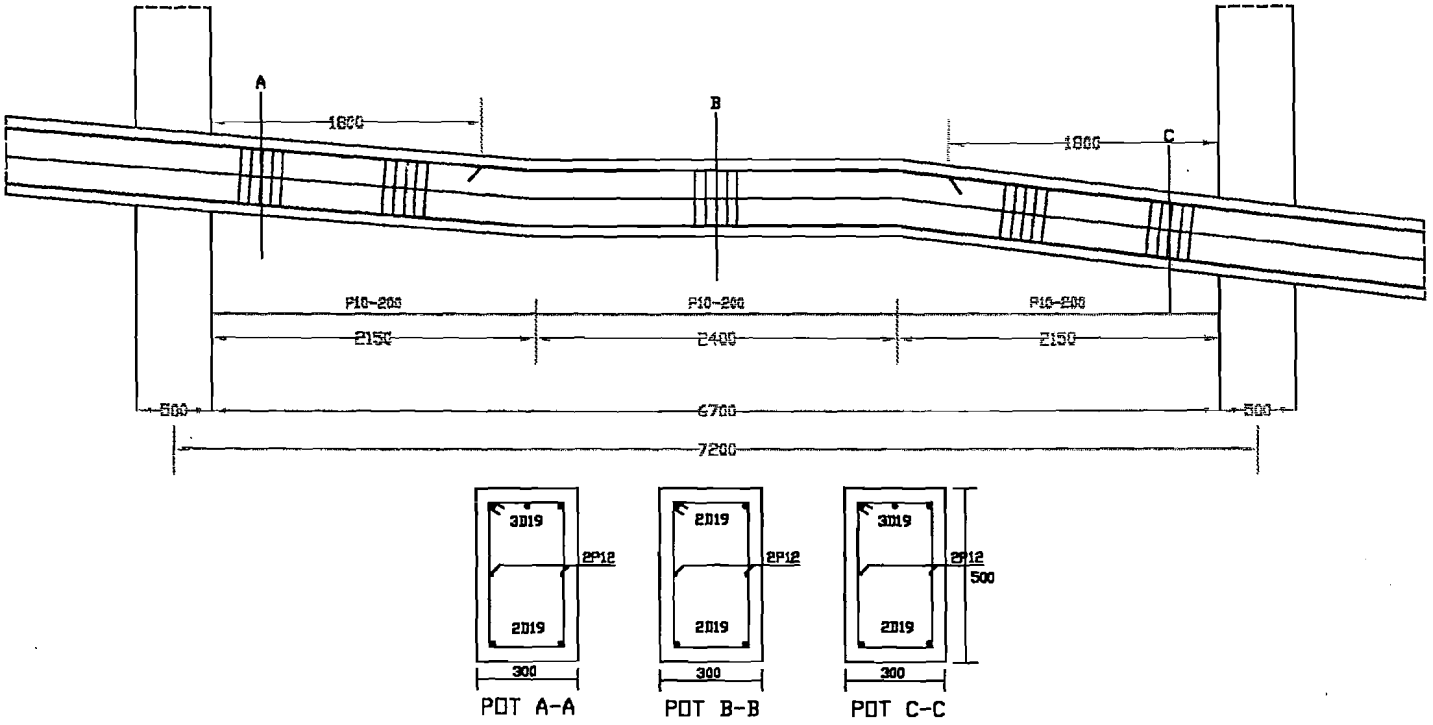
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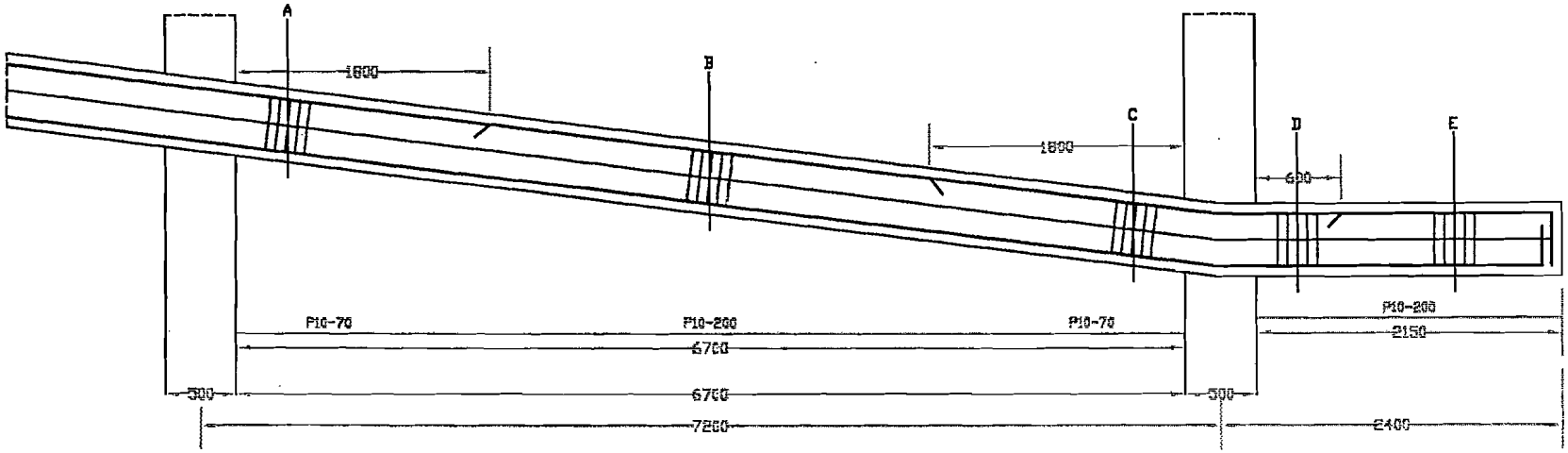
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(tipikal lantai 2 dan 1)

