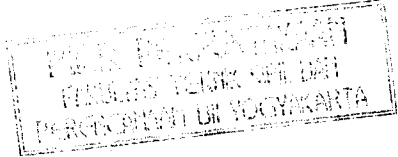


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**TUGAS AKHIR**

**PERENCANAAN ULANG KAMPUS III UNIT B**  
**UNIVERSITAS AHMAD DAHLAN**  
**YOGYAKARTA**



Disusun oleh :

**DODY DARMAWAN**  
 No. Mhs.: 96 310 001  
 NIRM: 960051013114120001

**ARIEF RACHMAN**  
 No. Mhs.: 96 310 049  
 NIRM: 960051013114120042

**JURUSAN TEKNIK SIPIL**  
**FAKULTAS TEKNIK SIPIL DAN PERENCANAAN**  
**UNIVERSITAS ISLAM INDONESIA**  
**YOGYAKARTA**  
 2002

**TUGAS AKHIR**

**PERENCANAAN ULANG KAMPUS III UNIT B**

**UNIVERSITAS AHMAD DAHLAN YOGYAKARTA**


Nama : DODY DARMAWAN  
No. Mhs. : 96 310 001  
NIRM : 960051013114120001

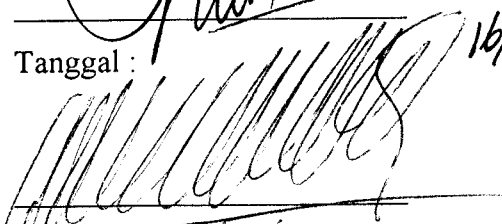
Nama : ARIEF RACHMAN  
No. Mhs. : 96 310 049  
NIRM : 960051013114120042

Telah diperiksa dan disetujui oleh:

Ir. H. Suharyatmo, MT  
Dosen Pembimbing I

Ir. H. A. Kadir Aboe, MS  
Dosen Pembimbing II

  
Tanggal : 16/11/02

  
Tanggal : 13/11/02

## KATA PENGANTAR



السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

Puji syukur kehadiran Allah SWT atas petunjuk dan bimbingan-Nya sehingga penulis dapat menyelesaikan Laporan Tugas Akhir ini. Semoga Allah selalu memberikan hambanya jalan kemudahan.

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# **BAB I**

## **PENDAHULUAN**

### **1. 1. Latar Belakang**

Pembangunan Nasional yang dilaksanakan di Indonesia bertujuan mewujudkan masyarakat yang adil dan makmur. Salah satu syarat yang penting untuk mencapai tujuan tersebut ialah penguasaan ilmu dan teknologi serta profesionalisme pada bidang yang ditekuni. Penguasaan ilmu dan teknologi merupakan elemen penting yang tidak bisa ditawar-tawar lagi dalam menghadapi kompetisi di masa mendatang. Sumber daya manusia yang profesional juga menjadi penentu dan pengarah kemana bangsa ini akan dituntun.

Seiring pesatnya pembangunan konstruksi di Indonesia menuntut para lulusan sarjana agar mampu mengaplikasikan ilmunya secara maksimal di lapangan bukan hanya memiliki kemampuan secara teoritis.

Untuk mengantisipasi permasalahan ini penulis mengambil tugas akhir tentang perencanaan Gedung Kampus III Unit B Universitas Ahmad Dahlan Yogyakarta sebagai penerapan ilmu yang didapat di bangku kuliah untuk merencanakan suatu bangunan sebagai bekal untuk mempersiapkan diri dalam dunia kerja yang akan dijalani secara profesional.

## **1. 2. Manfaat dan Tujuan**

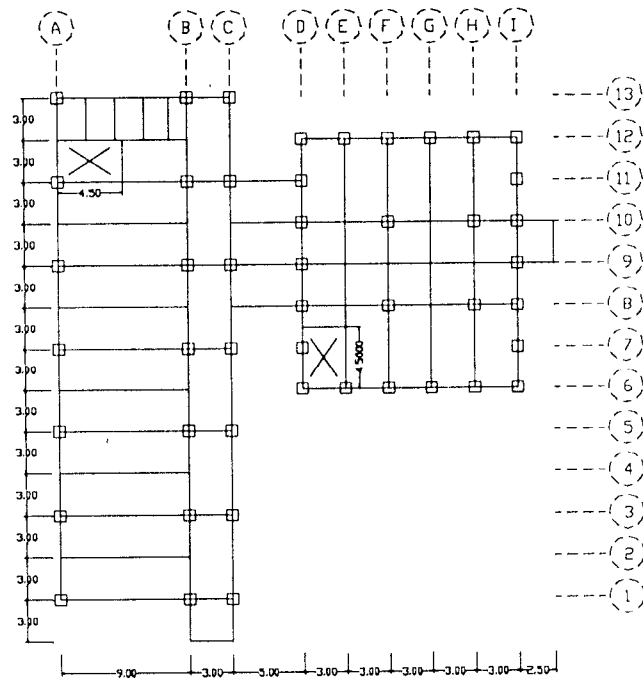
Perencanaan ulang ini dimaksudkan untuk merencanakan Gedung Kampus III Unit B UAD Yogyakarta, guna menerapkan ilmu yang didapat di bangku kuliah pada kondisi di lapangan, sehingga diperoleh gambaran dan pengetahuan tentang kegiatan perencanaan yang sebenarnya.

Adapun tujuan dari perencanaan ulang ini adalah memperoleh hasil perencanaan akhir dari data-data arsitektural dan lapangan, yang meliputi:

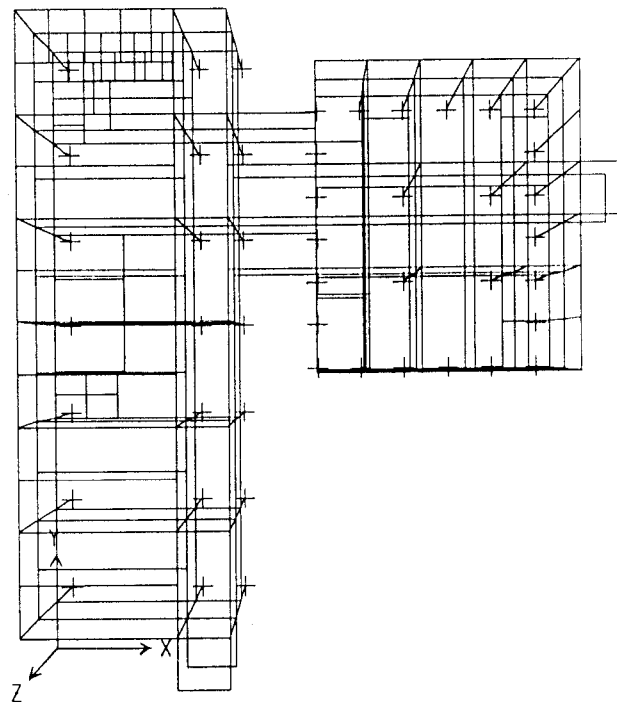
1. Perencanaan atap,
2. Perencanaan plat lantai ,
3. Perencanaan balok dan kolom, dan
4. Perencanaan pondasi.

## **1. 3. Batasan Masalah**

Masalah dibatasi pada perencanaan Gedung Kampus III Unit B UAD Yogyakarta, yang berlokasi di jalan Prof Sutomo Nglagasari Janturan Yogyakarta yang terdiri dari struktur bangunan tiga lantai. Berikut ini gambar rencana struktur:



Gambar I-1 Denah Lantai 3



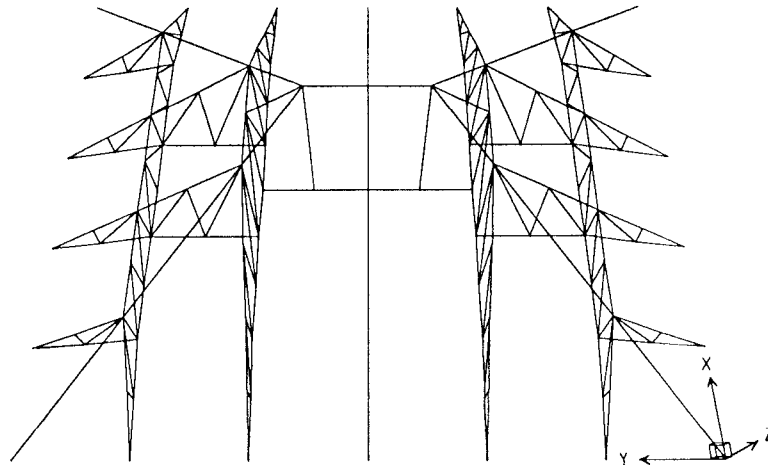
Gambar I-2 Tampak atas portal



Batasan yang di pakai dalam perencanaan

- 1) Struktur gedung ini terdiri dari bagian-bagian atap, pelat lantai, balok, kolom, dan bagian sub struktur yaitu pondasi.
- 2) Perencanaan atap

Atap yang direncanakan menggunakan kuda-kuda baja. Rangka kuda-kuda menggunakan profil baja 2L dengan mutu baja  $f_y = 240$  MPa dan atapnya memakai genteng. Gambar rangka kuda-kudanya adalah sebagai berikut:



Gambar I-3 Rangka kuda-kuda atap

- 3) Perencanaan Plat Lantai
  - a) Pelat lantai dibuat dari konstruksi beton bertulang yang berfungsi sebagai pendukung beban akibat berat sendiri dan beban berguna yang ada di atasnya.
  - b) Perencanaan plat lantai menggunakan baja tulangan mutu  $f_y = 240$  MPa dan mutu beton  $f_c' = 20$  MPa.
  - c) Perencanaan dimensi plat lantai berdasarkan fungsi konstruksi tiap lantai.

#### 4) Perencanaan Balok dan Kolom

- a) Balok adalah elemen horisontal dari sebuah portal yang menyalurkan beban dari lantai ke kolom. Balok diperhitungkan agar mampu menahan beban lantai dan berat dinding di atasnya.
- b) Kolom merupakan elemen vertikal yang meneruskan beban dari balok ke pondasi. Dimensi kolom pada bangunan ini berbentuk segi empat dengan konstruksi beton bertulang.
- c) Perencanaan balok dan kolom menggunakan baja tulangan polos mutu  $f_y = 240$  MPa (untuk diameter  $\leq 16$  mm), baja tulangan ulir mutu  $f_y = 400$  MPa (untuk diameter  $> 16$  mm) dan mutu beton  $f_c' = 20$  MPa.
- d) Perencanaan dimensi balok dan kolom diperhitungkan untuk mampu menahan beban sendiri konstruksi, beban hidup dan beban gempa.

#### 5) Perencanaan Pondasi

- a) Pondasi merupakan bagian dari struktur yang biasanya diletakkan di bawah permukaan tanah dan menyalurkan beban ke lapisan tanah atau batuan yang ada di bawahnya.
- b) Pondasi yang dipakai pada bangunan ini adalah pondasi dangkal dengan data tanah dari laboratorium Mekanika Tanah Universitas Atmajaya Yogyakarta, dengan hasil penyelidikan tanah sebagai berikut ini:
  - Dari permukaan tanah sampai kedalaman -0,40 m terdapat lapisan tanah pasir kelanauan, coklat,
  - dari -0,40 m sampai -1,20 m terdapat lapisan tanah pasir, berlanau, coklat kelabu,

- dari  $-1,20$  m sampai  $1,60$  m terdapat lapisan tanah pasir coklat abu-abu, berkerikil,
  - dari  $-1,60$  m sampai  $2,0$  m terdapat lapisan tanah pasir lanau, warna coklat abu-abu, dan
  - muka air tanah setempat pada saat penyelidikan ada pada kedalaman  $-2,0$  m dari elevasi  $+ 0.00$ .
- 6) Tangga merupakan bangunan non-struktur yang berfungsi sebagai sarana penghubung antar lantai.
- 7) Dasar-dasar Perencanaan lainnya
- a) Perencanaan beban mengacu pada Peraturan Pembebanan Indonesia untuk Gedung 1983.
  - b) Perencanaan beton mengacu pada SK-SNI T-15-1991-03.
  - c) Perencanaan baja mengacu pada Peraturan Perencanaan Bangunan Baja Indonesia 1983.
  - d) Analisa perhitungan struktur dengan program SAP 2000.

## BAB II

### TINJAUAN PUSTAKA

#### 2. 1. Pendahuluan

Menurut Yuan-Yu Hsieh, 1985 perencanaan yang lengkap dari suatu struktur dijabarkan dalam tahap-tahap sebagai berikut:

1. *Mengembangkan tata-susun umum.* Tata susun umum melibatkan pemilihan tipe struktur, pemilihan material, perkiraan sementara biaya, pemilihan lokasi yang terbaik atau penerapan struktur pada suatu tempat yang belum ditentukan sebelumnya, estetika serta pertimbangan lainnya, termasuk aspek hukum, finansial, dan sebagainya.
2. *Penyelidikan beban.* Sebelum analisa struktural yang disempurnakan dapat dilaksanakan, adalah perlu untuk menentukan beban-beban apa saja yang akan dipakai untuk perencanaan sebuah struktur. Beban-beban tersebut antara lain beban mati (*dead load*) yaitu berat sendiri dari struktur bersama-sama dengan material yang dipasang secara permanen pada struktur. Beban hidup (*live load*) yang pada umumnya diklasifikasikan sebagai beban yang dapat dipindahkan dan beban bergerak atau beban dinamis.
3. *Analisa tegangan.* Apabila bentuk dasar dari struktur dan beban-beban eksternal telah ditetapkan, dapat dibuat suatu analisa struktural untuk menentukan gaya-gaya internal pada batang-batang struktur serta perubahan

kedudukan pada beberapa titik kontrol. Jika terdapat beban-beban hidup maka adalah penting untuk mempertimbangkan penentuan tegangan-tegangan maksimum yang kemungkinan timbul pada setiap batang.

4. *Pemilihan unsur-unsur.* Pemilihan terhadap ukuran-ukuran dan bentuk-bentuk yang sesuai dengan batang dan sambungan-sambungannya tergantung pada hasil-hasil analisa tegangan bersama-sama dengan ketentuan-ketentuan untuk perencanaan dari spesifikasi-spesifikasi dan peraturan-peraturan.
5. *Penggambaran dan pemerincian.* Apabila penyusunan dari setiap bagian dari struktur telah ditetapkan, maka tahap terakhir dari perencanaan dapat dimulai yaitu meliputi persiapan gambar kontrak, pemerincian, spesifikasi pekerjaan dan anggaran biaya akhir yang diperlukan untuk melangsungkan bangunan.

Perencanaan gedung ini ditinjau sebagai portal tiga dimensi. Sistem portal adalah suatu bentuk kesatuan sistem kolom dan balok induk yang merupakan sistem bangunan yang dapat menahan beban vertikal gravitasi dan lateral akibat gempa. Sistem ini memanfaatkan kekakuan balok-balok utama dan kolom.

## **2. 2. Perencanaan Gedung Tahan Gempa**

Perencanaan dan pelaksanaan penulangan struktur bangunan gedung bertingkat harus tahan terhadap gempa. Dalam hal ini, beban lateral rencana dasar akibat gerak gempa untuk suatu daerah harus diambil sesuai dengan ketentuan yang ditetapkan dalam SK-SNI-1726-1989-F tentang Tata Cara Perencanaan Ketahanan Gempa untuk Rumah dan Gedung.

Pada perencanaan ini harus juga dilakukan idealisasi struktur dan estimasi dimensi komponen-komponen struktur sesuai dengan kebutuhan dan ketentuan dalam SK-SNI T-15-1991-03 [8]. Setelah idealisasi struktur dan dimensi komponen-komponen perhitungan konvensional ataupun bantuan program komputer guna memperoleh besar dan arah gaya-gaya dalam yang bekerja pada setiap komponen struktur. Pengaruh gempa diperhitungkan dalam bentuk beban gempa dinamis respons riwayat waktu.

Keadaan / kondisi lokasi proyek terhadap pengaruh gempa mempengaruhi tingkat daktilitas bangunan dalam lokasi tersebut. SK-SNI T-15-1991-03 [8] menetapkan bahwa struktur beton bertulang dapat direncanakan dengan tingkat daktilitas:

- Tingkat Daktilitas 1 (elastis),
- Tingkat Daktilitas 2 (Daktilitas Terbatas), dan
- Tingkat Daktilitas 3 (Daktilitas Penuh).

Proyek pembangunan Gedung Kampus III Unit B UAD merupakan bangunan dengan tingkat Daktilitas Terbatas, dalam hal ini beban gempa rencana dapat diperhitungkan dengan menggunakan faktor jenis struktur,  $K$  minimum sebesar 2,0.

Langkah-langkah perencanaan struktur rangka beton bertulang dengan daktilitas penuh antara lain adalah sebagai berikut:

1. Perencanaan balok portal terhadap beban lentur adalah sebagai berikut ini.

$$M_u = 1,2 \cdot M_D + 1,6 \cdot M_L \dots\dots\dots (p. 2. 2.1)$$

dimana:

$M_U$  = kuat lentur balok portal,

$M_D$  = momen lentur balok akibat beban mati,

$M_L$  = momen lentur balok akibat beban hidup.

2. Perencanaan balok portal terhadap beban geser

$$V_u = 1,05 \cdot \left( V_D + V_L + \frac{4 \cdot V_E}{K} \right) \dots\dots\dots (p. 2. 2.2)$$

dimana:

$V_U$  = kuat geser balok portal

$V_D$  = gaya geser balok akibat beban mati

$V_L$  = gaya geser balok akibat beban hidup

$V_E$  = gaya geser balok akibat beban gempa.

3. Perencanaan kolom portal terhadap beban lentur dan aksial

$$M_u = 1,05 \cdot (M_D + M_L + \omega_d M_E) \dots\dots\dots (p. 2. 2.3)$$

$$N_u = 1,05 \cdot (N_D + N_L + \omega_d N_E) \dots\dots\dots (p. 2. 2.4)$$

### 2. 3. Dasar-Dasar Perencanaan

Dasar-dasar perencanaan Gedung Kampus III Unit B UAD ini sebagai berikut ini.

1. Tata Cara Perhitungan Struktur Beton untuk Bangunan Gedung (SK-SNI T-15-1991-03),
2. Peraturan Pembebanan untuk Gedung 1983,
3. Peraturan Beton Bertulang Indonesia (PBBI-1971),
4. Peraturan Perencanaan Bangunan Baja Indonesia (PPBBI-1984),

5. Hasil penyelidikan tanah di lokasi, dan
6. Peraturan lain yang berkaitan dengan Perencanaan bangunan untuk gedung yang berlaku di Indonesia.

#### 2. 4. Perencanaan Pembebanan

Agar struktur dan komponen struktur memenuhi syarat kekuatan dan layak pakai terhadap bermacam-macam kombinasi beban, maka harus dipenuhi ketentuan dari faktor beban. Menurut SK-SNI T-15-1991-03 pasal 3.2 ayat 3.2.2 faktor beban ditentukan sebagai berikut:

$$U = 1,2 D + 1,6 L$$

$$U = 0,9D \pm E$$

$$U = 1,05(D + \phi L \pm E)$$

dimana:

U = kuat perlu adalah kekuatan suatu komponen struktur atau penampang yang diperlukan untuk menahan beban terfaktor atau momen dan gaya dalam yang berkaitan dengan beban tersebut dalam suatu kombinasi.

D = beban mati

L = beban hidup

E = beban gempa

Kepastian kekuatan beban terhadap pembebanan dianggap sebagai faktor reduksi kekuatan ( $\phi$ ). Menurut SK-SNI T-15-1991-03 ayat 3.2.3 faktor reduksi kekuatan ditentukan sebagai berikut:

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



2. aksial tarik, dan aksial tarik dengan lentur,  $\phi = 0,80$
3. aksial tekan, dan aksial tekan dengan lentur,  $\phi = 0,65$
4. Geser dan torsi,  $\phi = 0,60$

Faktor reduksi kekuatan di atas juga dipakai untuk mereduksi kekuatan beton dan baja berikut ini:

1. Untuk beton:  $f_c'$  (kuat tekan beton yang disyaratkan)
2. Untuk baja:  $f_y$  (tegangan leleh baja)

**BAB III**  
**LANDASAN TEORI**

**3. 1. Perencanaan Kuda-Kuda dan Konsol**

Ketentuan umum perencanaan kuda-kuda baja ini adalah menggunakan rumus-rumus AISC, yang menggunakan metode ASD-89.

1. Perencanaan Gording.

Syarat yang di gunakan untuk menentukan apakah gording aman terhadap gaya lentur adalah:

$$\frac{fbx}{0,66 \cdot fy} + \frac{fby}{0,75 \cdot fy} \leq 1 \dots\dots\dots (p. 3. 1.1)$$

Syarat lendutan yang di ijinakan untuk gording pada sumbu tegak lurus sag-rod adalah:

$$\delta \perp = \frac{5}{384} \cdot \frac{q \perp \cdot L^4}{E \cdot Ix} \leq \frac{L}{360} \dots\dots\dots (p. 3. 1.2)$$

Syarat lendutan yang di ijinakan untuk gording pada sumbu sejajar sag-rod adalah:

$$\delta // = \frac{5}{384} \cdot \frac{q // \cdot \left(\frac{L}{a+1}\right)^4}{E \cdot Iy} \leq \frac{L}{360} \dots\dots\dots (p. 3. 1.3)$$

a = jumlah sag rod dalam satu bentang

2. Perencanaan Sag rod.

Gaya yang mampu di tahan sag-rod adalah:

$$P = 0,33 \cdot Fu \cdot A_{sagrod} \dots\dots\dots (p. 3. 1.4)$$

Dari beban yang di tahan sagrod di peroleh luasan sag-rod yang di perlukan, yakni:

$$A_{sagrod} = \frac{P}{0,33Fu} = \frac{1}{4} \cdot \pi \cdot d_{sagrod}^2 \dots\dots\dots (p. 3. 1.5)$$

Dengan demikian diameter sag-rod yang di perlukan adalah:

$$D_{pakai} = D_{sagrod} + 3mm \dots\dots\dots (p. 3. 1.6)$$

### 3. Perencanaan Tie rod.

Gaya yang di tahan tie-rod pada arah sejajar tie-rod adalah:

$$T = T \cdot \cos \alpha \dots\dots\dots (p. 3. 1.7)$$

Gaya yang mampu di tahan tie-rod adalah:

$$T = 0,33 \cdot Fu \cdot A_{tierod} \dots\dots\dots (p. 3. 1.8)$$

Dari beban yang di tahan tie-rod di peroleh luasan tie-rod yang di perlukan, yakni:

$$A_{tierod} = \frac{T}{0,33Fu} = \frac{1}{4} \cdot \pi \cdot d_{tierod}^2 \dots\dots\dots (p. 3. 1.9)$$

Dengan demikian diameter tie-rod yang di perlukan adalah:

$$D_{pakai} = D_{tierod} + 3mm \dots\dots\dots (p. 3. 1.10)$$

### 4. Perencanaan Batang Tarik.

Perencanaan batang tarik pada hakekatnya menentukan luas penampang lintang batang yang cukup untuk menahan beban (yang diberikan) dengan faktor keamanan yang memadai terhadap keruntuhan.

Luas penampang yang di perlukan terhadap patah lentur:

$$A_{g_{perlu}} = \frac{T}{0,6fy} \dots\dots\dots (p. 3. 1.11)$$

Luas penampang yang di perlukan terhadap patah geser:

$$A_{e_{perlu}} = \frac{T}{0,5Fu} \dots\dots\dots (p. 3. 1.12)$$

$A_{n_{perlu}}$  di peroleh dari Tabel 3.5.1 Salmon-Johnson

$A_e$  diambil dari tabel AISC – 1.14.2.2 dan 1.14.2.3

$A_g$  = luas bruto penampang

$A_e$  = luas efektif

$A_n$  = luas netto =  $A_g - A_{perlemahan\ baut}$

$A_{perlemahan\ baut} = (\text{diameter baut} + \frac{1}{8})$ , dalam in

$$r_{min} = \frac{L}{300} \dots\dots\dots (p. 3. 1.13)$$

Dipakai profil yang luas annya ( $A$ ) lebih besar dari nilai  $A_{perlu}$  terpakai

Kontrol:

Tegangan yang terjadi bila patah lentur yaitu:

$$\frac{T}{A_{brutto}} < 0,6fy \dots\dots\dots (p. 3. 1.14)$$

Tegangan yang terjadi bila patah geser yaitu:

$$\frac{T}{A_{eff}} < 0,5fu \dots\dots\dots (p. 3. 1.15)$$

## 5. Perencanaan Batang Desak.

Ratio kelangsingan (“slenderness”) yang memisahkan antara tekuk elastis dan non-elastis sebesar:

$$C_c = \sqrt{\frac{2 \cdot \pi^2 \cdot E}{f_y}} = \frac{755}{\sqrt{f_y}}; \text{ (} f_y \text{ dalam ksi) } \dots\dots\dots (\text{p. 3. 1.16})$$

$$C_c = \frac{6400}{\sqrt{f_y}}; \text{ (} f_y \text{ dalam kg/cm}^2 \text{) } \dots\dots\dots (\text{p. 3. 1.17})$$

$$C_c = \frac{1987}{\sqrt{f_y}}; \text{ (} f_y \text{ dalam MPa) } \dots\dots\dots (\text{p. 3. 1.18})$$

Bila  $\frac{kL}{r} < C_c$  maka tegangan aksial ijin  $f_a$  adalah:

$$f_a = \frac{f_y}{FS} \left( 1 - 0,5 \left( \frac{\frac{kL}{r}}{C_c} \right)^2 \right) \dots\dots\dots (\text{p. 3. 1.19})$$

Dengan FS yaitu angka keamanan sebesar:

$$FS = \frac{5}{3} + \frac{3}{8} \cdot \frac{\frac{kL}{r}}{C_c} - \frac{1}{8} \cdot \left( \frac{\frac{kL}{r}}{C_c} \right)^3 \dots\dots\dots (\text{p. 3. 1.20})$$

Sedangkan bila  $\frac{kL}{r} > C_c$  maka tegangan aksial ijin  $f_a$  adalah:

$$f_a = \frac{12}{23} \cdot \frac{\pi^2 \cdot E}{\left( \frac{kL}{r} \right)^2} \dots\dots\dots (\text{p. 3. 1.21})$$

Dengan demikian dapat di hitung gaya aksial yang dapat di tahan yakni sebesar:

$$T = f_a \cdot A \dots\dots\dots (\text{p. 3. 1.22})$$

## 6. Perencanaan Sambungan

Sambungan menggunakan sambungan baut, di rencanakan sebagai berikut ini.

Besarnya gaya yang mampu di tahan baut adalah sebesar:

$$P_{tumpuan} = t_p \cdot D_{baut} \cdot 1,2 \cdot f_u \cdot n \dots\dots\dots (p. 3. 1.23)$$

Dengan demikian bila di ketahui gaya yang terjadi pada sambungan akibat beban, maka diameter baut dapat di tentukan yakni:

$$D_{baut} = \frac{P_{tumpuan}}{1,2 \cdot t_p \cdot f_u \cdot n} \dots\dots\dots (p. 3. 1.24)$$

Sedangkan bila baut di anggap menahan gaya geser, maka besarnya gaya yang bisa di tahan adalah sebesar:

$$P_{geser} = A_{baut} \cdot 0,33 \cdot f_u \cdot 2 = \frac{1}{4} \cdot \pi \cdot D_{baut}^2 \cdot 0,33 \cdot f_u \cdot 2n \dots\dots\dots (p. 3. 1.25)$$

Dengan demikian diameter baut adalah sebesar:

$$D_{baut} = \sqrt{\frac{4 \cdot P_{geser}}{\pi \cdot 0,33 \cdot f_u \cdot 2n}} \dots\dots\dots (p. 3. 1.26)$$

### 3. 2. Perencanaan Pelat Lantai

Untuk mencari momen yang terjadi pada pelat di pergunakan tabel distribusi momen dari Gideon:

$$Mu = 0,001 \cdot qu \cdot L^2 \cdot X \dots\dots\dots (p. 3. 2.1)$$

Untuk perencanaan diambil  $M_u$  ma, dan besar momen nominal yakni momen ultimit yang di reduksi adalah sebesar  $M_n = Mu/\phi$ . Di hitung ratio tulangan berimbang yang nilainya sebesar:

$$\rho_b = \frac{0,85 \cdot f_c' \cdot \beta_1 \left( \frac{600}{600 + f_y} \right)}{f_y} \dots\dots\dots (p. 3. 2.2)$$

Untuk menjamin keruntuhan yang terjadi merupakan ragam daktail, SK SNI menetapkan pembatasan tulangan maksimum:

$$\rho_{\max} = 0,75 \cdot \rho_b \dots\dots\dots (p. 3. 2.3)$$

Dan ratio tulangan minimum sebesar:

$$\rho_{\min} = \frac{1.4}{f_y} \dots\dots\dots (p. 3. 2.4)$$

Kemudian di tentukan  $\rho_{pakai}$  dimana:  $\rho_{\min} < \rho_{pakai} \leq \rho_{\max}$

$$As = \rho_{pakai} \cdot b \cdot d \dots\dots\dots (p. 3. 2.5)$$

Cek harga As:

Hitung Luas tulangan minimum:

$$As_{\min} = \rho_{\min} \cdot b \cdot d \dots\dots\dots (p. 3. 2.6)$$

bila  $1,33 As_{\text{perlu}} < As_{\min}$  maka dipakai  $As = 1,33 As_{\text{perlu}}$

bila  $1,33 As_{\text{perlu}} > As_{\min}$  maka dipakai  $As = As_{\min}$

bila  $As_{\text{perlu}} > As_{\min}$ , dipakai  $As = As_{\text{perlu}}$

bila  $As_{\text{perlu}} < As_{\min}$  maka dipakai  $As = As_{\min}$

Kontrol harga Mn yang bisa di tahan dengan langkah berikut ini:

Hitung tinggi blok tegangan ekuivalen:

$$a = \frac{As \cdot f_y}{0,85 \cdot f'c \cdot b} \dots\dots\dots (p. 3. 2.7)$$

Mn dapat di hitung sebagai berikut:

$$Mn = As \cdot f_y \cdot \left( d - \frac{a}{2} \right) \geq \frac{Mu}{\phi} \dots\dots\dots (p. 3. 2.8)$$

Mn yang di peroleh harus lebih besar dari Mn yang di perlukan.

**3. 3. Perencanaan Balok**

Perencanaan balok di lakukan untuk balok-balok induk, balok-balok penahan tembok, dan balok-balok ring.

**3.3.1. Perencanaan Balok Lentur**

Perencanaan balok lentur adalah, perencanaan tulangan utama dari balok, yang berfungsi menahan momen yang terjadi.

**a) Perencanaan Balok Persegi Tulangan Sebelah**

Diketahui:  $M_u$ ,  $f_c'$ ,  $f_y$ ,  $d'$

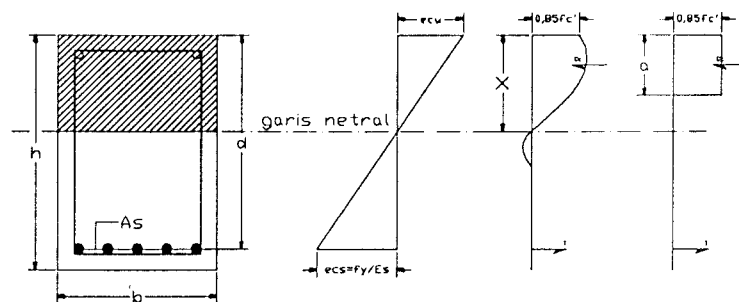
untuk  $f_c' \leq 30$  MPa, maka  $\beta_1 = 0,85$

untuk  $f_c' > 30$  MPa, maka

$$\beta_1 = 0,85 - 0,008 (f_c' - 30) \text{ dan } \beta_1 \geq 0,65 \dots\dots\dots (p. 3. 3.1)$$

Di hitung ratio tulangan berimbang yang nilainya sebesar:

$$\rho_b = \frac{0,85 \cdot f_c' \cdot \beta_1 \left( \frac{600}{600 + f_y} \right) \dots\dots\dots (p. 3. 3.2)$$



Gambar III-1 Distribusi tegangan dan regangan pada penampang balok

Untuk menjamin keruntuhan yang terjadi merupakan ragam daktail, SK SNI menetapkan pembatasan tulangan maksimum:



$$\rho_{\max} = 0,75 \cdot \rho_b \dots\dots\dots (p. 3. 3.3)$$

Dan ratio tulangan minimum sebesar:

$$\rho_{\min} = \frac{1.4}{f_y} \dots\dots\dots (p. 3. 3.4)$$

Kemudian di tentukan  $\rho$  awal dimana:  $\rho_{\min} < \rho \leq \rho_{\max}$

Tentukan koefisien resistansi Rn:

$$m = \frac{f_y}{0,85 \cdot f_c'} \dots\dots\dots (p. 3. 3.5)$$

$$Rn = \rho \cdot f_y \cdot \left(1 - \frac{1}{2} \rho \cdot m\right) \dots\dots\dots (p. 3. 3.6)$$

Momen nominal yang di perlukan adalah sebesar:

$$Mn = \frac{Mu}{\phi} \dots\dots\dots (p. 3. 3.7)$$

Tentukan nilai  $b \cdot d^2$  yang di perlukan:

$$b \cdot d^2 = \frac{Mn}{Rn} \dots\dots\dots (p. 3. 3.8)$$

dari nilai  $b \cdot d^2$  di tentukan pasangan b dan d yang akan di pakai, lalu hitung koefisien resistansi yang baru:

$$Rn_{baru} = \frac{Mn}{b \cdot d^2} \dots\dots\dots (p. 3. 3.9)$$

Kemudian dapat di tentukan ratio tulangan yang di perlukan

$$\rho = \frac{1}{m} \left(1 - \sqrt{1 - \frac{2m \cdot Rn_{baru}}{f_y}}\right) \dots\dots\dots (p. 3. 3.10)$$

Maka luas tulangan As yang di perlukan sebesar:

$$As = \rho \cdot b \cdot d \dots\dots\dots (p. 3. 3.11)$$

Tentukan tulangan yang dipakai dan hitung nilai  $d$  baru dari tulangan yang dipakai, dan hitung kapasitas momen.

Tinggi blok tegangan segiempat ekuivalen sebesar,

$$a = \frac{A_s \cdot f_y}{0,85 \cdot f_c' \cdot b} \dots\dots\dots (p. 3. 3.12)$$

sehingga kapasitas momen sebesar

$$M_n = A_s \cdot f_y \cdot \left( d - \frac{a}{2} \right) \dots\dots\dots (p. 3. 3.13)$$

Bila  $M_n \geq M_u/\phi$ , maka kapasitas momen balok telah cukup bila menggunakan tulangan sebelah.

Bila  $M_n < M_u/\phi$ , kapasitas penampang tidak mencukupi, sehingga di perlukan tulangan rangkap.

#### b) Perencanaan Balok Persegi Tulangan Rangkap

Perencanaan balok dengan tulangan rangkap terlebih dahulu di rencanakan sebagai tulangan sebelah namun diambil nilai  $d$  sehingga  $d_{pakai} < d_{perlu}$ .

Direncanakan momen nominal penampang menggunakan tulangan tarik maksimum yang diijinkan untuk tampang dengan tulangan sebelah pada kondisi seimbang ( $M_{n1}$ ).

Dihitung luas tulangan  $A_s$  dari ratio tulangan maksimum:

$$A_s = \rho_{\max} \cdot b \cdot d \dots\dots\dots (p. 3. 3.14)$$

Hitung tinggi blok tegangan segiempat ekuivalen:

$$a = \frac{A_{s1} \cdot f_y}{0,85 \cdot f_c' \cdot b} \dots\dots\dots (p. 3. 3.15)$$

Kemudian kapasitas momen  $Mn_1$  dapat di hitung sebagai berikut:

$$Mn_1 = As_1 \cdot fy \cdot \left( d - \frac{a}{2} \right) \dots\dots\dots (p. 3. 3.16)$$

Kelebihan momen yang perlu ditahan sebesar:

$$Mn_2 = Mn_{perlu} - Mn_1 \dots\dots\dots (p. 3. 3.17)$$

Tentukan letak garis netral:

$$x = \frac{600}{600 + fy} d \dots\dots\dots (p. 3. 3.18)$$

Periksa regangan tulangan tekan  $\epsilon_s'$ ,

$$\epsilon_s' = \frac{x - d'}{x} \epsilon_{cu} \dots\dots\dots (p. 3. 3.19)$$

dan regangan tulangan tarik  $\epsilon_s$ ,

$$\epsilon_s = \frac{d - x}{x} \epsilon_{cu} \dots\dots\dots (p. 3. 3.20)$$

terhadap regangan leleh baja:

$$\epsilon_y = \frac{fy}{Es} \dots\dots\dots (p. 3. 3.21)$$

Bila  $\epsilon_s' \geq \epsilon_y$ , maka baja tekan telah leleh pada saat regangan beton mencapai regangan hancur (0,003), maka  $fs' = fy$ .

Namun bila  $\epsilon_s < \epsilon_y$ , maka  $fs' = \epsilon_s' \cdot Es$

Luas tulangan tekan ( $As'$ ) dan tambahan tulangan tarik ( $As_2$ ) yang di perlukan adalah:

$$As' = As_2 = \frac{Mn_2}{fs' \cdot (d - d')} \dots\dots\dots (p. 3. 3.22)$$

Luas tulangan tarik yang di perlukan:

$$A_s = A_{s1} + A_{s2} \dots \dots \dots (p. 3. 3.23)$$

Kontrol harga Mn:

Ratio tulangan tarik yang di pakai:

$$\rho = \frac{A_s}{b \cdot d} \dots \dots \dots (p. 3. 3.24)$$

Ratio tulangan tekan yang di pakai:

$$\rho' = \frac{A_s'}{b \cdot d} \dots \dots \dots (p. 3. 3.25)$$

Regangan tulangan tekan yang terjadi:

$$\epsilon_s' = \frac{x - d'}{x} \epsilon_{cu} \dots \dots \dots (p. 3. 3.26)$$

Regangan tulangan tarik yang terjadi:

$$\epsilon_s = \frac{d - x}{x} \epsilon_{cu} \dots \dots \dots (p. 3. 3.27)$$

Bila  $\epsilon_s' \geq \epsilon_y$ , maka asumsi tulangan tekan ( $A_s'$ ) telah leleh adalah benar

Bila  $\epsilon_s \geq \epsilon_y$ , maka asumsi tulangan tarik ( $A_s$ ) telah leleh adalah benar

Bila ( $\epsilon_s' < \epsilon_y$ ) atau ( $\epsilon_s < \epsilon_y$ ), maka balok harus dianggap balok bertulangan

sebelah atau  $f_s'$  pada tulangan tekan harus di cari dengan dengan tegangan

aktual dengan langkah perhitungan sebagai berikut:

Ambil nilai asumsi awal  $\epsilon_s'$ .

Hitung tegangan pada baja tekan yakni:

$$f_s' = \epsilon_s' \cdot E_s \dots \dots \dots (p. 3. 3.28)$$

Tinggi blok tegangan ekuivalen menggunakan tegangan aktual tulangan tekan:

$$a = \frac{A_s \cdot f_y - A_s' f_s'}{0,85 \cdot f_c' \cdot b} \dots \dots \dots (p. 3. 3.29)$$

Maka letak garis netral dapat di hitung:

$$x = \frac{a}{\beta_1} \dots\dots\dots (p. 3. 3.30)$$

Cek ulang nilai regangan tulangan tekan:

$$\varepsilon_s' = \frac{x-d}{x} \varepsilon_{cu} \dots\dots\dots (p. 3. 3.31)$$

Bila  $\varepsilon_s'$  hasil perhitungan telah mendekati nilai asumsi awal  $\varepsilon_s'$  yang diambil maka coba-coba selesai dan  $f_s'$  menggunakan  $f_s'$  hasil coba-coba.

Bila  $\varepsilon_s'$  belum mendekati coba-coba dilanjutkan dengan mengambil nilai  $\varepsilon_s'$  baru.

Cek ratio tulangan:

$$\rho \leq \rho_{\max} + \rho' \frac{f_s'}{f_y} \dots\dots\dots (p. 3. 3.32)$$

bila  $\rho$  tidak memenuhi syarat di atas maka ukuran penampang yang di pergunakan tidak kuat, penampang harus di perbesar.

Hitung lagi tinggi blok tegangan ekuivalen:

$$a = \frac{A_s \cdot f_y - A_s' f_s'}{0,85 \cdot f_c' \cdot b} \dots\dots\dots (p. 3. 3.33)$$

Momen nominal dari tulangan tekan dapat di peroleh, yakni sebesar:

$$Mn = (A_s \cdot f_y - A_s' f_s') \left( d - \frac{a}{2} \right) + A_s' f_s' (d - d') \dots\dots\dots (p. 3. 3.34)$$

### 3.3.2. Penulangan Geser

Pada analisis struktur dua dimensi dengan kondisi beban yang berbeda serta letak komponen struktur yang tidak simetris dapat menimbulkan momen torsi.

Pada masalah ini dipakai kombinasi tulangan geser dan torsi. Perencanaan tulangan geser sebagai berikut:

1. Bila  $V_u \leq 0,5 \cdot \phi \cdot V_c$

tidak perlu tulangan geser

2. Bila  $0,5 \cdot \phi \cdot V_c < V_u \leq \phi \cdot V_c$

▫ Untuk pelat lantai, pelat atap, pondasi dan balok dengan  $d \leq 25$  cm tidak perlu tulangan geser.

▫ Selain itu, dipakai tulangan geser minimum, sebesar:

$$S \leq \frac{A_v \cdot f_y \cdot d}{\frac{1}{2} \cdot b \cdot d} \dots\dots\dots (p. 3. 3.35)$$

$$S \leq d/2$$

$$S \leq 600 \text{ mm}$$

3. Bila  $\phi \cdot V_c < V_u \leq (\phi \cdot V_u + \phi \cdot V_{smin})$

$$V_{smin} = \frac{1}{3} \cdot B \cdot d \dots\dots\dots (p. 3. 3.36)$$

Dipakai sengkang dengan jarak sebesar:

$$S \leq \frac{A_v \cdot f_y \cdot d}{\frac{1}{3} \cdot b \cdot d} \dots\dots\dots (p. 3. 3.37)$$

$$S \leq d/2$$

$$S \leq 600 \text{ mm}$$

4. Bila  $(\phi \cdot V_u + \phi \cdot V_{smin}) < V_u \leq 3 \cdot \phi \cdot V_c$

Dipakai sengkang dengan jarak sebesar:

$$V_s = \frac{V_u}{\phi} - V_c \dots\dots\dots (p. 3. 3.38)$$

$$S \leq \frac{A_v \cdot f_y \cdot d}{V_s} \dots\dots\dots (p. 3. 3.39)$$

$$S \leq d/2$$

$$S \leq 600 \text{ mm}$$

5. Bila  $3 \cdot \phi \cdot V_c < V_u < 5 \cdot \phi \cdot V_c$

Dipakai sengkang dengan jarak sebesar:

$$V_s = \frac{V_u}{\phi} - V_c \dots\dots\dots (p. 3. 3.40)$$

$$S \leq \frac{A_v \cdot f_y \cdot d}{V_s} \dots\dots\dots (p. 3. 3.41)$$

$$S \leq d/4$$

$$S \leq 300 \text{ mm}$$

6. Bila  $V_u > 5 \cdot \phi \cdot V_c$

Untuk balok dimensinya diperbesar atau diubah.

### 3. 4. Perencanaan Kolom

Perhitungan untuk menentukan tulangan pada kolom di mana ukuran penampang serta beban aksial dan momen yang bekerja telah diketahui. Perhitungan tulangan lentur di lakukan dua kali yakni kearah  $x$  dan kearah  $y$  untuk menentukan  $A_s$ ,  $A_s'$ ,  $A_{s_{ka}}$ , dan  $A_{s_{kj}}$ .

### 3.4.1. Langkah - Langkah Perencanaan Kolom Terhadap Lentur

- Penentuan tulangan yang diperlukan dengan bantuan grafik interaksi kolom dengan diketahui beban kerja kolom.

$M_u$  = momen ultimit ujung kolom karena beban vertikal pada arah sejajar dengan sumbu yang akan di perhitungkan.

$P_u$  = gaya aksial ultimit.

$b, h$  = ukuran kolom yang di pakai.

- Dari pembacaan grafik interaksi kolom diperoleh persentasi luas tulangan total yang diperlukan untuk arah sumbu yang sedang di perhitungkan. Pembacaan dilakukan dengan melihat letak titik ( $P_u, M_u$ ) terhadap lengkung persentasi luas tulangan, dengan grafik yang di pakai adalah grafik interaksi untuk ukuran kolom  $b \times h$ .

Bila ternyata pembacaan menunjukkan bahwa persentasi tulangan adalah lebih dari lima persen (5%), maka asumsi ukuran penampang di perbesar.

Dari persen  $A_s$  total, diperoleh luas tulangan yang di perlukan:

$$A_{s_t} = \text{persen} \times b \times h \dots\dots\dots (\text{p. 3. 4.1})$$

sehingga luas tulangan yang di perlukan untuk masing – masing sisi ( $A_s=A_s'$  untuk sumbu y, dan  $A_{s_ki}=A_{s_k\alpha}$  untuk sumbu x) dapat di hitung yakni:

$$A_s = A_s' = \frac{A_{s_t}}{2} \dots\dots\dots (\text{p. 3. 4.2})$$

atau,



$$A_{s_{ki}} = A_{s_{ka}} = \frac{A_{s_t}}{2} \dots\dots\dots (p. 3. 4.3)$$

Kemudian cek  $P_n$  yang mampu di tahan dengan langkah sebagai berikut.

tentukan letak garis netral patah balanced:

$$x_b = \frac{600}{600 + f_y} d \dots\dots\dots (p. 3. 4.4)$$

tinggi blok tekan ekuivalen dapat di peroleh sebesar:

$$a_b = x_b \cdot \beta_1 \dots\dots\dots (p. 3. 4.5)$$

dan tegangan yang terjadi pada baja:

$$f_s' = \frac{(x_b - d) \cdot 600}{x_b} \dots\dots\dots (p. 3. 4.6)$$

Kemudian  $P_n$  pada kondisi balanced dapat di tentukan:

$$P_{nb} = \beta_1 \cdot f_c' \cdot b \cdot d + A_s \cdot f_y - A_s' \cdot f_s' \dots\dots\dots (p. 3. 4.7)$$

dan  $M_n$  balanced di peroleh sebesar:

$$M_{nb} = 0,85 \cdot f_c' \cdot b \cdot a_b \cdot \left(\frac{h}{2} - \frac{a}{2}\right) + A_s' \cdot (f_s' - 0,85 \cdot f_c') \left(\frac{h}{2} - d\right) + A_s \cdot f_y \cdot \left(d - \frac{h}{2}\right) \dots\dots\dots (p. 3. 4.8)$$

eksentrisitas balanced dapat di hitung:

$$e_b = \frac{M_{nb}}{P_{nb}} \dots\dots\dots (p. 3. 4.9)$$

Tentukan  $e$  akibat  $M_u$  dan  $P_u$  yang terjadi:

$$e = \frac{M_u}{P_u} \dots\dots\dots (p. 3. 4.10)$$

Bila  $e > e_b$  maka yang terjadi adalah keruntuhan tarik,

bila  $e < e_b$  maka yang terjadi adalah keruntuhan desak.

Bila terjadi keruntuhan tarik, maka  $P_n$  dapat di hitung dengan persamaan:

$$P_n = 0,85 \cdot f_c' \cdot b \cdot d \left\{ \frac{-\rho + 1 - \frac{e}{d} + \sqrt{\left(1 - \frac{e}{d}\right)^2 + 2\rho \left[ (m-1) \left(1 - \frac{d'}{d}\right) + \frac{e}{d} \right]}}{\dots} \right\} \dots \dots \dots (p. 3. 4.11)$$

Bila terjadi keruntuhan desak, maka  $P_n$  dapat di hitung dengan persamaan:

$$P_n = \frac{A_s \cdot f_y}{\left(\frac{e}{d-d'} + 0,5\right)} + \frac{b \cdot h \cdot f_c'}{\left(3 \cdot h \cdot \frac{e}{d^2} + 1,18\right)} \dots \dots \dots (p. 3. 4.12)$$

Bila  $P_u < P_n$  maka penampang dan tulangan telah cukup.

### 3.4.2. Langkah - Langkah Perhitungan Tulangan Geser Pada Kolom.

Perhitungan geser dilakukan dengan langkah yang sama dengan langkah perhitungan geser pada balok induk.

### 3. 5. Perencanaan Pondasi

Pondasi direncanakan sebagai pondasi telapak. Nilai  $f_c'$ ,  $f_y$ ,  $\sigma_{\text{tanah}}$  di ketahui sedangkan tebal pelat di asumsikan, kemudian di hitung luas pondasi yang di perlukan berdasarkan  $\sigma_{\text{net}}$  tanah.

Hitung beban tanah di atas pondasi:

$$q = df \times bj_{\text{tanah}} + t_{\text{pondasi}} \times bj_{\text{beton}} \dots \dots \dots (p. 3. 5.1)$$

Hitung daya dukung tanah netto:

$$\sigma_{\text{net}} = \sigma - q \dots \dots \dots (p. 3. 5.2)$$

Ambil ukuran pondasi dari gaya dari kolom, dengan luas yang di butuhkan:

$$A_f = \frac{P_u}{\sigma_{\text{net}}} \dots \dots \dots (p. 3. 5.3)$$

Cek tegangan yang terjadi:

$$\sigma_{\max} = \frac{P}{A} + \frac{Mx \times y \max}{Ix} + \frac{My \times x \max}{Iy} + q \dots\dots\dots (p. 3. 5.4)$$

dengan  $\sigma_{\max} \leq \sigma_{\text{ijin}}$

$$\sigma_{\min} = \frac{P}{A} + \frac{Mx \times y \min}{Ix} + \frac{My \times x \min}{Iy} + q \dots\dots\dots (p. 3. 5.5)$$

dengan  $\sigma_{\max} > 0$

Cek kapasitas geser:

Gaya geser yang terjadi pada penampang kritis.

$$Vu = \sigma \times b_{\text{pakai}} \times l \text{ kritis} \dots\dots\dots (p. 3. 5.6)$$

Kapasitas geser.

$$Vc = \frac{1}{6} \sqrt{fc'} \times b \times d \dots\dots\dots (p. 3. 5.7)$$

$$Vc = \left(2 + \frac{4}{\rho_c}\right) \sqrt{fc'} \times b \times d \dots\dots\dots (p. 3. 5.8)$$

Kemudian untuk menghitung tulangan yang diperlukan, hitung momen yang terjadi.

$$Mu = 0,5 \times Pu \times l^2 \times b_{\text{pakai}} \dots\dots\dots (p. 3. 5.9)$$

Luas tulangan yang dibutuhkan adalah.

$$As = \rho \text{ pakai} \times d \dots\dots\dots (p. 3. 5.10)$$

## **BAB IV**

### **PERHITUNGAN KONSTRUKSI**

#### **4. 1. Perhitungan Rangka Atap**

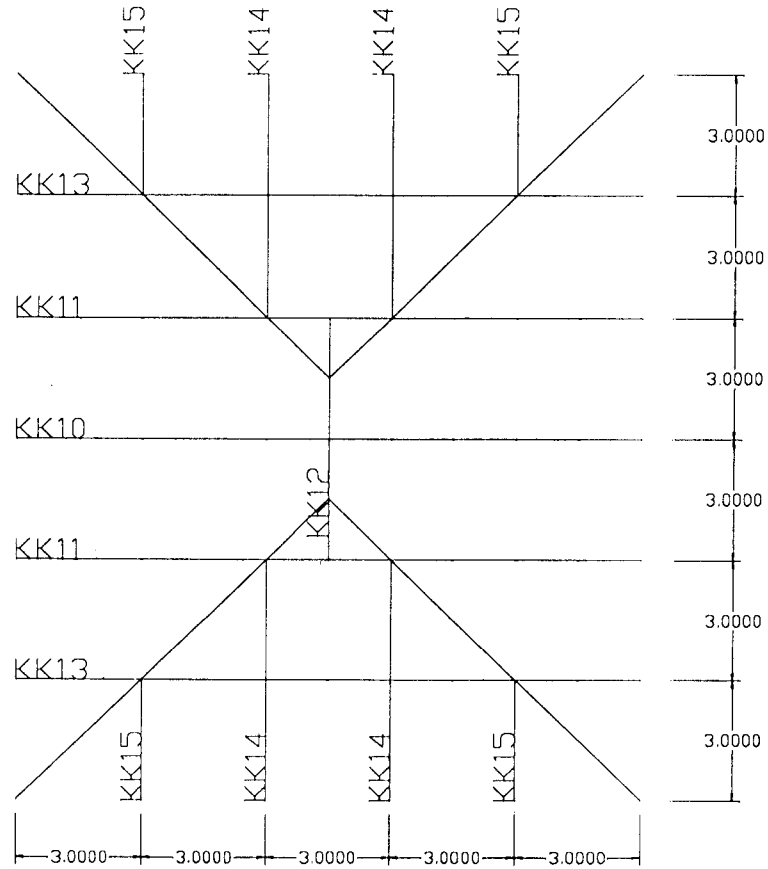
Perencanaan rangka atap dilakukan sebagai berikut ini.

##### **4.1.1. Data Konstruksi Yang Di Pgunakan**

- Mutu Baja Profil:
  - Tegangan Leleh,  $F_y$  : 36 ksi
  - Modulus Elastis,  $E_s$  : 29000 ksi
  - Profil yang digunakan : Siku (2L), Light Lip Channel (C)
- Alat Sambung Baut ( $U_{24}$ ) non full drat:
  - Tegangan tarik minimum,  $F_u$  : 58 ksi
  - Tegangan ijin geser,  $F_v$  : 30 ksi
  - Tegangan leleh,  $F_y$  : 140 MPa
  - Diameter,  $\phi$  :  $\frac{1}{2}$  in
- Jenis Penutup Atap: Genteng

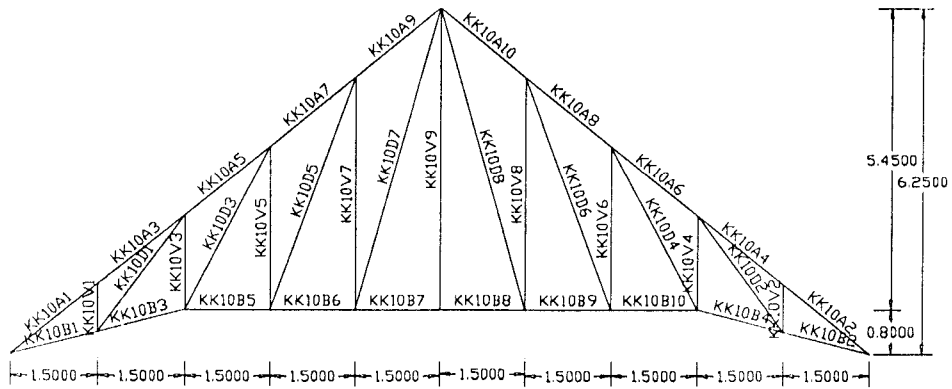
##### **4.1.2. Perletakan Kuda-Kuda**

Kuda-kuda yang terdiri atas beberapa rangka di letakkan dengan pengaturan sebagai berikut ini.

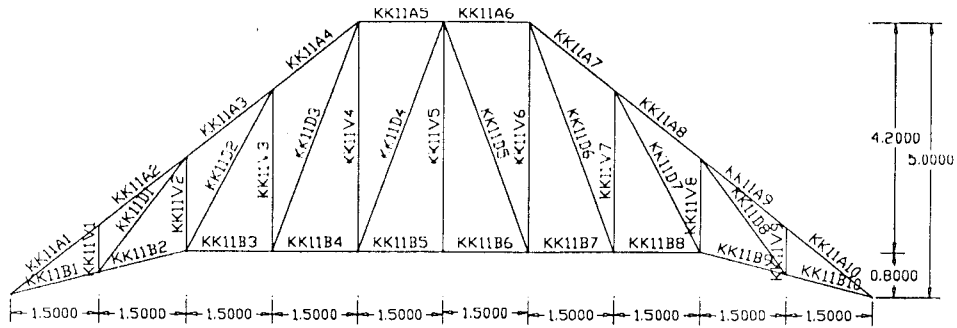


Gambar IV-1 Letak kuda-kuda

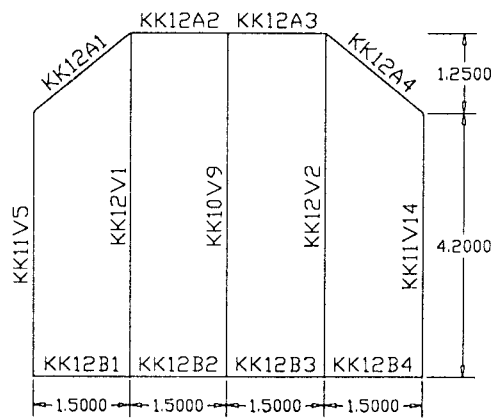
Berikut ini adalah detail kuda-kuda yang diberi kode elemen.



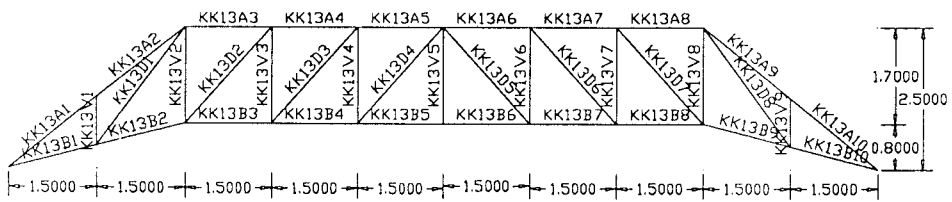
Gambar IV-2 Kuda-kuda KK10



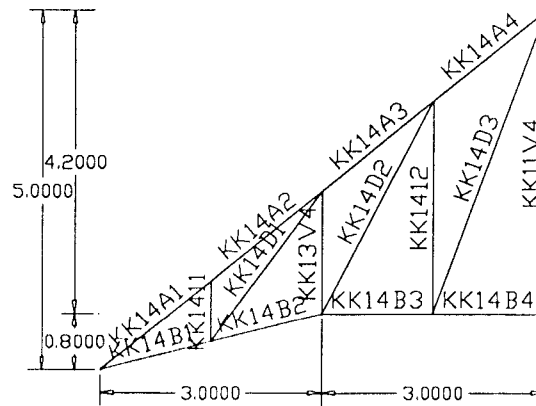
Gambar IV-3 Kuda-kuda KK11



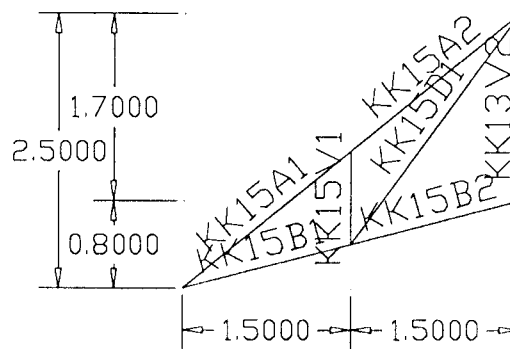
Gambar IV-4 Kuda-kuda KK12



Gambar IV-5 Kuda-kuda KK13



Gambar IV-6 Kuda-kuda KK14



Gambar IV-7 Kuda-kuda KK15

Kemudian elemen kuda-kuda di kelompokkan menjadi sebagai berikut ini.

Tabel IV-1 Pengelompokan elemen kuda-kuda

Jenis	Elemen kuda-kuda
Batang atas	KK10A1-KK10A10, KK11A1-KK11A20, KK12A1-KK12A4, KK13A1-KK13A20, KK14A1-KK14A16, KK15A1-KK15A8,

Jenis	Elemen kuda-kuda
Batang bawah	KK10B1-KK10B10, KK11B1-KK11B20, KK12B1-KK12B4, KK13B1-KK13B20, KK14B1-KK14B16, KK15B1-KK15B8
Batang diagonal	KK10D1-KK10D8, KK11D1-KK11D16, KK13D1-KK13D16, KK14D1-KK14D12, KK15D1-KK15D4
Batang vertikal	KK10V1-KK10V9, KK11V1-KK11V18, KK12V1-KK12V2, KK13V1-KK13V18, KK14V1-KK14V8, KK15V1-KK15V4

#### 4.1.3. Perhitungan Beban

Beban yang di gunakan untuk merencanakan kuda-kuda adalah sebagai berikut:

- Beban atas, terdiri atas:
  - berat penutup atap,
  - berat gording.
- Beban bawah, terdiri atas:
  - berat sendiri,
  - berat plafond.
- Beban Angin, terdiri atas:
  - angin tekan,



- angin hisap.

Untuk detail perhitungan beban kuda-kuda dapat dilihat pada lampiran XVII Perhitungan beban kuda-kuda.

#### **4.1.4. Analisis Struktur**

Kemudian dari data-data yang ada dibuat model rangka kuda-kuda pada program SAP 2000. Kemudian dengan menggunakan program SAP 2000, dilakukan analisis struktur untuk memperoleh gaya-gaya batang yang terjadi.

Hasil gaya-gaya batang yang diperoleh kemudian diolah untuk mencari gaya batang yang akan di pergunakan dalam desain. Gaya-gaya batang yang di gunakan pada desain dapat dilihat pada Lampiran XVI Perhitungan gaya batang kuda-kuda.

#### **4.1.5. Perhitungan Profil**

Setelah gaya batang untuk desain di peroleh barulah di lakukan pemilihan profil yang akan di gunakan. Perhitungan profil yang akan digunakan, direncanakan per jenis batang. Berikut ini adalah perhitungan pemilihan profil untuk rangka atap.

## Perencanaan Dimensi Batang.

Batang tarik

-Batang bawah

Panjang batang, L:	1,552 m	= 155,242 cm
Gaya batang, T:	4169,780 kg	
Fy:	36,000 ksi	= 2531,050 kg/cm <sup>2</sup>
Fu:	58,000 ksi	= 4077,804 kg/cm <sup>2</sup>
Ø Baut:	4/8 "	
t profil:	0,600 cm	
μ:	0,750	
jumlah lubang:	2,000	
Ø Lubang	= Ø Baut + 1/8"	
	= 4/8" + 1/8"	
	= 5/8 "	
	= 1,588 cm	
A lubang =	Ø Lubang×t profil×jumlah lubang	
	= 1,5875×0,6×2	
	= 1,905 cm <sup>2</sup>	

$$\text{Ag 1 perlu} = \frac{T}{0,6 \times F_y} = \frac{4169,780}{0,6 \times 2531,050} = 2,746 \text{ cm}^2$$

$$\text{Ag 2 perlu} = \frac{T}{0,5 \times F_u \times \mu} = \frac{4169,780}{0,5 \times 4077,804 \times 0,75} = 2,727 \text{ cm}$$

$$r_{\min} = \frac{k L}{300,000} = \frac{330,946}{300,000} = 1,103 \text{ cm}$$

Dicoba profil: **2L55X55X6-10**

Data Profil 2L55X55X6-10: Berat,  $w = 9,791 \text{ kg/m}$

$A = 12,500 \text{ cm}^2$

$t = 0,600 \text{ cm}$

$i_x = 1,685 \text{ cm}$

$i_y = 2,690 \text{ cm}$

$r_{\min} = 1,685 \text{ cm}$

Jumlah baut max = 2,543

A bruto = 12,500 cm<sup>2</sup>

A netto = A bruto - A lubang = 12,5 - 1,905 = 10,595 cm<sup>2</sup>

A efektif =  $\mu$  A netto = 0,75 × 10,595 = 7,946 cm<sup>2</sup>

> Ag2 = 2,727 cm<sup>2</sup> -- OK --

$$\begin{aligned}
 \text{Check: } \quad & \frac{T}{A_{net}} = \frac{4169,780}{43,400} \\
 & = 333,582 \text{ kg/cm}^2 \\
 & < 0,6 f_y = 1518,630 \text{ kg/cm}^2 \text{ -- OK --} \\
 \\ 
 & \frac{T}{A_e} = \frac{4169,780}{7,946} \\
 & = 524,748 \text{ kg/cm}^2 \\
 & < 0,5 f_u = 2038,902 \text{ kg/cm}^2 \text{ -- OK --}
 \end{aligned}$$

*Jadi profil 2L55X55X6-10 aman dipakai.*

Batang desak

- Batang atas

$$\begin{aligned}
 \text{Panjang batang, L:} & \quad 1,953 \text{ m} & = & \quad 195,256 \text{ cm} \\
 \text{Gaya batang, T:} & \quad 5319,182 \text{ kg} \\
 F_y: & \quad 36,000 \text{ ksi} & = & \quad 2531,050 \text{ kg/cm}^2 \\
 F_u: & \quad 58,000 \text{ ksi} & = & \quad 4077,804 \text{ kg/cm}^2 \\
 E: & \quad 29000 \text{ ksi} & = & \quad 2038902 \text{ kg/cm}^2 \\
 k: \text{ sendi-sendi} & = & \quad 1,0
 \end{aligned}$$

$$\begin{aligned}
 r & = \frac{k L}{200,000} = \frac{1 \times 195,2562}{200} \\
 & = 0,976281 \text{ cm}
 \end{aligned}$$

$$C_c = \sqrt{\frac{2\pi^2 E}{F_y}} = \sqrt{\frac{2 \times \pi^2 \times 2038901,781}{2531,050}}$$

$$= 126,0993$$

Dicoba profil: **2L55X55X6-10**

Data Profil 2L55X55X6-10: Berat,  $w = 9,791 \text{ kg/m}$

$A = 12,500 \text{ cm}^2$

$t = 0,600 \text{ cm}$

$i_x = 1,685 \text{ cm}$

$i_y = 2,690 \text{ cm}$

$r_{\min} = 1,685 \text{ cm}$

$$\frac{k L}{r} = \frac{1 \times 2531,050}{1,685}$$

$$= 115,8791 < C_c = 126,099 \text{ kg/cm}^2$$

untuk  $Kl/r \leq C_c$  :

$$FS = \frac{5}{3} + \frac{3}{8} \cdot \frac{kl}{r} \cdot \frac{1}{C_c} - \frac{1}{8} \cdot \left( \frac{kl}{r} \cdot \frac{1}{C_c} \right)^3$$

$$= 1,914$$

$$F_a = 763,921 \text{ kg/cm}^2$$

$$T = 9549,016 \text{ kg} > 5319,182 \text{ kg --OK--}$$

Jadi profil 2L55X55X6-10 aman dipakai.

#### 4.1.6. Hasil Dari Perencanaan Rangka Atap

Setelah dilakukan perhitungan, rangkuman hasil ukuran profil yang digunakan dan jumlah alat sambung terdapat pada tabel berikut ini:

Tabel IV-2 Hasil perencanaan rangka atap

Tipe Batang	Hasil sebelum perencanaan		Hasil perencanaan ulang	
	Profil (mm)	Baut	Profil (mm)	Baut
Atas, A	2L 50x50x5	2 $\varnothing$ 16mm	2L 55x55x6	2 $\varnothing$ 1/2"
Bawah, B	2L 50x50x5	2 $\varnothing$ 16mm	2L 55x55x6	2 $\varnothing$ 1/2"
Diagonal, D	2L 40x40x5	2 $\varnothing$ 16mm	2L 55x55x6	2 $\varnothing$ 1/2"
Vertikal, V	2L 40x40x5	2 $\varnothing$ 16mm	2L 55x55x6	2 $\varnothing$ 1/2"
Jurai, J	2C 125x50x20x2,3	2 $\varnothing$ 16mm	2L 55x55x6	2 $\varnothing$ 1/2"
Gording	Bengkirai $\frac{8}{12}$		C 100x50x20x2,3	

▪ Sagrod :  $\varnothing$  10 mm

▪ Tierod :  $\varnothing$  10 mm

Untuk perhitungan gording, sagrod, tierod dan baut dapat dilihat pada lampiran XVII-XIX.

#### 4. 2. Perhitungan Pelat

Perencanaan pelat dilakukan sebagai berikut ini.

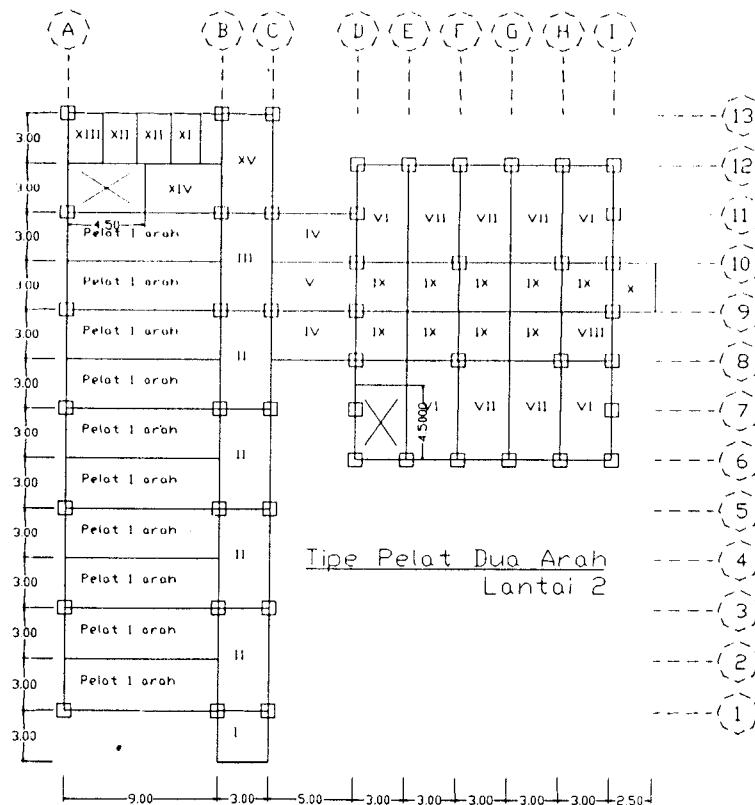
##### 4.2.1. Data Konstruksi Yang Di Pergunakan

- tebal pasir : 0,05 m
- tebal spesi : 0,03 m
- tebal keramik : 0,01 m
- bj beton : 23 kN/m<sup>3</sup>

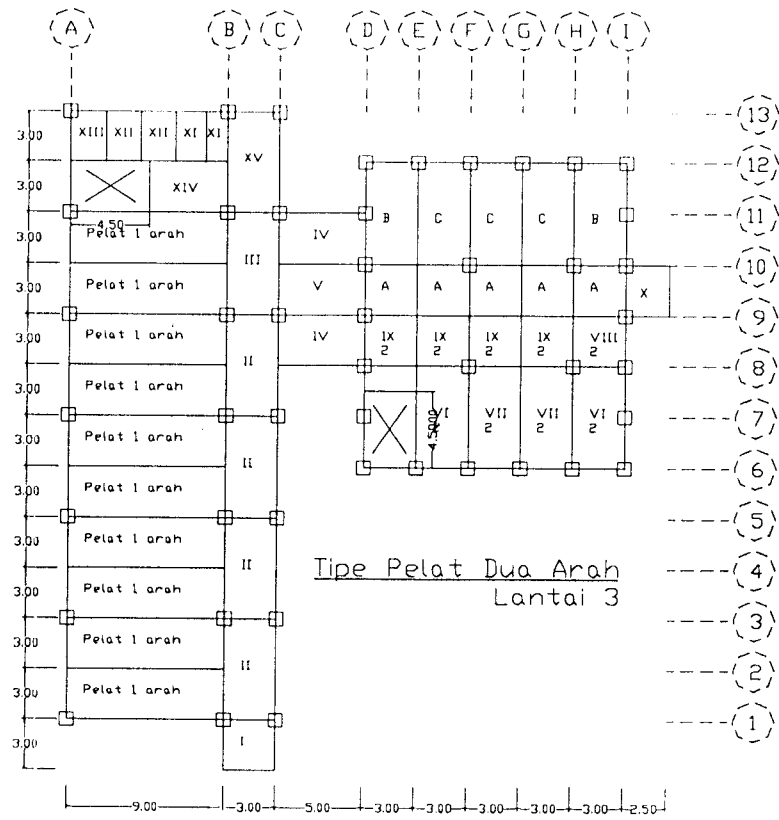
- $\gamma_{pasir}$  :  $16 \text{ kN/m}^3$
- $\gamma_{spesi}$  :  $22 \text{ kN/m}^3$
- $\gamma_{keramik}$  :  $20 \text{ kN/m}^3$
- $f_c'$  :  $20 \text{ MPa}$
- $f_y$  polos (untuk sengkang, dan pada plat lantai) :  $240 \text{ MPa}$
- $f_y$  deform (tulangan pokok balok dan kolom) :  $400 \text{ MPa}$
- $\phi = 0,8$  (faktor reduksi kekuatan untuk pembebanan lentur tanpa aksial)

#### 4.2.2. Perhitungan Pelat

Pelat lantai di bagi menjadi pelat satu arah dan pelat dua arah, dimana letak dari masing-masing tipe pelat dapat di lihat pada gambar berikut ini.



Gambar IV-8 Perletakan Pelat Lantai 2



Gambar IV-9 Perletakan Pelat Lantai 3

Berikut ini adalah contoh perhitungan yang digunakan untuk perencanaan tulangan pelat.



## a) Perencanaan Pelat Satu Arah

Pelat lantai

$$R. \text{Kuliah} = wL = 250 \text{ kg/cm}^2 = 2,5 \text{ kN/m}^2$$

$$\text{Selasar} = wL = 300 \text{ kg/cm}^2 = 3 \text{ kN/m}^2$$

$$Lx = 300 \text{ cm} = 3000 \text{ mm}$$

$$Ly = 900 \text{ cm} = 9000 \text{ mm}$$

$$Fy = 36 \text{ Ksi} = 248,21126 \text{ MPa}$$

$$Ly/Lx = 3$$

$Ly/Lx > 2$  maka dianggap pelat 1 arah

Tebal Pelat:

Pelat dengan satu ujung menerus

$$\begin{aligned} h_{\min} &= \frac{Lx}{24} \left( 0.4 + \frac{Fy}{700} \right) \\ &= 94,32344 \text{ mm} \end{aligned}$$

Pelat dengan dua ujung menerus

$$\begin{aligned} h_{\min} &= \frac{Lx}{28} \left( 0.4 + \frac{Fy}{700} \right) \\ &= 80,848663 \text{ mm} \end{aligned}$$

Diambil  $h = 120 \text{ mm}$

Beban pelat per lebar 1 meter

Berat pelat

$$= t. \text{pelat} \times b_j \text{ beton} = 0,12 \times 23 = 2,76 \text{ kN/m}^2$$

Pasir (5 cm)

$$= t. \text{pasir} \times b_j \text{ beton} = 0,05 \times 16 = 0,8 \text{ kN/m}^2$$

Spesi (3 cm)

$$= t. \text{spesi} \times b_j \text{ beton} = 0,03 \times 23 = 0,69 \text{ kN/m}^2$$

Keramik (1 cm)

$$= t. \text{krmk} \times b_j \text{ krmk} = 0,01 \times 20 = 0,2 \text{ kN/m}^2 +$$

---


$$wD = 4,45 \text{ kN/m}^2$$

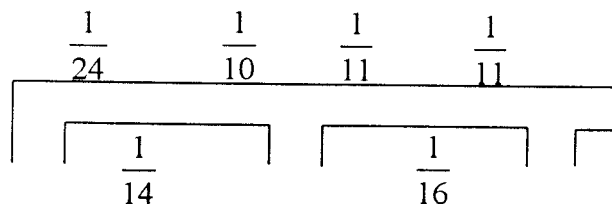
$$\text{Ruang kuliah (wL)} = 2,5 \text{ kN/m}^2$$

$$w_u = 1,2wD + 1,6wL = 9,34 \text{ kN/m}^2$$

$$\text{Untuk lebar 1 m, } W_u = 9,34 \text{ kN/m}^2$$

$$\text{Asumsi lebar balok} = 300 \text{ mm}$$

$$L_n = 2700 \text{ mm}$$



$$M_u = X \cdot w_u \cdot L_n^2$$

$$M_u \text{ 1/24} = \frac{1}{24} \times 9,340 \times (2,7)^2 = 2,837025 \text{ kNm}$$



$$M_u \text{ 1/10} = 1/10 \times 9,340 \times (2,7)^2 = 6,80886 \text{ kNm}$$

$$M_u \text{ 1/14} = 1/14 \times 9,340 \times (2,7)^2 = 4,863471 \text{ kNm}$$

$$M_u \text{ 1/11} = 1/11 \times 9,340 \times (2,7)^2 = 6,189873 \text{ kNm}$$

$$M_u \text{ 1/16} = 1/16 \times 9,340 \times (2,7)^2 = 4,255538 \text{ kNm}$$

$$\begin{aligned} V_u &= 1,15 \cdot \frac{1}{2} \cdot W_u \cdot L_n \\ &= 1,15 \times \frac{1}{2} \times 9,340 \times 2,7 \\ &= 14,50035 \text{ kN} \end{aligned}$$

$$\begin{aligned} V_u &= \frac{1}{2} \times W_u \times L_n \\ &= \frac{1}{2} \times 9,340 \times 2,7 \\ &= 12,609 \text{ kN} \end{aligned}$$

tulangan  $\emptyset$  10                      asumsi awal  
 dan 20                              mm penutup beton  
 $f_c' = 20$                               MPa  
 $d = 120 - 20 - (\frac{1}{2} \times 10) = 95 \text{ mm}$

**Kuat geser (tanpa tulangan geser)**

$$\phi \cdot V_n = \phi \cdot \left( \frac{1}{6} \sqrt{f_c'} x b_w x d \right)$$

$$\phi = 0,6$$

$$\begin{aligned}\phi \cdot V_n &= 0,6 \cdot \left( \frac{1}{6} \sqrt{20 \times 1000 \times 95} \right) = 42485,292 \text{ N} \\ &= 42,485292 \text{ kN} \\ &> 14,50035 \text{ OK}\end{aligned}$$

Tulangan Susut:

$$\begin{aligned}A_{sst} &= 0,0020 b h \\ &= 0,002 \times 1000 \times 120 \\ &= 240 \text{ mm}^2/\text{m}'\end{aligned}$$

pakai P8

$$s = 209,43951 \text{ mm}$$

$$5 h = 600$$

pakai P8 - 200 mm

Tabel IV-3 Perhitungan tulangan pelat satu arah

Nilai	Bagian				
	1/24	1/10	1/14	1/11	1/16
$f_y$ , Mpa	240	240	240	240	240
$f_c'$ , Mpa	20	20	20	20	20
$\beta_1$	0,85	0,85	0,85	0,85	0,85
$m$	14,118	14,118	14,118	14,118	14,118
$\rho_b$	0,0430	0,0430	0,0430	0,0430	0,0430
$\rho_{max}$	0,0323	0,0323	0,0323	0,0323	0,0323
$\rho_{min}$	0,0058	0,0058	0,0058	0,0058	0,0058