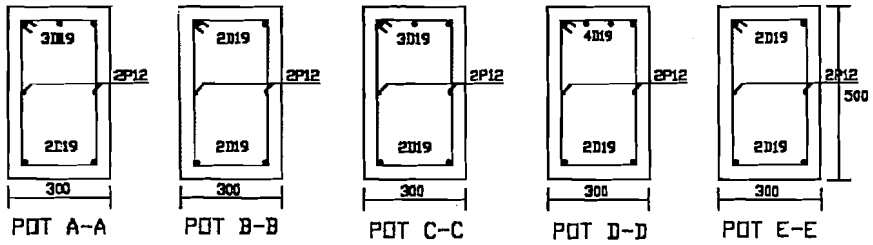


DETAIL PENULANGAN BALOK AS B/1-4 LANTAI 4

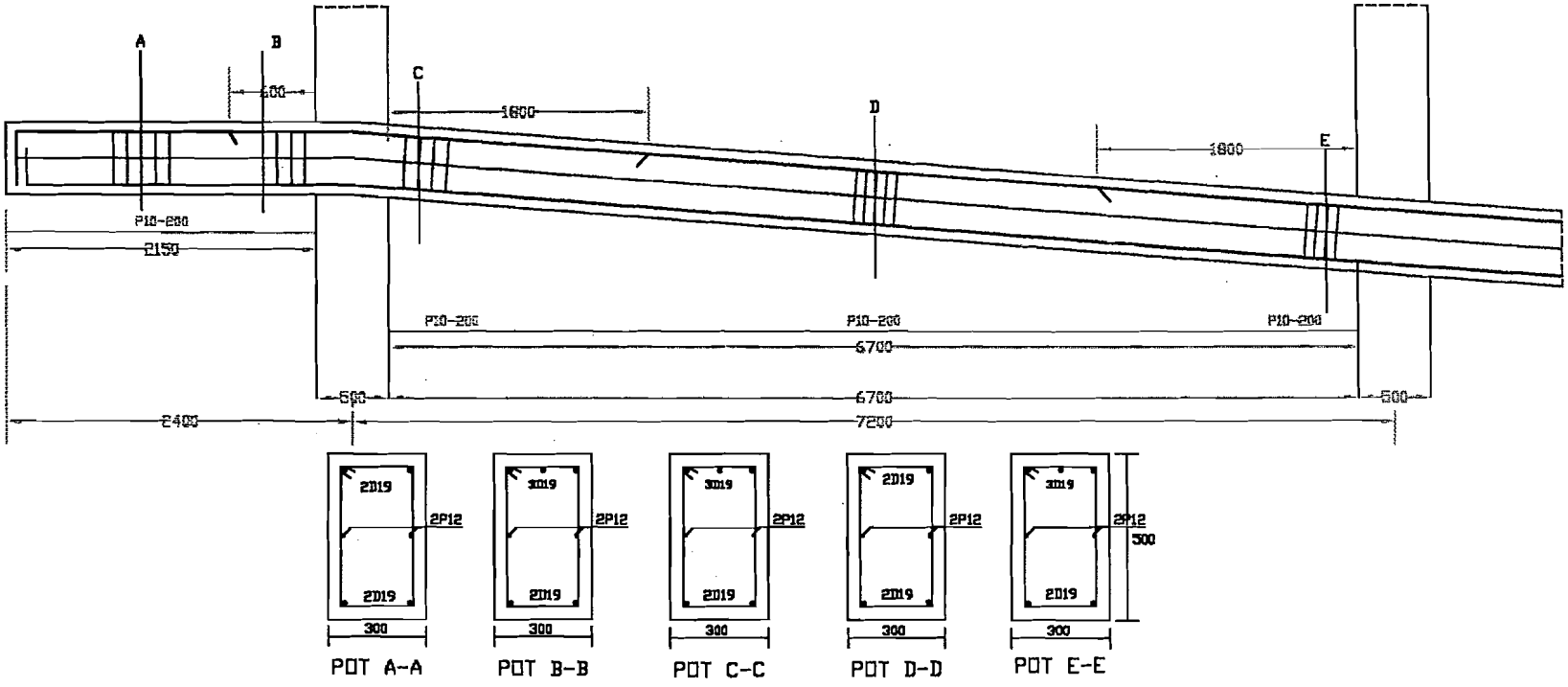


DETAIL PENULANGAN BALOK AS B/4-7 LANTAI 4

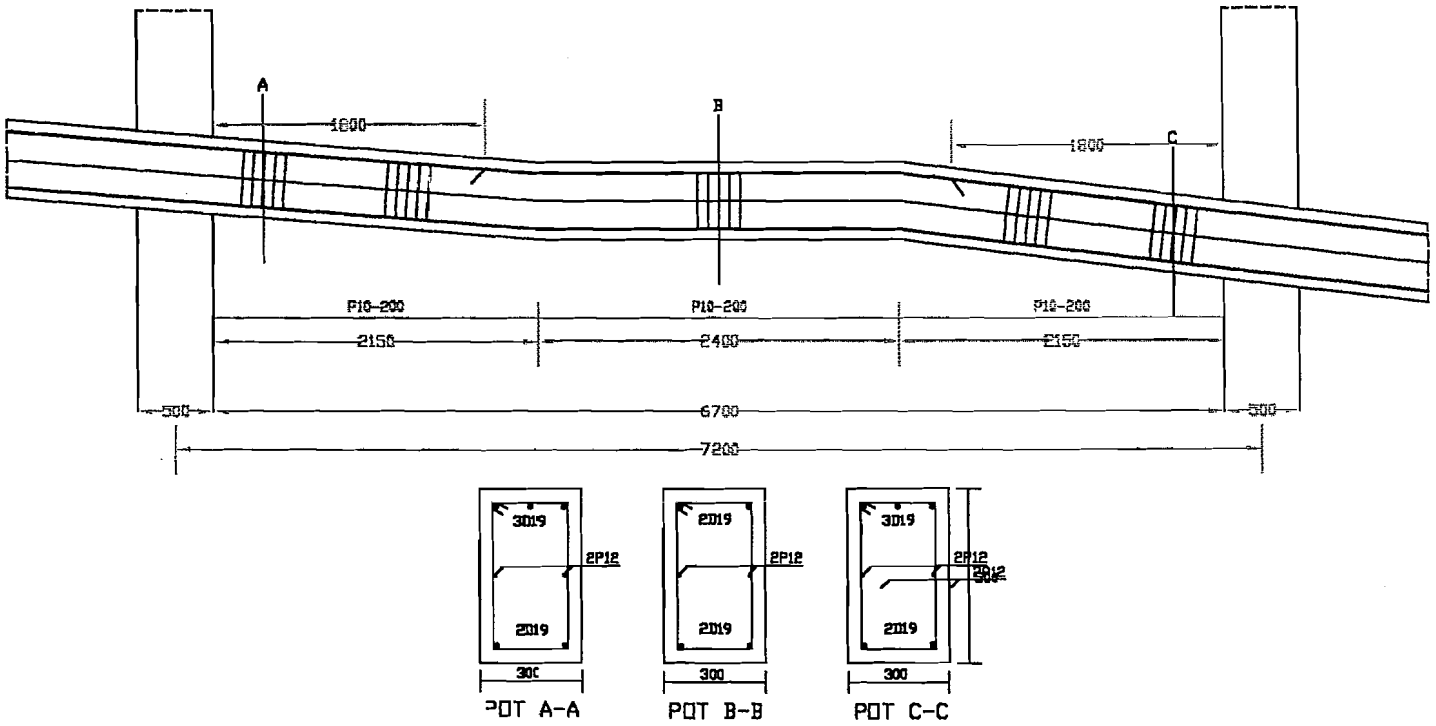




DETAIL PENULANGAN BALOK AS B/7-9 LANTAI 4

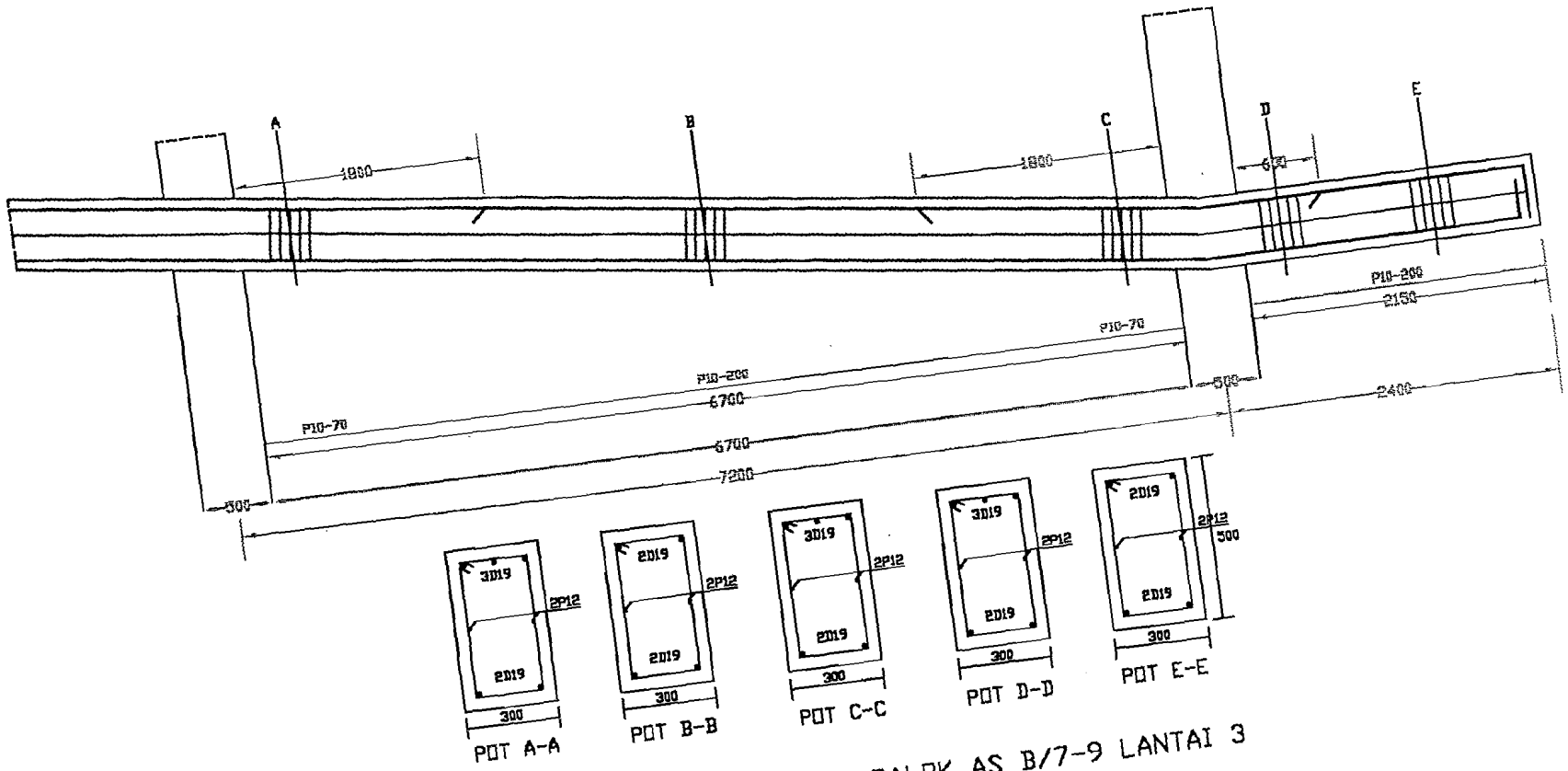


DETAIL PENULANGAN BALOK AS B/1-4 LANTAI 3
(tipikal lantai 2 dan 1)

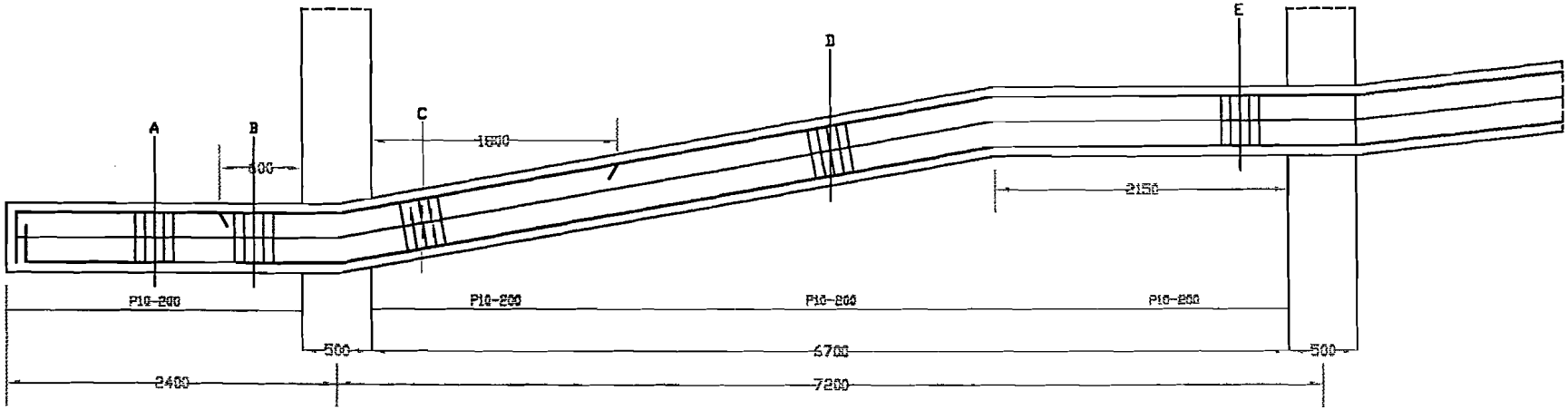


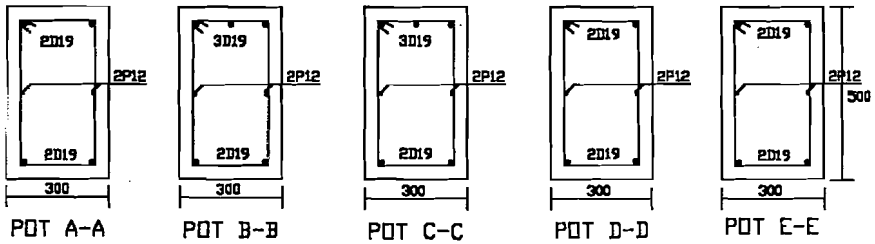
DETAIL PENULANGAN BALOK AS B/4-7 LANTAI 3

(=ipikal lantai 2 dan 1)

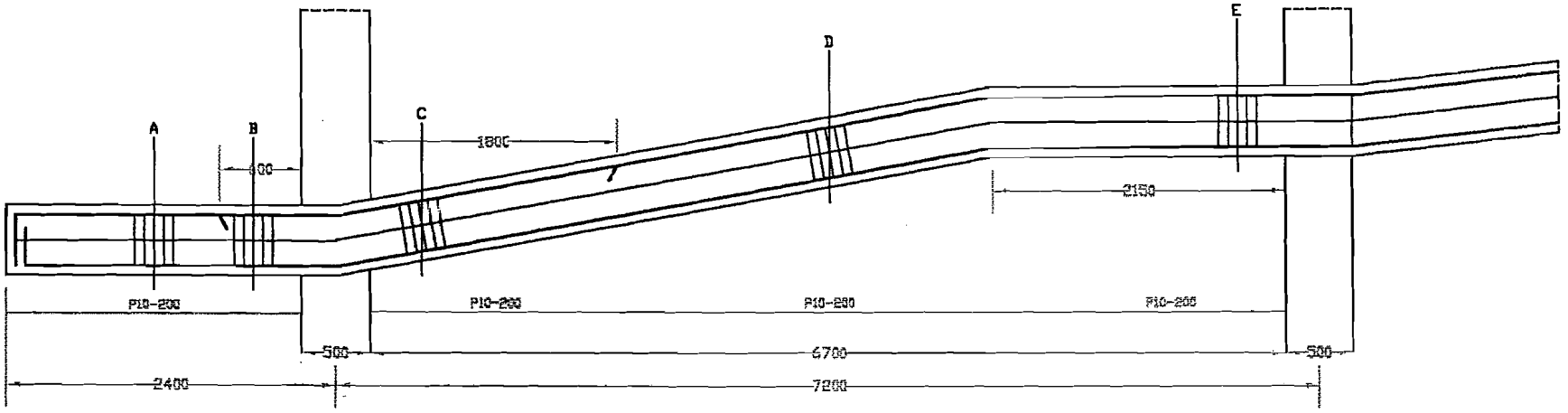


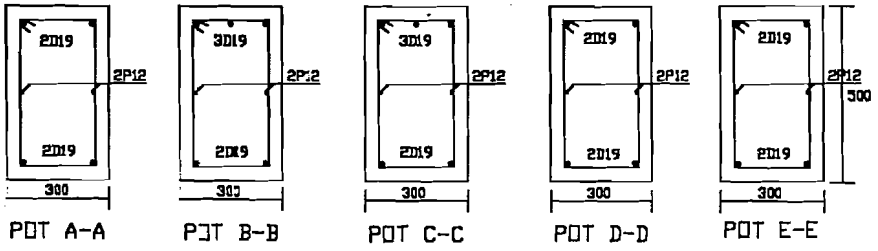
DETAIL PENULANGAN BALOK AS B/7-9 LANTAI 3
(tipikal lantai 2 dan 1)



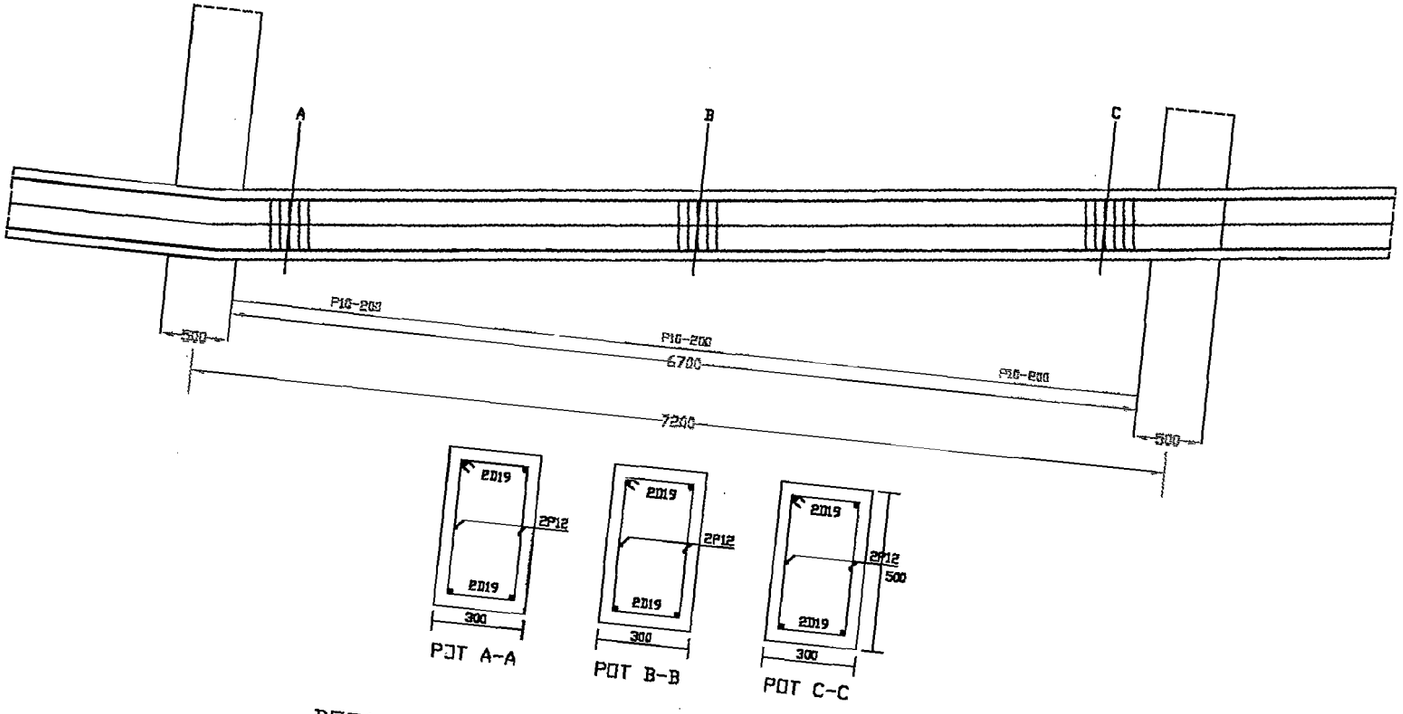


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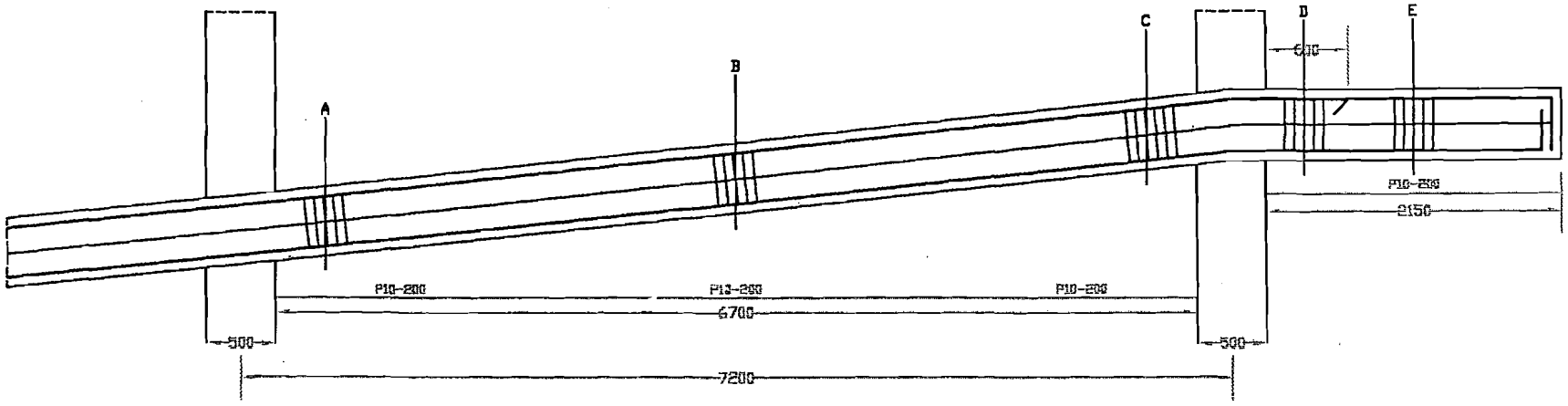


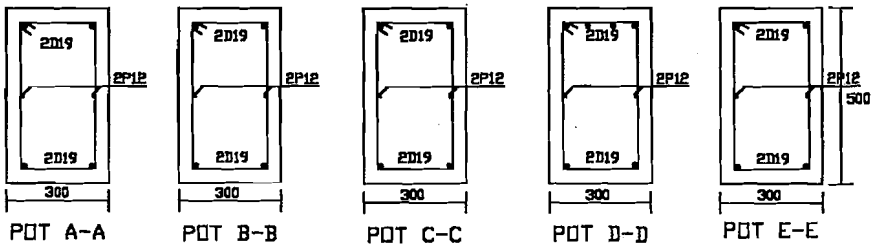


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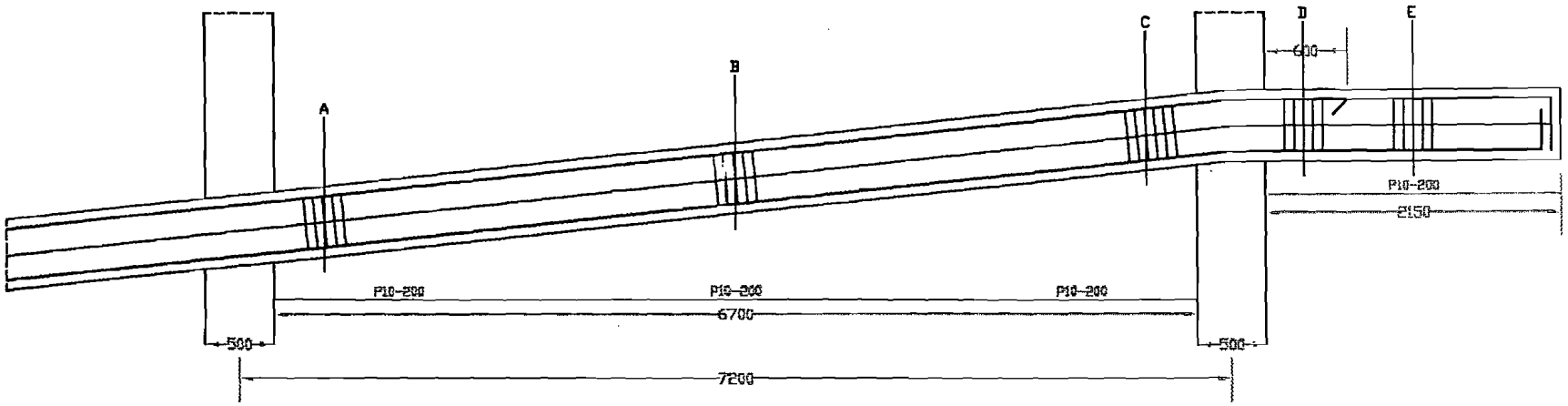
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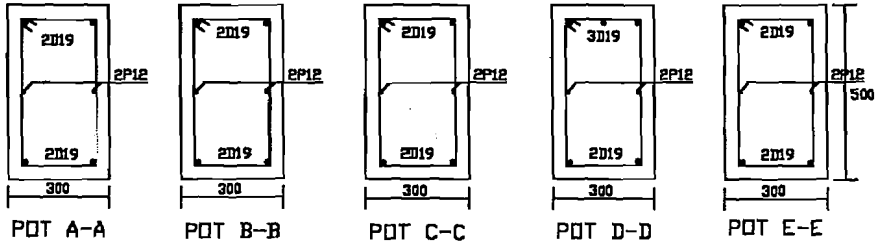