Nilai	Bagian				
	1/24	1/10	1/14	1/11	1/16
Mu, kNm	2,837	6,809	4,863	6,190	4,256
$\phi$	0,8	0,8	0,8	0,8	0,8
Mn, kNm	3,546	8,511	6,079	7,737	5,319
b, mm	1000	1000	1000	1000	1000
d, mm	95	95	95	95	95
Rn, Mpa	0,393	0,943	0,674	0,857	0,589
$\rho$	0,0017	0,0040	0,0029	0,0037	0,0025
1,33 $\rho$	0,0022	0,0054	0,0038	0,0049	0,0033
$\rho$ pakai	0,0058	0,0058	0,0058	0,0058	0,0058
As, mm <sup>2</sup>	554,16667	554,16667	554,1667	554,16667	554,16667
$\emptyset$ pakai, mm	10	10	10	10	10
A 1 $\emptyset$ , mm <sup>2</sup>	78,539816	78,539816	78,53982	78,539816	78,539816
s, mm	141,72598	141,72598	141,726	141,72598	141,72598
3 h, mm	360	360	360	360	360
s pakai, mm	140	140	140	140	140
As ada, mm <sup>2</sup>	560,99869	560,99869	560,9987	560,99869	560,99869
a, mm	7,9199815	7,9199815	7,919981	7,9199815	7,9199815
Mn ada, kNm	12,257598	12,257598	12,2576	12,257598	12,257598
kontrol	aman	aman	aman	aman	aman
jadi pakai	P10-140	P10-140	P10-140	P10-140	P10-140

## b) Perencanaan Pelat Dua Arah

Pelat lantai tipe II

$$L_x = 300 \text{ cm}$$

$$= 3000 \text{ mm}$$

$$F_y = 36 \text{ Ksi}$$

$$= 248,2113 \text{ MPa}$$

$$L_y/L_x = 2$$

$$L_y = 600 \text{ cm}$$

$$= 6000 \text{ mm}$$

$$F_c' = 20 \text{ MPa}$$

$L_y/L_x = 2$  maka dianggap pelat 2 arah

Tebal Pelat:

Diperkirakan balok tepi pelat mempunyai lebar  $b = 300 \text{ mm}$

Bentang bersih arah -x :  $L_{nx} = L_x - b = 3000 - 300 = 2700 \text{ mm}$

Bentang bersih arah -y :  $L_{ny} = L_y - b = 6000 - 300 = 5700 \text{ mm}$

$$\beta = L_{ny}/L_{nx} = 5700 / 2700 = 2,111111$$

$$h_{\min} = \frac{\text{Ln}(0,8 + f_y/1500)}{36 + 9\beta} = 100,0582$$

$$h_{\max} = \frac{\text{Ln}(0,8 + f_y/1500)}{36} = 152,8667$$

$h = 120 \text{ mm}$  dan  $h_{\min} < h < h_{\max}$ , maka dipakai  $h = 120 \text{ mm}$

Menentukan momen

$L_y/L_x = 2$  dari tabel pelat 4.2.b Gideon

skema VI<sup>a</sup>



$$x L_x = 70$$

$$x t_x = 114$$

$$x L_y = 17$$

$$x t_y = 76$$

$$bj \text{ beton} = 23 \text{ kN/m}^3$$

$$bj \text{ pasir} = 16 \text{ kN/m}^3$$

$$bj \text{ spesi} = 22 \text{ kN/m}^3$$

$$bj \text{ keramik} = 20 \text{ kN/m}^3$$

Beban pelat per lebar 1 meter

$$\text{Berat pelat} = t. \text{pelat} \times bj \text{ beton} = 0,12 \times 23 = 2,76 \text{ kN/m}$$

$$\text{Pasir (5 cm)} = t. \text{pasir} \times bj \text{ pasir} = 0,05 \times 16 = 0,8 \text{ kN/m}$$

$$\text{Spesi (3 cm)} = t. \text{spesi} \times bj \text{ spesi} = 0,03 \times 22 = 0,66 \text{ kN/m}$$

$$\text{Tegel (1cm)} = t. \text{krmk} \times bj \text{ krmk} = 0,01 \times 20 = 0,2 \text{ kN/m}$$

---


$$\text{Beban mati (Wd)} = 4,42 \text{ kN/m}$$

$$\text{Selasar (wL)} = 3 \text{ kN/m}$$

$$w_u = 1,2w_D + 1,6w_L = 10,104 \text{ kN/m}$$

$$\begin{aligned} \text{MuLx} &= 0,001 \times \text{Wu} \times \text{Lx}^2 \times \text{xLx} \\ &= 0,001 \times 10,104 \times 3^2 \times 70 = 6,36552 \text{ kNm} \end{aligned}$$

$$\begin{aligned} \text{Mutx} &= 0,001 \times \text{Wu} \times \text{Lx}^2 \times \text{xtx} \\ &= 0,001 \times 10,104 \times 3^2 \times 114 = 10,3667 \text{ kNm} \end{aligned}$$

$$\begin{aligned} \text{MuLy} &= 0,001 \times \text{Wu} \times \text{Lx}^2 \times \text{xLy} \\ &= 0,001 \times 10,104 \times 3^2 \times 17 = 1,54591 \text{ kNm} \end{aligned}$$

$$\begin{aligned} \text{Muty} &= 0,001 \times \text{Wu} \times \text{Lx}^2 \times \text{yty} \\ &= 0,001 \times 10,104 \times 3^2 \times 76 = 6,91114 \text{ kNm} \end{aligned}$$

$$\Phi = 0,8$$

$$\text{MuLx}/\Phi = 7,9569 \text{ kNm}$$

$$\text{Mutx}/\Phi = 12,9584 \text{ kNm}$$

$$\text{MuLy}/\Phi = 1,93239 \text{ kNm}$$

$$\text{Muty}/\Phi = 8,63892 \text{ kNm}$$

Tulangan Lx:

$$\text{Asumsi d tul.} = 10 \text{ mm}$$

$$\text{Penutup beton} = 20 \text{ mm}$$

$$\text{dx} = \text{t plat} - \text{penutup beton} - 1/2 \text{ d tul.}$$

$$= 120 - 20 - 1/2 \times 10$$

$$= 95 \text{ mm}$$



$$\beta_1 = 0,85$$

$$\begin{aligned} R_n &= \frac{M_n}{bdx^2} \\ &= \frac{7,9569 \times 1000000}{1000 \times 95^2} \\ &= 0,881651 \text{ MPa} \end{aligned}$$

$$\begin{aligned} m &= \frac{f_y}{0,85 f_c'} \\ &= \frac{248,2113}{0,85 \times 20} \\ &= 14,60066 \end{aligned}$$

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

$$\rho = \frac{1}{14,60066} \left( 1 - \sqrt{1 - \frac{2 \cdot 14,60066 \cdot 0,881651}{248,2113}} \right)$$

$$= 0,003649$$

$$\begin{aligned}\rho_b &= \frac{0,85 \times f_c'}{f_y} \times \beta_1 \times \frac{600}{600 + f_y} \\ &= \frac{0,85 \times 20,000}{248,211} \times 0,850 \times \frac{600}{600 + 248,211} \\ &= 0,04118\end{aligned}$$

$$\rho_{\max} = 0,75 \times \rho_b = 0,75 \times 0,041181 = 0,03089$$

$$\rho_{\min} = \frac{1,4}{f_y} = \frac{1,4}{248,211} = 0,00564$$

$$\rho_{\text{ambil}} = 0,00485 \text{ (1,33 } \rho \text{ perlu)}$$

$$A_s = \rho \times b \times d$$

$$= 0,004853 \times 1000 \times 95,000 = 461,081 \text{ mm}^2$$

$$A_{s_{\text{st}}} = 0,0020 \times b \times h$$

$$= 0,0020 \times 1000 \times 120,000 = 240 \text{ mm}^2$$

$$A_{s_{\text{ambil}}} = 461,081 \text{ mm}^2$$

$$A_1 \text{ tul} = \frac{1}{4} \times \pi \times d^2 = \frac{1}{4} \times \pi \times 10,000^2 = 78,5398 \text{ mm}^2$$

$$s \leq \frac{A_1 d \times 100}{A_s} = \frac{78,540 \times 1000}{461,081}$$

$$= 170,338 \text{ mm}$$

jadi pakai **P10 - 160**

cek Mn:

$$\begin{aligned}
 A_s \text{ ada} &= \frac{A_1 d \times 1000}{s} \\
 &= \frac{78,540 \times 1000}{160} \\
 &= 490,8739 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 a &= \frac{A_s \text{ ada} \times f_y}{0,85 \times f_c \times 1000} \\
 &= \frac{490,874 \times 248,211}{0,85 \times 20 \times 1000} \\
 &= 7,167083 \text{ mm}
 \end{aligned}$$

$$\begin{aligned}
 M_n \text{ ada} &= A_s \times f_y \times (d - a/2) \\
 &= 490,874 \times 248,211 \times (95,000 - 7,167/2) \\
 &= 11138220 \text{ Nmm} \\
 &= 11,13822 \text{ kNm}
 \end{aligned}$$

$$\geq 1,33 \text{ Mn perlu -- OK --}$$

$$= 10,58268 \text{ kNm}$$

Tulangan Susut &amp; Bagi:

pakai P8

$$\begin{aligned}
 A_s &= 0,0020 \text{ b h} & s &= 209,4395 \text{ mm} \\
 &= 0,002 \times 1000 \times 120 & 5 \text{ h} &= 600 \text{ mm} \\
 &= 240 \text{ mm}^2/\text{m}' & & \text{pakai P8 - 200 mm}
 \end{aligned}$$

Tabel IV-4 Perhitungan tulangan pelat dua arah

Ket.	Satuan	Bagian			
		lx	tx	ly	ty
Mu	kNm	6,36552	10,3667	1,54591	6,91114
$\Phi$	-	0,8	0,8	0,8	0,8
Mu/ $\Phi$	kNm	7,9569	12,9584	1,93239	8,63892
asumsi d t	mm	10	10	10	10
b	mm	1000	1000	1000	1000
d	mm	95	95	85	95
$\beta_1$	-	0,85	0,85	0,85	0,85
m	-	14,6007	14,6007	14,6007	14,6007
Rn	Mpa	0,88165	1,43583	0,26746	0,95722
$\rho$	-	0,00365	0,00605	0,00109	0,00397
$\rho_b$	-	0,04118	0,04118	0,04118	0,04118
$\rho_{max}$	-	0,03089	0,03089	0,03089	0,03089
$\rho_{min}$	-	0,00564	0,00564	0,00564	0,00564
$\rho_{ambil}$	-	0,00485	0,00605	0,00144	0,00528
		$1,33\rho_{perl}$	$\rho_{perlu}$	$1,33\rho_{perl}$	$1,33\rho_{perl}$
As	mm <sup>2</sup>	461,081	574,951	122,79	501,816
Asst	mm <sup>2</sup>	240	240	240	240

Ket.	Satuan	Bagian			
		lx	tx	ly	ty
As ambil	mm <sup>2</sup>	461,081	574,951	240	501,816
A l tul	mm <sup>2</sup>	78,5398	78,5398	78,5398	78,5398
s	mm	170,338	136,603	327,249	156,511
s pakai	mm	170	130	320	150
As ada	mm <sup>2</sup>	461,999	604,152	245,437	523,599
a	mm	6,74549	8,82103	3,58354	7,64489
Mn ada	kNm	10,5072	13,5846	5,06906	11,8497
Pakai Tul.		P10 - 170	P10 - 130	P10 - 320	P10 - 150

Hasil dari perhitungan pelat lantai dua arah dapat di lihat pada tabel berikut ini.

Tabel IV-5 Hasil perhitungan pelat dua arah

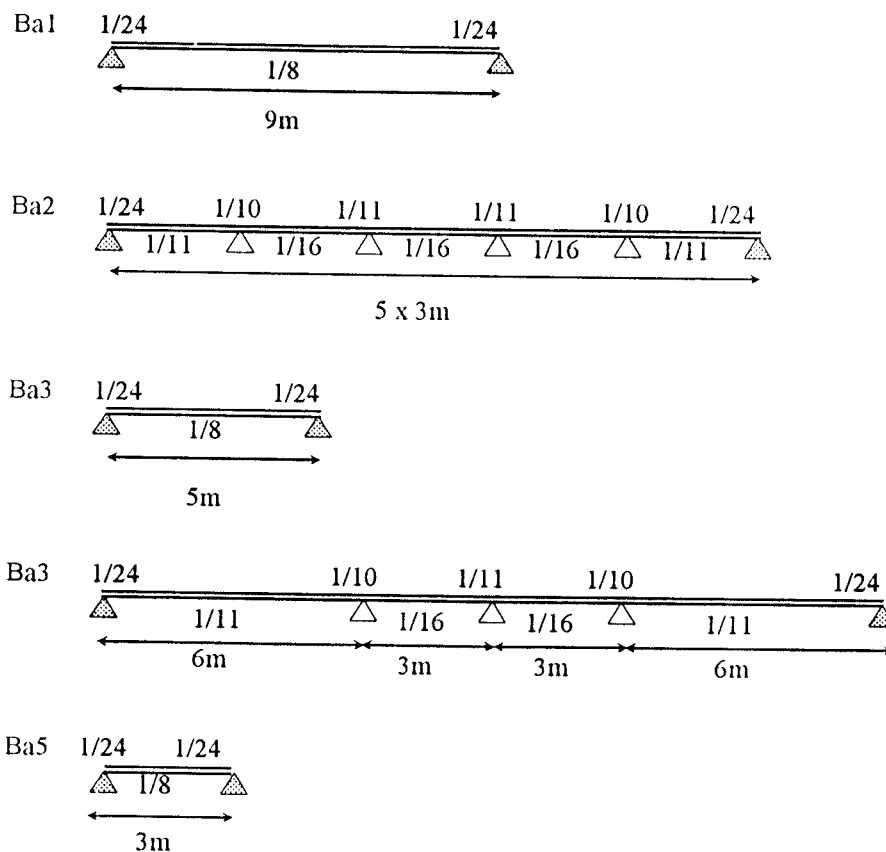
Kode	Ukuran Ly×Lx, mm	beban(wu) kN/m	Tulangan pelat di perlukan				Sebelum perencanaan ulang				
			LX	TX	LY	TY	LX	TX	LY	TY	
I	300×300	10,104	P10 - 300	P10 - 140	P10 - 320	P10 - 320	P10 - 320	P10-125	P10-125	P10-125	P10-125
II	600×300	10,104	P10 - 170	P10 - 130	P10 - 320	P10 - 150	P10 - 125	P10-125	P10-125	P10-125	P10-125
III	600×300	10,104	P10 - 200	P10 - 140	P10 - 320	P10 - 220	P10 - 125	P10-125	P10-125	P10-125	P10-125
IV	500×300	10,104	P10 - 200	P10 - 140	P10 - 320	P10 - 150	P10 - 125	P10-125	P10-125	P10-125	P10-125
V	500×300	10,104	P10 - 230	P10 - 150	P10 - 320	P10 - 220	P10 - 125	P10-125	P10-125	P10-125	P10-125
VI	600×300	11,704	P10 - 140	P10 - 110	P10 - 320	P10 - 140	P10 - 125	P10-125	P10-125	P10-125	P10-125
VII	600×300	11,704	P10 - 170	P10 - 140	P10 - 320	P10 - 190	P10 - 125	P10-125	P10-125	P10-125	P10-125
VIII	300×300	11,704	P10 - 320	P10 - 170	P10 - 320	P10 - 190	P10 - 125	P10-125	P10-125	P10-125	P10-125
IX	300×300	11,704	P10 - 320	P10 - 200	P10 - 320	P10 - 200	P10 - 125	P10-125	P10-125	P10-125	P10-125
X	300×250	13,304	P10 - 280	P10 - 140	P10 - 320	P10 - 320	P10 - 125	P10-125	P10-125	P10-125	P10-125
XI	300×175	9,304	P10 - 320	P10 - 320	P10 - 320	P10 - 320	P10 - 125	P10-125	P10-125	P10-125	P10-125
XII	300×200	9,304	P10 - 320	P10 - 320	P10 - 320	P10 - 320	P10 - 125	P10-125	P10-125	P10-125	P10-125

Kode	Ukuran Ly×Lx, mm	beban(wu)		Tulangan pelat di perlukan				Sebelum perencanaan ulang			
		kN/m	LX	TX	LY	TY	LX	TX	LY	TY	
XIII	250×200	9,304	P10 - 320	P10 - 320	P10 - 320	P10 - 320	P10-125	P10-125	P10-125	P10-125	
XIV	400×300	10,104	P10 - 280	P10 - 160	P10 - 320	P10 - 210	P10-125	P10-125	P10-125	P10-125	
XV	600×300	10,104	P10 - 160	P10 - 130	P10 - 320	P10 - 150	P10-125	P10-125	P10-125	P10-125	
VI 2	600×300	9,304	P10 - 180	P10 - 140	P10 - 320	P10 - 170	P10-125	P10-125	P10-125	P10-125	
VII 2	600×300	9,304	P10 - 220	P10 - 150	P10 - 320	P10 - 240	P10-125	P10-125	P10-125	P10-125	
VIII 2	300×300	9,304	P10 - 320	P10 - 210	P10 - 320	P10 - 240	P10-125	P10-125	P10-125	P10-125	
IX 2	300×300	9,304	P10 - 320	P10 - 250	P10 - 320	P10 - 250	P10-125	P10-125	P10-125	P10-125	
A	300×300	10,104	P10 - 320	P10 - 230	P10 - 320	P10 - 230	P10-125	P10-125	P10-125	P10-125	
B	600×300	9,304	P10 - 220	P10 - 150	P10 - 320	P10 - 240	P10-125	P10-125	P10-125	P10-125	
C	600×300	9,304	P10 - 220	P10 - 150	P10 - 320	P10 - 240	P10-125	P10-125	P10-125	P10-125	
Susut				P8-200				P8-200			
Bagi				P8-200				P8-200			

### 4.3. Perencanaan Balok Anak

Balok anak di rencanakan sebagai balok persegi dengan tulangan sebelah, dengan mengambil beban dari perhitungan pelat. Beban pelat didistribusikan ke balok anak dengan menggunakan metode trapesium. Kemudian untuk menentukan momen balok anak digunakan koefisien momen untuk balok yang terdapat pada tabel 4.1 dari buku Gideon seri 4.

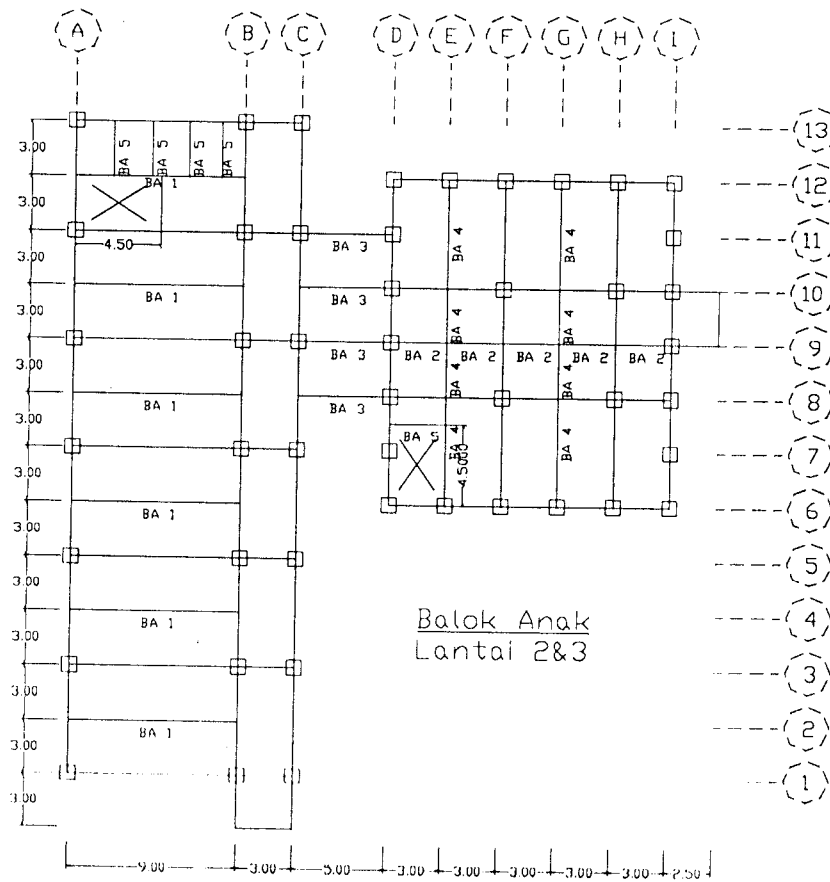
Pada perencanaan ulang di gunakan 5 tipe balok anak yang dapat di lihat pada gambar berikut ini.



Gambar IV-10 Tipe Balok Anak



Sedangkan letak dari balok anak dapat di lihat pada denah berikut ini.

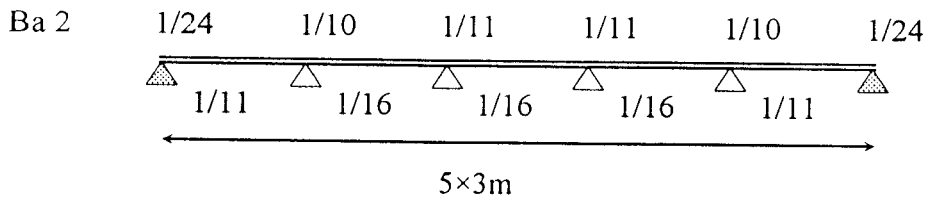


Gambar IV-11 Letak Balok Anak

Berikut ini adalah contoh perhitungan untuk balok anak.

### Perencanaan Balok Anak

Balok Ba 2 lt. 2



### Beban

Plat

$$L_y = 5 \text{ m}$$

$$L_x = 3 \text{ m}$$

$$t = 1/2 \times L_x = 1/2 \times 3 = 1,5 \text{ m}$$

$$h_{eq} = \frac{2t}{3} = \frac{2 \times 1,500}{3}$$

$$= 1 \text{ m}$$

$$W_u = 11,704 \text{ kN/m}^2$$

$$q_{upl} = 2 \times h_{eq} \times W_u = 2 \times 1,000 \times 11,704$$

$$= 23,408 \text{ kN/m}$$

### Berat Sendiri

$$b, \text{ pakai} = 0,3 \text{ m}$$

$$\text{asumsi, } h = L / 12 = 5,000 / 12$$

$$= 0,416667 \text{ m}$$

$$b_j \text{ beton} = 23 \text{ kN/m}^3$$

$$q_D \text{ bs} = b \times h \times b_j = 0,3 \times 0,417 \times 23$$

$$= 2,875 \text{ kN/m}$$

Partisi

$$\text{tinggi, } h_t = 4 \text{ m}$$

$$q_D \text{ pt} = 2,5 \text{ kN/m}^2$$

Beban	q, kN/m	faktor	qu, kN/m
Pelat	-	-	23,408
Brt sendir	2,875	1,2	3,45
Partisi	2,5	1,2	3
		qu Ba 2	29,858

### Perhitungan Momen

Lapangan	L, m	Koef.	qu, kN/m	Mu = koef × qu × L <sup>2</sup> , kNm	
		5	1/16	29,858	1/16 × 29,858 × 5 <sup>2</sup> =
	5	1/11	29,858	1/11 × 29,858 × 5 <sup>2</sup> =	67,85909
				Mu max	67,85909

Tumpuan	L, m	Koef.	qu, kN/m	Mu = koef × qu × L <sup>2</sup> , kNm	
		5	1/24	29,858	1/24 × 29,858 × 5 <sup>2</sup> =
	5	1/10	29,858	1/10 × 29,858 × 5 <sup>2</sup> =	74,645
	5	1/11	29,858	1/11 × 29,858 × 5 <sup>2</sup> =	67,85909
				Mu max	74,645

Design penampang

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

$$f_y = 240 \text{ MPa}$$

$$\beta_1 = 0,85$$

$$\Phi = 0,8$$

$$M_u \text{ design} = 74,645 \text{ kNm}$$

$$M_n \text{ desain} = \frac{M_u}{\Phi} = \frac{74,645}{0,8}$$

$$= 93,30625 \text{ kNm}$$

$$m = \frac{f_y}{0,85 f_c'} = \frac{240}{0,85 \times 20} = 14,11765$$

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

$$= \frac{0,85 \times 20,000}{240} \times 0,850 \times \frac{600}{600 + 240,000}$$

$$= 0,043006$$

$$\rho_{\max} = 0,75 \times \rho_b = 0,75 \times 0,043006 = 0,032254$$

$$\rho_{\min} = \frac{1,4}{f_y} = \frac{1,4}{240} = 0,005833$$

$$\rho = 0,5 \times \rho_{\max} = 0,5 \times 0,03225 = 0,016127$$

$$\begin{aligned}
 R_n &= \rho \times f_y \times (1 - 0,5 \times \rho \times m) \\
 &= 0,01613 \times 240,000 \times (1 - 0,5 \times 0,01613 \times 14,118) \\
 &= 3,429917 \text{ MPa}
 \end{aligned}$$

$$\begin{aligned}
 b d^2 &= \frac{M_n \text{ desain}}{R_n} = \frac{93,30625 \times 1000000}{3,429916693} \\
 &= 27203649 \text{ mm}^3
 \end{aligned}$$

b, mm	d, mm	
200	368,8065	b pakai = 300 mm
250	329,8706	d = 301,1293 mm
300	301,1293	d tulangan = 16 mm
350	278,7915	d sengkang = 10 mm
400	260,7856	penutup beton = 40 mm
		rak antar tulangan = 25 mm

$$\begin{aligned}
 d_s &= \text{tebal penutup beton} + d \text{ sengkang} + d \text{ tulangan} / 2 + \text{spasi} \\
 &= 40 + 10 + 16 / 2 + 25,000 \\
 &= 83 \text{ mm}
 \end{aligned}$$

$$\begin{aligned}
 h \text{ pakai} &= d + d_s & d \text{ ada} &= h - d_s \\
 &= 301,129 + 83,000 & &= 400 - 83,000 \\
 &= 384,1293 \text{ mm} & &= 317 \text{ mm} \\
 &= 400 \text{ mm}
 \end{aligned}$$

Jadi dimensi balok anak ba 2: 300 / 400 (mm)

Penulangan balok

b = 300 mm

h = 400 mm

d = 317 mm

*Penulangan daerah Mu max*

Mu max = 74,645 kNm

Mu / Φ = 93,30625 kNm

bd<sup>2</sup> = 300 × 317<sup>2</sup> = 30146700 mm<sup>3</sup>

$$Rn \text{ baru} = \frac{Mu / \Phi}{bd^2} = \frac{93,30625 \times 1000000}{30146700}$$

= 3,095073 MPa

$$\rho \text{ baru} = \rho \times \frac{Rn \text{ baru}}{Rn} = 0,01613 \times \frac{3,095073}{3,429917}$$

= 0,014553

As perlu = ρ × b × d = 0,01455 × 300 × 317 = 1383,973 mm<sup>2</sup>

d	14	12	<b>16</b>	19	20
jml perlu	9	13	<b>7</b>	5	5

d tulangan = 16 mm                      tul. per baris = 5

jml perlu = 7                                      jml baris = 2

As ada = 1407,434 mm<sup>2</sup>                      tul. baris terakhir = 2

titik pusat luas tulangan:

$$x_1 = \frac{(\text{jml tul. per brs}) \times [(\text{jml brs}-1)(\text{spasi}+d/2)] + (\text{tul. brs terakhir}) \times [d/2]}{\text{jml tul.}}$$

$$= \frac{5 \times [(2-1)(25+16/2)] + 2 \times [16/2]}{7}$$

$$= 25,85714 \text{ mm}$$

ds = x<sub>1</sub> + d sengkang + penutup beton

$$= 25,857 + 10 + 40$$

$$= 75,85714 \text{ mm} \leq 83,000 \text{ mm -- OK --}$$

$$jbd = \frac{b - 2 \times (\text{penutup beton} + d \text{ sengkang}) - (\text{tul. per baris} \times d \text{ tul})}{\text{tul. per baris} - 1}$$

$$= \frac{300 - 2 \times (40 + 10) - (5 \times 16)}{5 - 1}$$

$$= 30 \text{ mm} > 25 \text{ mm -- OK --}$$

Berikut ini adalah rangkuman hasil perhitungan balok anak

Tabel IV-6 Hasil perhitungan balok anak

Ba 1 lt. 2 & 3 400 / 650  $q_u = 31,488 \text{ kN/m}$

bagian	1/8	1/24
	12D19	4D19

Ba 2 lt. 2 300 / 400  $q_u = 29,858 \text{ kN/m}$

bagian	1/16	1/11	1/24	1/10	1/11
	5D16	7D16	3D16	7D16	7D16

Ba 2 lt. 3 300 / 400  $q_u = 25,058 \text{ kN/m}$

bagian	1/16	1/11	1/24	1/10	1/11
	4D16	6D16	3D16	6D16	6D16

Ba 3 lt. 2 & 3 300 / 450  $q_u = 26,658 \text{ kN/m}$

bagian	1/8	1/24
	7D16	3D16

Ba 4 lt. 2 300 / 450  $q_u = 29,858 \text{ kN/m}$

bagian	1/16	1/11	1/24	1/10	1/11
	2D16	8D16	4D16	9D16	2D16

Ba 4 lt. 3 300 / 450  $q_u = 25,058 \text{ kN/m}$

bagian	1/16	1/11	1/24	1/10	1/11
	2D16	7D16	3D16	7D16	2D16

Ba 5 lt. 2 250 / 300  $q_u = 24,933 \text{ kN/m}$

bagian	1/8	1/24
	4D16	2D16



#### 4. 4. Analisis Struktur

Untuk memperoleh gaya-gaya yang terjadi pada struktur dilakukan analisis struktur dengan bantuan program komputer yaitu SAP 2000. Dengan program ini nantinya dapat diperoleh hasil berupa gaya aksial, geser, dan momen yang terjadi pada struktur. Adapun data yang dipergunakan untuk menghasilkan gaya-gaya tersebut, diperoleh dari beberapa sumber yaitu:

- Data geometri struktur, diambil dari gambar-gambar struktur seperti denah dan potongan.
- Data beban atap, diambil dari perhitungan perencanaan atap.
- Data beban balok, diambil dari perhitungan pelat dan beban tembok
- Data beban gempa berupa riwayat waktu, diambil dari data gempa Elcentro yang dimiliki oleh SAP 2000.
- Serta beberapa data pendukung lainnya.

Data geometri struktur di pergunakan untuk membuat model struktur, kemudian data beban di masukkan ke model struktur, lalu di buat kombinasi-kombinasi beban. Untuk output digunakan gaya dari kombinasi beban ULTBLK dan ULTKLM yang merupakan hasil maximum dan minimum dari kombinasi lainnya yaitu kombinasi:

- 1,4 M
- 1,2 M + 1,6 H
- 1,05 (M + Hr + G)

dimana: M adalah gaya akibat beban mati.

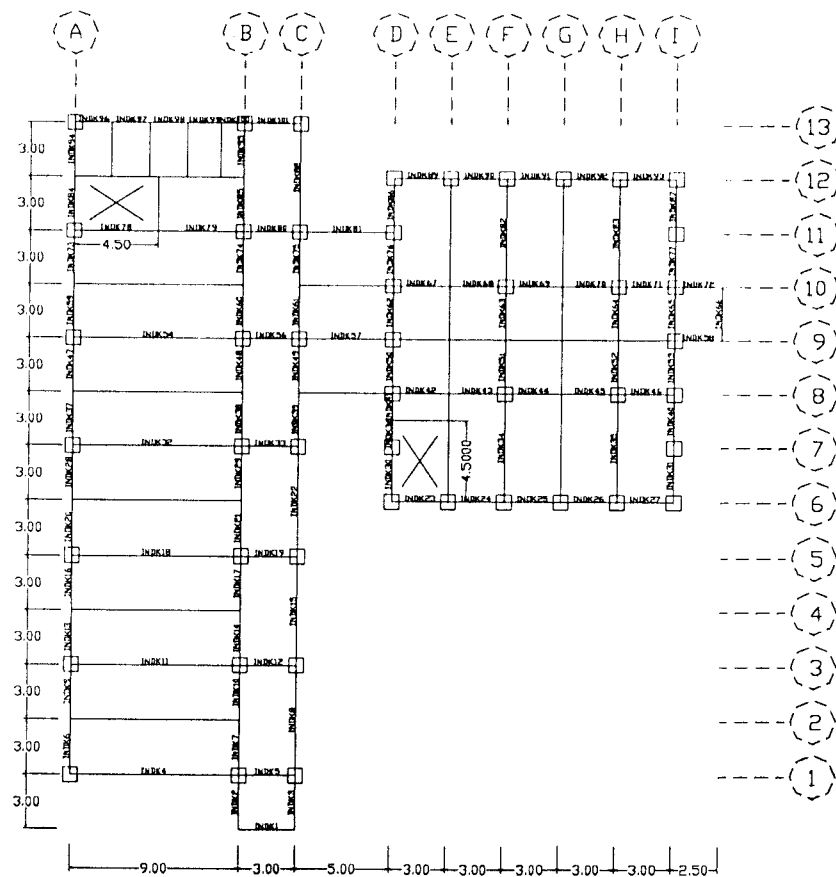
H adalah gaya akibat beban hidup.

Hr adalah gaya akibat beban hidup yang tereduksi factor 0,6.

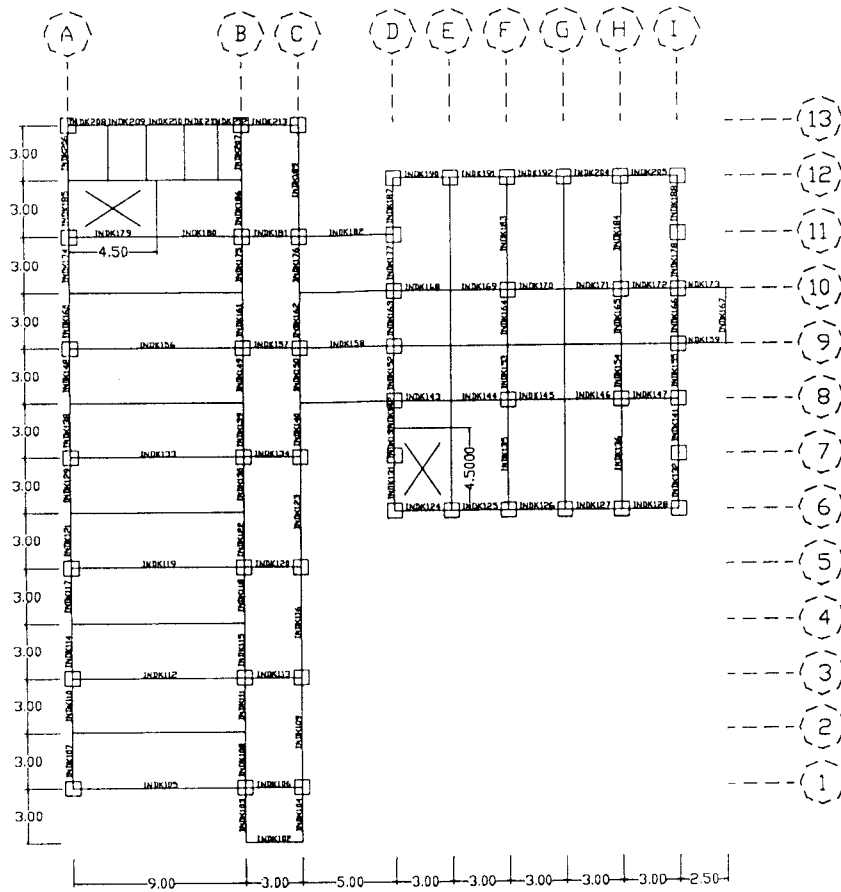
G adalah gaya akibat beban gempa dinamis.

#### 4. 5. Perencanaan Balok Induk

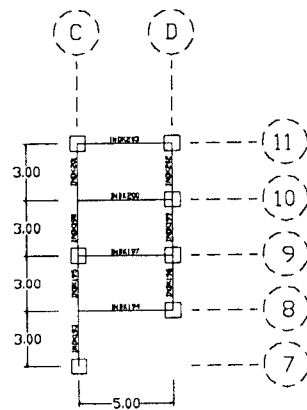
Balok induk direncanakan sebagai balok dengan tulangan rangkap, dengan dimensi awal berdasarkan perencanaan balok dengan tulangan sebelah. Perencanaan menggunakan hasil-hasil yang di peroleh dari analisis struktur, seperti halnya momen dan gaya geser. Perletakkan dari balok-balok induk dapat di lihat pada gambar berikut ini.



Gambar IV-12 Letak Balok Induk Pada Lantai 2



Gambar IV-13 Letak Balok Induk Pada Lantai 3



Gambar IV-14 Letak Balok Induk Pada Atap

Berikut ini adalah contoh perhitungan balok induk.