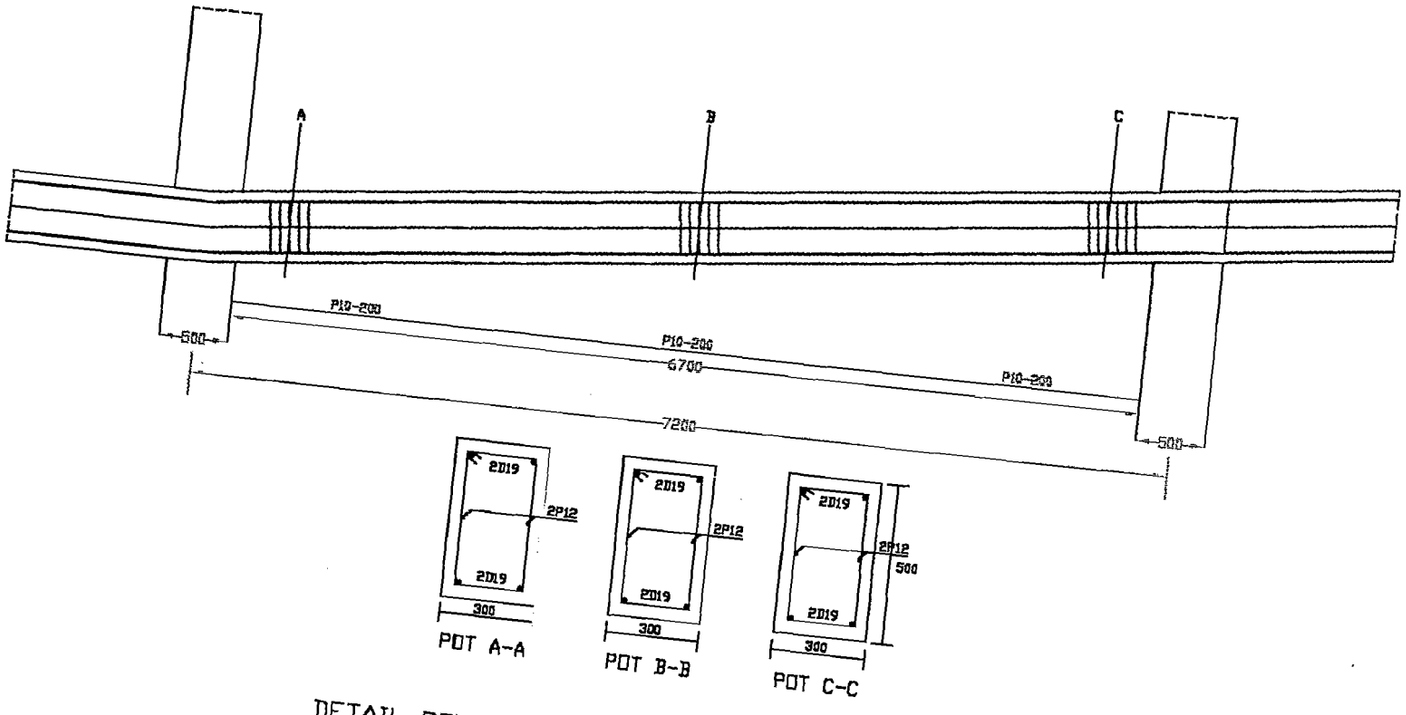
DETAIL PENULANGAN BALOK AS C/7-9 LANTAI 4

14

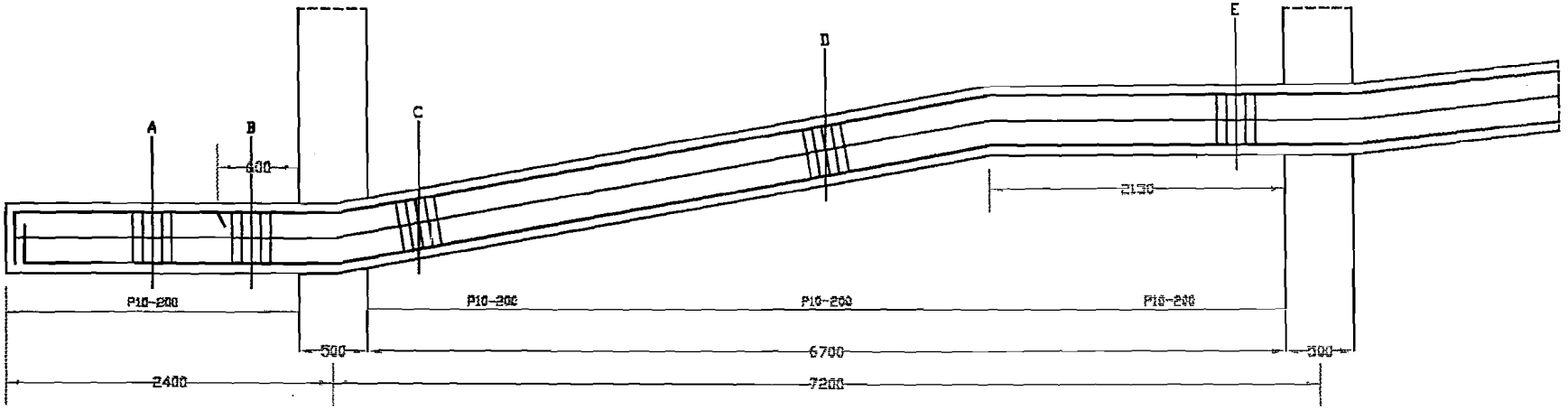


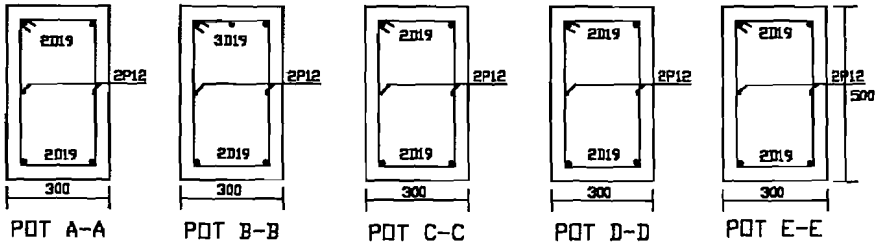


DETAIL PENULANGAN BALOK AS C/7-9 LANTAI 3
(tipikal lantai 2 dan 1)

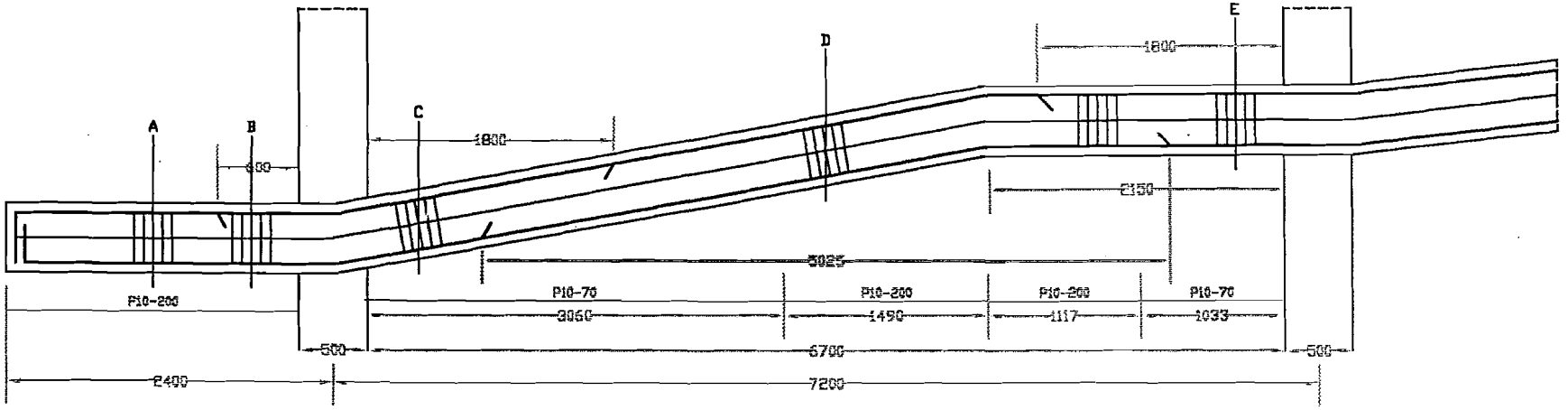


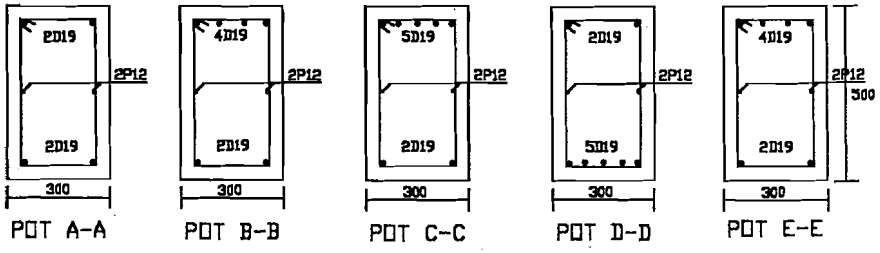
DETAIL PENULANGAN BALOK AS C/4-7 LANTAI 3
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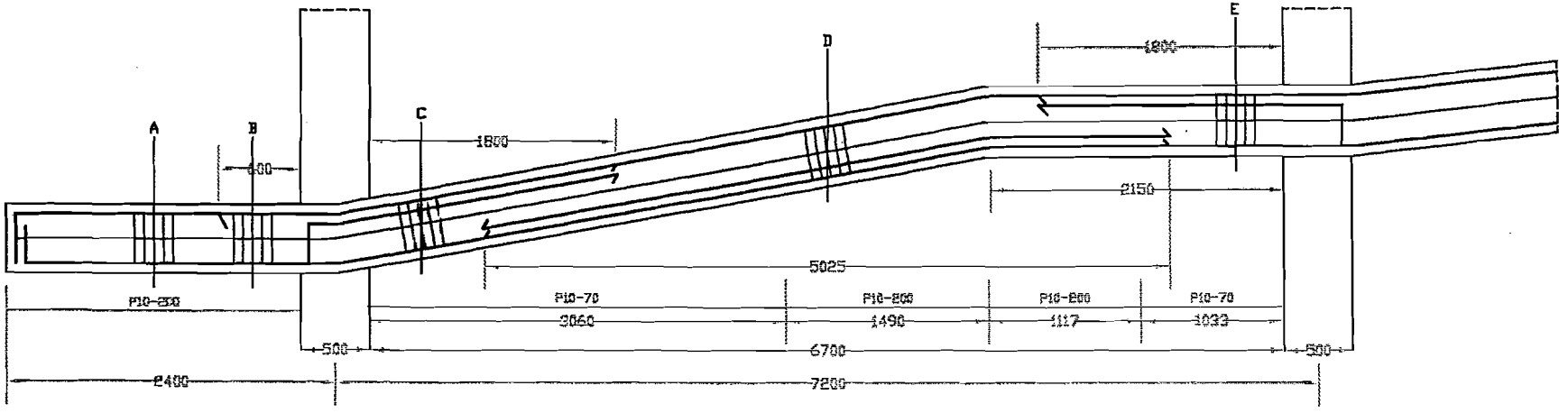


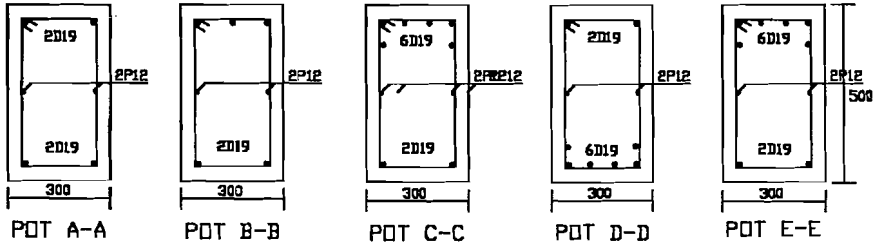
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(tipikal lantai 2 dan 1)



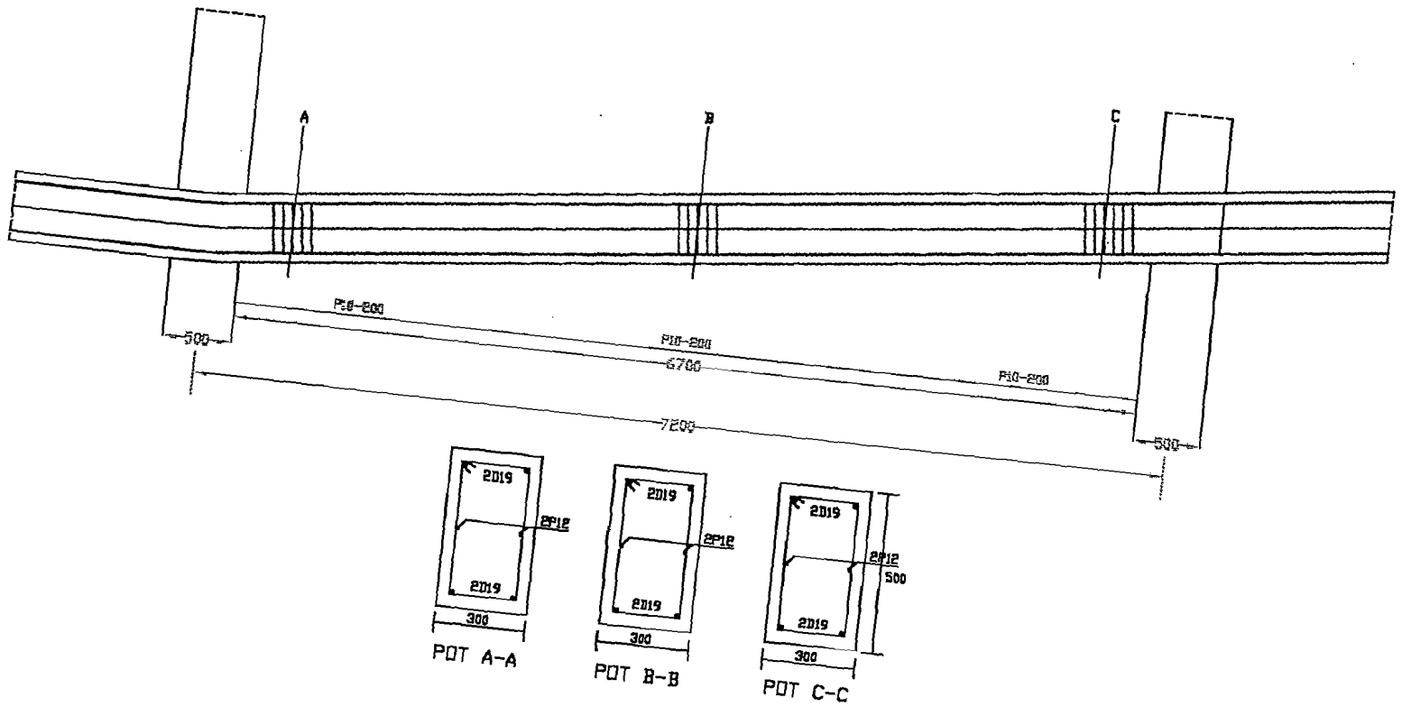


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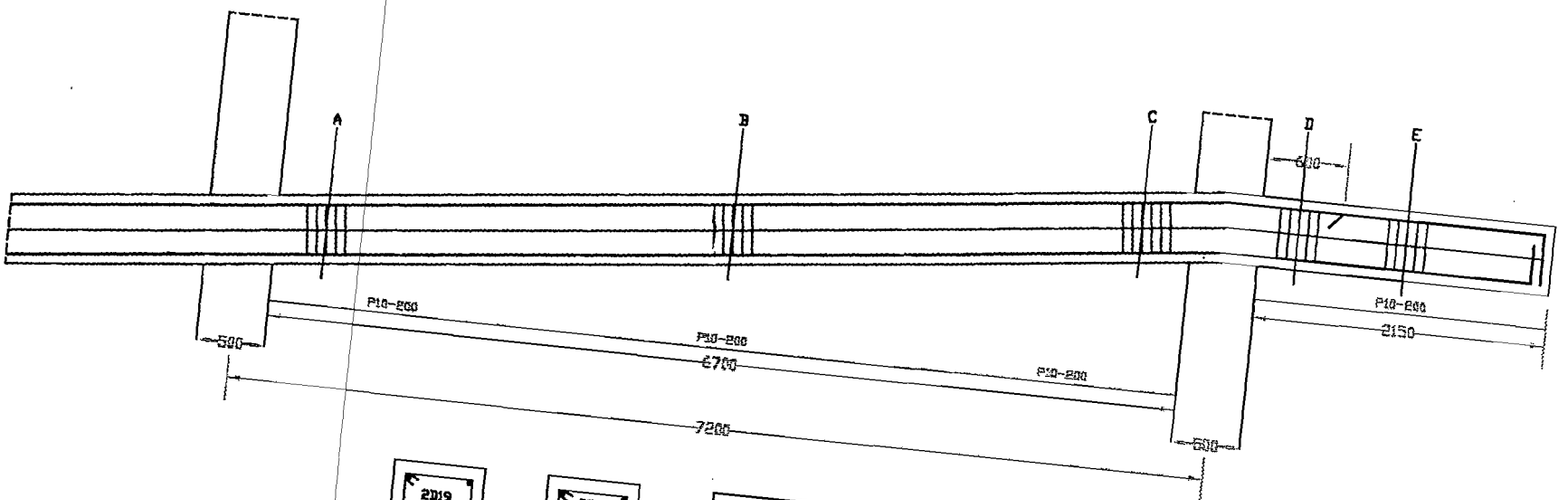


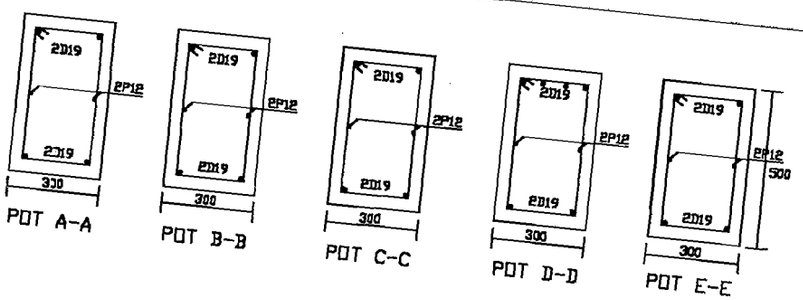


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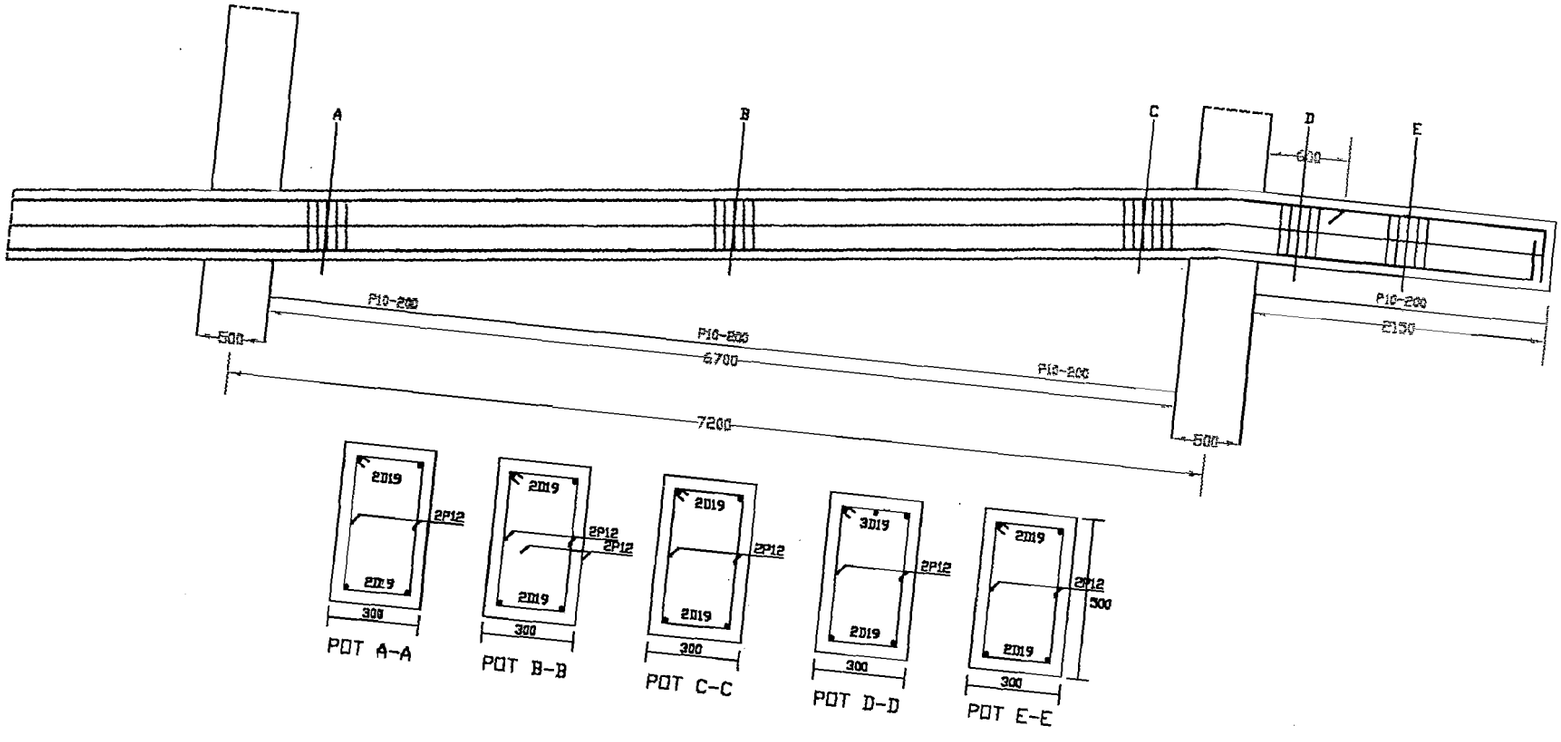


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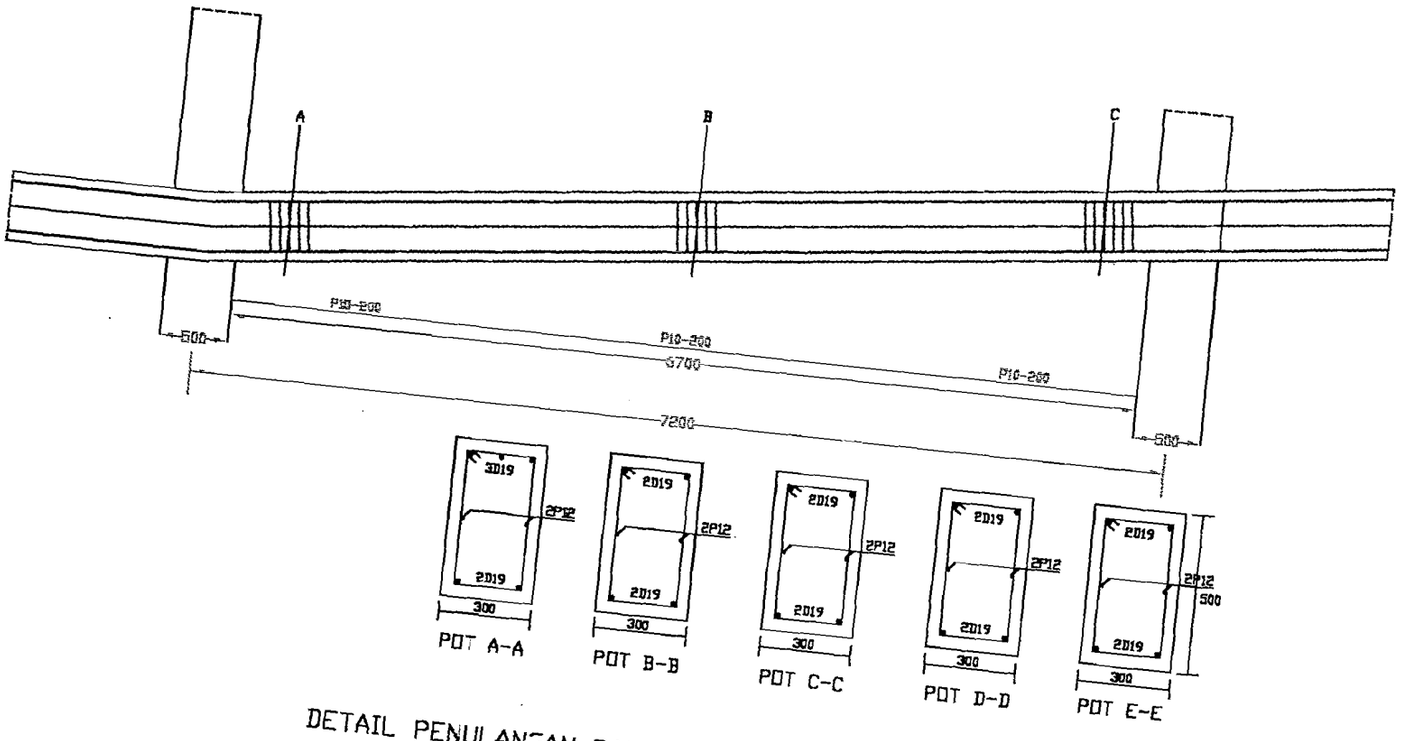