## Perencanaan Balok Induk

Hasil SAP Balok INDK54

FRAME

LOC	P	V2	V3	T	M2	M3
-----	---	----	----	---	----	----

INDK54 ULTBLK MAX

0,2	0	6,96	0	0,2241	0	214,78
4,5	0	62,4364	0	0,2241	0	102,96
8,8	0	128,018	0	0,2241	0	142,3

INDK54 ULTBLK MIN

0,2	0	-123,45	0	-0,1195	0	-355,33
4,5	0	-57,86	0	-0,1195	0	27,84
8,8	0	-3,9	0	-0,1195	0	-322,05

Momen

M tumpuan max,  $M_{tmp} = 355,33$  kNm

M lapangan max,  $M_{lap} = 102,96$  kNm

Geser

V1 = 128,0183 kNm di: 0,2 m

V2 = 62,43635 kNm di: 4,5 m

Design penampang

$f_c' = 20$  MPa

$f_y = 58,0151$  ksi = 400 MPa

$\beta_1 = 0,85$

$\Phi = 0,8$

$E_c = 4700\sqrt{f_c'} = 4700\sqrt{20} = 21019,04$  MPa

$$E_s = 29000 \text{ ksi} = 199948 \text{ MPa}$$

$$M_u \text{ design} = 355,33 \text{ kNm}$$

$$M_n \text{ desain} = \frac{M_u}{\Phi} = \frac{355,33}{0,8}$$

$$= 444,163 \text{ kNm}$$

$$m = \frac{f_y}{0,85 f_c'} = \frac{400}{0,85 \times 20} = 23,52941$$

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

$$= \frac{0,85 \times 20,000}{400} \times 0,850 \times \frac{600}{600 + 400,000}$$

$$= 0,02168$$

$$\rho_{\max} = 0,75 \times \rho_b = 0,75 \times 0,021675 = 0,016256$$

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

$$\rho = \rho_{\max} = 0,016256$$

$$R_n = \rho \times f_y \times (1 - 0,5 \times \rho \times m)$$

$$= 0,01626 \times 400,000 \times (1 - 0,5 \times 0,01626 \times 23,529)$$

$$= 5,2589 \text{ MPa}$$

$$b d^2 = \frac{M_n \text{ desai}}{R_n} = \frac{444,1625 \times 1000000}{5,258896875}$$

$$= 8,4E+07 \text{ mm}^3$$

b, mm	d, mm
300	530,595
350	491,235
<b>400</b>	<b>459,509</b>
450	433,229
500	410,997

$$b \text{ pakai} = 400 \text{ mm}$$

$$d = 459,5086 \text{ mm}$$

$$d \text{ tulangan tekan} = 22 \text{ mm}$$

$$d \text{ tulangan tarik} = 22 \text{ mm}$$

$$d \text{ sengkang} = 10 \text{ mm}$$

$$\text{penutup beton} = 40 \text{ mm}$$

$$\text{jarak antar tulangan} = 25 \text{ mm}$$

$$d \text{ pakai} = 0,8 d$$

$$d \text{ pakai} = 0,8 \times 459,509 = 367,6069 \text{ mm}$$

$$d_s = \text{tebal penutup beton} + d \text{ sengkang} + d \text{ tulangan} / 2 + \text{spasi}$$

$$= 40 + 10 + 22/2 + 25,000$$

$$= 86 \text{ mm}$$

$$d' = \text{tebal penutup beton} + d \text{ sengkang} + d \text{ tulangan} / 2$$

$$= 40 + 10 + 22/2$$

$$= 61 \text{ mm}$$

$$h \text{ pakai} = d + d_s$$

$$= 367,607 + 86,000$$

$$= 453,607 \text{ mm}$$

$$= 650 \text{ mm}$$

$$d \text{ ada} = h - d_s$$

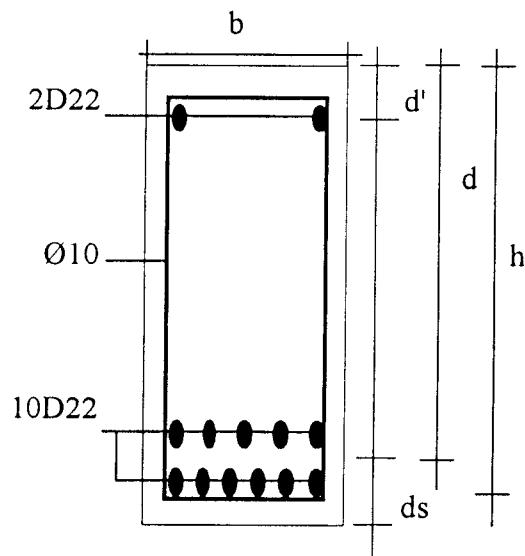
$$= 650 - 86,000$$

$$= 564 \text{ mm}$$

Jadi dimensi balok induk INDK54 : **400 / 650 (mm)**

Penulangan daerah Mu max

$$\begin{aligned}
 b &= 400 \text{ mm} \\
 h &= 650 \text{ mm} \\
 d &= 564 \text{ mm}
 \end{aligned}$$



$$\begin{aligned}
 x &= \frac{600 d}{600 + f_y} = \frac{600 \times 564,000}{600 + 400,000} \\
 &= 338,4 \text{ mm} \\
 a &= \beta_1 x = 0,85 \times 338,400 = 287,64 \text{ mm}
 \end{aligned}$$

$$Mn \text{ desain} = 444,163 \text{ kNm}$$

$$As_1 = \rho \times b \times d$$

$$0,01626 \times 400 \times 564 = 3667,41 \text{ mm}^2$$

$$T_1 = As_1 \times f_y = 3667,410 \times 400,000$$

$$= 1466964 \text{ Nmm}$$

$$Mn_1 = T_1 \times \left( d - \frac{a}{2} \right)$$

$$= 1466964 \times \left( 564 - \frac{287,64}{2} \right)$$

$$= 6,2E+08 \text{ Nmm}$$

$$= 616,389 \text{ kNm}$$

$$Mn2 = Mn - Mn1 = 444,163 - 616,389$$

$$= -172,226 \text{ kNm}$$

$$= 0 \text{ Nmm}$$

$$T2 = Cs = \frac{Mn2}{d - d'} = \frac{0}{564,000 - 61,000}$$

$$= 0 \text{ Nmm}$$

*periksa regangan:*

$$\epsilon_{cu} = 0,003$$

$$\epsilon_y = \frac{f_y}{E_s} = \frac{400}{199948}$$

$$= 0,002$$

$$\epsilon_s = \frac{(d - x)\epsilon_{cu}}{x} = \frac{(564,000 - 338,400) \times 0,003}{338,4}$$

$$= 0,002 < \epsilon_y = 0,002001 \text{ -- belum leleh --}$$

$$\epsilon_{s'} = \frac{(x - d')\epsilon_c}{x} = \frac{(338,400 - 61,000) \times 0,003}{338,4}$$

$$= 0,00246 \geq \epsilon_y = 0,002001 \text{ -- sudah leleh --}$$

$$f_{s'} = \epsilon_{s'} \times E_s$$

$$\epsilon_{s'} = 0,002$$



$$f_s' = \epsilon_s' \times E_s = 0,00200 \times 199947,962$$

$$= 400 \text{ MPa}$$

$$A_s' = \frac{C_s}{f_s'} = \frac{0}{400}$$

$$= 0 \text{ mm}^2$$

$$A_{s2} = \frac{T_2}{f_y} = \frac{0}{400}$$

$$= 0 \text{ mm}^2$$

$$A_s = A_{s1} + A_{s2} = 3667,410 + 0,000$$

$$= 3667,41 \text{ mm}^2$$

*pilih tulangan pakai:*

$$A_s' = 0 \text{ mm}^2$$

d	19	20	<b>22</b>	25	28
jml perlu	1	1	<b>1</b>	1	1

$$d \text{ tulangan} = 22 \text{ mm} \qquad \text{tul. per baris} = 6$$

$$\text{jml pakai} = 2 \qquad \text{jml baris} = 1$$

$$A_s' \text{ ada} = 760,265 \text{ mm}^2 \qquad \text{tul. baris terakhir} = 2$$

titik pusat luas tulangan:

$$\frac{(\text{jml tul. per brs}) \times [(\text{jml brs}-1)(\text{spasi}+d/2)] + (\text{tul. brs terakhir}) \times [d/2]}{\text{jml tul.}}$$

$$\begin{aligned}
 & 6 \times [ (1-1)(25+22/2) ] \\
 & = + 2 \times [ 22/2 ] \\
 & \hline
 & \qquad \qquad \qquad 2 \\
 & = \qquad \qquad 11 \text{ mm}
 \end{aligned}$$

$$d' = x_1 + d \text{ sengkang} + \text{penutup beton}$$

$$= 11,000 + 10 + 40$$

$$= 61 \text{ mm} \leq 61,000 \text{ mm -- OK --}$$

$$A_s = 3667,41 \text{ mm}^2$$

d	19	20	<b>22</b>	25	28
jml perlu	13	12	<b>10</b>	8	6

$$d \text{ tulangan} = 22 \text{ mm} \qquad \qquad \text{tul. per baris} = 6$$

$$\text{jml pakai} = 10 \qquad \qquad \qquad \text{jml baris} = 2$$

$$A_s \text{ ada} = 3801,33 \text{ mm}^2 \qquad \text{tul. baris terakhir} = 4$$

titik pusat luas tulangan:

$$\begin{aligned}
 & (\text{jml tul. per brs}) \times [(\text{jml brs}-1)(\text{spasi}+d/2)] \\
 x_1 & = +(\text{tul. brs terakhir}) \times [d/2] \\
 & \hline
 & \qquad \qquad \qquad \text{jml tul.}
 \end{aligned}$$

$$\begin{aligned}
 & 6 \times [ (2-1)(25+22/2) ] \\
 & = + 4 \times [ 22/2 ] \\
 & \hline
 & \qquad \qquad \qquad 10 \\
 & = \qquad \qquad 26 \text{ mm}
 \end{aligned}$$

$$\begin{aligned}
 ds &= x_1 + d \text{ sengkang} + \text{penutup beton} \\
 &= 26,000 + 10 + 40 \\
 &= 76 \text{ mm} \leq 86,000 \text{ mm -- OK --}
 \end{aligned}$$

$$\begin{aligned}
 d \text{ ada} &= h - ds \\
 &= 650 - 76,000 \\
 &= 574 \text{ mm}
 \end{aligned}$$

$$\begin{aligned}
 As_1 &= As - As' \quad 3801,327 - 760,265 \\
 &= 3041,06 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 \rho &= \frac{As_1}{b d} = \frac{3041,061689}{400,000 \times 574,000} \\
 &= 0,01325 \leq \rho \text{ max} = 0,016256 \text{ -- Ok --}
 \end{aligned}$$

*periksa kapasitas penampang:*

$$\begin{aligned}
 Cc &= 0,85 \times fc' \times b \times a = 0,85 \times 20,000 \times 400,000 \times a \\
 &= 6800 a
 \end{aligned}$$

$$\begin{aligned}
 Cs &= As' (fy - 0,85 \times fc') \\
 &= 760,265 \times (400,000 - 0,85 \times 20,000) \\
 &= 291182 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 T &= As \times fy = 3801,327 \times 400,000 \\
 &= 1520531 \text{ N}
 \end{aligned}$$

$$a = \frac{1520530,844 - 291181,657}{6800}$$

$$= 180,787 \text{ mm}$$

$$x = \frac{a}{\beta_1} = \frac{180,7866}{0,85}$$

$$= 212,69 \text{ mm}$$

*periksa regangan:*

$$\epsilon_{cu} = 0,003$$

$$\epsilon_y = \frac{f_y}{E_s} = \frac{400}{199948}$$

$$= 0,002$$

$$\epsilon_s = \frac{(d - x)\epsilon_{cu}}{x} = \frac{(564,000 - 212,690) \times 0,003}{212,6902}$$

$$= 0,00496 \geq \epsilon_y = 0,002001 \text{ -- sudah leleh --}$$

$$\epsilon_s' = \frac{(x - d')\epsilon_c}{x} = \frac{(212,690 - 61,000) \times 0,003}{212,6902}$$

$$= 0,00214 \geq \epsilon_y = 0,002001 \text{ -- sudah leleh --}$$

*hitung momen nominal:*

$$C_c = 6800 a = 6800,000 \times 180,787$$

$$= 1229349 \text{ N}$$

$$M_n = C_c (d - a/2) + C_s (d - d')$$

$$= 1229349,188 \times (564,000 - 180,787/2) +$$

$$291181,657 \times (564,000 - 61,000)$$

$$= 7,3E+08 \text{ Nmm} = 728,6924 \text{ kNm}$$

$$\geq M_n \text{ design} = 444,1625 \text{ kNm} \text{ -- Ok --}$$

Perencanaan tulangan geser balok induk

Dari data sap 2000, gaya geser penampang kritis:

$$V_1 = 128,0183 \text{ kNm} \quad \text{di:} \quad 0,2 \text{ m} = \quad 200 \text{ mm}$$

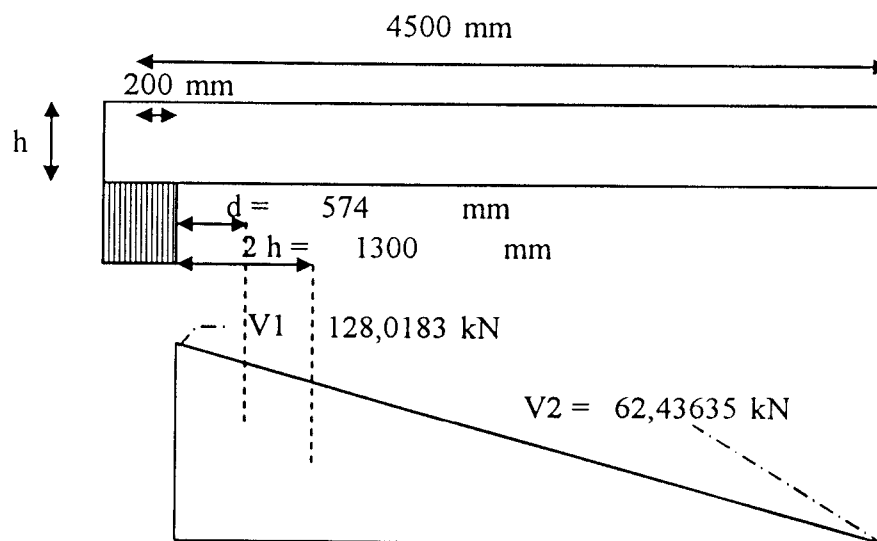
$$V_2 = 62,43635 \text{ kNm} \quad \text{di:} \quad 4,5 \text{ m} = \quad 4500 \text{ mm}$$

$$b = \quad 400 \text{ mm} \quad \quad \quad d \text{ sengkang} = \quad 10 \text{ mm}$$

$$h = \quad 650 \text{ mm} \quad \quad \text{jml kaki sengkang} = \quad 2 \text{ (vertikal)}$$

$$d = \quad 574 \text{ mm} \quad \quad \quad F_y = \quad 240 \text{ MPa}$$

$$\Phi = \quad 0,6$$



$$V_c = 1/6 \times \sqrt{f_c'} \times b \times d$$

$$= 171133,7 \text{ N}$$

$$= 171,1337 \text{ kN}$$

$$d/2 = 574,000/2$$

$$= \quad 287 \text{ mm}$$

$$d/4 = 574,000/4$$

$$= \quad 143,5 \text{ mm}$$

$$V_{s1} = 2 V_c = \quad 2 \times 171,134 = \quad 342,2675 \text{ kN}$$

$$V_{s2} = 4 V_c = \quad 4 \times 171,134 = \quad 684,5349 \text{ kN}$$

$$\Phi V_c = 0,6 \times 171,134 = 102,6802 \text{ kN}$$

$$\Phi 1/2 V_c = 1/2 \times 102,680 = 51,34012 \text{ kN}$$

$$\Phi V_{s1} = 0,6 \times 342,267 = 205,3605 \text{ kN}$$

$$\Phi V_{s2} = 0,6 \times 684,535 = 410,721 \text{ kN}$$

$$\Phi(V_c + V_{s1}) = \Phi 3 V_c = 0,6 \times (102,680 + 205,360) = 184,8244 \text{ kN}$$

$$\Phi(V_c + V_{s2}) = \Phi 5 V_c = 0,6 \times (102,680 + 410,721) = 308,0407 \text{ kN}$$

$$l_1 = 4500,000 - 200,000$$

$$= 4300 \text{ mm}$$

$$\Delta V_u = 128,018 - 62,436 = 65,58195 \text{ kN}$$

$$V_u \text{ pada jarak } d = 62,436 + \frac{4300,000 - 574,000}{4300} \times 65,582$$

$$= 119,264 \text{ kN}$$

$$\geq 1/2 V_c = 51,34012 \text{ kN} \quad \text{-- OK --}$$

$$\leq \Phi 5 V_c = 308,0407 \text{ kN} \quad \text{-- OK --}$$

$V_u$  berada pada daerah:

$$\Phi 1/2 V_c \quad \text{s.d.} \quad \Phi 3 V_c$$

$$2h = 1300 \text{ mm}$$

$$V_u \text{ pada jarak } 2h = 62,436 + \frac{4300,000 - 1300,000}{4300} \times 65,582$$

$$= 108,191 \text{ kN}$$

$$A_v = k_s \frac{1}{4} \pi d^2 \quad 2 \times \frac{1}{4} \pi \times 10^2$$

$$= 157,08 \text{ mm}$$

Daerah:  $\Phi V_c$  s/d  $\Phi 3 V_c$

$$V_u = 184,824 \text{ kN}$$

$$\Phi V_s = V_u - \Phi V_c = 184,824 - 102,680$$

$$= 82,1442 \text{ kN}$$

$$V_s \text{ perlu} = 82,1442 / 0,6$$

$$= 136,907 \text{ kN}$$

$$= 136907 \text{ N}$$

$$s = \frac{A_v \times f_y \times d}{V_s} = \frac{157,080 \times 240,000 \times 574,000}{136907}$$

$$= 158,058 \text{ mm}$$

$$s \text{ pakai} = 155 \text{ mm}$$

$$\leq d / 2 = 287 \text{ mm} \quad \text{-- OK --}$$

$$\leq 600 \text{ mm} \quad \text{-- OK --}$$

$$x = \frac{(\Phi V_c - V_2) \times 11}{\Delta V_u}$$

$$= \frac{(102,680 - 62,436) \times 4500,000}{65,58195}$$

$$= 2761,39$$

Daerah:  $\Phi 1/2 V_c$  s/d  $\Phi V_c$

$$V_u = 102,68 \text{ kN}$$

Tulangan geser minimum

$$s = \frac{3 A_v f_y}{b} = \frac{3,000 \times 157,080 \times 240,000}{400}$$

$$= 282,743 \text{ mm}$$

$$s \text{ pakai} = 280 \text{ mm}$$

$$\leq d / 2 = 287 \text{ mm} \quad \text{-- OK --}$$

$$\leq 600 \text{ mm} \quad \text{-- OK --}$$

$$x = \frac{(\Phi 1/2 V_c - V_2) \times l_1}{\Delta V_u}$$

$$= \frac{(51,340 - 62,436) \times 4500,000}{65,58195}$$

$$= -761,384$$



Rangkuman hasil perhitungan balok induk dapat di lihat pada tabel berikut ini.

Tabel IV-7 Hasil Perhitungan Balok Induk

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Panjang m	Lentur			Tumpuan			Daerah Gaya Geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$			
							As'	As	As'	As	As'	As	min	max	S	X	S	X	S	X	S	X
							mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
INDK4	-370,60	121,10	149,47	62,84	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-140	-	P10-155	2069,32	P10-285	-		
INDK11	-340,49	107,64	125,94	60,36	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-140	-	P10-155	2904,06	P10-285	-		
INDK18	-400,03	153,10	170,95	61,09	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-140	-	P10-155	1703,59	P10-285	-		
INDK32	-350,43	101,47	124,71	59,13	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-140	-	P10-155	2988,53	P10-285	-		
INDK54	-355,25	102,98	128,02	62,44	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-140	-	P10-155	2761,39	P10-285	-		
INDK78,79	-389,38	205,58	171,61	45,55	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	0	$\Phi 3Vc$	P10-140	-	P10-155	2039,39	P10-285	206,69		
INDK96-100	-483,15	240,81	236,15	81,34	400/650	9,00	2D22	10D22	2D22	10D22	2D22	10D22	$\Phi 1/2Vc$	$\Phi 5Vc$	P10-115	3008,07	P10-155	620,32	P10-285	-		
INDK1	-24,46	11,35	22,44	10,86	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	0	tidakperlu	-	-	P10-155	-	P10-235	-		
INDK5	-323,52	19,06	213,26	197,42	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-85	-	P10-155	-	P10-235	-		
INDK12	-320,60	22,31	214,41	198,57	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-85	-	P10-155	-	P10-235	-		
INDK19	-340,97	14,57	222,60	206,76	400/550	3,00	2D22	8D22	2D22	8D22	2D22	9D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-80	-	P10-155	-	P10-235	-		
INDK33	-302,67	34,12	199,86	184,02	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-95	-	P10-155	-	P10-235	-		
INDK56	-338,38	69,96	198,53	182,69	400/550	3,00	2D22	8D22	2D22	8D22	2D22	9D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-95	-	P10-155	-	P10-235	-		
INDK80	-336,28	50,68	183,57	167,73	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-110	-	P10-155	-	P10-235	-		

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang m	Lentur		Tumpuan				Daerah Gaya Geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$						
							As'	As	As'	As	As'	As	max	s	x	mm	mm	s	x	mm	mm	s	x	mm	mm
INDK101	-384,04	8,55	236,90	226,03	400/550	3,00	2D22	8D22	2D22	9D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-70	-	P10-155	-	P10-235	-							
INDK55	-355,25	102,98	128,02	62,44	400/550	9,00	2D22	8D22	2D22	9D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	1513,49	P10-235	-							
INDK57	-262,58	9,29	96,20	79,16	400/550	5,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	727,96	P10-235	-							
INDK81	-212,03	42,11	78,41	64,67	400/550	5,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	-	P10-235	-							
INDK89	-213,13	51,53	152,68	128,16	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	1422,64	P10-155	-	P10-235	-							
INDK90	-128,51	19,35	117,67	93,15	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-							
INDK91	-142,49	16,07	126,68	102,16	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-							
INDK92	-144,97	19,27	126,78	102,26	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-							
INDK93	-255,14	67,48	165,55	141,03	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 5Vc$	P10-115	635,43	P10-155	-	P10-235	-							
INDK67-71	-466,73	284,27	211,66	-39,60	400/550	6,00	2D22	8D22	3D22	11D22	0	$\Phi 5Vc$	P10-105	1978,34	P10-155	792,21	P10-235	50,87							
INDK72	-119,64	-26,73	58,45	44,79	400/550	2,50	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	-	P10-235	-							
INDK58	-30,54	7,47	33,72	20,06	400/550	2,50	2D22	8D22	2D22	8D22	0	tidak perlu	-	-	P10-155	-	P10-235	-							
INDK42,43	-392,04	207,07	216,44	182,70	400/550	6,00	2D22	8D22	2D22	10D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-85	-	P10-155	-	P10-235	-							
INDK44,45	-401,41	204,78	-217,30	183,55	400/550	6,00	2D22	8D22	2D22	10D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-80	-	P10-155	-	P10-235	-							
INDK46	-344,08	3,86	247,76	230,96	400/550	3,00	2D22	8D22	2D22	9D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-65	-	P10-155	-	P10-235	-							
INDK23	-231,29	65,18	152,71	132,80	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	1402,54	P10-155	-	P10-235	-							

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang		Lentur		Tumpuan		Daerah Gaya Geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi \frac{1}{2}Vc-\Phi Vc$						
						m	As'	As	As'	As	As'	As	mm	s	x	mm	s	x	mm	s	x	mm	s	x
INDK24	-143,18	17,93	121,14	95,92	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	P10-115	P10-155	P10-235								
INDK25	-140,69	8,36	117,49	92,26	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	P10-115	P10-155	P10-235								
INDK26	-126,72	14,21	113,21	87,98	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 3Vc$	P10-115	P10-155	P10-235								
INDK27	-240,70	61,93	160,49	135,26	400/550	3,00	2D22	8D22	2D22	8D22	2D22	8D22	$\Phi 5Vc$	P10-115	960,76	P10-235								
INDK6,9	-562,94	400,65	270,04	219,51	450/550	6,00	2D22	10D22	4D22	13D22	4D22	13D22	$\Phi 3Vc$	P10-60	P10-140	P10-235								
INDK13,1																								
6	-441,72	269,94	-212,82	-162,29	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-95	539,32	P10-235								
INDK20,2																								
8	-446,97	264,96	-212,85	-162,32	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-95	537,53	P10-235								
INDK37,4																								
7	-441,64	262,97	-211,40	-160,88	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-95	623,15	P10-235								
INDK59,7																								
3	-431,53	256,51	207,46	156,93	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-100	857,54	P10-235								
INDK84,9																								
4	-538,80	395,42	-271,46	-230,17	450/550	6,00	2D22	10D22	4D22	13D22	4D22	13D22	$\Phi 3Vc$	P10-60	P10-140	P10-235								
INDK2	-102,68	-6,19	47,41	32,72	450/550	3,00	2D22	9D22	2D22	9D22	2D22	9D22	0	tidak perlu	P10-140	P10-230	1384,53							
INDK7,10	-585,63	346,16	277,60	212,46	450/550	6,00	2D22	9D22	5D22	14D22	5D22	14D22	$\Phi 3Vc$	P10-60	P10-140	P10-235								
INDK14,1																								
7	-454,24	252,04	-226,22	-161,09	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-85	473,69	P10-235								
INDK21,2																								
9	-458,59	251,01	-226,81	-161,68	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-85	446,52	P10-235								
INDK38,4																								
8	-457,52	250,48	-226,69	-161,55	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-85	452,44	P10-235								
INDK60,7																								
4	-447,10	239,40	221,85	156,72	450/550	6,00	2D22	9D22	2D22	11D22	2D22	11D22	$\Phi 5Vc$	P10-90	674,98	P10-235								

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Panjang m	Lentur		Tumpuan		Daerah Gaya Geser		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
							As'	As	As'	As	min	max	s	X	s	X	s	X
INDK85,9	-526,32	388,90	-272,09	-235,78	450/550	6,00	2D22	10D22	4D22	13D22	Φ3Vc	Φ5Vc	P10-60	P10-140	P10-235	-	-	-
INDK3	-82,51	4,11	40,63	26,79	400/550	3,00	2D22	8D22	2D22	8D22	0	tidakperlu	-	P10-155	P10-235	-	-	-
INDK8	-320,65	55,41	113,29	85,97	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	P10-155	P10-235	-	-	-
INDK15	-182,35	24,87	79,37	52,05	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	P10-155	P10-235	-	-	-
INDK22	-192,21	20,32	83,97	56,65	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	P10-155	P10-235	-	-	-
INDK39,4	-198,37	138,67	-94,72	64,45	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	Φ3Vc	P10-115	P10-155	1949,54	P10-235	-	-
INDK61,7	-177,97	116,34	-84,78	59,04	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	P10-155	2923,18	P10-235	-	-
INDK88	-263,92	62,51	109,75	82,42	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	Φ3Vc	P10-115	P10-155	186,28	P10-235	-	-
INDK30	-283,79	59,95	174,87	168,86	400/550	3,00	2D22	8D22	2D22	8D22	Φ3Vc	Φ5Vc	P10-115	P10-155	-	P10-235	-	-
INDK36,4	-185,46	163,59	-142,17	-136,17	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	P10-155	-	P10-235	-	-
INDK50	-177,81	13,62	140,65	124,48	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	P10-155	-	P10-235	-	-
INDK62	-169,25	26,35	137,25	120,61	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	P10-155	-	P10-235	-	-
INDK76	-197,64	23,39	172,48	138,05	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ5Vc	P10-115	582,33	P10-155	P10-235	-	-
INDK86	-275,07	80,47	207,49	177,92	400/550	3,00	2D22	8D22	2D22	8D22	Φ3Vc	Φ5Vc	P10-90	P10-155	-	P10-235	-	-
INDK55	-355,25	102,98	128,02	62,44	400/550	9,00	2D22	8D22	2D22	9D22	Φ1/2Vc	Φ3Vc	P10-115	P10-155	1513,49	P10-235	-	-
INDK58	-30,54	7,47	33,72	20,06	400/550	2,50	2D22	8D22	2D22	8D22	0	tidakperlu	-	P10-155	-	P10-235	-	-

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Panjang m	Lentur		Tumpuan		Daerah Gaya Geser		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc					
							As'	As	As'	As	min	max	mm	mm	s	x	s	x	mm	mm	s	x
INDK34	-526,82	3,98	194,06	149,11	400/600	6,00	2D22	7D25	3D22	9D25	Φ5Vc	Φ10-125	1230,73	Φ10-155	-	Φ10-260	-	-				
INDK51,6 3,82	-698,98	391,32	-293,55	-84,89	400/600	6,00	2D22	7D25	6D22	11D25	Φ5Vc	Φ10-70	1204,70	Φ10-155	126,83	Φ10-260	-	-				
INDK35	-480,97	29,47	181,68	136,73	400/550	5,95	2D25	7D25	3D25	9D25	ΦVc	Φ10-115	984,57	Φ10-155	-	Φ10-235	-	-				
INDK52,6 4,83	-551,70	212,12	-218,79	-57,44	400/550	6,00	2D25	7D25	4D25	10D25	Φ1/2Vc	Φ10-95	1760,81	Φ10-155	503,56	Φ10-235	-	-				
INDK31	-286,52	70,45	194,99	165,67	400/550	3,00	2D22	8D22	2D22	8D22	Φ3Vc	Φ10-105	-	Φ10-155	-	Φ10-235	-	-				
INDK40	-206,95	11,12	160,19	134,97	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ10-115	978,40	Φ10-155	-	Φ10-235	-	-				
INDK53	-194,76	13,54	153,24	128,02	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ10-115	1391,35	Φ10-155	-	Φ10-235	-	-				
INDK65	-178,57	25,63	149,78	132,21	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ10-115	-	Φ10-155	-	Φ10-235	-	-				
INDK77	-189,08	14,80	159,85	131,56	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ10-115	1052,85	Φ10-155	-	Φ10-235	-	-				
INDK87	-269,48	78,95	219,07	190,77	400/550	3,00	2D22	8D22	2D22	8D22	Φ3Vc	Φ10-85	-	Φ10-155	-	Φ10-235	-	-				
INDK66	-17,64	16,60	29,97	12,37	400/550	3,00	2D22	8D22	2D22	8D22	0	tidakperlu	-	Φ10-155	-	Φ10-235	-	-				
L a n t a i																						
INDK105	-206,11	122,56	114,15	27,51	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc	Φ10-115	Φ10-155	2940,34	Φ10-235	755,55	-				
INDK112	-175,38	123,10	97,27	27,44	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc	Φ10-115	Φ10-155	3652,88	Φ10-235	942,41	-				
INDK119	-234,19	175,70	150,21	29,78	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc	Φ10-115	Φ10-155	2030,47	Φ10-235	458,80	-				
INDK133	-176,43	125,21	98,79	28,69	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc	Φ10-115	Φ10-155	3558,56	Φ10-235	858,43	-				
INDK156	-175,49	123,37	99,02	28,36	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc	Φ10-115	Φ10-155	3551,19	Φ10-235	872,49	-				

Hasil	M tumpuan		M	V tumpuan	V lapangan	Ukuran	Panjang	Lentur			Tumpuan			Daerah Gaya Geser			Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc		
	kNm	kNm	kNm	kN	kN	mm	m	As'	As	As	As'	As	As'	min	max	s	X	mm	s	X	mm	s	X
INDK179,180	-233,24	189,12	154,21	36,86	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ3Vc				P10-115	4392,92	P10-155	1812,30	P10-235			199,42
INDK208-212	-302,29	220,20	211,26	37,34	400/550	9,00	2D22	8D22	2D22	8D22	0	Φ5Vc				P10-95	2951,64	P10-155	1210,41	P10-235			122,14
INDK102	-14,31	8,22	20,00	6,24	400/600	3,00	2D22	9D22	2D22	9D22	0	tidak perlu						P10-155		P10-260			
INDK106	-139,53	-9,37	90,35	74,51	400/600	3,00	2D22	9D22	2D22	9D22	Φ1/2Vc	ΦVc						P10-155		P10-260			
INDK113	-146,97	-5,87	95,61	79,77	400/600	3,00	2D22	9D22	2D22	9D22	Φ1/2Vc	ΦVc						P10-155	1315,86	P10-260			
INDK120	-175,64	18,78	127,28	111,44	400/600	3,00	2D22	9D22	2D22	9D22	ΦVc	Φ3Vc						P10-155		P10-260			
INDK134	-566,41	212,76	279,00	263,16	400/600	3,00	2D22	9D22	3D22	12D22	Φ3Vc	Φ5Vc						P10-155		P10-260			
INDK157	-357,08	92,97	213,63	197,79	400/600	3,00	2D22	9D22	2D22	9D22	Φ3Vc	Φ5Vc						P10-155		P10-260			
INDK181	-215,35	-6,10	117,12	101,27	400/600	3,00	2D22	9D22	2D22	9D22	ΦVc	Φ3Vc						P10-155		P10-260			
INDK213	-194,26	-32,32	106,37	95,50	400/600	3,00	2D22	9D22	2D22	9D22	ΦVc	Φ3Vc						P10-155		P10-260			
INDK151	-263,63	124,03	120,52	103,51	400/600	3,00	2D20	7D25	2D20	7D25	ΦVc	Φ3Vc						P10-155		P10-255			
INDK158	-591,06	70,41	230,69	197,48	400/600	5,00	2D22	7D25	4D22	10D25	Φ3Vc	Φ5Vc						P10-155		P10-260			
INDK182	-127,02	26,21	61,39	39,56	400/600	5,00	2D22	7D25	2D22	7D25	0	ΦVc						P10-155		P10-255			755,46
INDK190	-76,70	28,21	66,24	41,72	400/400	3,00	2D22	6D22	2D22	6D22	Φ1/2Vc	ΦVc						P10-155	1157,53	P10-165			
INDK191	-62,85	25,67	65,30	40,78	400/400	3,00	2D22	6D22	2D22	6D22	Φ1/2Vc	ΦVc						P10-155	1214,89	P10-165			
INDK192	-58,72	17,45	65,88	41,36	400/400	3,00	2D22	6D22	2D22	6D22	Φ1/2Vc	ΦVc						P10-155	1179,48	P10-165			
INDK204	-69,56	20,36	75,83	51,30	400/400	3,00	2D22	6D22	2D22	6D22	Φ1/2Vc	Φ3Vc						P10-155	571,23	P10-165			

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang m	Lentur		Tumpuan		Daerah Gaya Geser		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
							As'	As	As	As'	min	max	S	X	S	X	S	X
							mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
INDK205	-85,21	38,20	66,04	41,51	400/400	3,00	2D22	6D22	2D22	6D22	Φ1/2Vc	ΦVc	-	P10-155	1170,03	P10-165	-	-
INDK168- 172	-490,05	230,28	-196,69	-17,24	400/550	6,00	2D22	8D22	4D22	12D22	0	Φ5Vc	P10-105	5691,98	P10-155	2841,97	P10-235	1060,72
INDK173	-101,04	-25,59	49,67	37,86	400/550	3,00	2D22	8D22	2D22	8D22	0	ΦVc	-	P10-155	-	P10-235	471,27	
INDK159	-28,39	3,20	29,74	17,93	400/550	3,00	2D22	8D22	2D22	8D22	0	tidakperlu	-	P10-155	-	P10-235	-	
INDK143; 144	-235,45	216,68	172,13	141,20	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ5Vc	P10-115	991,04	P10-155	-	P10-235	-
INDK145; 146	-228,11	183,87	-149,91	-118,97	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	-	P10-155	-	P10-235	-
INDK147	-144,80	-7,27	106,13	90,77	400/550	3,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	-	P10-155	-	P10-235	-
INDK124	-82,35	40,94	64,93	45,03	400/550	3,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	-	P10-155	-	P10-235	-
INDK125	-66,62	18,96	73,16	48,63	400/550	3,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	-	P10-155	-	P10-235	-
INDK126	-60,08	6,15	58,57	34,04	400/550	3,00	2D22	8D22	2D22	8D22	0	ΦVc	-	-	P10-155	-	P10-235	490,35
INDK127	-61,87	14,96	62,66	38,13	400/550	3,00	2D22	8D22	2D22	8D22	0	ΦVc	-	-	P10-155	-	P10-235	240,16
INDK128	-82,12	34,66	66,55	42,03	400/550	3,00	2D22	8D22	2D22	8D22	0	ΦVc	-	-	P10-155	-	P10-235	1,85
INDK110; 107	-265,29	170,53	173,77	123,25	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ5Vc	P10-115	1672,66	P10-155	-	P10-235	-
INDK114; 117	-244,32	96,67	-139,45	-88,92	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	-	P10-155	-	P10-235	-
INDK121; 129	-236,43	98,70	136,25	85,73	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	-	P10-155	-	P10-235	-

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang m	Lentur		Tumpuan		Daerah Gaya		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
							As'	As	As'	As	min	max	s	x	s	x	s	x
INDK138; 148	-250,78	151,65	-158,29	-107,76	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	2591,98	P10-155	P10-155	P10-235	-
INDK160; 174	-236,01	87,49	133,23	82,71	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	Φ3Vc	P10-115	-	P10-155	83,78	P10-235	-
INDK185; 206	-269,59	189,61	-177,11	-135,82	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ5Vc	P10-115	1133,27	P10-155	-	P10-235	-
INDK103	-99,20	-17,69	49,26	33,72	400/550	3,00	2D22	8D22	2D22	8D22	0	ΦVc	-	-	P10-155	-	P10-235	751,47
INDK108; 111	-342,77	179,91	193,78	128,64	400/550	6,00	2D22	8D22	2D22	9D22	ΦVc	Φ5Vc	P10-105	1079,91	P10-155	-	P10-235	-
INDK115; 118	-255,87	114,96	153,71	-88,58	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	2894,41	P10-155	-	P10-235	-
INDK122; 130	-261,18	115,09	155,41	90,27	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	2816,13	P10-155	-	P10-235	-
INDK139; 149	-268,25	169,65	174,90	-109,77	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ5Vc	P10-115	1918,36	P10-155	-	P10-235	-
INDK161; 175	-254,41	104,20	149,13	84,00	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	Φ3Vc	P10-115	-	P10-155	5,57	P10-235	-
INDK186; 207	-288,43	208,25	-193,46	-156,69	400/550	6,00	2D22	8D22	2D22	8D22	Φ3Vc	Φ5Vc	P10-100	-	P10-155	-	P10-235	-
INDK104	-67,21	-5,40	39,97	24,49	400/550	3,00	2D22	8D22	2D22	8D22	0	tidakperlu	-	-	P10-155	-	P10-235	-
INDK109	-238,84	41,43	90,05	62,73	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	Φ3Vc	P10-115	-	P10-155	2349,05	P10-235	-
INDK116	-130,99	22,89	63,42	36,10	400/550	6,00	2D22	8D22	2D22	8D22	0	ΦVc	-	-	P10-155	-	P10-235	654,51
INDK123	-225,88	42,16	87,03	59,71	400/550	6,00	2D22	8D22	2D22	8D22	Φ1/2Vc	ΦVc	-	-	P10-155	2680,76	P10-235	-
INDK140; 150	-269,53	200,52	-120,52	89,64	400/550	6,00	2D22	8D22	2D22	8D22	ΦVc	Φ3Vc	P10-115	-	P10-155	-	P10-235	-



Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang m	Lentur		Tumpuan		Daerah Gaya Geser			$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$	
							As'	As	As'	As	min	max	s	X	s	X	s	X	
							mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
INDK162; 176	-256,31	185,38	-120,13	-83,06	400/550	6,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	85,85	P10-235	-	-
INDK189	-241,38	34,56	105,28	77,96	400/550	6,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	676,29	P10-235	-	-
INDK131	-245,74	56,21	153,85	147,84	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi Vc$	$\Phi 3Vc$	P10-130	-	P10-140	-	P10-260	-	-
INDK137; 142	-187,56	135,82	-132,95	-126,94	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi Vc$	$\Phi 3Vc$	P10-130	-	P10-140	-	P10-260	-	-
INDK152	-308,08	75,24	190,35	174,65	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi Vc$	$\Phi 3Vc$	P10-130	1362,05	P10-140	-	P10-260	-	-
INDK163	-389,50	40,73	291,67	275,96	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-65	-	P10-140	-	P10-260	-	-
INDK177	-296,29	69,55	252,11	218,96	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-85	-	P10-140	-	P10-260	-	-
INDK187	-232,66	100,16	166,68	138,39	450/600	3,00	2D22	10D22	2D22	10D22	$\Phi Vc$	$\Phi 3Vc$	P10-130	-	P10-140	-	P10-260	-	-
INDK135	-338,85	-13,84	126,78	86,09	400/550	5,95	2D22	8D22	2D22	9D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-	-
INDK153; 164;183	-462,36	345,14	-249,65	-53,09	400/550	12,00	2D22	9D22	3D22	11D22	$\Phi 1/2Vc$	$\Phi 5Vc$	P10-70	3051,71	P10-155	975,14	P10-235	-	-
INDK136	-270,88	5,57	109,41	68,73	400/550	5,95	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	1125,59	P10-235	-	-
INDK154; 165;184	-348,26	194,49	-167,10	-23,16	400/550	6,00	2D22	8D22	2D22	9D22	0	$\Phi 5Vc$	P10-115	5374,26	P10-155	2556,63	P10-235	795,61	-
INDK132	-106,65	41,00	83,73	55,43	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	-	P10-235	-	-
INDK141	-100,08	2,93	86,77	62,25	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	1337,81	P10-235	-	-
INDK155	-84,86	10,39	74,10	49,57	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	-	P10-235	-	-
INDK166	-80,04	26,17	77,14	61,44	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-155	-	P10-235	-	-

Hasil	M tumpuan kNm	M lapangan kNm	V tumpuan kN	V lapangan kN	Ukuran mm	Pan- jang m	Lentur		Tumpuan		Daerah Gaya Geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$		
							As'	As	As	As'	min	max	s	x	s	x	s	x	
INDK178	-108,31	20,98	97,26	68,96	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	803,65	P10-235	-	
INDK188	-81,68	46,63	102,26	73,96	400/550	3,00	2D22	8D22	2D22	8D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-115	-	P10-155	538,70	P10-235	-	
INDK167	-13,48	14,77	25,17	9,97	400/550	3,00	2D22	8D22	2D22	8D22	0	tidakperlu	-	-	P10-155	-	P10-235	-	
A t a p																			
INDK193; 195	250,70	124,63	106,15	92,80	400/550	6,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-	
INDK198; 201	-270,58	110,51	107,17	93,82	400/550	6,00	2D22	8D22	2D22	8D22	$\Phi Vc$	$\Phi 3Vc$	P10-115	-	P10-155	-	P10-235	-	
INDK194	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK197	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK200	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK203	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK196	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK199	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	
INDK202	-58,72	17,45	65,88	41,36	400/550	3,00	2D22	8D22	2D22	8D22	0	$\Phi Vc$	-	-	P10-155	-	P10-235	42,83	

Sedangkan hasil perhitungan balok induk sebelumnya adalah sebagai berikut.