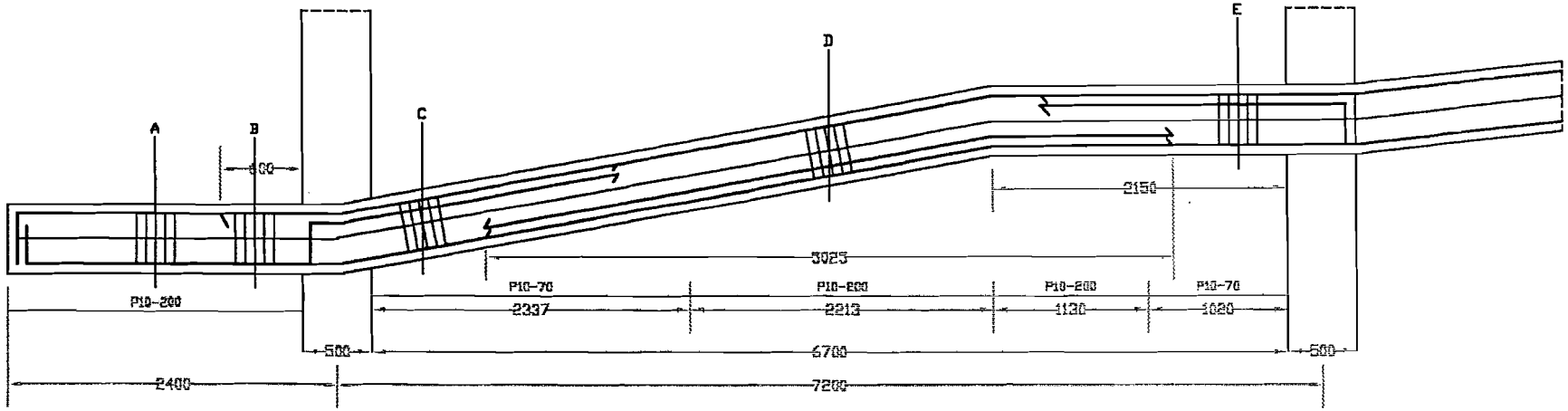
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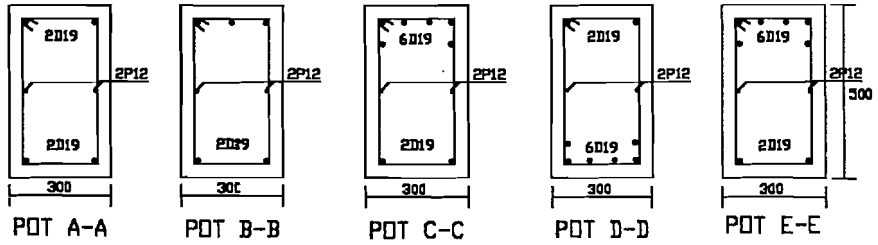


DETAIL PENULANGAN BALOK AS D/7-9 LANTAI 3
(tipikal lantai 2 dan 1)



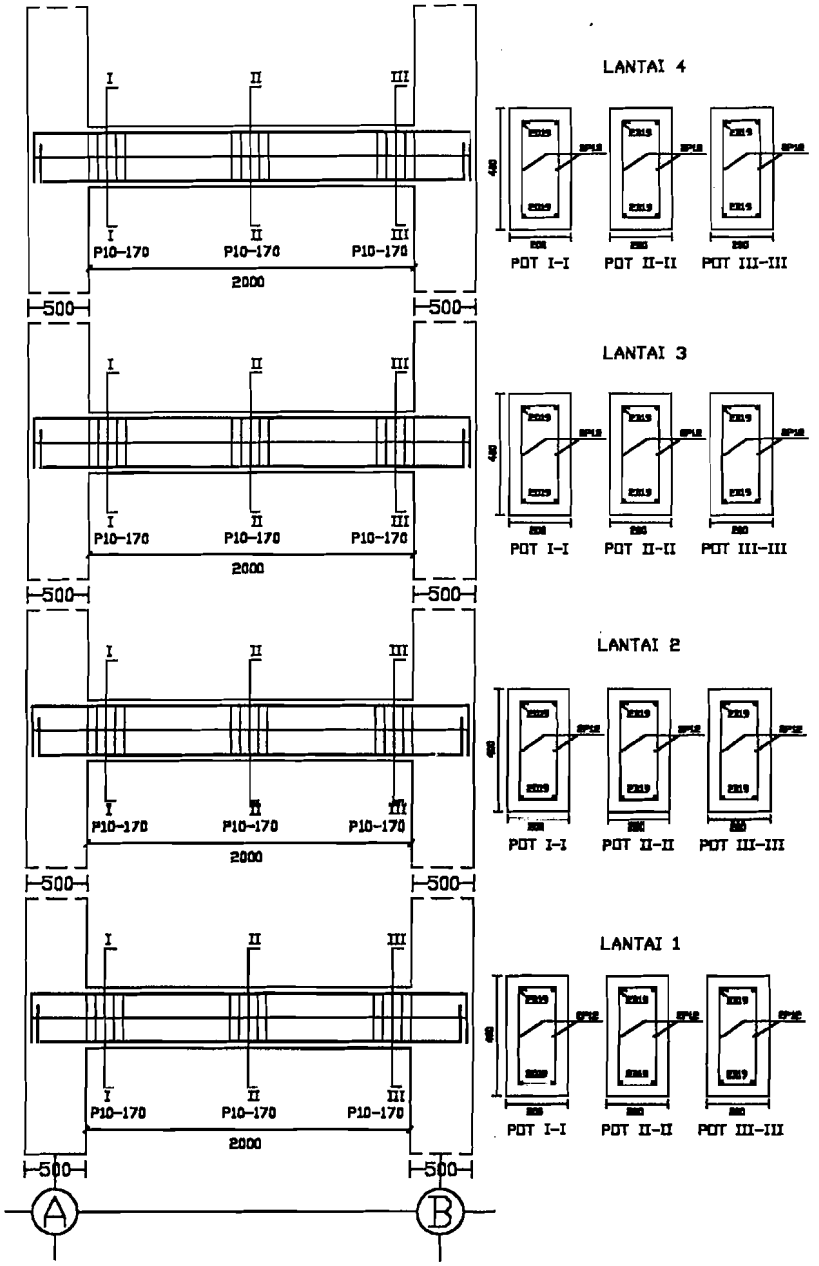
DETAIL PENULANGAN BALOK AS D/4-7 LANTAI 3
(tipikal lantai 2 dan 1)



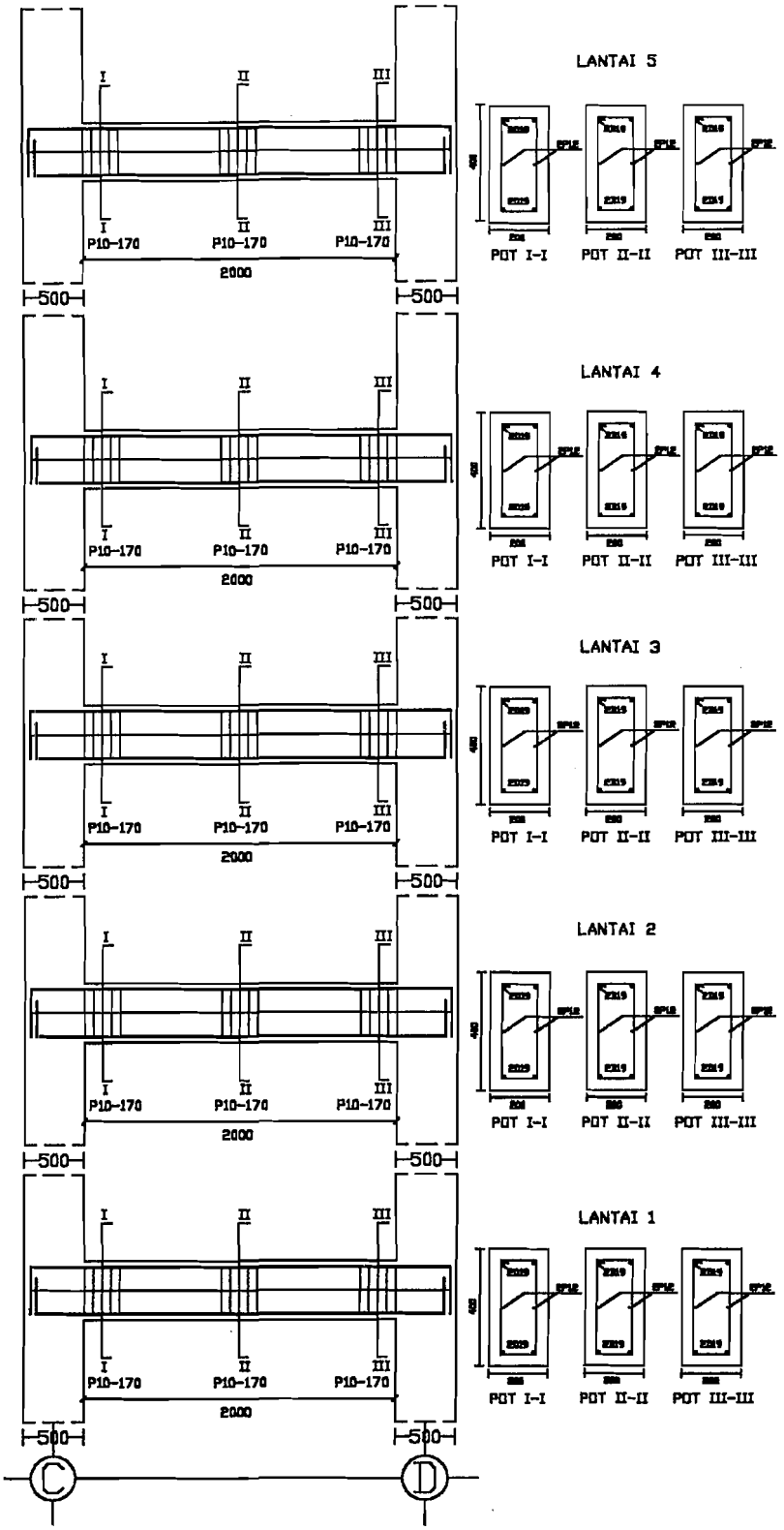


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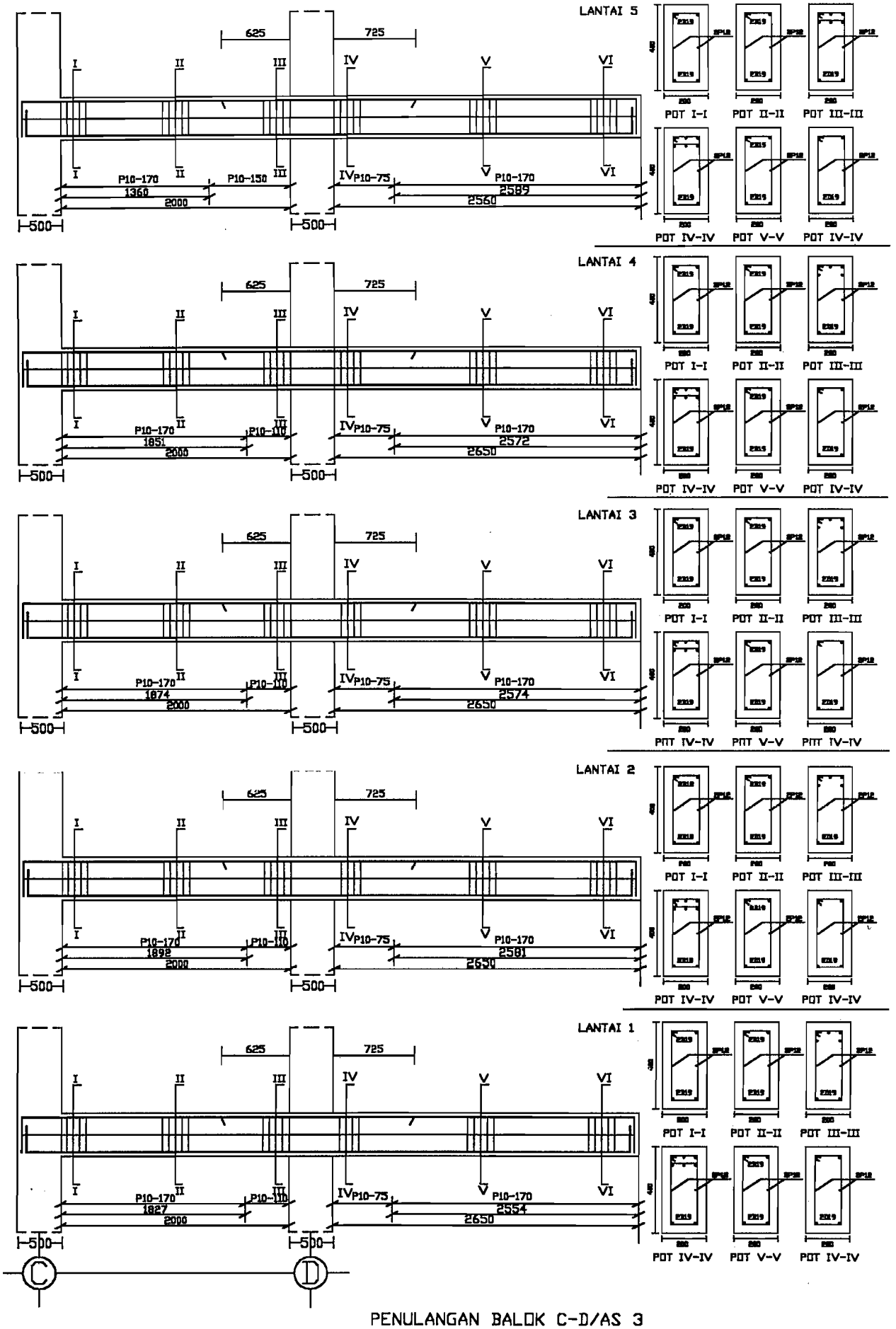
(tipikal lantai 2 dan 1)



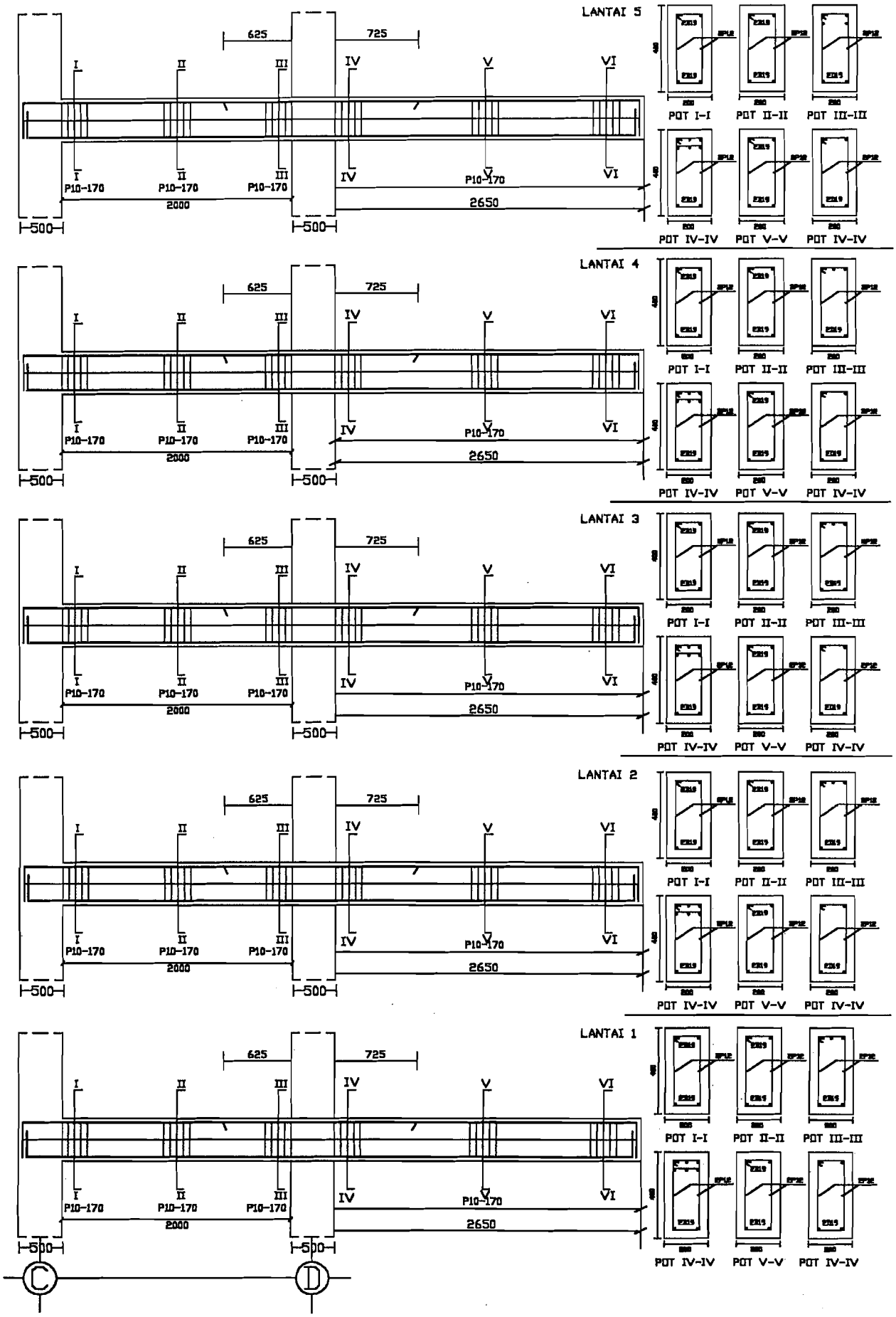
PENULANGAN BALOK A-B/AS 1 TIPIKAL AS 2, AS 4, AS 5, AS 6, AS 7,AS 8, AS 9



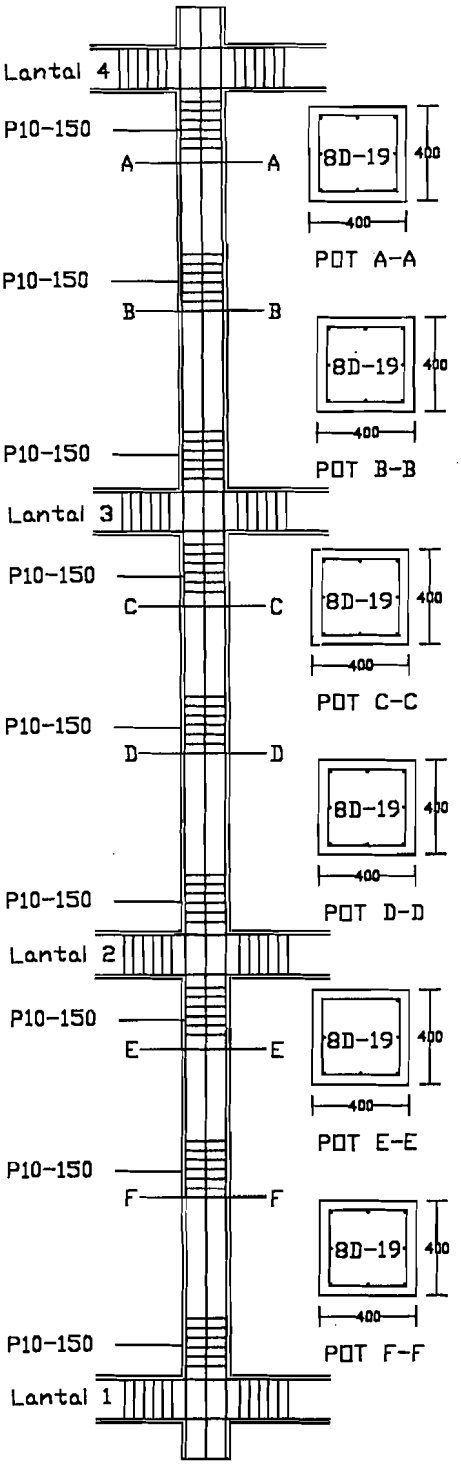
PENULANGAN BALOK C-D/AS 1



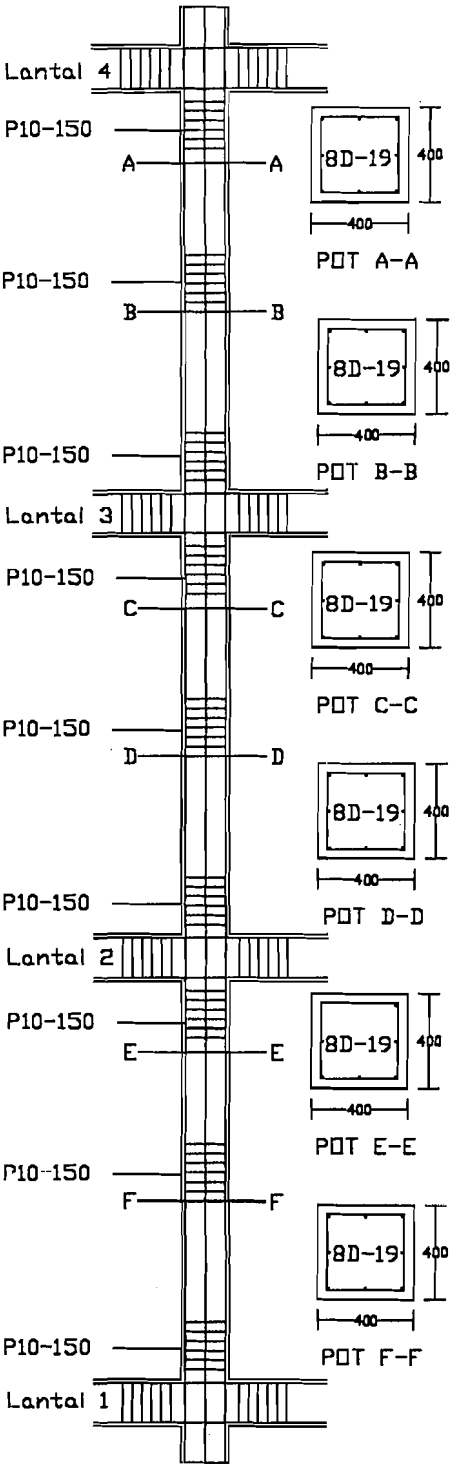
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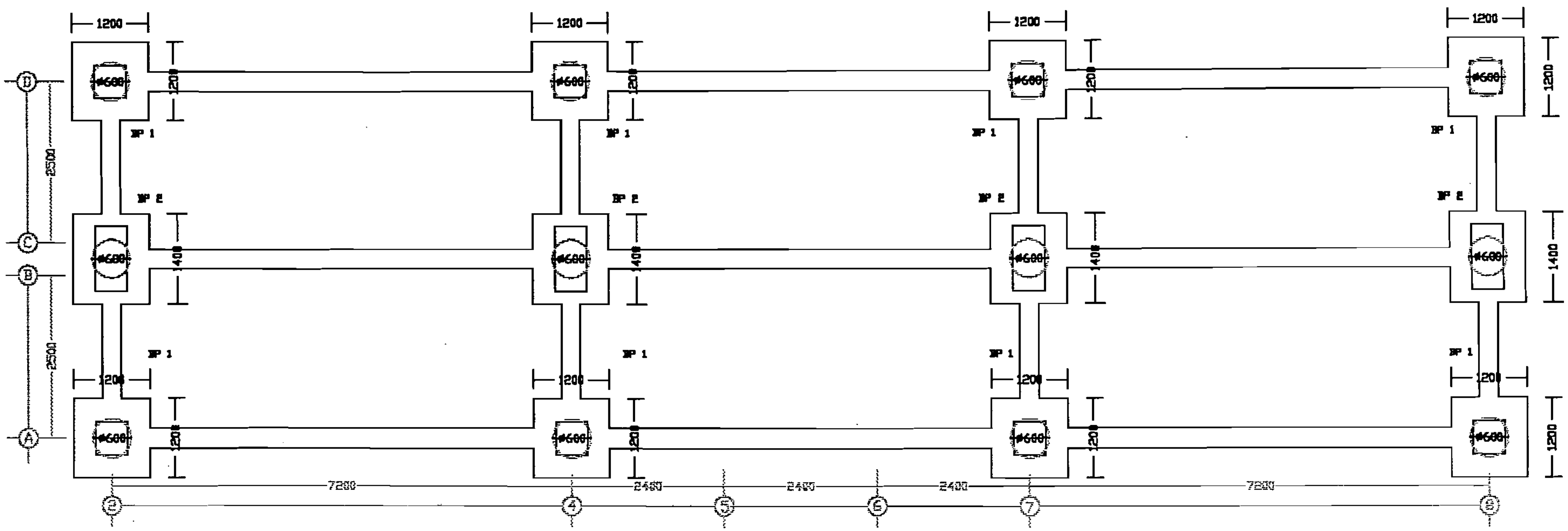
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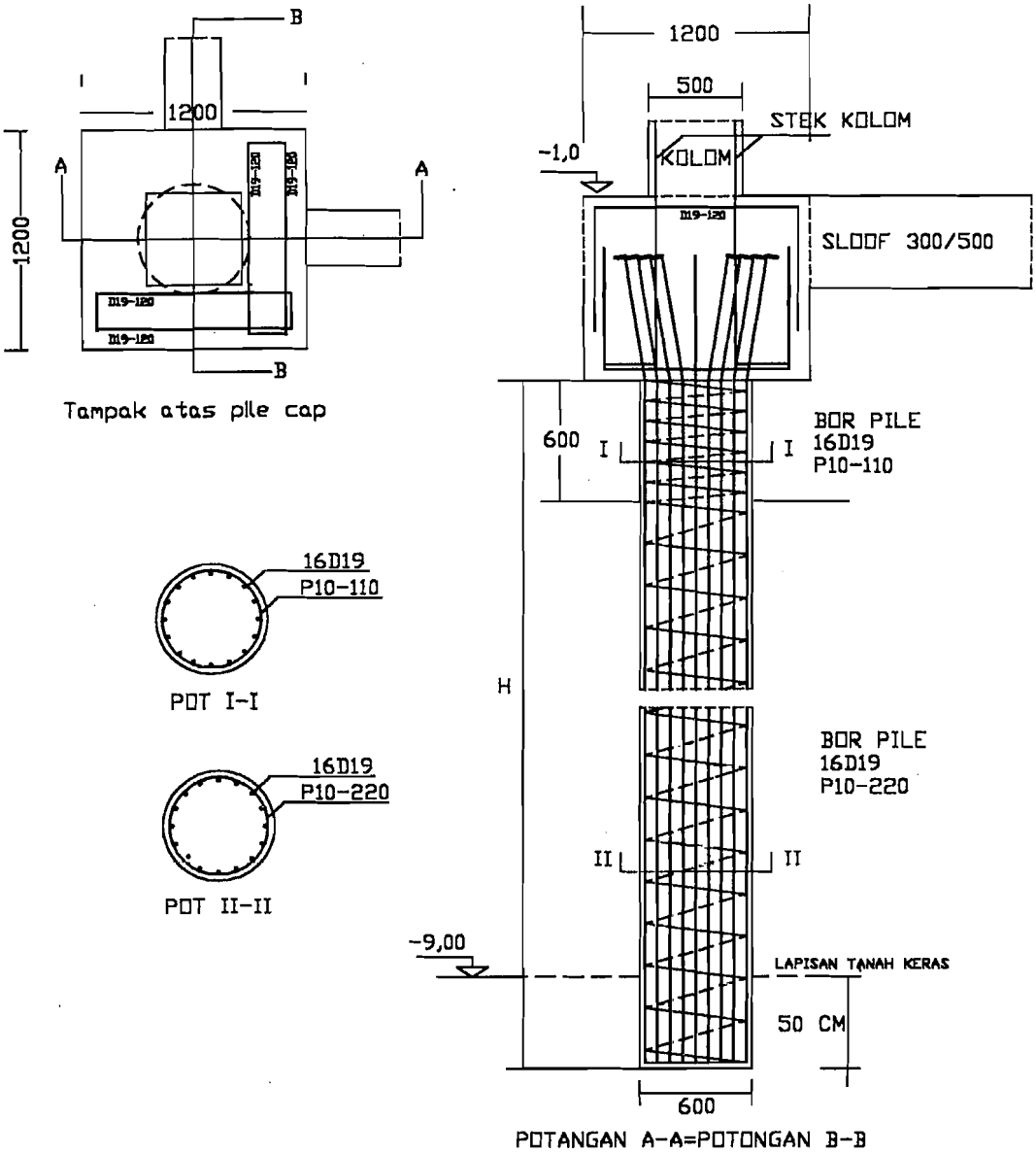
Gambar Detail tulangan kolom as C