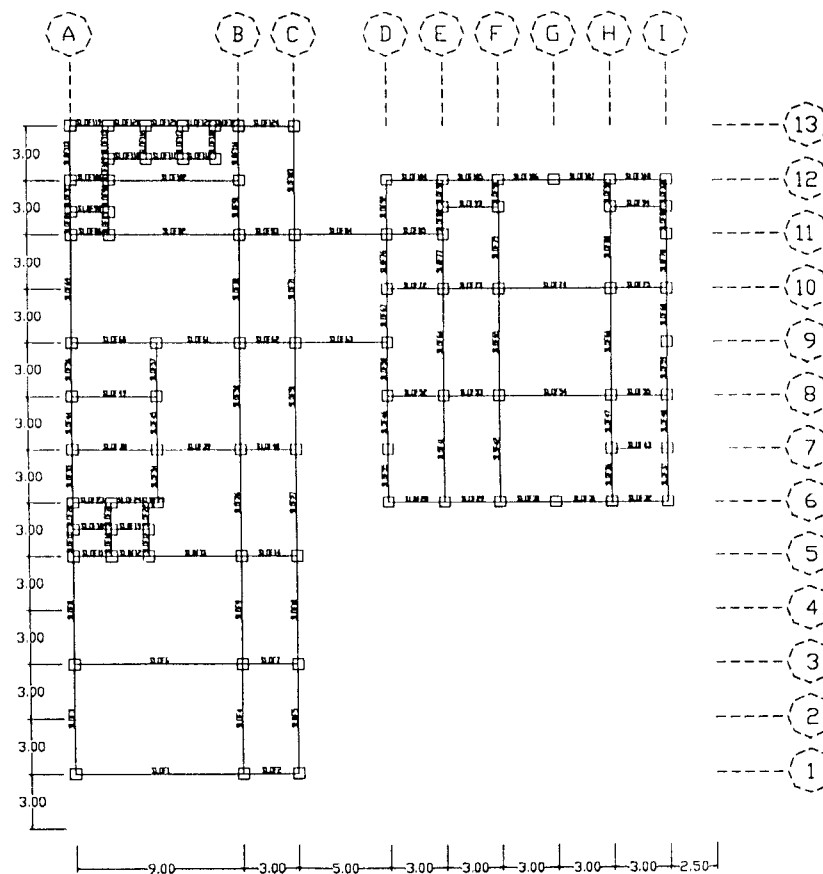
**Tabel IV-8 Hasil perhitungan balok induk sebelum perencanaan**

Sebelum Perencanaan Ulang	Ukuran	As	Sengkang
	mm		
balok lantai			
b1	300/600	6D22	P10-100
b2	300/600	5D22	P10-100
b1'	300/600	6D22	P10-100
b1''	300/600	4D22	P10-100
b3	300/600	5D19	P10-150
b4	300/600	6D19	P10-100
b4'	300/600	6D19	P10-150
b5	250/400	6D16	P8-100
b5'	250/400	8D16	P8-150
b6	300/400	6D19	P10-100
b7	300/400	7D19	P10-100
b7'	300/400	4D19	P10-150
b8	300/400	3D22	P10-150
b8'	300/600	5D22	P10-150
b9	150/300	2D16	P8-150
b10	200/300	2D16	P8-150
b11	400/800	10D22	P10-100
b12	150/300	3D16	P8-100
b3'	300/700	11D19	P10-100
b5''	250/600	9D16	P8-100

#### 4. 6. Perencanaan Balok Penahan Tembok Dan Balok Ring

Perencanaan balok penahan tembok dan balok ring menggunakan perencanaan balok dengan tulangan sebelah. Gaya-gaya yang dipergunakan untuk merencanakan di ambil dari perhitungan SAP 2000.

Perletakan dari balok-balok penahan tembok dapat di lihat pada gambar berikut ini.



Gambar IV-15 Letak Balok Penahan Tembok

Adapun langkah-langkah perhitungannya untuk balok penahan tembok dan juga untuk balok ring adalah sebagai berikut ini.

## Perencanaan Balok Penahan Tembok

## Balok SLOF1

$$M \text{ tumpuan max, } M_{tmp} = -207,614 \text{ kNm}$$

$$M \text{ lapangan max, } M_{lap} = 59,10954 \text{ kNm}$$

$$V1(\text{tump}) = 84,57756 \text{ kNm di: } 0,2 \text{ m}$$

$$V2(\text{lap}) = 31,79934 \text{ kNm di: } 4,5 \text{ m}$$

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

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

$$\beta_1 = 0,85$$

$$\Phi = 0,8$$

$$E_c = 21019,04 \text{ MPa}$$

$$E_s = 200000 \text{ MPa}$$

$$M_u \text{ design} = 207,6141 \text{ kNm}$$

$$M_n \text{ desain} = \frac{M_u}{\Phi} = \frac{207,6141}{0,8}$$

$$= 259,5176 \text{ kNm}$$

$$m = \frac{f_y}{0,85 f_c'} = \frac{400}{0,85 \times 20}$$

$$= 23,52941$$

$$\begin{aligned}\rho_b &= \frac{0,85 \times f_c'}{f_y} \times \beta_1 \times \frac{600}{600 + f_y} \\ &= \frac{0,85 \times 20,000}{400} \times 0,850 \times \frac{600}{600 + 400,000} \\ &= 0,021675\end{aligned}$$

$$\begin{aligned}\rho_{\max} &= 0,75 \times \rho_b &= 0,75 \times 0,02168 \\ &= 0,016256\end{aligned}$$

$$\begin{aligned}\rho_{\min} &= 1,4 \div f_y &= 1,4 \div 400 \\ &= 0,0035\end{aligned}$$

$$\begin{aligned}\rho &= \rho_{\max} \\ &= 0,016256\end{aligned}$$

$$\begin{aligned}R_n &= \rho \times f_y \times (1 - 0,5 \times \rho \times m) \\ &= 0,01626 \times 400 \times (1 - 0,5 \times 0,01626 \times 23,529) \\ &= 5,258897 \text{ MPa}\end{aligned}$$

$$\begin{aligned}bd^2 &= M_n \div R_n &= 259,518 \times 1000000 \div 5,259 \\ &= 49348301 \text{ mm}^3\end{aligned}$$

$$b \text{ pakai} = 300 \text{ mm} \quad \text{tulangan} = 25 \text{ mm}$$

$$d_{\text{perlu}} = 405,579 \text{ mm} \quad d \text{ pakai} = 1 \text{ d}$$

$$d \text{ tulangan tekan} = 22 \text{ mm} \quad d \text{ pakai} = 405,579 \text{ mm}$$

$$d \text{ tulangan tarik} = 22 \text{ mm} \quad \text{sumsi brs}' = 2$$

$$d \text{ sengkang} = 10 \text{ mm} \quad \text{asumsi brs} = 1$$

$$\text{penutup beton} = 40 \text{ mm}$$

$$d_s = p_b + d \text{ sengkang} + d \text{ tul}/2$$

$$= 40 + 10 + 22/2$$

$$= 61 \text{ mm}$$

$$d' = p_b + d \text{ sengkang} + d \text{ tul}/2 + \text{spasi}$$

$$= 40 + 10 + 22/2 + 25$$

$$= 86 \text{ mm}$$

$$h \text{ perlu} = d \text{ perlu} + d_s$$

$$= 405,579 + 61,000$$

$$\approx 500 \text{ mm}$$

$$h \text{ pakai} = 600 \text{ mm}$$

(di sesuaikan dg balok lainnya)

$$d \text{ ada} = h \text{ pakai} - d_s = 600 - 61,000$$

$$= 539 \text{ mm}$$

dimensi balok SLOF1 : **300 / 600** (mm)

Tumpuan

$$b = 300 \text{ mm} \quad R_n = 5,258897 \text{ MPa}$$

$$h = 600 \text{ mm} \quad \rho = 0,016256$$

$$d = 539 \text{ mm} \quad M_u = 207,6141 \text{ kNm}$$

$$\Phi = 0,8$$

$$M_u/\phi = \frac{207,6141}{0,8}$$

$$= 259,5176 \text{ kNm}$$

$$bd^2 = 300,000 \times 539,000^2$$

$$= 87156300 \text{ mm}^3$$

$$R_n \text{ baru} = \frac{M_u/\phi}{bd^2} = \frac{259,5176}{87156300}$$

$$= 2,977612 \text{ MPa}$$

$$\rho \text{ baru} = \rho \times R_n \text{ baru} / R_n$$

$$= 0,0163 \times 2,978 / 5,259$$

$$= 0,009204$$

$$A_s' \text{ perlu} = \rho \times b \times d$$

$$= 0,00920 \times 300 \times 539$$

$$= 1488,346 \text{ mm}^2$$

$$d \text{ tulangan} = 22 \text{ mm} \quad \text{tul.akhir} = 4$$

$$\text{jml perlu} = 4 \quad x1 = 11 \text{ mm}$$

$$A_s \text{ ada} = 1520,531 \text{ mm}^2 \quad ds = 61 \text{ mm}$$

$$\text{tul./baris} = 4 \quad \text{jbd} = 37,33333 \text{ mm}$$

$$\text{jml baris} = 1 \text{ --Ok--}$$

$$\text{tulangan} = \mathbf{4D22}$$



Lapangan

$$b = 300 \text{ mm} \quad R_n = 5,258897 \text{ MPa}$$

$$h = 600 \text{ mm} \quad \rho = 0,016256$$

$$d = 539 \text{ mm} \quad \mu = 59,10954 \text{ kNm}$$

$$\Phi = 0,8$$

$$\frac{\mu}{\Phi} = \frac{59,10954}{0,8}$$

$$= 73,88693 \text{ kNm}$$

$$bd^2 = 300,000 \times 539,000^2$$

$$= 87156300 \text{ mm}^3$$

$$R_n \text{ baru} = \frac{\frac{\mu}{\Phi}}{bd^2} = \frac{73,88693}{87156300}$$

$$= 0,847752 \text{ MPa}$$

$$\rho \text{ baru} = \rho \times R_n \text{ baru} / R_n$$

$$= 0,0163 \times 0,848 / 5,259$$

$$= 0,002621$$

$$A_s' \text{ perlu} = \rho \times b \times d$$

$$= 0,00262 \times 300 \times 539$$

$$= 423,745 \text{ mm}^2$$

$$d \text{ tulangan} = 22 \text{ mm} \quad \text{tul.akhir} = 2$$

$$\text{jml perlu} = 2 \quad x1 = 11 \text{ mm}$$

$$\begin{aligned}
 \text{As ada} &= 760,2654 \text{ mm}^2 & \text{ds} &= 61 \text{ mm} \\
 \text{tul./baris} &= 4 & \text{jbd} &= 37,33333 \text{ mm} \\
 \text{jml baris} &= 1 \text{ --Ok--} \\
 \text{tulangan} &= \mathbf{2D22}
 \end{aligned}$$

Perencanaan tulangan geser balok sloof

Dari data sap 2000, gaya geser penampang kritis:

$$V_1 = 84,57756 \text{ kNm} \quad b = 300 \text{ mm}$$

$$\text{pada } 200 \text{ mm} \quad h = 84,57756 \text{ mm}$$

$$V_2 = 31,79934 \text{ kNm} \quad d = 405,579 \text{ mm}$$

$$\text{pada } 4500 \text{ mm}$$

$$\Phi = 0,6$$

$$d \text{ sengkang} = 10 \text{ mm}$$

$$\text{kaki sengkang} = 2 \text{ (vertikal)}$$

$$F_y = 240 \text{ MPa}$$

$$V_c = 90,69022 \text{ kN} \quad \Phi V_c = 54,41413 \text{ kN}$$

$$d/2 = 202,7895 \text{ mm} \quad \Phi \frac{1}{2}V_c = 27,20707 \text{ kN}$$

$$d/4 = 101,3948 \text{ mm}$$

$$V_{s1} = 181,3804 \text{ kN} \quad \Phi V_{s1} = 108,8283 \text{ kN}$$

$$V_{s2} = 362,7609 \text{ kN} \quad \Phi V_{s2} = 217,6565 \text{ kN}$$

$$\Phi(V_c + V_{s1}) = \Phi 3 V_c = 97,94544 \text{ kN}$$

$$\Phi(V_c + V_{s2}) = \Phi 5 V_c = 163,2424 \text{ kN}$$

$$l_1 = 4300 \text{ mm}$$

$$\Delta V_u = 52,77822 \text{ kN}$$

$$V_u \text{ pada jarak } d = 79,59948 \text{ kN} \quad > \Phi \frac{1}{2} V_c = 27,20707 \text{ -- Ok --}$$

$$\leq \Phi 5 V_c = 163,2424 \text{ -- Ok --}$$

$V_u$  berada pada daerah:  $\Phi \frac{1}{2} V_c$  s/d  $\Phi 3 V_c$

$$2h = 169,1551 \text{ mm}$$

$$V_u \text{ pada jarak } 2h = 82,50135 \text{ kN}$$

$$A_v = 157,0796 \text{ mm}$$

Daerah:  $\Phi V_c$  s/d  $\Phi 3 V_c$

$$V_u = 97,94544 \text{ kN} \quad x = 1928,193 \text{ mm}$$

$$\Phi V_s = 43,53131 \text{ kN}$$

$$V_s \text{ perlu} = 72552,18 \text{ N}$$

$$s = \frac{A_v \times F_y \times d}{V_s}$$

$$= 210,7444 \text{ mm}$$

$$s \text{ pakai} = 200 \text{ mm} \quad < d / 2 = 202,7895 \text{ -- Ok --}$$

$$< 600 \text{ -- Ok --}$$

Daerah:  $\frac{1}{2} \Phi V_c$  s/d  $\Phi V_c$

$$V_u = 54,41413 \text{ kN} \quad x = - \text{ mm}$$

$$s = \frac{A_v \times F_y \times d}{V_s}$$

$$= 376,9911 \text{ mm}$$

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

$$< d / 2 = 202,7895 \text{ -- Ok --}$$

$$< 600 \text{ -- Ok --}$$

$$\Phi V_s = 127,4164 \text{ kN}$$

$$V_s \text{ ada} = 212360,7 \text{ N}$$

Hasil perhitungan balok penahan dapat dilihat pada tabel berikut ini.  
Tabel IV-9 Hasil perhitungan balok penahan tembok

Balok P. Tembok	Ukuran		As'	As	Daerah Gaya geser			Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	
SLOF1	300/600	4D22	2D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-200	1928	P10-200	-	-
SLOF6	300/600	4D22	2D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-200	1908	P10-200	-	-
SLOF11	300/600	5D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-110	-	-	-	-	-	-
SLOF12	300/600	2D22	2D22	3D22	ΦVc	Φ3Vc	-	-	P10-155	-	-	-	-
SLOF13	300/600	5D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-205	-	-	-	-
SLOF18	300/600	2D22	2D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-75	108	P10-75	-	-
SLOF19	300/600	2D22	2D22	2D22	0	Φ3Vc	-	-	P10-50	853	P10-50	260	-
SLOF23	300/600	2D22	2D22	2D22	ΦVc	Φ5Vc	P10-50	706	P10-100	-	-	-	-
SLOF24	300/600	2D22	2D22	2D22	0	ΦVc	-	-	P10-65	1070	P10-65	418	-
SLOF25	300/600	2D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-40	-	-	-	-
SLOF38	300/600	4D22	2D22	2D22	ΦVc	Φ5Vc	P10-95	1149	P10-195	-	-	-	-
SLOF39	300/600	4D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-190	-	-	-	-
SLOF49	300/600	2D22	2D22	2D22	0	Φ3Vc	-	-	P10-90	978	P10-90	125	-

Balok P. Tembok	Ukuran		As'	As	Daerah Gaya geser		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc			Φ <sup>1/2</sup> Vc-ΦVc	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	s, mm
SLOF60	300/600	3D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF61	300/600	5D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-210	-	-	-	-
SLOF81	300/600	3D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-165	-	-	-	-
SLOF82	300/600	3D22	2D22	2D22	ΦVc	Φ5Vc	P10-70	15	P10-145	-	-	-	-
SLOF98	300/600	4D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-
SLOF101	300/600	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-90	-	-	-	-	-	-
SLOF102	300/600	2D22	2D22	2D22	ΦVc	Φ5Vc	P10-55	741	P10-115	-	-	-	-
SLOF110	300/600	2D22	2D22	2D22	0	tidak perlu	-	-	-	-	-	-	-
SLOF111	300/600	2D22	2D22	2D22	Φ <sup>1/2</sup> Vc	Φ3Vc	-	-	P10-65	508	P10-65	-	-
SLOF112	300/600	2D22	2D22	2D22	0	ΦVc	-	-	P10-70	1135	P10-70	434	-
SLOF119	300/600	2D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-120	-	-	-	-
SLOF120	300/600	6D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-120	-	-	-	-	-	-
SLOF121	300/600	2D22	2D22	3D22	ΦVc	Φ5Vc	P10-80	393	P10-160	-	-	-	-
SLOF122	300/600	2D22	2D22	3D22	ΦVc	Φ3Vc	-	-	P10-165	-	-	-	-



Balok P. Tembok	Ukuran		As'	As	Daerah Gaya geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi \frac{1}{2}Vc-\Phi Vc$		
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	s, mm
SLOF32	300/400	5D22	2D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-80	-	-	-	-	-	-
SLOF43	250/300	2D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	-	-	P10-95	139	P10-95	-	-
SLOF52	300/450	5D22	2D22	2D22	$\Phi Vc$	$\Phi 3Vc$	-	-	P10-180	-	-	-	-
SLOF53	300/450	5D22	2D22	2D22	$\Phi Vc$	$\Phi 5Vc$	P10-95	920	P10-190	-	-	-	-
SLOF54	300/450	5D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-90	3496	P10-180	53	P10-180	-	-
SLOF55	300/450	5D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-90	3496	P10-180	53	P10-180	-	-
SLOF72	300/450	3D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-140	2890	P10-140	-	-
SLOF73	300/450	5D22	3D22	3D22	$\Phi Vc$	$\Phi 5Vc$	P10-90	471	P10-185	-	-	-	-
SLOF74	300/450	5D22	2D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-90	-	-	-	-	-	-
SLOF75	300/450	3D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-140	2719	P10-140	-	-
SLOF85	250/250	2D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-80	9930	P10-80	-	-
SLOF93	300/450	5D22	2D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-90	-	-	-	-	-	-
SLOF94	300/450	2D22	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	-	-	P10-65	776	P10-65	-	-



Balok P. Tembok	Ukuran mm	As'	As	Daerah Gaya geser		Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
SLOF104	300/400	4D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-145	1868	P10-145	-
SLOF105	300/400	4D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-
SLOF106	300/400	4D22	2D22	Φ3Vc	Φ5Vc	P10-70	-	-	-	-	-
SLOF107	300/400	4D22	2D22	Φ3Vc	Φ5Vc	P10-70	-	-	-	-	-
SLOF108	300/400	4D22	2D22	Φ3Vc	Φ5Vc	P10-70	-	-	-	-	-
SLOF3	300/500	6D22	2D22	ΦVc	Φ3Vc	-	-	P10-205	-	-	-
SLOF8	300/500	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-205	-	-	-
SLOF15	300/500	6D22	3D22	Φ3Vc	Φ5Vc	P10-105	-	-	-	-	-
SLOF20	300/500	2D22	3D22	Φ3Vc	Φ5Vc	P10-65	-	-	-	-	-
SLOF33	300/500	6D22	3D22	Φ3Vc	Φ5Vc	P10-110	-	-	-	-	-
SLOF44	300/500	6D22	3D22	ΦVc	Φ5Vc	P10-105	452	P10-210	-	-	-
SLOF56	300/500	5D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-
SLOF69	300/500	4D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-
SLOF86	300/500	2D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-85	540	P10-85	-

Balok P. Tembok	Ukuran mm	As'	As	Daerah Gaya geser				$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi \frac{1}{2}Vc-\Phi Vc$	
				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
SLOF95	300/500	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	-	-	P10-70	657	P10-70	-	-	
SLOF113	300/500	2D22	2D22	$\Phi Vc$	$\Phi 5Vc$	P10-20	661	P10-45	-	-	-	-	
SLOF16	300/550	2D22	2D22	$\Phi Vc$	$\Phi 3Vc$	-	-	P10-80	-	-	-	-	
SLOF21	300/550	2D22	2D22	0	$\Phi Vc$	-	-	P10-50	786	P10-50	123	-	
SLOF87	300/550	6D22	3D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-105	-	-	-	-	-	-	
SLOF96	300/550	3D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-70	-	-	-	-	-	-	
SLOF109	300/550	3D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-80	-	-	-	-	-	-	
SLOF115	300/550	5D22	3D22	$\Phi Vc$	$\Phi 3Vc$	-	-	P10-205	-	-	-	-	
SLOF17	300/500	2D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-50	-	-	-	-	-	-	
SLOF22	300/500	2D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	-	-	P10-80	250	P10-80	-	-	
SLOF116	300/500	2D22	2D22	$\Phi Vc$	$\Phi 5Vc$	P10-45	399	P10-95	-	-	-	-	
SLOF117	300/500	2D22	2D22	$\Phi Vc$	$\Phi 3Vc$	-	-	P10-90	-	-	-	-	
SLOF118	300/500	2D22	2D22	$\Phi Vc$	$\Phi 3Vc$	-	-	P10-95	-	-	-	-	
SLOF34	300/500	2D22	2D22	$\Phi Vc$	$\Phi 5Vc$	P10-55	1259	P10-115	-	-	-	-	

Balok P. Tembok	Ukuran mm	As'	As	Daerah Gaya geser			Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	
SLOF45	300/500	2D22	2D22	ΦVc	Φ5Vc	P10-55	1269	P10-110	-	-	-	
SLOF57	300/500	6D22	3D22	ΦVc	Φ5Vc	P10-100	559	P10-205	-	-	-	
SLOF4	300/550	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-205	-	-	-	
SLOF9	300/550	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	
SLOF26	300/550	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	
SLOF50	300/550	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	
SLOF70	300/550	5D22	2D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	
SLOF91	300/550	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-120	-	-	-	
SLOF114	300/550	6D22	3D22	Φ3Vc	Φ5Vc	P10-110	-	-	-	-	-	
SLOF5	300/400	4D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-145	2148	P10-145	-	
SLOF10	300/400	4D22	2D22	Φ1/2Vc	ΦVc	-	-	P10-140	2750	P10-140	-	
SLOF27	300/400	4D22	2D22	Φ1/2Vc	ΦVc	-	-	P10-140	2731	P10-140	-	
SLOF51	300/400	4D22	2D22	Φ1/2Vc	ΦVc	-	-	P10-140	2732	P10-140	-	
SLOF71	300/400	7D22	2D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	

Balok P. Tembok	Ukuran		As'	As	Daerah Gaya geser			Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	
SLOF103	300/400	3D22	2D22	2D22	0	Φ3Vc	-	-	P10-125	1453	P10-125	276	
SLOF35	300/500	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-90	-	-	-	-	-	-
SLOF46	300/500	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF58	300/500	2D22	2D22	2D22	ΦVc	Φ5Vc	P10-50	1149	P10-100	-	-	-	-
SLOF67	300/500	4D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-
SLOF76	300/500	5D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-95	-	-	-	-	-	-
SLOF92	300/500	6D22	3D22	2D22	ΦVc	Φ3Vc	-	-	P10-210	-	-	-	-
SLOF41	300/450	4D22	2D22	2D22	Φ1/2Vc	ΦVc	-	-	P10-150	8346	P10-150	-	-
SLOF64	300/450	5D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-
SLOF77	300/450	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF88	300/450	2D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-50	-	-	-	-
SLOF97	300/450	2D22	2D22	2D22	Φ1/2Vc	Φ3Vc	-	-	P10-70	62	P10-70	-	-
SLOF42	300/450	5D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-185	-	-	-	-
SLOF65	300/450	2D22	2D22	2D22	0	Φ5Vc	P10-45	2737	P10-95	1416	P10-95	591	

Balok P. Tembok	Ukuran		As'	As	Daerah Gaya geser			Φ3Vc-Φ5Vc		ΦVc-Φ3Vc		Φ½Vc-ΦVc	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	
SLOF79	300/450	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF98	300/450	5D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-
SLOF36	300/500	5D22	3D22	3D22	ΦVc	Φ3Vc	-	-	P10-195	-	-	-	-
SLOF47	300/500	5D22	3D22	3D22	ΦVc	Φ3Vc	-	-	P10-200	-	-	-	-
SLOF66	300/500	4D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-175	-	-	-	-
SLOF80	300/500	4D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-165	-	-	-	-
SLOF99	300/500	4D22	3D22	3D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-
SLOF37	300/450	5D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-90	-	-	-	-	-	-
SLOF48	300/450	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF59	300/450	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF68	300/450	4D22	2D22	2D22	Φ3Vc	Φ5Vc	P10-80	-	-	-	-	-	-
SLOF78	300/450	2D22	2D22	2D22	ΦVc	Φ5Vc	P10-55	1115	P10-115	-	-	-	-
SLOF89	300/450	2D22	2D22	2D22	ΦVc	Φ3Vc	-	-	P10-115	-	-	-	-
SLOF100	300/450	5D22	3D22	3D22	ΦVc	Φ3Vc	-	-	P10-180	-	-	-	-

Sedangkan hasil perhitungan sebelumnya adalah sebagai berikut.

Tabel IV-10 Hasil perhitungan balok penahan tembok

Sebelum Perencanaan Ulang	Ukuran	As	Sengkang
	mm		
balok sloof			
S1	200/400	6D16	P8-150
S2	200/350	4D16	P8-150
S3	200/300	2D16	P8-150

Rangkuman hasil perhitungan balok ring dapat dilihat pada tabel berikut ini.

Tabel IV-11 Hasil perhitungan balok ring

Balok Ring	Ukuran		As'	As	Daerah Gaya geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
RING3	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-65	4736	P10-65	1730
RING5	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-60	4269	P10-60	1553
RING7	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-55	4124	P10-55	1586
RING9	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-60	4283	P10-60	1681
RING11	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-60	4191	P10-60	1405
RING13	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-65	4941	P10-65	1805
RING4	250/350		5D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-85	13741	P10-175	829	P10-175	-
RING6	250/350		4D22	2D22	$\Phi 1/2Vc$	$\Phi 3Vc$	P10-75	13829	P10-150	2617	P10-150	-
RING8	250/300		3D22	2D22	0	$\Phi Vc$	-	-	P10-120	7470	P10-120	1933
RING10	250/300		3D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-115	4648	P10-115	-
RING12	250/300		3D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-125	4759	P10-125	-

Balok Ring	Ukuran mm	As'	As	Daerah Gaya geser				$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$	
				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
RING14	250/350	5D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-170	6149	P10-170	-	-	-
RING1	250/250	2D22	2D22	0	$\Phi Vc$	-	-	P10-75	5277	P10-75	-	-	2268
RING2	250/250	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-60	1915	P10-60	-	-	-
RING15	250/250	2D22	2D22	0	$\Phi Vc$	-	-	P10-85	6125	P10-85	-	-	2430
RING16	250/250	2D22	2D22	$\Phi Vc$	$\Phi 3Vc$	P10-30	4345	P10-65	-	P10-65	-	-	-
RING22	250/450	6D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-110	-	P10-220	-	P10-220	-	-	-
RING24	250/400	5D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-95	-	P10-190	-	P10-190	-	-	-
RING26	250/300	4D22	3D22	0	$\Phi Vc$	-	-	P10-130	6217	P10-130	-	-	279
RING28	250/400	5D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-95	-	P10-195	-	P10-195	-	-	-
RING30	250/300	4D22	3D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-135	5859	P10-135	-	-	-
RING32	250/450	6D22	2D22	$\Phi 3Vc$	$\Phi 5Vc$	P10-115	-	P10-230	-	P10-230	-	-	-
RING23	250/250	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-40	1832	P10-40	-	-	-
RING25	250/250	2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-50	2349	P10-50	-	-	-



Balok Ring	Ukuran		As'	As	Daerah Gaya geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
RING27	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-55	2659	P10-55	-
RING29	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-45	1704	P10-45	-
RING31	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-55	2127	P10-55	-
RING33	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-50	2870	P10-50	501
RING17	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-90	2368	P10-90	-
RING18	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-45	1524	P10-45	-
RING19	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-40	2503	P10-40	618
RING20	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-45	2261	P10-45	202
RING21	250/250		2D22	2D22	0	$\Phi Vc$	-	-	P10-40	2389	P10-40	370
RING34	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-80	1755	P10-80	-
RING35	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-50	2197	P10-50	-
RING36	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-40	1912	P10-40	-
RING37	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-40	1612	P10-40	-

Balok Ring	Ukuran		As'	As	Daerah Gaya geser		$\Phi 3Vc-\Phi 5Vc$		$\Phi Vc-\Phi 3Vc$		$\Phi 1/2Vc-\Phi Vc$	
	mm				min	max	s, mm	x, mm	s, mm	x, mm	s, mm	x, mm
RING38	250/250		2D22	2D22	$\Phi 1/2Vc$	$\Phi Vc$	-	-	P10-50	1848	P10-50	-

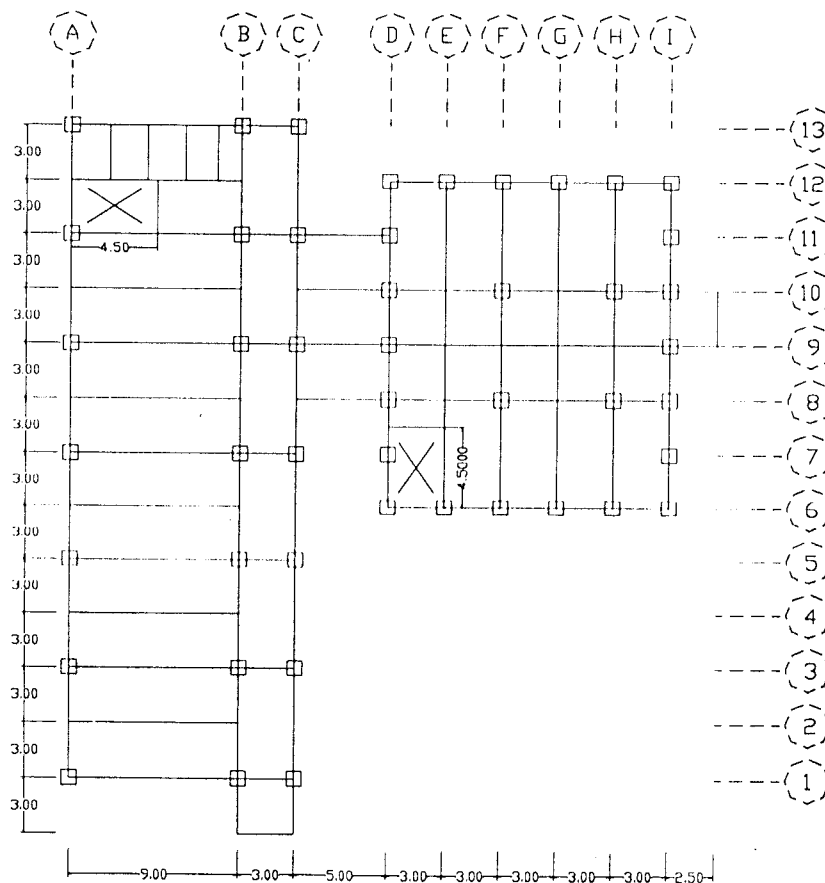
Sedangkan hasil perhitungan balok ring sebelumnya adalah sebagai berikut.

Tabel IV-12 Hasil perhitungan balok ring

Sebelum Perencanaan Ulang	Ukuran	As	Sengkang
	mm		
R1	250/400	3D16	P8-150
R1'	250/400	6D16	P8-150
R2	150/300	2D16	P8-150
R3	250/400	3D16	P8-150
R4	250/400	3D16	P8-150
R7	150/400	4D16	P8-150
R5	200/400	3D16	P8-150
R6	200/300	3D16	P8-150

#### 4. 7. Perencanaan Kolom

Kolom direncanakan sebagai kolom persegi. Perencanaan menggunakan hasil-hasil yang di peroleh dari analisis struktur, seperti halnya momen dan gaya geser. Tulangan yang dipakai adalah persentase tulangan yang di peroleh dari diagram interaksi kolom dengan menggunakan gaya aksial, momen arah x, dan momen arah y. Sedangkan letak kolom dapat dilihat dari gambar berikut ini.



Gambar IV-16 Perletakan kolom

Untuk merencanakan kolom digunakan beberapa langkah perhitungan.

Berikut ini adalah contoh perhitungan salah satu kolom.

## Perencanaan Tulangan Kolom

Hasil SAP Kolom K1

FRAME

LOC	P	V2	V3	T	M2	M3
-----	---	----	----	---	----	----

ULTKLM MAX

0	610,31	473,03	601,16	2,75	1747,87	1343,68
1,4	615,85	473,03	601,16	2,75	906,24	689,8
2,8	621,38	473,03	601,16	2,75	105,12	196,76

ULTKLM MIN

0	-1722,62	-500,49	-613,18	-2,75	-1763,94	-1362,89
1,4	-1717,08	-500,49	-613,18	-2,75	-905,48	-670,57
2,8	-1711,55	-500,49	-613,18	-2,75	-87,53	-139,09

$$P_u = 1722,619 \text{ kN}$$

$$M_u x = 1763,938 \text{ kNm}$$

$$M_u y = 1362,891 \text{ kNm}$$

$$V_u = 613,1828 \text{ kN}$$

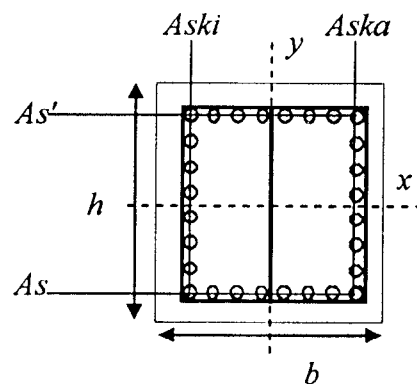
$$L = 2,8 \text{ m}$$

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

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

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

$$b = 750 \text{ mm}$$



$$h = 750 \text{ mm}$$

$$d = 690 \text{ mm}$$

$$\Phi = 0,65$$

$$P_u/\Phi = 1722,619 / 0,65 = 2650,183 \text{ kN}$$

$$M_{ux}/\Phi = 1763,938 / 0,65 = 2713,751 \text{ kNm}$$

$$M_{uy}/\Phi = 1362,891 / 0,65 = 2096,755 \text{ kNm}$$

$$\beta_1 = 0,85$$

Arah x

$$P_n \text{ desain} = 2650,183 \text{ kN}$$

$$M \text{ desain} = 2713,751 \text{ kNm}$$

$$e = \frac{M_u/\Phi}{P_u/\Phi} = \frac{2713,751}{2650,183} = 1,023986 \text{ m}$$

dari grafik  $P_u$  &  $M_n$ :

$$\%A_{st} = 2,80\%$$

$$A_{st} = \%A_{st} \times b \times h = 2,800\% \times 750 \times 750$$

$$= 15750 \text{ mm}^2$$

$$D. \text{ tul} = 36 \text{ mm}$$

$$\text{jml. perlu} = 16$$

$$\text{jml. pakai} = 16$$

$$\text{pakai} = 16 \text{ } \emptyset 36$$

$$A_{st} = n \times \frac{1}{4} \times \pi \times D^2 = 16 \times \frac{1}{4} \times \pi \times 36^2$$

$$= 16286,02 \text{ mm}^2$$

$$A_s = A_s' = \frac{1}{2} A_{st} = \frac{1}{2} \times 16286,016$$

$$= 8143,008 \text{ mm}^2$$

$$x_b = \frac{600 d}{600 + f_y} = \frac{600 \times 690,000}{600 + 400,000}$$

$$= 414 \text{ mm}$$

$$a_b = x_b \beta_1 = 414,000 \times 0,850$$

$$= 351,9 \text{ mm}$$

$$f_s' = \frac{x_b - d'}{x_b} \times 600 = \frac{414 - 60}{414} \times 600$$

$$= 513,0435 \text{ Mpa}$$

$$> \quad f_y = 400 \text{ MPa}$$

$$\text{maka } f_s' = 400 \text{ Mpa}$$

$$P_{nb} = \beta_1 \times f_c' \times b \times d + A_s \times f_y - A_s' \times f_s'$$

$$= 0,85 \times 20,000 \times 750,000 \times 351,900 + 8143,008 \times 400,000$$

$$- 8143,008 \times 400,000$$

$$= 4486725 \text{ N} \quad = 4486,725 \text{ kN}$$

$$M_{nb} = 0,85 f_c' b a (h/2 - a/2) + A_s' (f_s' - 0,85 f_c') (h/2 - d') + A_s f_y (d - h/2)$$

$$= 0,85 \times 20,000 \times 750,000 \times 351,900 \times (750,000/2 - 351,900/2)$$

$$+ 8143,008 \times (400,000 - 0,85 \times 20,000) \times (750,000/2 - 60,000)$$

$$+ 8143,008 \times 400,000 \times (690,000 - 750,000/2)$$

$$= 2901,515 \text{ kNm}$$

$$e_b = 0,646689 \text{ m}$$

$$e < e_b: \text{Patah Desak}$$

Patah Desak

$$e = 1023,986 \text{ mm}$$

$$P_n = \frac{A_s \cdot f_y}{\left(\frac{e}{d-d'} + 0,5\right)} + \frac{b \cdot h \cdot f_c'}{\left(3 \cdot h \cdot \frac{e}{d^2} + 1,18\right)}$$

$$P_n = \frac{8143,008 \cdot 400}{\left(\frac{1023,986}{690 - 60} + 0,5\right)} + \frac{750 \cdot 750 \cdot 20}{\left(3 \cdot 750 \cdot \frac{1023,986}{690^2} + 1,18\right)}$$

$$= 3401534 \text{ N} \qquad = 3401,534 \text{ kN}$$

$$> P_n \text{ desain} = 2650,183 \text{ kN} \quad \text{--Ok--}$$

Arah y

$$P_n \text{ desain} = 2650,183 \text{ kN}$$

$$M \text{ desain} = 2096,755 \text{ kNm}$$

$$e = \frac{M_u / \phi}{P_u / \phi} = \frac{2096,755}{2650,183}$$

$$= 0,791174 \text{ m}$$



dari grafik Pu & Mn:

$$\%A_{st} = 2,80\%$$

$$A_{st} = \%A_{st} \times b \times h = 2,800\% \times 750 \times 750$$

$$= 15750 \text{ mm}^2$$

$$D. \text{ tul} = 36 \text{ mm}$$

$$\text{jml. perlu} = 16$$

$$\text{jml. pakai} = 16$$

$$\text{pakai} = 16 \text{ } \emptyset 36$$

$$A_{st} = n \times \frac{1}{4} \times \pi \times D^2 = 16 \times \frac{1}{4} \times \pi \times 36^2$$

$$= 16286,02 \text{ mm}^2$$

$$A_{ski} = A_{ska} = \frac{1}{2} A_{st} = \frac{1}{2} \times 16286,016$$

$$= 8143,008 \text{ mm}^2$$

$$x_b = \frac{600 d}{600 + f_y} = \frac{600 \times 690,000}{600 + 400,000}$$

$$= 414 \text{ mm}$$

$$a_b = x_b \beta_1 = 414,000 \times 0,850$$

$$= 351,9 \text{ mm}$$

$$f_s' = \frac{x_b - d'}{x_b} \times 600 = \frac{414 - 60}{414} \times 600$$

$$= 513,0435 \text{ Mpa} > f_y =$$

$$\text{maka } f_s' = 400 \text{ Mpa}$$

$$\begin{aligned}
 P_{nb} &= \beta_1 \times f_c' \times b \times d + A_s \times f_y - A_s' \times f_s' \\
 &= 0,85 \times 20,000 \times 750,000 \times 351,900 + 8143,008 \times 400,000 \\
 &\quad - 8143,008 \times 400,000 \\
 &= 4486725 \text{ N} \qquad \qquad \qquad = 4486,725 \text{ kN}
 \end{aligned}$$

$$\begin{aligned}
 M_{nb} &= 0,85 f_c' b a (h/2 - a/2) + A_s' (f_s' - 0,85 f_c') (h/2 - d') + A_s f_y (d - h/2) \\
 &= 0,85 \times 20,000 \times 750,000 \times 351,900 \times (750,000/2 - 351,900/2) \\
 &= 8143,008 \times (400,000 - 0,85 \times 20,000) \times (750,000/2 - 60,000) \\
 &\quad + 8143,008 \times 400,000 \times (690,000 - 750,000/2) \\
 &= 2901,515 \text{ kNm}
 \end{aligned}$$

$$e_b = 0,646689 \text{ m} \qquad e < e_b: \text{Patah Desak}$$

Patah Desak

$$e = 791,1738 \text{ mm}$$

$$P_n = \frac{A_s \cdot f_y}{\left(\frac{e}{d-d'} + 0,5\right)} + \frac{b \cdot h \cdot f_c'}{\left(3 \cdot h \cdot \frac{e}{d^2} + 1,18\right)}$$

$$\begin{aligned}
 P_n &= \frac{8143,008 \cdot 400}{\left(\frac{791,174}{690 - 60} + 0,5\right)} \\
 &\quad + \frac{750 \cdot 750 \cdot 20}{\left(3 \cdot 750 \cdot \frac{791,174}{690^2} + 1,18\right)} \\
 &= 4142125 \text{ N} \qquad \qquad \qquad = 4142,125 \text{ kN}
 \end{aligned}$$

$$> P_n \text{ design} = 2650,183 \text{ kN} \qquad \text{--Ok--}$$

Perencanaan tulangan geser kolom

$$V_u = 613,1828 \text{ kNm}$$

$$L = 2800 \text{ mm}$$

$$b = 750 \text{ mm}$$

$$h = 750 \text{ mm}$$

$$d = 690 \text{ mm}$$

$$\Phi = 0,6$$

$$d \text{ sengkang} = 10 \text{ mm}$$

$$\text{kaki sengkang} = 3 \text{ (vertikal)}$$

$$F_y = 240 \text{ MPa}$$

$$V_c = 1/6 \sqrt{f_c'} b d = 1/6 \sqrt{20,000 \times 750,000 \times 690,000}$$

$$= 385721,7 \text{ N}$$

$$= 385,7217 \text{ kN}$$

$$d/2 = 345 \text{ mm}$$

$$d/4 = 172,5 \text{ mm}$$

$$V_{s1} = 2 \times V_c = 2 \times 385,722$$

$$= 771,4435 \text{ kN}$$

$$V_{s2} = 4 \times V_c = 4 \times 385,722$$

$$= 1542,887 \text{ kN}$$

$$\Phi V_c = 0,600 \times 385,722 = 231,433 \text{ kN}$$

$$\Phi \frac{1}{2} V_c = 0,600 \times 192,861 = 115,7165 \text{ kN}$$

$$\Phi V_{s1} = 0,600 \times 771,443 = 462,8661 \text{ kN}$$

$$\Phi V_{s2} = 0,600 \times 1542,887 = 925,7321 \text{ kN}$$

$$\Phi(V_c + V_{s1}) = \Phi 3V_c = 0,600 \times (385,722 + 771,443) = 416,5795 \text{ kN}$$

$$\Phi(V_c + V_{s2}) = \Phi 5V_c = 0,600 \times (385,722 + 1542,887) = 694,2991 \text{ kN}$$

$$l_1 = 2800 \text{ mm}$$

$$V_u = 613,1828 \text{ kN} > \Phi \frac{1}{2} V_c = -\text{Ok}-$$

$$\leq \Phi 5V_c = -\text{Ok}-$$

$V_u$  berada pd daerah:  $\Phi 3 V_c$  s/d  $\Phi 5 V_c$

$$A_v = k \times \frac{1}{4} \times \pi \times D \text{ sengkang}^2 = 3,000 \times \frac{1}{4} \times \pi \times 10,000^2$$

$$= 235,6194 \text{ mm}$$

Daerah:  $\Phi 3V_c$  s/d  $\Phi 5V_c$

$$V_u = 613,1828 \text{ kN}$$

$$\Phi V_s = V_u - \Phi V_c$$

$$= 381,7498 \text{ kN}$$

$$= 381749,8 \text{ N}$$

$$V_s \text{ perlu} = \frac{\Phi V_s}{\Phi} = \frac{381749,8}{0,6}$$

$$= 636249,6 \text{ N}$$

$$s = \frac{235,619 \times 240,000 \times 690,000}{636249,607}$$

$$= 61,3259 \text{ mm}$$

$$s \text{ pakai} = 60 \text{ mm} \leq d / 4 \quad -\text{Ok}-$$

$$\leq 300 \quad -\text{Ok}-$$

Hasil perhitungan kolom sebelum perencanaan ulang adalah sebagai berikut ini.

Tabel IV-13 Hasil perhitungan kolom sebelum perencanaan ulang

Sebelum Perencanaan Ulang	Ukuran	As	Sengkang	Letak
	mm			
k1	400/400	16D22	P10-100	A3,A5,A7,A9,A11, B1,B3,B5,B7,B9,B11, F8,F10, H8,H10
k2	400/400	12D22	P10-100	A1,A13,B13
k3	300/300	12D22	P10-100	C1,C3,C5,C7,C9,C11, D6-D12,E6,E12, F6,F12, G6,G12, H6,H12, I6-I12

Rangkuman hasil perhitungan kolom adalah sebagai berikut ini.

Tabel IV-14 Hasil perhitungan kolom

Hasil Perhitungan Kolom Pondasi

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		S <sub>pakai</sub> , mm
					$\Phi$ 3 Vc	$\Phi$ 5 Vc	
K1	A1	750 / 750	16 Ø36	12 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 60
K2	B1	800 / 800	12 Ø36	12 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K3	C1	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 185
K4	A3	850 / 850	16 Ø36	10 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 55
K5	B3	850 / 850	14 Ø36	12 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 55
K6	C3	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 185
K7	A5	850 / 850	16 Ø36	10 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K8	B5	850 / 850	14 Ø36	10 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 55
K9	C5	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 190
K10	D6	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 345
K11	E6	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 230
K12	F6	750 / 750	6 Ø36	6 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 280

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		Spakai, mm
K13	G6	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K14	H6	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 240
K15	I6	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 345
K16	A7	850 / 850	16 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K17	B7	850 / 850	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K18	C7	1000 / 1000	10 Ø36	10 Ø36	Φ 1/2 Vc	Φ Vc	P10- 165
K19	D7	750 / 750	10 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 135
K20	I7	750 / 750	10 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 145
K21	D8	750 / 750	8 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 130
K22	F8	850 / 850	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 70
K23	H8	850 / 850	12 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 70
K24	I8	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 170
K25	A9	850 / 850	16 Ø36	12 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K26	B9	850 / 850	14 Ø36	12 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K27	C9	1150 / 1150	14 Ø36	14 Ø36	Φ 1/2 Vc	Φ Vc	P10- 145
K28	D9	1150 / 1150	14 Ø36	14 Ø36	Φ 1/2 Vc	Φ Vc	P10- 145
K29	I9	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 160
K30	D10	1100 / 1100	12 Ø36	12 Ø36	Φ 1/2 Vc	Φ Vc	P10- 150
K31	F10	1000 / 1000	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 40
K32	H10	950 / 950	18 Ø36	16 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 40
K33	I10	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 165
K34	A11	850 / 850	16 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K35	B11	850 / 850	14 Ø36	16 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K36	C11	850 / 850	8 Ø36	8 Ø36	Φ Vc	Φ 3 Vc	P10- 395
K37	D11	750 / 750	8 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 130
K38	I11	750 / 750	8 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 150

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		Spakai, mm
K39	D12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 345
K40	E12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 230
K41	F12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 265
K42	G12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 285
K43	H12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 240
K44	I12	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 345
K45	A13	850 / 850	12 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 75
K46	B13	850 / 850	12 Ø36	12 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K47	C13	750 / 750	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 200
Hasil Perhitungan Kolom Lt. 1							
K48	A1	700 / 700	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K49	B1	800 / 800	12 Ø36	12 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K50	C1	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 185
K51	A3	850 / 850	16 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K52	B3	850 / 850	14 Ø36	14 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K53	C3	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 140
K54	A5	850 / 850	16 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K55	B5	850 / 850	14 Ø36	12 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K56	C5	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 150
K57	D6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 185
K58	E6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 160
K59	F6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 180
K60	G6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 175
K61	H6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 165
K62	I6	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 160
K63	A7	850 / 850	16 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		Spakai, mm
					$\Phi$ 3 Vc	$\Phi$ 5 Vc	
K64	B7	850 / 850	14 $\emptyset$ 36	12 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K65	C7	1000 / 1000	10 $\emptyset$ 36	10 $\emptyset$ 36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 165
K66	D7	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 95
K67	I7	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 90
K68	D8	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 95
K69	F8	850 / 850	14 $\emptyset$ 36	10 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 45
K70	H8	850 / 850	14 $\emptyset$ 36	12 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K71	I8	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 95
K72	A9	850 / 850	16 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K73	B9	850 / 850	14 $\emptyset$ 36	12 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K74	C9	1150 / 1150	14 $\emptyset$ 36	14 $\emptyset$ 36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 145
K75	D9	1150 / 1150	14 $\emptyset$ 36	14 $\emptyset$ 36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 145
K76	I9	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 90
K77	D10	1100 / 1100	12 $\emptyset$ 36	12 $\emptyset$ 36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 150
K78	I10	700 / 700	6 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 90
K79	A11	850 / 850	16 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K80	B11	850 / 850	16 $\emptyset$ 36	12 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 45
K81	C11	850 / 850	8 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 395
K82	D11	700 / 700	10 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 95
K83	I11	700 / 700	6 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 90
K84	D12	700 / 700	6 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 185
K85	E12	700 / 700	6 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 145
K86	F12	700 / 700	6 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 155
K87	G12	700 / 700	6 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 160
K88	H12	700 / 700	6 $\emptyset$ 36	8 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 145
K89	I12	700 / 700	6 $\emptyset$ 36	6 $\emptyset$ 36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 165



Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		S <sub>pakai</sub> , mm
K90	A13	850 / 850	12 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 80
K91	B13	850 / 850	12 Ø36	14 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 50
K92	C13	700 / 700	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 155
Hasil Perhitungan Kolom Lt. 2							
K93	A1	600 / 600	12 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 75
K94	B1	600 / 600	10 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 65
K95	C1	600 / 600	6 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K96	A3	700 / 700	14 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K97	B3	700 / 700	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K98	C3	600 / 600	8 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 180
K99	A5	700 / 700	14 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K100	B5	700 / 700	12 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K101	C5	600 / 600	6 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 205
K102	D6	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K103	E6	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K104	F6	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K105	G6	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K106	H6	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 235
K107	I6	600 / 600	6 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 220
K107	A7	600 / 600	6 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 220
K109	B7	700 / 700	10 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K110	C7	1000 / 1000	10 Ø36	10 Ø36	Φ 1/2 Vc	Φ Vc	P10- 165
K111	D7	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 165
K112	I7	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K113	D8	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K114	F8	750 / 750	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55

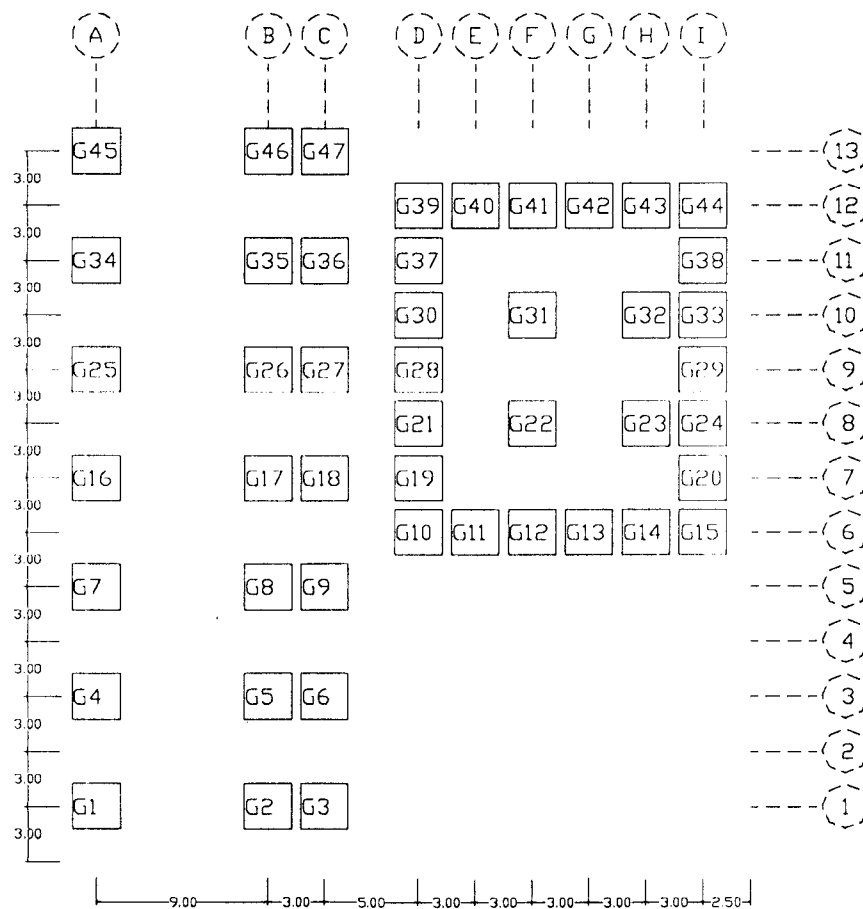
Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		S <sub>pakai</sub> , mm
K115	H8	750 / 750	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K116	I8	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K117	A9	700 / 700	14 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K118	B9	700 / 700	12 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K119	C9	1150 / 1150	14 Ø36	14 Ø36	tidak perlu tulangan geser		
K120	D9	1150 / 1150	14 Ø36	14 Ø36	tidak perlu tulangan geser		
K121	I9	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K122	D10	1100 / 1100	12 Ø36	12 Ø36	tidak perlu tulangan geser		
K123	I10	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K124	A11	700 / 700	14 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 55
K125	B11	750 / 750	6 Ø36	6 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 60
K126	C11	850 / 850	8 Ø36	8 Ø36	Φ 1/2 Vc	Φ Vc	P10- 195
K127	D11	600 / 600	4 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K128	I11	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 135
K129	D12	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K130	E12	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K131	F12	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K132	G12	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K133	H12	600 / 600	4 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 270
K134	I12	600 / 600	6 Ø36	4 Ø36	Φ Vc	Φ 3 Vc	P10- 230
K135	A13	600 / 600	12 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 70
K136	B13	700 / 700	10 Ø36	10 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 85
K137	C13	600 / 600	6 Ø36	6 Ø36	Φ Vc	Φ 3 Vc	P10- 270
Hasil Perhitungan Kolom Lt. 3							
K138	A1	1000 / 1000	12 Ø36	28 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 40
K139	B1	1150 / 1150	14 Ø36	16 Ø36	Φ 3 Vc	Φ 5 Vc	P10- 45

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu		Spakai, mm
					$\Phi$ 3 Vc	$\Phi$ 5 Vc	
K140	C1	1150 / 1150	16 Ø36	16 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 45
K141	A3	1100 / 1100	18 Ø36	12 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K142	B3	850 / 850	16 Ø36	8 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 50
K143	C3	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K144	A5	600 / 600	6 Ø36	4 Ø36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 270
K145	B5	600 / 600	6 Ø36	4 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 270
K146	C5	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K147	D6	600 / 600	12 Ø36	4 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 220
K148	E6	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K149	F6	600 / 600	10 Ø36	4 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 270
K150	G6	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K151	H6	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K152	I6	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K153	A7	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K154	B7	600 / 600	6 Ø36	4 Ø36	$\Phi$ 1/2 Vc	$\Phi$ Vc	P10- 270
K155	C7	600 / 600	6 Ø36	4 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 270
K156	D7	600 / 600	12 Ø36	4 Ø36	$\Phi$ Vc	$\Phi$ 3 Vc	P10- 155
K157	I7	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K158	D8	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K159	I8	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K160	A9	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K161	B9	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K162	C9	600 / 600	16 Ø36	4 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 105
K163	D9	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		
K164	I9	600 / 600	14 Ø36	14 Ø36	$\Phi$ 3 Vc	$\Phi$ 5 Vc	P10- 115
K165	D10	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser		

Elemen	Letak	Ukuran, m	As+As'	Aska+Aski	Daerah Vu	$s_{pakai}$ , mm
K166	I10	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K167	A11	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K168	B11	600 / 600	16 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc P10- 105
K169	C11	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K170	D11	600 / 600	12 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc P10- 135
K171	I11	600 / 600	6 Ø36	4 Ø36	Φ 1/2 Vc	Φ Vc P10- 270
K172	D12	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K173	E12	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K174	F12	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K175	G12	600 / 600	4 Ø36	4 Ø36	tidak perlu tulangan geser	
K176	H12	600 / 600	6 Ø36	6 Ø36	Φ 3 Vc	Φ 5 Vc P10- 80
K177	I12	600 / 600	6 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc P10- 95
K178	A13	600 / 600	8 Ø36	4 Ø36	Φ 3 Vc	Φ 5 Vc P10- 95
K179	B13	850 / 850	12 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc P10- 50
K180	C13	850 / 850	12 Ø36	8 Ø36	Φ 3 Vc	Φ 5 Vc P10- 45

#### 4. 8. Perencanaan Pondasi

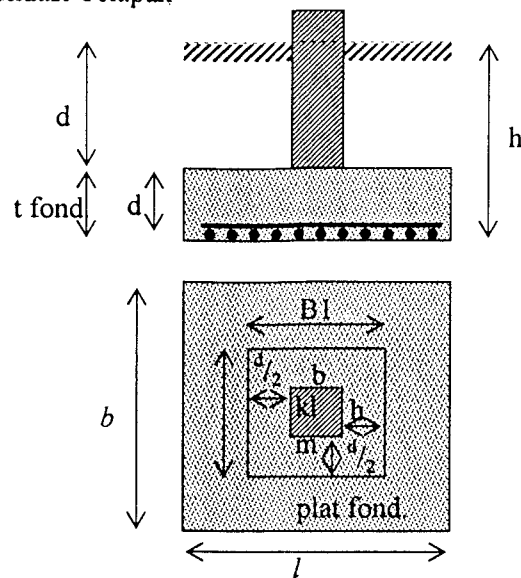
Pondasi direncanakan sebagai pondasi telapak dengan gaya-gaya yang dipergunakan diambil dari perhitungan SAP 2000. Gaya-gaya yang diambil adalah reaksi dari model struktur. Data-data tanah juga dipergunakan untuk memperoleh tegangan ijin. Letak dari pondasi dapat di lihat pada gambar berikut ini.



Gambar IV-17 Letak Titik Pondasi

Berikut ini adalah contoh perhitungan pondasi dan rangkuman hasilnya, sedangkan hitung pondasi lainnya dapat di lihat pada lampiran.

## Perencanaan Pondasi Telapak



Data : G1

$$\begin{aligned} \sigma \text{ tanah} : \quad 95 \text{ kg/cm}^2 &= 9,3163 \text{ MPa} \\ &= 9316,3 \text{ kN/m}^2 \end{aligned}$$

$$h \text{ tnh keras} : \quad 3 \text{ m}$$

$$f_c : \quad 20 \text{ MPa}$$

$$f_y : \quad 400 \text{ MPa}$$

$$B_j \text{ tnh} : \quad 1,69 \text{ g/cm}^3 = 16,57321 \text{ kN/m}^3$$

$$B_j \text{ btn} : \quad 24 \text{ kN/m}^3$$

$$\text{tebal pondasi} : \quad 0,65 \text{ m}$$

$$P_u : 847,7698 \text{ kN}$$

$$M_{ux} : 447,0112 \text{ kNm}$$

$$M_{uy} : 347,9272 \text{ kNm}$$

Ukuran kolom :

$$b_{klm} : \quad 750 \text{ mm}$$

$$h_{klm} : \quad 750 \text{ mm}$$

Daya dukung netto :

$$df = h - t_{pondasi} = 3 - 0,65$$

$$= 2,35 \text{ m}$$

$$q = (b_j \text{ tnh} \times df) + (b_j \text{ btn} \times t_{bl})$$

$$= 16,573 \times 2,35 + 24 \times 0,65$$

$$= 54,54704 \text{ kN/m}^2$$

$$\sigma_{\text{netto}} = \sigma_{\text{tanah}} - q = 9,3163 \times 1000 - 54,5470373157895$$

$$= 9261,753 \text{ kN/m}^2$$

$$SF = 1,5$$

$$\sigma_{\text{ijin}} = SF \times \sigma_{\text{tanah}} = 1,5 \times 9316,3$$

$$= 13974,45 \text{ kN/m}^2$$

Dimensi pondasi bjr. sangkar :

$$A_{f_{\text{perlu}}} = \frac{P_u}{\sigma_{\text{netto}}} = \frac{847,7698}{9261,753} = 0,091534 \text{ m}^2$$

$$b = \sqrt{A} = \sqrt{0,092}$$

$$= 0,302547 \text{ m}$$

$$\approx 0,35 \text{ m}$$

$$b : 3,55 \text{ m} \quad \frac{1}{6} b = 0,591667 \text{ m}$$

$$l : 3,55 \text{ m} \quad \frac{1}{6} l = 0,591667 \text{ m}$$

$$A_{f_{\text{pakai}}} = 3,55 \times 3,55 = 12,6025 \text{ m}^2$$

$$\sigma = q_s = P_u \div A_{\text{pakai}} = 847,7698 \div 12,6025$$

$$= 67,26997 \text{ kN/m}^2$$

Perenc t<sub>bl</sub> pond telapak syarat kuat geser :

asumsi tebal pondasi / d : 550 mm

tebal selimut beton / pb : 70 mm

Ø tul : 22 mm

$$d = d - pb - \text{Øtul} = 550 - 70 - 22$$

$$= 458 \text{ mm}$$

$$e_x = M_{ux} + P u = 447,011 + 847,770$$

$$= 0,527279 \text{ m}$$

$$e_y = M_{uy} + P u = 347,927 + 847,770$$

$$= 0,410403 \text{ m}$$

$$I_x = \frac{1}{12} \times b_x \times b_y^3 = \frac{1}{12} \times 3,55 \times 3,55^3$$

$$= 13,23525 \text{ m}^4$$

$$I_y = \frac{1}{12} \times b_x^3 \times b_y = \frac{1}{12} \times 3,55^3 \times 3,55$$

$$= 13,23525 \text{ m}^4$$

$$x \text{ max} = 0,5 \times b_x = 0,5 \times 3,550$$

$$= 1,775 \text{ m}$$

$$y \text{ max} = 0,5 \times b_y = 0,5 \times 3,550$$

$$= 1,775 \text{ m}$$

$$x \text{ min} = -0,5 \times b_x = -0,5 \times 3,550$$

$$= -1,775 \text{ m}$$

$$y \text{ min} = -0,5 \times b_y = -0,5 \times 3,550$$

$$= -1,775 \text{ m}$$

$$\sigma_{\text{max}} = \frac{P}{A} + \frac{M_x \times y_{\text{max}}}{I_x} + \frac{M_y \times x_{\text{max}}}{I_y} + q < \sigma_{\text{ijin}}$$

$$= 228,4274 \text{ kN/m}^2 < \sigma_{\text{ijin}} \quad \text{--Ok--}$$



$$\begin{aligned}\sigma_{\min} &= \frac{P}{A} + \frac{Mx \times y \text{ min}}{I_x} + \frac{My \times x \text{ min}}{I_y} + q > 0 \\ &= 15,20658 \text{ kN/m}^2 > 0 \quad \text{--Ok--}\end{aligned}$$

1. Perhitungan geser beton untuk 2 arah

$$\phi \text{ lentur} = 0,7$$

$$\phi \text{ geser} = 0,6$$

$$\begin{aligned}B1_{\text{kritis}} &= b + (d \div 2) \times 2 &= 750 + (458 \div 2) \times 2 \\ &= 1208 \text{ mm}\end{aligned}$$

$$\begin{aligned}B2_{\text{kritis}} &= h + (d \div 2) \times 2 &= 750 + (458 \div 2) \times 2 \\ &= 1208 \text{ mm}\end{aligned}$$

$$\begin{aligned}\text{keliling kritis } b_o &= 2 \times B1 + 2 \times B2 &= 2 \times 1208 + 2 \times 1208 \\ &= 4832 \text{ mm}\end{aligned}$$

$$V_u \text{ pada bid kritis} = q_s (A_f - (B1 \times B2))$$

$$= 67,270 \times (12,6025 - ((1208 \div 1000) \times (1208 \div 1000)))$$

$$= 749,6052 \text{ kN}$$

$$\beta_c = b_{klm} \div h_{klm} = 750 \div 750$$

$$= 1$$

$$\begin{aligned}V_c &= \left(2 + \frac{4}{\beta_c}\right) \times (\sqrt{f_c'}) \times b_o \times d \\ &= \left(2 + \frac{4}{1}\right) \times (\sqrt{20 \times 1000}) \times \frac{4832}{1000} \times \frac{458}{1000}\end{aligned}$$

$$= 1877,84 \text{ kN}$$

$$V_c' = 4\sqrt{f_c'} \times (b_o \times d)$$

$$= 4\sqrt{(20 \times 1000)} \times (4832 \div 1000) \times (458 \div 1000)$$

$$= 1251,894 \text{ kN}$$

$$V_c \text{ pakai} = 1251,894 \text{ kN}$$

$$\begin{aligned}\Phi V_n &= 0,6 \times V_c \\ &= 0,6 \times 1251,894 \\ &= 751,1361 \text{ kN}\end{aligned}$$

check :  $V_u < \Phi V_n$  --Ok--

## 2. Perhitungan geser beton untuk 1 arah

$$\begin{aligned}l_{\text{kritis}} &= (b_{\text{pakai}} - b_{\text{klm}}) \div 2 - d &&= (((3,55 \times 1000) - 750) \div 2) - 458 \\ &= 942 \text{ mm}\end{aligned}$$

$$\begin{aligned}V_u &= \sigma \times b_{\text{pakai}} \times l_{\text{kritis}} &&= 67,270 \times 3,55 \times (942 \div 1000) \\ &= 224,9575 \text{ kN}\end{aligned}$$

$$\begin{aligned}V_c &= (1/6) \times \sqrt{f_c} \times b_{\text{pakai}} \times d \\ &= (1/6) \times \sqrt{(20 \times 1000)} \times 3,55 \times (458 \div 1000) \\ &= 38,32283 \text{ kN}\end{aligned}$$

$$\begin{aligned}\Phi V_c &= 0,6 \times 2949,391 \\ &= 1769,635 \text{ kN}\end{aligned}$$

check :  $V_u < \Phi V_c$  Ok

## Perenc. Tulangan Utk Arah X & Y

$$\begin{aligned}\text{lengan mmn arah pj.} &= (l - b_{\text{klm}}) \div 2 &&= (3,55 - (750 \div 1000)) \div 2 \\ &= 1,4 \text{ mm}\end{aligned}$$

$$\begin{aligned}M_u &= 0,5 \times P_u \times l^2 \times b_{\text{pakai}} &&= 0,5 \times 847,7698 \times 1,4^2 \times 3,55 \\ &= 2949,391 \text{ kNm}\end{aligned}$$

$$\beta_1 = 0,85$$

$$\begin{aligned}m &= f_y \div (0,85 \times f_c) &&= 400 \div (0,85 \times 20) \\ &= 23,52941\end{aligned}$$

$$\begin{aligned}
 R_n &= \frac{M_u}{(0,85 \times f_c' \times b_y \times d^2)} \\
 &= \frac{2949,391}{(0,85 \times 3,55 \times (458 \div 1000)^2)} \\
 &= 4,659659 \text{ MPa}
 \end{aligned}$$

$$\rho = \frac{1}{m} \times \left( 1 - \sqrt{1 - \frac{2 \times m \times R_n}{f_y}} \right)$$

$$\rho = \frac{1}{23,52941} \times \left( 1 - \sqrt{1 - \frac{2 \times 23,52941 \times 4,659659}{400}} \right)$$

$$= 0,013933$$

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

$$= \frac{0,85 \times 20}{400} \times 0,85 \times \left( \frac{600}{600 + 400} \right)$$

$$= 0,021675$$

$$\rho_{\max} = 0,75 \times \rho_b = 0,75 \times 0,02168$$

$$= 0,016256$$

$$\rho_{\min} = 1,4 \div f_y = 1,4 \div 400$$

$$= 0,0035$$

$$\rho_{\text{pakai}} = 0,013933 \text{ (}\rho \text{ perlu)}$$

$$\text{As perlu /sat lebar} = \rho_{\text{pakai}} \times d = 0,01393 \times 10^3 \times 458$$

$$= 6381,322 \text{ mm}^2$$

Jumlah tulangan sejajar arah lebar melintang hanya selebar pondasi

$$= 17 \text{ (=P22-200)}$$

$$\text{As tulangan} = 6458,98 \text{ mm}^2$$

check :  $A_s \text{ tul} > A_s \text{ perlu}$  Ok

$$\begin{aligned} A_{s1} &= 2A_s \div (\beta + 1) &&= 2 \times 6381,322 \div (1+1) \\ &= 6458,98 \text{ mm}^2 \end{aligned}$$

$$\begin{aligned} \text{sisas } A_s \text{ di tepi} &= A_s - A_{s1} &&= 6458,98 - 6458,98 \\ &= 0 \text{ mm}^2 \end{aligned}$$

$$\sqrt{A_2/A_1} = 4,733333$$

$$\sqrt{A_2/A_1} \text{ pakai } < 2 = 2$$

$$\begin{aligned} \text{Kuat tumpuan klm} &= \phi 0,85 f_c' b_{klm} h_{klm} &&= 0,7 \times 0,85 \times 20 \times (750 \times 750) \\ &= 6693,75 \text{ kN} \end{aligned}$$

check :  $P_u < \text{kuat tumpuan kolom}$  --Ok--

$$\begin{aligned} \text{Kuat tumpuan fond.} &= \phi 0,85 f_c' b_{klm} h_{klm} \sqrt{A_2/A_1} \\ &= 0,7 \times 0,85 \times 20 \times (750 \times 750) \times \sqrt{A_2/A_1} \\ &= 13387,5 \text{ kN} \end{aligned}$$

check :  $P_u < \text{kuat tumpuan fond.}$  --Ok--

Rangkuman hasil perhitungan pondasi dapat dilihat pada tabel berikut ini.

Tabel IV-15 Hasil perhitungan pondasi

Titik Pondasi	b (m)	l (m)	$\sigma$ max (kN/m <sup>2</sup> )	tebal pondasi / d (mm)	As perlu /sat lebar (mm <sup>2</sup> )	Ø tul(mm)	Jml tul.
G1	3,55	3,55	227,68475	550	6381,322	22	17
G2	3,25	3,25	315,34562	630	5464,84	22	15
G3	2,2	2,2	362,31969	440	1557,927	22	5
G4	3,5	3,5	246,45223	560	6184,744	22	17
G5	3,35	3,35	299,73536	620	5827,949	22	16
G6	2,4	2,4	295,57611	420	1923,034	22	6
G7	3,45	3,45	270,55627	590	6158,201	22	17
G8	3,3	3,3	312,19753	620	5647,049	22	15
G9	2,4	2,4	297,62949	430	1908,875	22	6
G10	2,3	2,3	295,54755	400	1671,068	22	5
G11	2,75	2,75	188,09489	340	2528,295	22	7
G12	2,75	2,75	190,00629	340	2570,933	22	7
G13	2,75	2,75	166,06241	300	2409,94	22	7
G14	2,6	2,6	227,49738	380	2247,281	22	6
G15	2,3	2,3	290,68281	390	1669,341	22	5
G16	3,45	3,45	258,49788	570	6003,158	22	16
G17	3,3	3,3	297,09405	600	5531,177	22	15
G18	2,3	2,3	305,66553	340	1532,954	22	5
G19	3	3	141,09099	280	2743,529	22	8
G20	2,85	2,85	167,15377	310	2787,354	22	8
G21	2,65	2,65	219,93908	370	2393,506	22	7
G22	2,65	2,65	539,5364	670	3464,753	22	10
G23	3,2	3,2	318,18422	610	5078,13	22	14
G24	2,45	2,45	276,94166	410	2009,336	22	6
G25	3,55	3,55	238,10029	550	6382,763	22	17
G26	3,4	3,4	281,91401	600	5936,005	22	16

Titik Pondasi	b (m)	l (m)	$\sigma$ max (kN/m <sup>2</sup> )	tebal pondasi / d (mm)	As perlu /sat lebar (mm <sup>2</sup> )	Ø tul(mm)	Jml tul.
G27	2,5	2,5	275,72748	320	1895,707	22	5
G28	2,15	2,15	405,78909	330	1211,862	22	4
G29	2,45	2,45	240,5953	370	1886,247	22	5
G30	2,05	2,05	465,73787	340	1125,012	22	3
G31	5,25	5,25	99,149875	340	3753,91	22	10
G32	5,2	5,2	100,18975	350	3819,389	22	11
G33	2,3	2,3	330,7677	430	1766,901	22	5
G34	3,2	3,2	316,14689	600	5161,349	22	14
G35	3,05	3,05	350,85417	620	4523,717	22	12
G36	2,6	2,6	202,37666	320	2148,426	22	6
G37	2,55	2,55	228,61872	370	2133,85	22	6
G38	2,7	2,7	188,50027	330	2441,656	22	7
G39	2,2	2,2	332,11593	410	1505,354	22	4
G40	2,5	2,5	251,13466	390	2047,986	22	6
G41	2,25	2,25	336,44784	430	1619,978	22	5
G42	2,25	2,25	300,94426	390	1585,997	22	5
G43	2,45	2,45	262,61503	400	1952,161	22	6
G44	2,3	2,3	295,304	400	1686,116	22	5
G45	3,4	3,4	274,93802	590	5904,383	22	16
G46	3,25	3,25	329,1923	640	5427,726	22	15
G47	2,45	2,45	258,70261	390	1956,466	22	6

Hasil perhitungan pondasi sebelum perencanaan ulang adalah sebagai berikut ini.

Tabel IV-16 Hasil perhitungan pondasi sebelum perencanaan ulang

Sebelum perencanaan	b (m):	l (m):	Tulangan	Letak
F1	2,75	2,75	D16-100	G4-5;G7-8;G16-17;G25-26;G34-35;G22-23;G31-32
F2	2	2	D16-150	G3;G6;G9;G18;G47
F3	2,5	2,5	D16-125	G1-2;G10-15;G19-20;G21;G24;G27-29;G30;G33;G36-46

## **BAB V**

### **KESIMPULAN**

Berdasarkan hasil dari perhitungan perencanaan ulang gedung Kampus II Unit B Universitas Ahmad Dahlan, dan berdasarkan data – data yang ada penyusun memberikan kesimpulan sebagai berikut :

1. Perencanaan rangka kuda-kuda menggunakan dimensi profil yang lebih besar dari perencanaan sebelumnya agar dalam pengerjaan seperti pemasangan baut lebih mudah dan lebih aman.
2. Perencanaan plat lantai didesain lebih spesifik dari hanya menggunakan empat tipe pelat dua arah menjadi satu tipe pelat satu arah dan beberapa tipe pelat dua arah.
3. Perencanaan balok induk memperoleh hasil dimensi yang lebih besar bila dibandingkan dengan hasil perencanaan sebelumnya, namun dengan jumlah tulangan yang relatif lebih sedikit. Hal ini di sebabkan oleh desain gempa yang menggunakan desain gempa dinamis, sehingga gaya geser yang terjadi relatif lebih besar sehingga penampang balok harus di perbesar agar beton masih mampu menahan geser.

4. Perencanaan dimensi kolom lebih besar dari perencanaan sebelumnya karena dalam perencanaan ulang gaya geser yang terjadi lebih besar mengingat gaya gempa yang digunakan adalah gaya gempa dinamis sedangkan pada perencanaan sebelumnya hanya menggunakan static ekuivalen.
5. Perencanaan pondasi memperoleh hasil dimensi yang lebih besar bila dibandingkan dengan hasil perencanaan sebelumnya, karena tegangan ijin tanah mempergunakan angka aman yang lebih kecil dari perencanaan sebelumnya.

Dari kesimpulan di atas terdapat profil atau dimensi struktur yang berbeda dengan profil atau dimensi struktur sebenarnya, tetapi berdasar hasil analisis yang ada, maka hasil perencanaan ulang gedung Kampus II Unit B Universitas Ahmad Dahlan aman digunakan.



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## KARTU-PESERTA TUGAS AKHIR

NO	N.A.M.A	NO. MHS.	BID. STUDI
1	DODY DARMAWAN	96 310 001	STRUKTUR
2	ARIEF RACHMAN	96 310 049	STRUKTUR

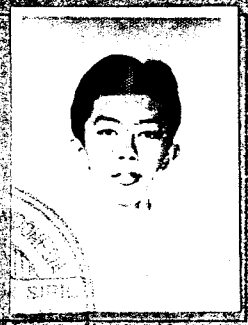
**JUDUL TUGAS AKHIR:**

**PERENCANAAN TILANG KAMPUS III UNIT B UNIVERSITAS AHMAD DAHLAN  
YOGYAKARTA**

**PERIODE IV : JUNI - NOPEMBER  
TAHUN : 2000 / 2001**

No	Kegiatan	Bulan - Ke :					
		Juni	Juli	Agustus	Sept	Oktober	Nop
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. H. SUHARYATMO, MT.  
DOSEN PEMBIMBING II : IR. H. A. KADIRABOE, MS.



Yogyakarta, 23 Juli 2001  
A.n. Dekan

*(Signature)*  
IR. H. MUNADHIR, MS.