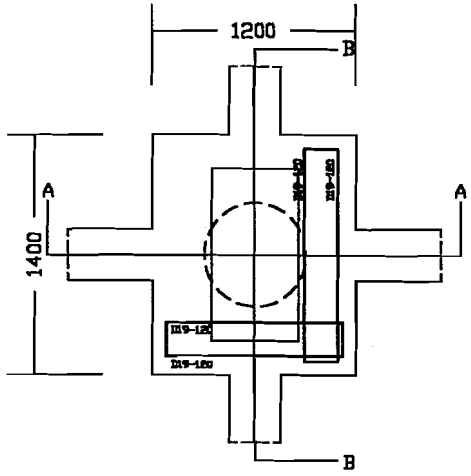
Gambar Detail tulangan kolom as D



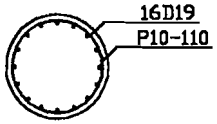
Gambar denah pondasi dan sloof



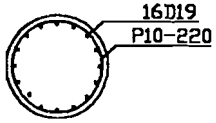
Gambar Detail Pondasi BP 1



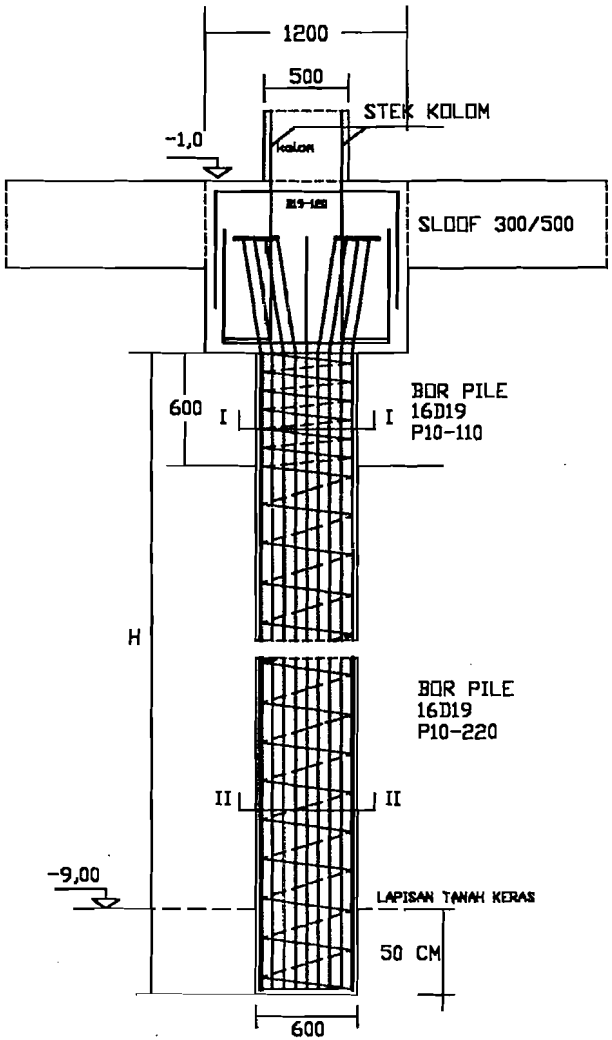
tampak atas pile cap



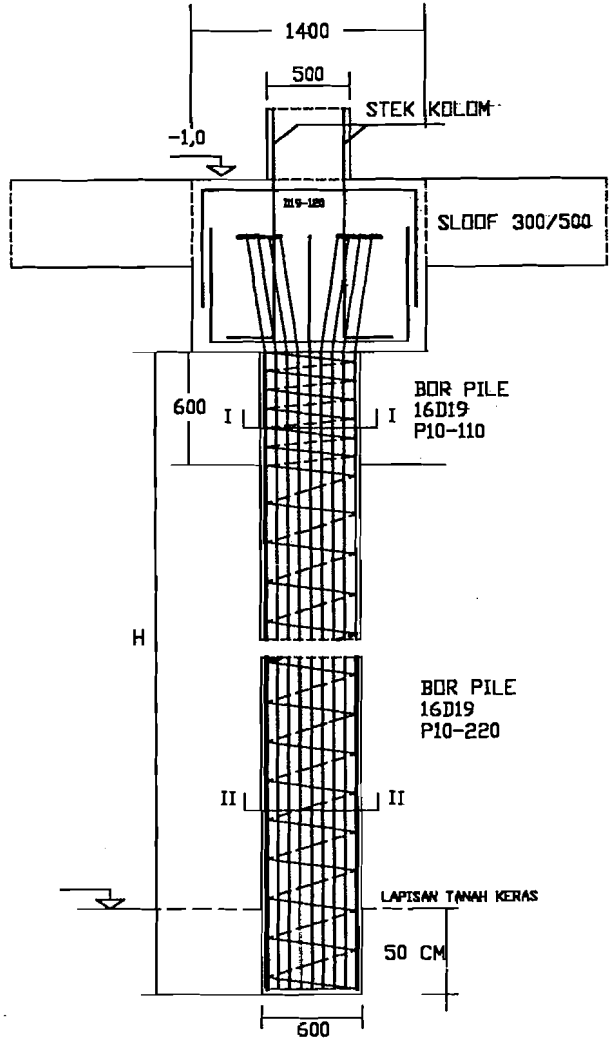
POT I-I



POT II-II



POTANGAN A-A



POTANGAN B-B

21

FM-UII-AA-FPU-09

KARTU PESERTA TUGAS AKHIR

NO.	N A M A	NO. MHS.	BID.STUDI
1	Evan setiawan	99511004	Teknik Sipil
2			Teknik Sipil

JUDUL TUGAS AKHIR :

Redesain Ramp pot RSUP. DR. Sarjito Yogyakarta.

PERIODE III : MARET - AGUSTUS
TAHUN : 2002 / 2003

No.	Kegiatan	Bulan Ke :					
		Mar.	Apr.	Mei.	Jun.	Jul.	Aug.
1.	Pendaftaran	■					
2.	Penentuan Dosen Pembimbing	■					
3.	Pembuatan Proposal		■				
4.	Seminar Proposal		■	■			
5.	Konsultasi Penyusunan TA.			■	■	■	
6.	Sidang-Sidang					■	■
7.	Pendadaran.						■

DOSEN PEMBIMBING I : Ir. Tri Fajar Budiono, MT.
DOSEN PEMBIMBING II : Ir. H. Suharyatmo, MT.



Foto
4 x 6

Yogyakarta, 19 Maret 2003
a.n. Dekan,

Ir. H. Munadhir, MS
(.....)

Catatan.

Seminar : .....
Sidang : .....
Pendadaran : .....

CATATAN KONSULTASI TUGAS AKHIR

NO.	TANGGAL	CATATAN KONSULTASI	TANDA TANGAN
1	25/4/03	- perbaiki rem. Gording - Lanjutkan : uraian pembebanan balok .- pada beban pelat - jangan di-SAP dulu	
		t — Q (kN/m²) $q_h = Q.t$ (kN/m')	
2	2/5/03	Lanjutkan SAP	
3	9/5/03	dibuat 2 model stuk	
4.	20/5/03	Lanjutkan	
5.	27/5/03	- [illegible] - [illegible]	
-	6/6/03 -	Data ± Kelengkapan - Lanjutkan	
-	3/9/03	hit pondasi Bore Pile	
-	30/12/03	Lengkapi, ringkas cicilan	

5/1/04 - Lanjutkan ✓ 12/1/04 → Perbaiki - ✓
6/1/04 Lanjut ✓ 15/1/04 ✓
7/1/04 Lanjutkan ✓ 21/1/04 ACC ✓