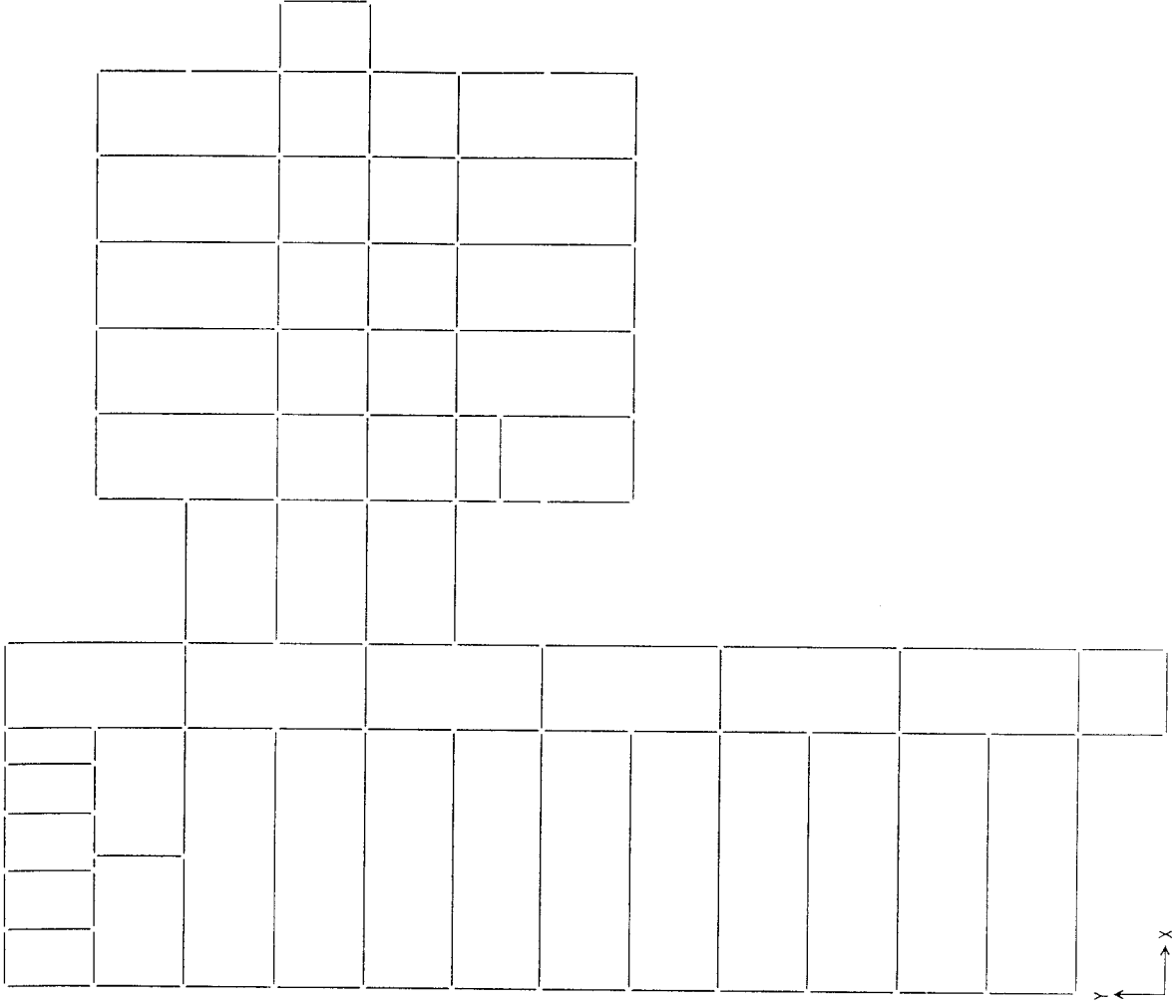


**Catatan:**

- Seminar .....
- Sidang .....
- Pendadaran .....

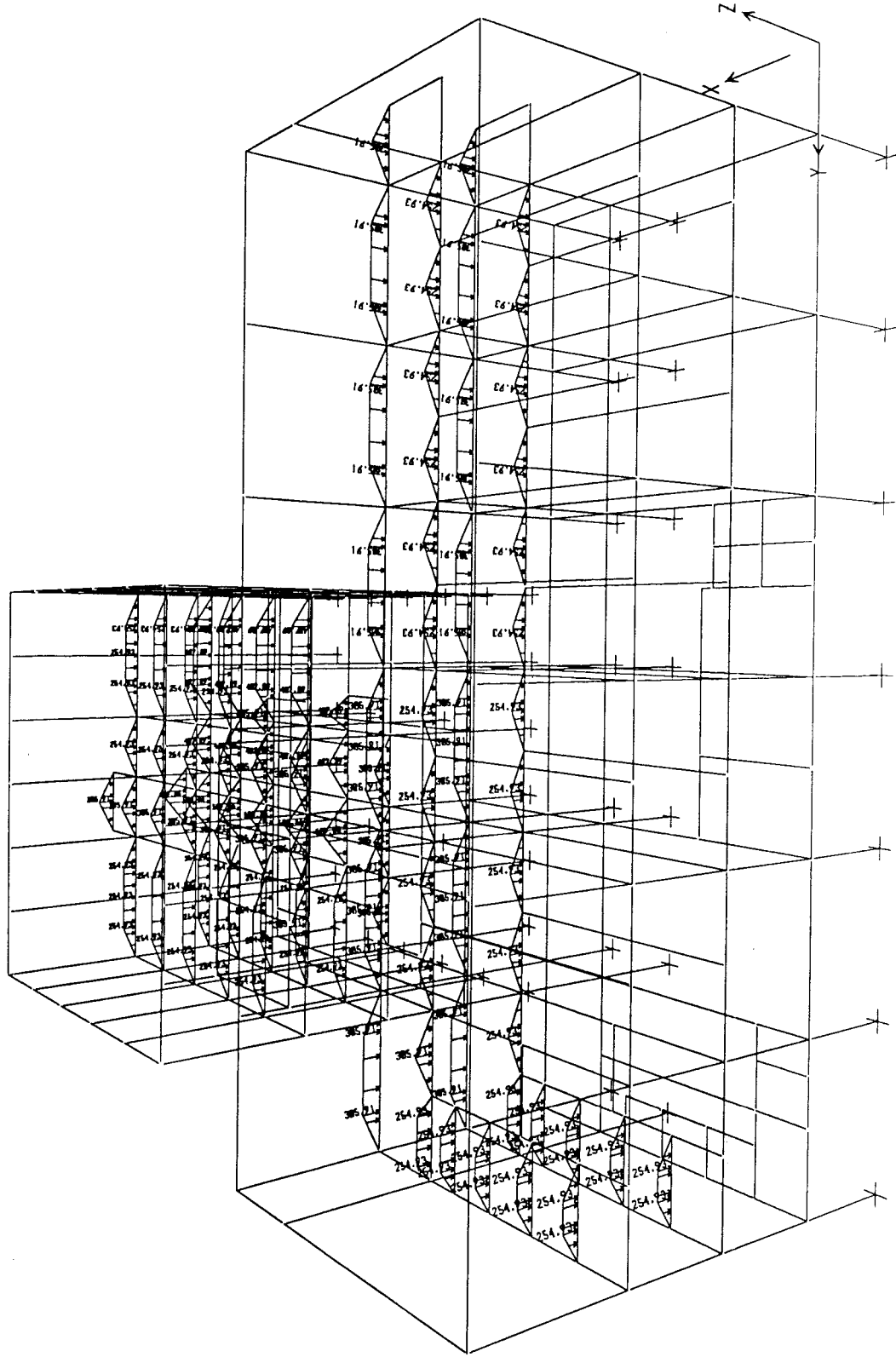
# LAMPIRAN

# LAMPIRAN i











STAT I C L O A D C A S E S

STATIC CASE	CASE TYPE	SELF WT FACTOR
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BAWAH	DEAD	0.0000
ANGINKR	WIND	0.0000
ANGINKN	WIND	0.0000

J O I N T D A T A

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	RESTRAINTS	ANGLE-A	ANGLE-B	ANGLE-C
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139	12.00000	18.00000	0.00000	0 0 1 0 0	0.000	0.000	0.000
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SAP2000 v7.42 File: RANGKA ATAP SECTION 2 KN-m Units PAGE 3  
10/15/02 20:46:29

FRAME ELEMENT DATA

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247	58	34	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
248	34	6	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
250	56	60	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.462
251	60	58	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.462
252	60	80	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
295	60	57	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
299	46	59	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
300	59	68	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
301	60	59	2L55X55X	0.000	000000	2	0.000	0.000	1.000	5.450
622	80	82	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
623	82	101	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
624	68	81	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
625	81	90	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
626	81	82	2L55X55X	0.000	000000	2	0.000	0.000	1.000	5.450
674	140	126	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
675	126	107	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
676	135	120	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
679	120	100	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.924
680	100	82	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.462

681	82	102	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.462
KK10A1	72	61	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A2	62	73	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A3	74	72	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A4	73	75	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A5	76	74	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A6	75	77	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A7	78	76	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A8	77	79	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10A9	80	78	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10B1	61	63	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK10B2	64	62	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK10B3	63	65	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK10B4	71	64	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK10B5	65	66	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK10B6	66	67	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK10B7	67	68	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK10B8	68	69	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK10B9	69	70	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK10D1	63	74	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK10D2	75	64	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK10D3	65	76	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK10D4	77	71	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK10D5	66	78	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK10D6	79	70	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK10D7	67	80	2L55X55X	0.000	000000	2	0.000	0.000	1.000	5.653
KK10D8	80	69	2L55X55X	0.000	000000	2	0.000	0.000	1.000	5.653
KK10V1	72	61	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK10V2	64	73	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK10V3	74	65	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK10V4	71	75	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK10V5	76	66	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK10V6	70	77	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK10V7	78	67	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.200
KK10V8	69	79	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.200
KK10V9	80	68	2L55X55X	0.000	000000	2	0.000	0.000	1.000	5.450
KK11A1	50	39	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A2	52	50	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A3	54	52	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A4	56	54	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A5	57	56	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK11A6	58	57	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK11A7	55	58	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A8	53	55	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A9	51	53	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11B1	39	41	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11B2	41	43	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11B3	43	44	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B4	44	45	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B5	45	46	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B6	46	47	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B7	47	48	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B8	48	49	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B9	49	42	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11D1	41	52	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK11D2	43	54	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK11D3	44	56	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK11D4	45	57	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK11D5	57	47	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK11D6	58	48	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK11D7	55	49	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK11D8	53	42	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK11D9	85	96	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK11V1	50	41	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK11V2	52	43	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK11V3	54	44	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK11V4	56	45	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.200
KK11V5	57	46	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.200
KK11V6	47	58	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.200
KK11V7	48	55	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK11V8	49	53	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK11V9	42	51	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK13A1	26	15	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK13A2	28	26	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK13A3	29	28	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A4	30	29	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A5	31	30	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A6	32	31	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A7	33	32	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A8	34	33	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK13A9	27	34	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK13B1	15	17	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK13B2	17	19	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK13B3	19	20	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B4	20	21	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B5	21	22	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B6	22	23	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B7	23	24	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B8	24	25	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK13B9	25	18	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK13D1	17	28	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK13D2	19	29	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267
KK13D3	20	30	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267
KK13D4	21	31	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267
KK13D5	31	23	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267

KK13D6	32	24	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267
KK13D7	33	25	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.267
KK13D8	34	18	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK13D9	109	120	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK13V1	26	17	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK13V2	28	19	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V3	29	20	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V4	30	21	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V5	31	22	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V6	23	32	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V7	24	33	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V8	25	34	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.700
KK13V9	18	27	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK14.11	12	8	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK14.12	37	35	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK14.13	105	103	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK14.14	132	128	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK14.15	13	9	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK14.16	38	36	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK14.17	106	104	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.950
KK14.18	133	129	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK14A1	3	12	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A2	12	30	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A3	30	17	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A4	37	56	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A5	105	100	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A6	122	105	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A7	132	122	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A8	137	132	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14A9	4	13	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK14B1	8	3	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK14B2	21	8	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK14B3	21	35	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK14B4	35	45	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK14B5	103	89	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK14B6	113	103	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK14B7	128	113	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK14B8	137	128	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK14B9	9	4	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK14D1	8	10	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK14D2	21	37	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK14D3	35	56	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK14D4	103	100	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK14D5	105	113	2L55X55X	0.000	000000	2	0.000	0.000	1.000	3.309
KK14D6	128	122	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK14D7	9	32	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK14D8	23	18	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.309
KK14D9	36	58	2L55X55X	0.000	000000	2	0.000	0.000	1.000	4.460
KK15A1	2	11	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A2	11	28	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A3	120	111	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A4	131	116	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A5	5	14	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A6	14	34	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A7	126	114	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15A8	134	119	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK15B1	7	2	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B2	19	7	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B3	127	111	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B4	136	127	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B5	10	5	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B6	25	10	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B7	130	117	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15B8	139	130	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK15D1	7	28	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK15D2	127	120	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK15D3	10	34	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK15D4	130	126	2L55X55X	0.000	000000	2	0.000	0.000	1.000	2.581
KK15V1	11	7	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK15V2	127	131	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK15V3	14	10	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK15V4	130	134	2L55X55X	0.000	000000	2	0.000	0.000	1.000	0.850
KK10A10	79	80	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK10B10	70	71	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11A10	40	51	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A11	94	83	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A12	96	94	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A13	98	96	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A14	100	98	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A15	101	100	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK11A16	102	101	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.500
KK11A17	99	102	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A18	97	99	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A19	95	97	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11A20	84	95	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.953
KK11B10	42	40	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11B11	83	85	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11B12	85	87	2L55X55X	0.000	000000	2	0.000	0.000	1.000	1.552
KK11B13	87	88	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B14	88	89	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B15	89	90	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B16	90	91	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B17	91	92	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500
KK11B18	92	93	2L55X55X	0.000	000000	4	0.000	0.000	1.000	1.500

KK11B19	93	86	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK11B20	86	84	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK11D10	87	98	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.109
KK11D11	88	100	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.660
KK11D12	89	101	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.660
KK11D13	101	91	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.660
KK11D14	102	92	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.660
KK11D15	99	93	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.109
KK11D16	97	86	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.581
KK11V10	94	85	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	0.850
KK11V11	96	87	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.100
KK11V12	98	88	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.950
KK11V13	100	89	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.200
KK11V14	101	90	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.200
KK11V15	91	102	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.200
KK11V16	92	99	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.950
KK11V17	93	97	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK11V18	86	95	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	0.850
KK13A10	16	27	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK13A11	118	107	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK13A12	120	118	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK13A13	121	120	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A14	122	121	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A15	123	122	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A16	124	123	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A17	125	124	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A18	126	125	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.500
KK13A19	119	126	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK13A20	108	119	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK13B10	18	16	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK13B11	107	109	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK13B12	109	111	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK13B13	111	112	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B14	112	113	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B15	113	114	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B16	114	115	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B17	115	116	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B18	116	117	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK13B19	117	110	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK13B20	110	108	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK13D10	111	121	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D11	112	122	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D12	113	121	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D13	123	115	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D14	124	116	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D15	125	117	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.267
KK13D16	126	110	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.581
KK13V10	118	109	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	0.850
KK13V11	120	111	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V12	121	112	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V13	122	113	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V14	123	114	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V15	115	124	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V16	116	125	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V17	117	126	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.700
KK13V18	110	119	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	0.850
KK14A10	13	32	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A11	32	38	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A12	38	58	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A13	106	102	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A14	124	106	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A15	133	124	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14A16	138	133	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.953
KK14B10	23	9	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK14B11	23	36	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK14B12	36	43	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK14B13	104	91	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK14B14	115	104	2L55X55X	0.000	0.00000	4	0.000	0.000	1.000	1.500
KK14B15	129	115	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK14B16	138	129	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	1.552
KK14D10	104	102	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	4.660
KK14D11	106	115	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	3.169
KK14D12	129	124	2L55X55X	0.000	0.00000	2	0.000	0.000	1.000	2.581

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J O I N T F O R C E S Load Case ATAS

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	GLOBAL-XX	GLOBAL-YY	GLOBAL-ZZ
61	0.000	0.000	-1.755	0.000	0.000	0.000
62	0.000	0.000	-1.755	0.000	0.000	0.000
73	0.000	0.000	-3.423	0.000	0.000	0.000
75	0.000	0.000	-3.423	0.000	0.000	0.000
77	0.000	0.000	-3.423	0.000	0.000	0.000
79	0.000	0.000	-3.423	0.000	0.000	0.000
78	0.000	0.000	-3.423	0.000	0.000	0.000
76	0.000	0.000	-3.423	0.000	0.000	0.000
74	0.000	0.000	-3.423	0.000	0.000	0.000
72	0.000	0.000	-3.423	0.000	0.000	0.000
80	0.000	0.000	-1.834	0.000	0.000	0.000
40	0.000	0.000	-1.755	0.000	0.000	0.000
39	0.000	0.000	-1.755	0.000	0.000	0.000
84	0.000	0.000	-1.755	0.000	0.000	0.000

83	0.000	0.000	-1.755	0.000	0.000	0.000
51	0.000	0.000	-3.423	0.000	0.000	0.000
53	0.000	0.000	-3.423	0.000	0.000	0.000
52	0.000	0.000	-3.423	0.000	0.000	0.000
50	0.000	0.000	-3.423	0.000	0.000	0.000
95	0.000	0.000	-3.423	0.000	0.000	0.000
97	0.000	0.000	-3.423	0.000	0.000	0.000
96	0.000	0.000	-3.423	0.000	0.000	0.000
94	0.000	0.000	-3.423	0.000	0.000	0.000
55	0.000	0.000	-3.462	0.000	0.000	0.000
54	0.000	0.000	-3.462	0.000	0.000	0.000
99	0.000	0.000	-3.462	0.000	0.000	0.000
98	0.000	0.000	-3.462	0.000	0.000	0.000
58	0.000	0.000	-2.609	0.000	0.000	0.000
56	0.000	0.000	-2.609	0.000	0.000	0.000
102	0.000	0.000	-2.609	0.000	0.000	0.000
100	0.000	0.000	-2.609	0.000	0.000	0.000
57	0.000	0.000	-2.550	0.000	0.000	0.000
101	0.000	0.000	-2.550	0.000	0.000	0.000
16	0.000	0.000	-1.755	0.000	0.000	0.000
15	0.000	0.000	-1.755	0.000	0.000	0.000
108	0.000	0.000	-1.755	0.000	0.000	0.000
107	0.000	0.000	-1.755	0.000	0.000	0.000
27	0.000	0.000	-2.540	0.000	0.000	0.000
26	0.000	0.000	-2.540	0.000	0.000	0.000
119	0.000	0.000	-2.540	0.000	0.000	0.000
118	0.000	0.000	-2.540	0.000	0.000	0.000
34	0.000	0.000	-2.609	0.000	0.000	0.000
28	0.000	0.000	-2.609	0.000	0.000	0.000
126	0.000	0.000	-2.609	0.000	0.000	0.000
120	0.000	0.000	-2.609	0.000	0.000	0.000
33	0.000	0.000	-2.167	0.000	0.000	0.000
29	0.000	0.000	-2.167	0.000	0.000	0.000
125	0.000	0.000	-2.167	0.000	0.000	0.000
121	0.000	0.000	-2.167	0.000	0.000	0.000
32	0.000	0.000	-2.167	0.000	0.000	0.000
31	0.000	0.000	-1.716	0.000	0.000	0.000
30	0.000	0.000	-2.167	0.000	0.000	0.000
124	0.000	0.000	-2.167	0.000	0.000	0.000
123	0.000	0.000	-1.716	0.000	0.000	0.000
122	0.000	0.000	-2.167	0.000	0.000	0.000
2	0.000	0.000	-1.755	0.000	0.000	0.000
5	0.000	0.000	-1.755	0.000	0.000	0.000
136	0.000	0.000	-1.755	0.000	0.000	0.000
139	0.000	0.000	-1.755	0.000	0.000	0.000
11	0.000	0.000	-2.540	0.000	0.000	0.000
14	0.000	0.000	-2.540	0.000	0.000	0.000
131	0.000	0.000	-2.540	0.000	0.000	0.000
134	0.000	0.000	-2.540	0.000	0.000	0.000
3	0.000	0.000	-1.755	0.000	0.000	0.000
4	0.000	0.000	-1.755	0.000	0.000	0.000
137	0.000	0.000	-1.755	0.000	0.000	0.000
138	0.000	0.000	-1.755	0.000	0.000	0.000
12	0.000	0.000	-3.423	0.000	0.000	0.000
13	0.000	0.000	-3.423	0.000	0.000	0.000
132	0.000	0.000	-3.423	0.000	0.000	0.000
133	0.000	0.000	-3.423	0.000	0.000	0.000
37	0.000	0.000	-1.716	0.000	0.000	0.000
38	0.000	0.000	-1.716	0.000	0.000	0.000
105	0.000	0.000	-1.716	0.000	0.000	0.000
106	0.000	0.000	-1.716	0.000	0.000	0.000
60	0.000	0.000	-0.843	0.000	0.000	0.000
82	0.000	0.000	-0.843	0.000	0.000	0.000
1	0.000	0.000	-1.824	0.000	0.000	0.000
6	0.000	0.000	-1.824	0.000	0.000	0.000
140	0.000	0.000	-1.824	0.000	0.000	0.000
135	0.000	0.000	-1.824	0.000	0.000	0.000

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JOINT FORCES Load Case BAWAH

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	GLOBAL-XX	GLOBAL-YY	GLOBAL-ZZ
61	0.000	0.000	-0.745	0.000	0.000	0.000
62	0.000	0.000	-0.745	0.000	0.000	0.000
63	0.000	0.000	-1.491	0.000	0.000	0.000
64	0.000	0.000	-1.491	0.000	0.000	0.000
65	0.000	0.000	-1.471	0.000	0.000	0.000
71	0.000	0.000	-1.471	0.000	0.000	0.000
66	0.000	0.000	-1.461	0.000	0.000	0.000
67	0.000	0.000	-1.461	0.000	0.000	0.000
68	0.000	0.000	-1.461	0.000	0.000	0.000
69	0.000	0.000	-1.461	0.000	0.000	0.000
70	0.000	0.000	-1.461	0.000	0.000	0.000
40	0.000	0.000	-2.236	0.000	0.000	0.000
39	0.000	0.000	-2.236	0.000	0.000	0.000
84	0.000	0.000	-0.745	0.000	0.000	0.000
83	0.000	0.000	-0.745	0.000	0.000	0.000
41	0.000	0.000	-1.491	0.000	0.000	0.000
42	0.000	0.000	-1.491	0.000	0.000	0.000
85	0.000	0.000	-1.491	0.000	0.000	0.000
86	0.000	0.000	-1.491	0.000	0.000	0.000

43	0.000	0.000	-1.471	0.000	0.000	0.000
49	0.000	0.000	-1.471	0.000	0.000	0.000
87	0.000	0.000	-1.471	0.000	0.000	0.000
93	0.000	0.000	-1.471	0.000	0.000	0.000
44	0.000	0.000	-1.461	0.000	0.000	0.000
45	0.000	0.000	-1.265	0.000	0.000	0.000
46	0.000	0.000	-1.265	0.000	0.000	0.000
47	0.000	0.000	-1.265	0.000	0.000	0.000
48	0.000	0.000	-1.461	0.000	0.000	0.000
88	0.000	0.000	-1.461	0.000	0.000	0.000
89	0.000	0.000	-1.265	0.000	0.000	0.000
90	0.000	0.000	-1.265	0.000	0.000	0.000
91	0.000	0.000	-1.265	0.000	0.000	0.000
92	0.000	0.000	-1.461	0.000	0.000	0.000
16	0.000	0.000	-0.745	0.000	0.000	0.000
15	0.000	0.000	-0.745	0.000	0.000	0.000
108	0.000	0.000	-0.745	0.000	0.000	0.000
107	0.000	0.000	-0.745	0.000	0.000	0.000
17	0.000	0.000	-1.442	0.000	0.000	0.000
18	0.000	0.000	-1.442	0.000	0.000	0.000
109	0.000	0.000	-1.442	0.000	0.000	0.000
110	0.000	0.000	-1.442	0.000	0.000	0.000
19	0.000	0.000	-1.471	0.000	0.000	0.000
25	0.000	0.000	-1.471	0.000	0.000	0.000
111	0.000	0.000	-1.471	0.000	0.000	0.000
117	0.000	0.000	-1.471	0.000	0.000	0.000
20	0.000	0.000	-1.265	0.000	0.000	0.000
21	0.000	0.000	-1.069	0.000	0.000	0.000
22	0.000	0.000	-1.265	0.000	0.000	0.000
23	0.000	0.000	-1.069	0.000	0.000	0.000
24	0.000	0.000	-1.265	0.000	0.000	0.000
112	0.000	0.000	-1.265	0.000	0.000	0.000
113	0.000	0.000	-1.069	0.000	0.000	0.000
114	0.000	0.000	-1.265	0.000	0.000	0.000
115	0.000	0.000	-1.069	0.000	0.000	0.000
116	0.000	0.000	-1.265	0.000	0.000	0.000
2	0.000	0.000	-0.745	0.000	0.000	0.000
5	0.000	0.000	-0.745	0.000	0.000	0.000
136	0.000	0.000	-0.745	0.000	0.000	0.000
139	0.000	0.000	-0.745	0.000	0.000	0.000
7	0.000	0.000	-1.442	0.000	0.000	0.000
10	0.000	0.000	-1.442	0.000	0.000	0.000
127	0.000	0.000	-1.442	0.000	0.000	0.000
130	0.000	0.000	-1.442	0.000	0.000	0.000
1	0.000	0.000	-1.079	0.000	0.000	0.000
6	0.000	0.000	-1.079	0.000	0.000	0.000
140	0.000	0.000	-1.079	0.000	0.000	0.000
135	0.000	0.000	-1.079	0.000	0.000	0.000
3	0.000	0.000	-0.745	0.000	0.000	0.000
4	0.000	0.000	-0.745	0.000	0.000	0.000
137	0.000	0.000	-0.745	0.000	0.000	0.000
138	0.000	0.000	-0.745	0.000	0.000	0.000
8	0.000	0.000	-1.491	0.000	0.000	0.000
9	0.000	0.000	-1.491	0.000	0.000	0.000
128	0.000	0.000	-1.491	0.000	0.000	0.000
129	0.000	0.000	-1.491	0.000	0.000	0.000
35	0.000	0.000	-1.059	0.000	0.000	0.000
36	0.000	0.000	-1.059	0.000	0.000	0.000
103	0.000	0.000	-1.059	0.000	0.000	0.000
104	0.000	0.000	-1.059	0.000	0.000	0.000

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J O I N T F O R C E S Load Case ANGINKR

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	GLOBAL-XX	GLOBAL-YY	GLOBAL-ZZ
61	0.276	0.000	-0.426	0.000	0.000	0.000
80	0.460	0.000	-0.142	0.000	0.000	0.000
78	0.122	0.000	-0.853	0.000	0.000	0.000
76	0.122	0.000	-0.853	0.000	0.000	0.000
74	0.122	0.000	-0.853	0.000	0.000	0.000
72	0.122	0.000	-0.853	0.000	0.000	0.000
62	0.184	0.000	0.284	0.000	0.000	0.000
73	8.149E-02	0.000	0.569	0.000	0.000	0.000
75	8.149E-02	0.000	0.569	0.000	0.000	0.000
77	8.149E-02	0.000	0.569	0.000	0.000	0.000
79	8.149E-02	0.000	0.569	0.000	0.000	0.000
39	0.276	0.000	-0.426	0.000	0.000	0.000
83	0.276	0.000	-0.426	0.000	0.000	0.000
52	0.122	0.000	-0.853	0.000	0.000	0.000
50	0.122	0.000	-0.853	0.000	0.000	0.000
96	0.122	0.000	-0.853	0.000	0.000	0.000
94	0.122	0.000	-0.853	0.000	0.000	0.000
54	0.214	0.000	-1.493	0.000	0.000	0.000
98	0.214	0.000	-1.493	0.000	0.000	0.000
56	9.167E-02	0.000	-0.640	0.000	0.000	0.000
100	9.167E-02	0.000	-0.640	0.000	0.000	0.000
58	6.112E-02	0.000	0.426	0.000	0.000	0.000
102	6.112E-02	0.000	0.426	0.000	0.000	0.000
55	0.143	0.000	0.995	0.000	0.000	0.000
99	0.143	0.000	0.995	0.000	0.000	0.000
51	8.149E-02	0.000	0.569	0.000	0.000	0.000
53	8.149E-02	0.000	0.569	0.000	0.000	0.000

95	8.149E-02	0.000	0.569	0.000	0.000	0.000
97	8.149E-02	0.000	0.569	0.000	0.000	0.000
40	0.184	0.000	0.284	0.000	0.000	0.000
84	0.184	0.000	0.284	0.000	0.000	0.000
15	0.276	0.000	-0.426	0.000	0.000	0.000
107	0.276	0.000	-0.426	0.000	0.000	0.000
26	8.919E-02	0.000	-0.622	0.000	0.000	0.000
118	8.919E-02	0.000	-0.622	0.000	0.000	0.000
28	8.173E-02	0.000	0.570	0.000	0.000	0.000
120	8.173E-02	0.000	0.570	0.000	0.000	0.000
16	0.184	0.000	0.284	0.000	0.000	0.000
108	0.184	0.000	0.284	0.000	0.000	0.000
27	5.946E-02	0.000	0.415	0.000	0.000	0.000
119	5.946E-02	0.000	0.415	0.000	0.000	0.000
34	5.449E-02	0.000	0.380	0.000	0.000	0.000
126	5.449E-02	0.000	0.380	0.000	0.000	0.000

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JOINT FORCES Load Case ANGINKN

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	GLOBAL-XX	GLOBAL-YY	GLOBAL-ZZ
78	-8.149E-02	0.000	0.569	0.000	0.000	0.000
76	-8.149E-02	0.000	0.569	0.000	0.000	0.000
74	-8.149E-02	0.000	0.569	0.000	0.000	0.000
72	-8.149E-02	0.000	0.569	0.000	0.000	0.000
61	-0.184	0.000	0.284	0.000	0.000	0.000
80	-0.460	0.000	-0.142	0.000	0.000	0.000
62	-0.276	0.000	-0.426	0.000	0.000	0.000
73	-0.122	0.000	-0.853	0.000	0.000	0.000
75	-0.122	0.000	-0.853	0.000	0.000	0.000
77	-0.122	0.000	-0.853	0.000	0.000	0.000
79	-0.122	0.000	-0.853	0.000	0.000	0.000
39	-0.184	0.000	0.284	0.000	0.000	0.000
83	-0.184	0.000	0.284	0.000	0.000	0.000
52	-8.149E-02	0.000	0.569	0.000	0.000	0.000
50	-8.149E-02	0.000	0.569	0.000	0.000	0.000
96	-8.149E-02	0.000	0.569	0.000	0.000	0.000
94	-8.149E-02	0.000	0.569	0.000	0.000	0.000
54	-0.143	0.000	0.995	0.000	0.000	0.000
98	-0.143	0.000	0.995	0.000	0.000	0.000
56	-6.112E-02	0.000	0.426	0.000	0.000	0.000
100	-6.112E-02	0.000	0.426	0.000	0.000	0.000
58	-9.167E-02	0.000	-0.640	0.000	0.000	0.000
102	-9.167E-02	0.000	-0.640	0.000	0.000	0.000
55	-0.214	0.000	-1.493	0.000	0.000	0.000
99	-0.214	0.000	-1.493	0.000	0.000	0.000
51	-0.122	0.000	-0.853	0.000	0.000	0.000
53	-0.122	0.000	-0.853	0.000	0.000	0.000
95	-0.122	0.000	-0.853	0.000	0.000	0.000
97	-0.122	0.000	-0.853	0.000	0.000	0.000
40	-0.276	0.000	-0.426	0.000	0.000	0.000
84	-0.276	0.000	-0.426	0.000	0.000	0.000
16	-0.276	0.000	-0.426	0.000	0.000	0.000
108	-0.276	0.000	-0.426	0.000	0.000	0.000
27	-8.919E-02	0.000	-0.622	0.000	0.000	0.000
119	-8.919E-02	0.000	-0.622	0.000	0.000	0.000
34	-8.173E-02	0.000	-0.570	0.000	0.000	0.000
126	-8.173E-02	0.000	-0.570	0.000	0.000	0.000
15	-0.184	0.000	0.284	0.000	0.000	0.000
107	-0.184	0.000	0.284	0.000	0.000	0.000
26	-5.946E-02	0.000	0.415	0.000	0.000	0.000
118	-5.946E-02	0.000	0.415	0.000	0.000	0.000
28	-5.449E-02	0.000	0.380	0.000	0.000	0.000
120	-5.449E-02	0.000	0.380	0.000	0.000	0.000



STAT I C L O A D C A S E S

STATIC CASE	CASE TYPE	SELF WT FACTOR
PELATDX2	DEAD	0.0000
PELATDY2	DEAD	0.0000
PELATLY2	LIVE	0.0000
PELATLX2	LIVE	0.0000
PELATDX1	DEAD	0.0000
PELATDY1	DEAD	0.0000
PELATLY1	LIVE	0.0000
PELATLX1	LIVE	0.0000
BSENDIRI	DEAD	1.0000
ATAP	DEAD	0.0000
DINDING	DEAD	0.0000

T I M E H I S T O R Y C A S E S

HISTORY CASE	HISTORY TYPE	NUMBER OF TIME STEPS	TIME STEP INCREMENT
THGEMPA	LINEAR	650	0.02000

J O I N T D A T A

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	RESTRAINTS	ANGLE-A	ANGLE-B	ANGLE-C
G1	0.00000	3.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G2	9.00000	3.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G3	12.00000	3.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G4	0.00000	9.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G5	9.00000	9.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G6	12.00000	9.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G7	0.00000	15.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G8	9.00000	15.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G9	12.00000	15.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
I1	0.00000	3.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I2	9.00000	3.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I3	12.00000	3.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I4	0.00000	9.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I5	9.00000	9.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I6	12.00000	9.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I7	0.00000	15.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I8	2.00000	15.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
I9	4.00000	15.00000	0.00000	0 0 0 0 0 0	0.000	0.000	0.000
V1	0.00000	3.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V2	9.00000	3.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V3	12.00000	3.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V4	0.00000	9.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V5	12.00000	9.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V6	0.00000	15.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V7	12.00000	15.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V8	0.00000	21.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
V9	12.00000	21.00000	13.90000	0 0 0 0 0 0	0.000	0.000	0.000
G10	17.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G11	20.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G12	23.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G13	26.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G14	29.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G15	32.00000	18.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G16	0.00000	21.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G17	9.00000	21.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G18	12.00000	21.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G19	17.00000	21.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G20	32.00000	21.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G21	17.00000	24.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G22	23.00000	24.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G23	29.00000	24.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G24	32.00000	24.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G25	0.00000	27.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G26	9.00000	27.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G27	12.00000	27.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G28	17.00000	27.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G29	32.00000	27.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G30	17.00000	30.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G31	23.00000	30.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G32	29.00000	30.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000
G33	32.00000	30.00000	-3.00000	1 1 1 1 1 1	0.000	0.000	0.000







11151	9.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11152	12.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11153	17.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11154	20.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11155	23.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11156	26.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11157	29.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11158	32.00000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11159	34.50000	30.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11160	0.00000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11161	4.50000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11162	9.00000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11163	12.00000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11164	17.00000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11165	32.00000	33.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11166	0.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11167	2.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11168	4.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11169	4.50000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11170	6.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11171	7.75000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11172	9.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11173	17.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11174	20.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11175	23.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11176	26.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11177	29.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11178	32.00000	36.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11179	0.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11180	2.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11181	4.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11182	6.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11183	7.75000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11184	9.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
11185	12.00000	39.00000	8.00000	0 0 0 0 0	0.000	0.000	0.000
MASS1	15.14700	23.92420	0.00000	0 0 0 0 0	0.000	0.000	0.000
MASS2	13.97070	23.34950	4.00000	0 0 0 0 0	0.000	0.000	0.000
MASS3	13.88760	23.33090	8.00000	0 0 0 0 0	0.000	0.000	0.000
MASS4	14.99120	24.29730	11.93000	0 0 0 0 0	0.000	0.000	0.000

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JOINT MASS DATA

JOINT	M-U1	M-U2	M-U3	M-R1	M-R2	M-R3
MASS1	22521.480	22521.480	0.000	0.000	0.000	0.000
MASS2	57319.200	57319.200	0.000	0.000	0.000	0.000
MASS3	57081.600	57081.600	0.000	0.000	0.000	0.000
MASS4	20044.560	20044.560	0.000	0.000	0.000	0.000

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JOINT CONSTRAINT DATA

JOINT	TYPE
113	DIAPH2
115	DIAPH2
1110	DIAPH2
118	DIAPH2
1113	DIAPH2
1115	DIAPH2
1126	DIAPH2
1124	DIAPH2
1140	DIAPH2
1160	DIAPH2
1179	DIAPH2
1184	DIAPH2
1185	DIAPH2
1173	DIAPH2
1164	DIAPH2
1118	DIAPH2
1119	DIAPH2
1120	DIAPH2
1121	DIAPH2
1122	DIAPH2
1123	DIAPH2
1139	DIAPH2
1178	DIAPH2
1177	DIAPH2
1176	DIAPH2
1175	DIAPH2
1174	DIAPH2
112	DIAPH2

111 DIAPH2  
117 DIAPH2  
116 DIAPH2  
1112 DIAPH2  
1111 DIAPH2  
1117 DIAPH2  
1116 DIAPH2  
1132 DIAPH2  
1131 DIAPH2  
1151 DIAPH2  
1150 DIAPH2  
1152 DIAPH2  
1133 DIAPH2  
1166 DIAPH2  
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1161 DIAPH2  
1171 DIAPH2  
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1182 DIAPH2  
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1181 DIAPH2  
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1180 DIAPH2  
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1154 DIAPH2  
1159 DIAPH2  
1149 DIAPH2  
1169 DIAPH2  
1130 DIAPH2  
1129 DIAPH2  
1153 DIAPH2  
1134 DIAPH2  
114 DIAPH2  
119 DIAPH2  
1114 DIAPH2  
1125 DIAPH2  
1141 DIAPH2  
1142 DIAPH2  
1143 DIAPH2  
1127 DIAPH2  
1128 DIAPH2  
1148 DIAPH2  
1158 DIAPH2  
1165 DIAPH2  
1138 DIAPH2  
1157 DIAPH2  
1136 DIAPH2  
1155 DIAPH2  
1162 DIAPH2  
1163 DIAPH2  
1146 DIAPH2  
1156 DIAPH2  
1137 DIAPH2  
MASS2 DIAPH2  
1113 DIAPH3  
1114 DIAPH3  
1115 DIAPH3  
11110 DIAPH3  
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11113 DIAPH3  
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11115 DIAPH3  
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11153 DIAPH3  
11143 DIAPH3  
11134 DIAPH3  
11127 DIAPH3  
11118 DIAPH3  
11119 DIAPH3

11120 DIAPH3  
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11174 DIAPH3  
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1111 DIAPH3  
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11152 DIAPH3  
11133 DIAPH3  
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11182 DIAPH3  
11168 DIAPH3  
11181 DIAPH3  
11167 DIAPH3  
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11159 DIAPH3  
11149 DIAPH3  
11169 DIAPH3  
11130 DIAPH3  
11129 DIAPH3  
11146 DIAPH3  
11156 DIAPH3  
11137 DIAPH3  
MASS3 DIAPH3  
11 DIAPH1  
12 DIAPH1  
13 DIAPH1  
16 DIAPH1  
14 DIAPH1  
17 DIAPH1  
111 DIAPH1  
128 DIAPH1  
125 DIAPH1  
139 DIAPH1  
142 DIAPH1  
150 DIAPH1  
176 DIAPH1  
181 DIAPH1  
182 DIAPH1  
166 DIAPH1  
145 DIAPH1  
143 DIAPH1  
134 DIAPH1  
119 DIAPH1  
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121 DIAPH1  
123 DIAPH1  
124 DIAPH1  
131 DIAPH1  
138 DIAPH1  
149 DIAPH1  
171 DIAPH1  
170 DIAPH1

168 DIAPH1  
 167 DIAPH1  
 115 DIAPH1  
 132 DIAPH1  
 163 DIAPH1  
 165 DIAPH1  
 180 DIAPH1  
 179 DIAPH1  
 178 DIAPH1  
 177 DIAPH1  
 155 DIAPH1  
 130 DIAPH1  
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FRAME ELEMENT DATA

FRAME	JNT-1	JNT-2	SECTION	ANGLE	RELEASES	SEGMENTS	R1	R2	FACTOR	LENGTH
K1	G1	11	KLMB	0.000	000000	2				
K2	G2	12	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K3	G3	13	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K4	G4	14	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K5	G5	15	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K6	G6	16	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K7	G7	17	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K8	G8	110	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K9	G9	111	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K10	G10	119	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K11	G11	120	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K12	G12	121	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K13	G13	122	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K14	G14	123	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K15	G15	124	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K16	G16	125	KLMB	0.000	000000	2	0.000	0.150	0.000	3.000
							0.000	0.175	0.000	3.000



K17	G17	127	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K18	G18	128	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K19	G19	129	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K20	G20	131	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K21	G21	134	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K22	G22	136	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K23	G23	137	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K24	G24	138	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K25	G25	139	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K26	G26	141	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K27	G27	142	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K28	G28	143	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K29	G29	144	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K30	G30	145	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K31	G31	147	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K32	G32	148	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K33	G33	149	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K34	G34	150	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K35	G35	152	KLMB	0.000	000000	2	0.000	0.175	0.000	3.000
K36	G36	153	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K37	G37	154	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K38	G38	156	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K39	G39	166	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K40	G40	167	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K41	G41	168	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K42	G42	169	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K43	G43	170	KLMA	0.000	000000	2	0.000	0.150	0.000	3.000
K44	G44	171	KLMA	0.000	000000	2	0.000	0.175	0.000	3.000
K45	G45	176	KLMB	0.000	000000	2	0.000	0.150	0.000	3.000
K46	G46	181	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K47	G47	182	KLMA	0.000	000000	2	0.000	0.200	0.000	3.000
K48	11	113	KLMB	0.000	000000	2	0.000	0.200	0.000	3.000
K49	12	114	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K50	13	115	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K51	14	118	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K52	15	119	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K53	16	1110	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K54	17	1113	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K55	110	1114	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K56	111	1115	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K57	119	1118	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K58	120	1119	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K59	121	1120	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K60	122	1121	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K61	123	1122	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K62	124	1123	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K63	125	1124	KLMB	0.000	000000	2	0.150	0.300	0.000	4.000
K64	127	1125	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K65	128	1126	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K66	129	1127	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K67	131	1128	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K68	134	1134	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K69	136	1136	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K70	137	1138	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K71	138	1139	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K72	139	1140	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K73	141	1141	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K74	142	1142	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K75	143	1143	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K76	144	1148	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K77	145	1153	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K78	149	1158	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K79	150	1160	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K80	152	1162	KLMB	0.000	000000	2	0.175	0.300	0.000	4.000
K81	153	1163	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K82	154	1164	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K83	156	1165	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K84	166	1173	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K85	167	1174	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K86	168	1175	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K87	169	1176	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K88	170	1177	KLMA	0.000	000000	2	0.150	0.300	0.000	4.000
K89	171	1178	KLMA	0.000	000000	2	0.175	0.300	0.000	4.000
K90	176	1179	KLMB	0.000	000000	2	0.150	0.300	0.000	4.000
K91	181	1184	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K92	182	1185	KLMA	0.000	000000	2	0.200	0.300	0.000	4.000
K93	113	1113	KLMB	0.000	000000	2	0.200	0.300	0.000	4.000
K94	114	1114	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K95	115	1115	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K96	118	1118	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K97	119	1119	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K98	1110	11110	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K99	1113	11113	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K100	1114	11114	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K101	1115	11115	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K102	1118	11118	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K103	1119	11119	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000

K104	1120	11120	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K105	1121	11121	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K106	1122	11122	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K107	1123	11123	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K108	1124	11124	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K109	1125	11125	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K110	1126	11126	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K111	1127	11127	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K112	1128	11128	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K113	1134	11134	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K114	1136	11136	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K115	1138	11138	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K116	1139	11139	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K117	1140	11140	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K118	1141	11141	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K119	1142	11142	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K120	1143	11143	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K121	1148	11148	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K122	1153	11153	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K123	1158	11158	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K124	1160	11160	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K125	1162	11162	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K126	1163	11163	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K127	1164	11164	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K128	1165	11165	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K129	1173	11173	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K130	1174	11174	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K131	1175	11175	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K132	1176	11176	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K133	1177	11177	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K134	1178	11178	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K135	1179	11179	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K136	1184	11184	KLMB	0.000	000000	2	0.300	0.300	0.000	4.000
K137	1185	11185	KLMA	0.000	000000	2	0.300	0.300	0.000	4.000
K138	11126	IV1	KLMA	0.000	000000	2	0.000	0.000	1.000	3.930
K139	11142	IV4	KLMA	0.000	000000	2	0.000	0.000	1.000	3.930
K140	11143	IV5	KLMA	0.000	000000	2	0.000	0.000	1.000	3.930
K141	11153	IV7	KLMA	0.000	000000	2	0.000	0.000	1.000	3.930
K142	11163	IV8	KLMA	0.000	000000	2	0.000	0.000	1.000	3.930
K143	1119	V1	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K144	1114	V2	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K145	1115	V3	KLMA	0.000	000000	2	0.000	0.000	1.000	5.900
K146	1118	V4	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K147	11110	V5	KLMA	0.000	000000	2	0.000	0.000	1.000	5.900
K148	11113	V6	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K149	11115	V7	KLMA	0.000	000000	2	0.000	0.000	1.000	5.900
K150	11124	V8	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K151	11140	V10	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K152	11160	V12	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K153	11179	V14	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K154	11184	V15	KLMB	0.000	000000	2	0.000	0.000	1.000	5.900
K155	11185	V16	KLMA	0.000	000000	2	0.000	0.000	1.000	5.900
K156	11118	V17	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K157	11119	V18	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K158	11120	V19	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K159	11121	V20	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K160	11122	V21	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K161	11123	V22	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K162	11127	V23	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K163	11128	V24	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K164	11134	V25	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K165	11139	V26	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K166	11148	V28	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K167	11158	V30	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K168	11164	V31	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K169	11165	V32	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K170	11173	V33	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K171	11174	V34	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K172	11175	V35	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K173	11176	V36	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K174	11177	V37	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K175	11178	V38	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K176	IV1	V9	KLMA	0.000	000000	2	0.000	0.000	1.000	6.200
K177	IV4	V11	KLMA	0.000	000000	2	0.000	0.000	1.000	1.970
K178	IV8	V13	KLMA	0.000	000000	2	0.000	0.000	1.000	1.970
K179	IV5	V27	KLMA	0.000	000000	2	0.000	0.000	1.000	1.970
K180	IV7	V29	KLMA	0.000	000000	2	0.000	0.000	1.000	2.270
ANAK2	1116	1117	BA1	0.000	000000	2	0.000	0.000	0.000	9.000
ANAK3	1111	1112	BA1	0.000	000000	2	0.000	0.000	0.000	9.000
ANAK4	1116	1117	BA1	0.000	000000	2	0.000	0.000	0.000	9.000
ANAK5	1119	1130	BA4	0.000	000000	2	0.000	0.000	0.000	9.000
ANAK6	1137	1121	BA4	0.000	000000	2	0.150	0.000	0.000	4.500
ANAK7	1129	1130	BA5	0.000	000000	2	0.000	0.150	0.000	6.000
ANAK8	1130	1135	BA4	0.000	000000	2	0.000	0.000	0.000	3.000
ANAK9	1131	1132	BA1	0.000	000000	2	0.000	0.000	0.000	1.500
INDK1	111	112	BLK	0.000	000000	2	0.000	0.000	0.000	3.000

INDK2	111	114	BLK	0.000	0.000000	2	0.000	0.200	0.000	3.000
INDK3	115	112	BLK	0.000	0.000000	2	0.150	0.000	0.000	3.000
INDK4	113	114	BLK	0.000	0.000000	2	0.200	0.200	0.000	9.000
INDK5	114	115	BLK	0.000	0.000000	2	0.200	0.150	0.000	3.000
INDK6	113	116	BLK	0.000	0.000000	2	0.200	0.000	0.000	3.000
INDK7	114	117	BLK	0.000	0.000000	2	0.200	0.000	0.000	3.000
INDK8	1110	115	BLK	0.000	0.000000	2	0.200	0.000	0.000	3.000
INDK9	116	118	BLK	0.000	0.000000	2	0.150	0.150	0.000	3.000
RING1	V2	V1	RING	0.000	0.000000	2	0.000	0.200	0.000	3.000
RING2	V3	V2	RING	0.000	0.000000	2	0.000	0.000	1.000	3.000
RING3	V1	V4	RING	0.000	0.000000	2	0.000	0.000	1.000	9.000
RING4	V3	V5	RING	0.000	0.000000	2	0.000	0.000	1.000	3.000
RING5	V4	V6	RING	0.000	0.000000	2	0.000	0.000	1.000	6.000
RING6	V5	V7	RING	0.000	0.000000	2	0.000	0.000	1.000	6.000
RING7	V6	V8	RING	0.000	0.000000	2	0.000	0.000	1.000	6.000
RING8	V7	V9	RING	0.000	0.000000	2	0.000	0.000	1.000	6.000
RING9	V8	V10	RING	0.000	0.000000	2	0.000	0.000	1.000	6.000
SLOF1	11	12	S1	0.000	0.000000	2	0.000	0.000	1.000	6.000
SLOF2	12	13	S1	0.000	0.000000	2	0.200	0.200	0.000	6.000
SLOF3	11	14	S2	0.000	0.000000	2	0.200	0.200	0.000	9.000
SLOF4	12	15	S2	0.000	0.000000	2	0.200	0.150	0.000	3.000
SLOF5	16	13	S3	0.000	0.000000	2	0.200	0.200	0.000	6.000
SLOF6	14	15	S1	0.000	0.000000	2	0.150	0.150	0.000	6.000
SLOF7	15	16	S1	0.000	0.000000	2	0.200	0.200	0.000	6.000
SLOF8	14	17	S2	0.000	0.000000	2	0.200	0.200	0.000	9.000
SLOF9	15	110	S2	0.000	0.000000	2	0.200	0.150	0.000	3.000
ANAK10	1133	1134	BA3	0.000	0.000000	2	0.200	0.200	0.000	6.000
ANAK12	1135	1144	BA4	0.000	0.000000	2	0.000	0.150	0.000	6.000
ANAK13	1146	1137	BA4	0.000	0.000000	2	0.000	0.000	0.000	5.000
ANAK14	1144	1145	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK15	1145	1146	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK16	1146	1147	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK17	1147	1148	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK19	1144	1154	BA4	0.000	0.000000	2	0.000	0.150	0.000	3.000
ANAK20	1156	1146	BA4	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK22	1150	1151	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK23	1152	1153	BA3	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK25	1154	1174	BA4	0.000	0.000000	2	0.000	0.150	0.000	9.000
ANAK26	1176	1156	BA4	0.000	0.000000	2	0.000	0.150	0.000	5.000
ANAK27	1169	1161	BA5	0.000	0.000000	2	0.150	0.000	0.000	6.000
ANAK28	1166	1167	BA1	0.000	0.000000	2	0.000	0.000	0.000	6.000
ANAK29	1167	1168	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK30	1168	1169	BA1	0.000	0.000000	2	0.000	0.000	0.000	2.000
ANAK31	1169	1170	BA1	0.000	0.000000	2	0.000	0.000	0.000	2.000
ANAK32	1170	1171	BA1	0.000	0.000000	2	0.000	0.000	0.000	0.500
ANAK33	1171	1172	BA1	0.000	0.000000	2	0.000	0.000	0.000	1.500
ANAK34	1167	1180	BA5	0.000	0.000000	2	0.000	0.000	0.000	1.750
ANAK35	1168	1181	BA5	0.000	0.000000	2	0.000	0.000	0.000	1.250
ANAK36	1170	1182	BA5	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK37	1171	1183	BA5	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK39	1116	1117	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK40	1111	1112	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK41	1116	1117	BA1	0.000	0.000000	2	0.000	0.000	0.000	9.000
ANAK42	1119	11130	BA4	0.000	0.000000	2	0.000	0.000	0.000	9.000
ANAK43	11137	11121	BA4	0.000	0.000000	2	0.150	0.000	0.000	9.000
ANAK44	11129	11130	BA5	0.000	0.000000	2	0.000	0.150	0.000	4.500
ANAK45	11130	11135	BA4	0.000	0.000000	2	0.000	0.000	0.000	6.000
ANAK46	11131	11132	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK47	11133	11134	BA3	0.000	0.000000	2	0.000	0.000	0.000	1.500
ANAK49	11135	11144	BA4	0.000	0.000000	2	0.000	0.150	0.000	9.000
ANAK50	11146	11137	BA4	0.000	0.000000	2	0.000	0.000	0.000	5.000
ANAK51	11144	11145	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK52	11145	11146	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK53	11146	11147	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK54	11147	11148	BA2	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK56	11144	11154	BA4	0.000	0.000000	2	0.000	0.150	0.000	3.000
ANAK57	11156	11146	BA4	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK59	11150	11151	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK60	11152	11153	BA3	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK62	11154	11174	BA4	0.000	0.000000	2	0.000	0.150	0.000	9.000
ANAK63	11176	11156	BA4	0.000	0.000000	2	0.000	0.150	0.000	5.000
ANAK64	11169	11161	BA5	0.000	0.000000	2	0.150	0.000	0.000	6.000
ANAK65	11166	11167	BA1	0.000	0.000000	2	0.000	0.000	0.000	6.000
ANAK66	11167	11168	BA1	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK67	11168	11169	BA1	0.000	0.000000	2	0.000	0.000	0.000	2.000
ANAK68	11169	11170	BA1	0.000	0.000000	2	0.000	0.000	0.000	2.000
ANAK69	11170	11171	BA1	0.000	0.000000	2	0.000	0.000	0.000	0.500
ANAK70	11171	11172	BA1	0.000	0.000000	2	0.000	0.000	0.000	1.500
ANAK71	11167	11180	BA5	0.000	0.000000	2	0.000	0.000	0.000	1.750
ANAK72	11168	11181	BA5	0.000	0.000000	2	0.000	0.000	0.000	1.250
ANAK73	11170	11182	BA5	0.000	0.000000	2	0.000	0.000	0.000	3.000
ANAK74	11171	11183	BA5	0.000	0.000000	2	0.000	0.000	0.000	3.000
INDK10	117	119	BLK	0.000	0.000000	2	0.000	0.000	0.000	3.000
INDK11	118	119	BLK	0.000	0.000000	2	0.000	0.000	0.000	3.000
INDK12	119	1110	BLK	0.000	0.000000	2	0.200	0.200	0.000	3.000
INDK13	118	1111	BLK	0.000	0.000000	2	0.200	0.150	0.000	9.000
INDK14	119	1112	BLK	0.000	0.000000	2	0.200	0.000	0.000	3.000
			BLK	0.000	0.000000	2	0.200	0.000	0.000	3.000

INDK15	1115	1110	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK16	1111	1113	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK17	1112	1114	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK18	1113	1114	BLK	0.000	000000	2	0.200	0.200	0.000	3.000
INDK19	1114	1115	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK20	1113	1116	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK21	1114	1117	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK22	1126	1115	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK23	1118	1119	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK24	1119	1120	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK25	1120	1121	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK26	1121	1122	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK27	1122	1123	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK28	1116	1124	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK29	1117	1125	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK30	1118	1127	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK31	1123	1128	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK32	1124	1125	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK33	1125	1126	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK34	1120	1136	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK35	1122	1138	BLK	0.000	000000	2	0.150	0.200	0.000	6.000
INDK36	1127	1129	BLK	0.000	000000	2	0.150	0.200	0.000	6.000
INDK37	1124	1131	BLK	0.000	000000	2	0.150	0.000	0.000	1.500
INDK38	1125	1132	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK39	1133	1126	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK40	1128	1139	BLK	0.000	000000	2	0.000	0.150	0.000	3.000
INDK41	1129	1134	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK42	1134	1135	BLK	0.000	000000	2	0.000	0.150	0.000	1.500
INDK43	1135	1136	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK44	1136	1137	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK45	1137	1138	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK46	1138	1139	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK47	1131	1140	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK48	1132	1141	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK49	1142	1133	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK50	1134	1143	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK51	1136	1145	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK52	1138	1147	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK53	1139	1148	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK54	1140	1141	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK55	1143	1144	BA2	0.000	000000	2	0.200	0.200	0.000	9.000
INDK56	1141	1142	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK57	1142	1143	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK58	1148	1149	BLK	0.000	000000	2	0.150	0.150	0.000	5.000
INDK59	1140	1150	BLK	0.000	000000	2	0.150	0.000	0.000	2.500
INDK60	1141	1151	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK61	1152	1142	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK62	1143	1153	BLK	0.000	000000	2	0.000	0.150	0.000	3.000
INDK63	1145	1155	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK64	1147	1157	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK65	1148	1158	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK66	1159	1149	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK67	1153	1154	BLK	0.000	000000	2	0.000	0.000	0.000	3.000
INDK68	1154	1155	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK69	1155	1156	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK70	1156	1157	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK71	1157	1158	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK72	1158	1159	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK73	1150	1160	BLK	0.000	000000	2	0.150	0.000	0.000	2.500
INDK74	1151	1162	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK75	1163	1152	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK76	1153	1164	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK77	1158	1165	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK78	1160	1161	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK79	1161	1162	BLK	0.000	000000	2	0.200	0.000	0.000	4.500
INDK80	1162	1163	BLK	0.000	000000	2	0.000	0.200	0.000	4.500
INDK81	1163	1164	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK82	1155	1175	BLK	0.000	000000	2	0.150	0.150	0.000	5.000
INDK83	1157	1177	BLK	0.000	000000	2	0.200	0.150	0.000	6.000
INDK84	1160	1166	BLK	0.000	000000	2	0.200	0.150	0.000	6.000
INDK85	1162	1172	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK86	1164	1173	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK87	1165	1178	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK88	1185	1163	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK89	1173	1174	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK90	1174	1175	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK91	1175	1176	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK92	1176	1177	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK93	1177	1178	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK94	1166	1179	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK95	1172	1184	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK96	1179	1180	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK97	1180	1181	BLK	0.000	000000	2	0.200	0.000	0.000	2.000
INDK98	1181	1182	BLK	0.000	000000	2	0.000	0.000	0.000	2.000
INDK99	1182	1183	BLK	0.000	000000	2	0.000	0.000	0.000	2.000
RING10	V9	V11	RING	0.000	000000	2	0.000	0.000	0.000	1.750
RING11	V10	V12	RING	0.000	000000	2	0.000	0.000	1.000	6.000

RING12	V11	V13	RING	0.000	000000	2	0.000	0.000	1.000	6.000
RING13	V12	V14	RING	0.000	000000	2	0.000	0.000	1.000	6.000
RING14	V13	V16	RING	0.000	000000	2	0.000	0.000	1.000	6.000
RING15	V15	V14	RING	0.000	000000	2	0.000	0.000	1.000	9.000
RING16	V16	V15	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING17	V17	V18	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING18	V18	V19	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING19	V19	V20	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING20	V20	V21	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING21	V21	V22	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING22	V23	V17	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING23	V24	V22	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING24	V25	V23	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING25	V26	V24	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING26	V27	V25	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING27	V28	V26	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING28	V29	V27	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING29	V30	V28	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING30	V31	V29	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING31	V32	V30	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING32	V33	V31	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING33	V38	V32	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING34	V33	V34	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING35	V34	V35	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING36	V35	V36	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING37	V36	V37	RING	0.000	000000	2	0.000	0.000	1.000	3.000
RING38	V37	V38	RING	0.000	000000	2	0.000	0.000	1.000	3.000
SLOF10	I11	I6	S3	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF11	I7	I8	S1	0.000	000000	2	0.200	0.000	0.000	2.000
SLOF12	I8	I9	S1	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF13	I9	I10	S1	0.000	000000	2	0.000	0.200	0.000	5.000
SLOF14	I10	I11	S1	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF15	I7	I12	S2	0.000	000000	2	0.200	0.000	0.000	1.500
SLOF16	I13	I8	S0	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF17	I14	I9	S0	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF18	I12	I13	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF19	I13	I14	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF20	I12	I15	S2	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF21	I16	I13	S0	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF22	I17	I14	S0	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF23	I15	I16	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF24	I16	I17	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF25	I17	I18	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF26	I10	I27	S2	0.000	000000	2	0.000	0.000	0.000	0.500
SLOF27	I28	I11	S3	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF28	I19	I20	S3	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF29	I20	I21	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF30	I21	I22	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF31	I22	I23	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF32	I23	I24	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF33	I15	I25	S2	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF34	I26	I18	S0	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF35	I19	I29	S3	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF36	I23	I30	S2	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF37	I24	I31	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF38	I25	I26	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF39	I26	I27	S3	0.000	000000	2	0.200	0.000	0.000	4.500
SLOF40	I27	I28	S3	0.000	000000	2	0.000	0.200	0.000	4.500
SLOF41	I20	I35	S2	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF42	I21	I36	S2	0.000	000000	2	0.150	0.200	0.000	6.000
SLOF43	I31	I30	S0	0.000	000000	2	0.150	0.000	0.000	6.000
SLOF44	I25	I32	S2	0.000	000000	2	0.150	0.000	0.000	3.000
SLOF45	I33	I26	S0	0.000	000000	2	0.200	0.000	0.000	3.000
SLOF46	I29	I34	S3	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF47	I30	I37	S2	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF48	I31	I38	S3	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF49	I32	I33	S0	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF50	I27	I41	S2	0.000	000000	2	0.000	0.000	0.000	4.500
SLOF51	I42	I28	S3	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF52	I34	I35	S2	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF53	I35	I36	S2	0.000	000000	2	0.150	0.000	0.000	3.000
SLOF54	I36	I37	S2	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF55	I37	I38	S2	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF56	I32	I39	S2	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF57	I40	I33	S0	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF58	I34	I43	S3	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF59	I38	I44	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF60	I39	I40	S1	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF61	I40	I41	S1	0.000	000000	2	0.200	0.000	0.000	4.500
SLOF62	I41	I42	S1	0.000	000000	2	0.000	0.200	0.000	4.500
SLOF63	I42	I43	S1	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF64	I35	I46	S2	0.000	000000	2	0.150	0.150	0.000	5.000
SLOF65	I36	I47	S2	0.000	000000	2	0.000	0.000	0.000	6.000
SLOF66	I37	I48	S2	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF67	I43	I45	S3	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF68	I44	I49	S3	0.000	000000	2	0.150	0.150	0.000	3.000

SLOF69	139	150	S2	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF70	141	152	S2	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF71	153	142	S3	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF72	145	146	S2	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF73	146	147	S2	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF74	147	148	S2	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF75	148	149	S2	0.000	000000	2	0.200	0.200	0.000	6.000
SLOF76	145	154	S3	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF77	146	155	S2	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF78	149	156	S3	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF79	147	160	S2	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF80	148	161	S2	0.000	000000	2	0.200	0.000	0.000	4.500
SLOF81	150	151	S0	0.000	000000	2	0.200	0.000	0.000	4.500
SLOF82	151	152	S0	0.000	000000	2	0.200	0.000	0.000	2.000
SLOF83	152	153	S0	0.000	000000	2	0.000	0.200	0.000	7.000
SLOF84	153	154	S0	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF85	154	155	S0	0.000	000000	2	0.150	0.150	0.000	5.000
SLOF86	150	157	S2	0.000	000000	2	0.150	0.000	0.000	3.000
SLOF87	158	151	S0	0.000	000000	2	0.200	0.000	0.000	1.250
SLOF88	155	159	S2	0.000	000000	2	0.000	0.000	0.000	1.250
SLOF89	156	162	S3	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF90	157	150	S0	0.000	000000	2	0.000	0.000	0.000	1.500
SLOF91	152	165	S2	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF92	154	166	S3	0.000	000000	2	0.200	0.000	0.000	3.000
SLOF93	159	160	S0	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF94	162	161	S0	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF95	157	163	S2	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF96	164	150	S0	0.000	000000	2	0.000	0.000	0.000	1.750
SLOF97	159	167	S2	0.000	000000	2	0.000	0.000	0.000	1.750
SLOF98	160	168	S2	0.000	000000	2	0.000	0.150	0.000	1.500
SLOF99	161	170	S2	0.000	000000	2	0.000	0.150	0.000	1.500
INDK100	1183	1184	BLK	0.000	000000	2	0.000	0.150	0.000	1.500
INDK101	1184	1185	BLK	0.000	000000	2	0.000	0.200	0.000	1.250
INDK102	1111	1112	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK103	1111	1114	BLK	0.000	000000	2	0.000	0.000	0.000	3.000
INDK104	1115	1112	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK105	1113	1114	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK106	1114	1115	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK107	1113	1116	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK108	1114	1117	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK109	11110	1115	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK110	1116	1118	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK111	1117	1119	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK112	1118	1119	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK113	1119	11110	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK114	1118	11111	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK115	1119	11112	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK116	11115	11110	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK117	11111	11113	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK118	11112	11114	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK119	11113	11114	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK120	11114	11115	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK121	11113	11116	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK122	11114	11117	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK123	11126	11115	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK124	11118	11119	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK125	11119	11120	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK126	11120	11121	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK127	11121	11122	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK128	11122	11123	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK129	11116	11124	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK130	11117	11125	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK131	11118	11127	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK132	11123	11128	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK133	11124	11125	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK134	11125	11126	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK135	11120	11136	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK136	11122	11138	BLK	0.000	000000	2	0.150	0.200	0.000	6.000
INDK137	11127	11129	BLK	0.000	000000	2	0.150	0.200	0.000	6.000
INDK138	11124	11131	BLK	0.000	000000	2	0.150	0.000	0.000	1.500
INDK139	11125	11132	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK140	11133	11126	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK141	11128	11139	BLK	0.000	000000	2	0.000	0.150	0.000	3.000
INDK142	11129	11134	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK143	11134	11135	BLK	0.000	000000	2	0.000	0.150	0.000	1.500
INDK144	11135	11136	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK145	11136	11137	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK146	11137	11138	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK147	11138	11139	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK148	11131	11140	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK149	11132	11141	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK150	11142	11133	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK151	11143	11144	BA2	0.000	000000	2	0.150	0.000	0.000	3.000
INDK152	11134	11143	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK153	11136	11145	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK154	11138	11147	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK155	11139	11148	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
			BLK	0.000	000000	2	0.150	0.150	0.000	3.000

INDK156	11140	11141	BLK	0.000	000000	2	0.200	0.200	0.000	9.000
INDK157	11141	11142	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK158	11142	11143	BLK	0.000	000000	2	0.150	0.150	0.000	5.000
INDK159	11148	11149	BLK	0.000	000000	2	0.150	0.000	0.000	2.500
INDK160	11140	11150	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK161	11141	11151	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK162	11152	11142	BLK	0.000	000000	2	0.000	0.150	0.000	3.000
INDK163	11143	11153	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK164	11145	11155	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK165	11147	11157	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK166	11148	11158	BLK	0.000	000000	2	0.150	0.200	0.000	3.000
INDK167	11159	11149	BLK	0.000	000000	2	0.000	0.150	0.000	3.000
INDK168	11153	11154	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK169	11154	11155	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK170	11155	11156	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK171	11156	11157	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK172	11157	11158	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK173	11158	11159	BLK	0.000	000000	2	0.150	0.000	0.000	2.500
INDK174	11150	11160	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK175	11151	11162	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK176	11163	11152	BLK	0.000	000000	2	0.150	0.000	0.000	3.000
INDK177	11153	11164	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK178	11158	11165	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK179	11160	11161	BLK	0.000	000000	2	0.200	0.000	0.000	4.500
INDK180	11161	11162	BLK	0.000	000000	2	0.000	0.200	0.000	4.500
INDK181	11162	11163	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK182	11163	11164	BLK	0.000	000000	2	0.150	0.150	0.000	5.000
INDK183	11155	11175	BLK	0.000	000000	2	0.200	0.150	0.000	6.000
INDK184	11157	11177	BLK	0.000	000000	2	0.200	0.000	0.000	6.000
INDK185	11160	11166	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
INDK186	11162	11172	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK187	11164	11173	BLK	0.000	000000	2	0.200	0.000	0.000	3.000
INDK188	11165	11178	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK189	11185	11163	BLK	0.000	000000	2	0.150	0.150	0.000	6.000
INDK190	11173	11174	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK191	11174	11175	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK192	11175	11176	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK193	1V1	1V2	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK194	1V3	1V2	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK195	1V2	1V4	BLK	0.000	000000	2	0.000	0.000	1.000	5.000
INDK196	1V5	1V3	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK197	1V5	1V4	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK198	1V4	1V6	BLK	0.000	000000	2	0.000	0.000	1.000	5.000
INDK199	1V7	1V5	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK200	1V7	1V6	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK201	1V6	1V8	BLK	0.000	000000	2	0.000	0.000	1.000	5.000
INDK202	1V9	1V7	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK203	1V8	1V9	BLK	0.000	000000	2	0.000	0.000	1.000	3.000
INDK204	11176	11177	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK205	11177	11178	BLK	0.000	000000	2	0.150	0.150	0.000	3.000
INDK206	11166	11179	BLK	0.000	000000	2	0.000	0.200	0.000	3.000
INDK207	11172	11184	BLK	0.000	000000	2	0.000	0.000	0.000	3.000
INDK208	11179	11180	BLK	0.000	000000	2	0.200	0.000	0.000	2.000
INDK209	11180	11181	BLK	0.000	000000	2	0.000	0.000	0.000	2.000
INDK210	11181	11182	BLK	0.000	000000	2	0.000	0.000	0.000	2.000
INDK211	11182	11183	BLK	0.000	000000	2	0.000	0.000	0.000	1.750
INDK212	11183	11184	BLK	0.000	000000	2	0.000	0.200	0.000	1.250
INDK213	11184	11185	BLK	0.000	000000	2	0.200	0.150	0.000	3.000
SLOF100	162	171	S3	0.000	000000	2	0.000	0.150	0.000	1.500
SLOF101	163	164	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF102	164	165	S0	0.000	000000	2	0.000	0.000	0.000	7.000
SLOF103	182	153	S3	0.000	000000	2	0.150	0.150	0.000	6.000
SLOF104	166	167	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF105	167	168	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF106	168	169	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF107	169	170	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF108	170	171	S3	0.000	000000	2	0.150	0.150	0.000	3.000
SLOF109	172	164	S0	0.000	000000	2	0.000	0.000	0.000	3.000
SLOF110	172	173	S0	0.000	000000	2	0.000	0.000	0.000	1.200
SLOF111	173	174	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF112	174	175	S0	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF113	163	176	S2	0.000	000000	2	0.000	0.000	0.000	1.750
SLOF114	165	181	S2	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF115	177	172	S0	0.000	000000	2	0.000	0.200	0.000	3.000
SLOF116	173	178	S0	0.000	000000	2	0.000	0.000	0.000	1.800
SLOF117	174	179	S0	0.000	000000	2	0.000	0.000	0.000	1.800
SLOF118	175	180	S0	0.000	000000	2	0.000	0.000	0.000	1.800
SLOF119	176	177	S1	0.000	000000	2	0.200	0.000	0.000	2.000
SLOF120	177	178	S1	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF121	178	179	S1	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF122	179	180	S1	0.000	000000	2	0.000	0.000	0.000	2.000
SLOF123	180	181	S1	0.000	000000	2	0.000	0.000	0.000	1.750
SLOF124	181	182	S1	0.000	000000	2	0.200	0.150	0.000	3.000

JOINT FORCES Load Case ATAP

JOINT	GLOBAL-X	GLOBAL-Y	GLOBAL-Z	GLOBAL-XX	GLOBAL-YY	GLOBAL-ZZ
V1	0.000	0.000	-245.619	0.000	0.000	0.000
V3	0.000	0.000	-239.348	0.000	0.000	0.000
V2	0.000	0.000	-475.596	0.000	0.000	0.000
V4	0.000	0.000	-1522.916	0.000	0.000	0.000
V13	0.000	0.000	-1522.916	0.000	0.000	0.000
V12	0.000	0.000	-1652.226	0.000	0.000	0.000
V5	0.000	0.000	-1652.226	0.000	0.000	0.000
V6	0.000	0.000	-2417.013	0.000	0.000	0.000
V11	0.000	0.000	-2417.013	0.000	0.000	0.000
V10	0.000	0.000	-2266.870	0.000	0.000	0.000
V7	0.000	0.000	-2266.870	0.000	0.000	0.000
V8	0.000	0.000	-2258.957	0.000	0.000	0.000
V9	0.000	0.000	-2258.957	0.000	0.000	0.000
V16	0.000	0.000	-245.619	0.000	0.000	0.000
V14	0.000	0.000	-239.348	0.000	0.000	0.000
V15	0.000	0.000	-442.016	0.000	0.000	0.000
V17	0.000	0.000	-298.461	0.000	0.000	0.000
V18	0.000	0.000	-659.236	0.000	0.000	0.000
V19	0.000	0.000	-1140.542	0.000	0.000	0.000
V20	0.000	0.000	-1137.891	0.000	0.000	0.000
V21	0.000	0.000	-628.675	0.000	0.000	0.000
V22	0.000	0.000	-443.597	0.000	0.000	0.000
V23	0.000	0.000	-1499.666	0.000	0.000	0.000
V24	0.000	0.000	-1421.168	0.000	0.000	0.000
V25	0.000	0.000	-2866.504	0.000	0.000	0.000
V26	0.000	0.000	-2855.776	0.000	0.000	0.000
V27	0.000	0.000	-2384.035	0.000	0.000	0.000
V28	0.000	0.000	-2336.924	0.000	0.000	0.000
V29	0.000	0.000	-2714.505	0.000	0.000	0.000
V30	0.000	0.000	-2703.767	0.000	0.000	0.000
V31	0.000	0.000	-1499.666	0.000	0.000	0.000
V32	0.000	0.000	-1421.168	0.000	0.000	0.000
V33	0.000	0.000	-298.461	0.000	0.000	0.000
V34	0.000	0.000	-659.236	0.000	0.000	0.000
V35	0.000	0.000	-1140.542	0.000	0.000	0.000
V36	0.000	0.000	-1137.891	0.000	0.000	0.000
V37	0.000	0.000	-628.675	0.000	0.000	0.000
V38	0.000	0.000	-443.597	0.000	0.000	0.000

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FRAME SPAN DISTRIBUTED LOADS Load Case PELATDX2

FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK2	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
ANAK2	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
ANAK2	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
ANAK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
ANAK3	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
ANAK3	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
ANAK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
ANAK4	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
ANAK4	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
ANAK9	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
ANAK9	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
ANAK9	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
ANAK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
ANAK22	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
ANAK22	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
INDK1	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK1	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK7	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK7	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK7	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK67	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK67	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK42	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK42	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
INDK4	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
INDK4	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
INDK5	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK5	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK11	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
INDK11	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
INDK11	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000
INDK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK12	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK18	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146
INDK18	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146
INDK18	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000







INDK172	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK44	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK44	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK44	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000

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FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK27	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK27	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146
ANAK35	FORCE	GLOBAL-Z	0.3333	-450.7146	0.6667	-450.7146
ANAK35	FORCE	GLOBAL-Z	0.6667	-450.7146	1.0000	0.0000
ANAK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146
ANAK34	FORCE	GLOBAL-Z	0.3333	-450.7146	0.6667	-450.7146
ANAK34	FORCE	GLOBAL-Z	0.6667	-450.7146	1.0000	0.0000
ANAK37	FORCE	GLOBAL-Z	0.0000	0.0000	0.2083	-450.7146
ANAK37	FORCE	GLOBAL-Z	0.2083	-450.7146	0.7917	-450.7146
ANAK37	FORCE	GLOBAL-Z	0.7917	-450.7146	1.0000	0.0000
ANAK36	FORCE	GLOBAL-Z	0.0000	0.0000	0.2917	-450.7146
ANAK36	FORCE	GLOBAL-Z	0.2917	-450.7146	0.7083	-450.7146
ANAK36	FORCE	GLOBAL-Z	0.7083	-450.7146	1.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK50	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK62	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK76	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK86	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK86	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK41	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK41	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK65	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK77	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK65	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK52	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK35	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK35	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK64	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK64	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK83	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK83	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK83	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK34	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK34	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK63	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK63	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK82	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK82	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK82	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK85	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK85	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK95	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK95	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK74	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK74	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK13	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK13	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK20	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK20	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK6	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK6	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK6	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK26	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK26	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK26	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK12	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK19	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK19	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK25	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK25	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK25	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK8	FORCE	GLOBAL-Z	0.0000	-450.7146	1.0000	0.0000
ANAK5	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146





ANAK43	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK43	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK62	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK62	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK142	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK142	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000

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FRAME SPAN DISTRIBUTED LOADS Load Case RELATLY2						
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK27	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK27	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK35	FORCE	GLOBAL-Z	0.3333	-254.9290	0.6667	-254.9290
ANAK35	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000
ANAK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK34	FORCE	GLOBAL-Z	0.3333	-254.9290	0.6667	-254.9290
ANAK34	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000
ANAK36	FORCE	GLOBAL-Z	0.0000	0.0000	0.2917	-254.9290
ANAK36	FORCE	GLOBAL-Z	0.2917	-254.9290	0.7083	-254.9290
ANAK36	FORCE	GLOBAL-Z	0.7083	-254.9290	1.0000	0.0000
ANAK37	FORCE	GLOBAL-Z	0.0000	0.0000	0.2083	-254.9290
ANAK37	FORCE	GLOBAL-Z	0.2083	-254.9290	0.7917	-254.9290
ANAK37	FORCE	GLOBAL-Z	0.7917	-254.9290	1.0000	0.0000
INDK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK41	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK41	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK50	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK76	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	-407.8865
INDK86	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK86	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK77	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
INDK35	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
INDK35	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK52	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK83	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK83	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK83	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
INDK34	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
INDK34	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK82	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK82	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK82	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK85	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK85	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	-305.9149
INDK95	FORCE	GLOBAL-Z	0.0000	-305.9149	0.5000	-305.9149
INDK95	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK74	FORCE	GLOBAL-Z	0.0000	-305.9149	0.5000	-305.9149
INDK74	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK26	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK26	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK26	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK6	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
ANAK6	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
ANAK6	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
ANAK13	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
ANAK13	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
ANAK5	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-407.8865
ANAK5	FORCE	GLOBAL-Z	0.3333	-407.8865	1.0000	-407.8865
ANAK8	FORCE	GLOBAL-Z	0.0000	-407.8865	1.0000	0.0000
ANAK25	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK25	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK25	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK12	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
ANAK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK6	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK6	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK9	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK9	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK13	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK13	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK16	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000







ANAK43	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK62	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK62	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK142	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK142	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK45	FORCE	GLOBAL-Z	0.0000	-254.9290	1.0000	0.0000
ANAK42	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK42	FORCE	GLOBAL-Z	0.3333	-254.9290	1.0000	-254.9290

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FRAME SPAN DISTRIBUTED LOADS Load Case PELATLX2						
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK2	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK2	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK2	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK3	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK3	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK4	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK4	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK9	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK9	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK9	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK22	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK22	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK1	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK1	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK7	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
ANAK7	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
ANAK7	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK67	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK67	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK42	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK42	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK4	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK4	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK5	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK5	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK11	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK11	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK11	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK12	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK18	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK18	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK18	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK19	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK19	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK32	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK32	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK32	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK33	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK33	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK54	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK54	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK54	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK56	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK56	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK27	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK27	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK26	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK26	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK25	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK25	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK26	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK24	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK24	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK80	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK80	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK79	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-305.9149
INDK79	FORCE	GLOBAL-Z	0.3333	-305.9149	0.6667	-305.9149
INDK79	FORCE	GLOBAL-Z	0.6667	-305.9149	1.0000	0.0000
INDK46	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK46	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK45	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK45	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK44	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK44	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK43	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865



INDK157	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK157	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK151	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK151	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK181	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK181	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
ANAK51	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
ANAK52	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK53	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
ANAK53	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
ANAK54	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
ANAK54	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK159	FORCE	GLOBAL-Z	0.0000	0.0000	0.6000	-305.9149
INDK159	FORCE	GLOBAL-Z	0.6000	-305.9149	1.0000	0.0000
ANAK60	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
ANAK60	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
ANAK60	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
ANAK47	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
ANAK47	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
ANAK47	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
INDK158	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
INDK158	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
INDK158	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
ANAK65	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK65	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK66	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK66	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK69	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK69	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK70	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK70	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK67	FORCE	GLOBAL-Z	0.0000	0.0000	1.0000	-127.4645
ANAK68	FORCE	GLOBAL-Z	0.0000	-127.4645	0.3333	-254.9290
ANAK68	FORCE	GLOBAL-Z	0.3333	-254.9290	1.0000	0.0000
INDK168	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK168	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK125	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK125	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK126	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK126	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK127	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK127	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK128	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK128	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK144	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK144	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK145	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK145	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK146	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK146	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK147	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK147	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK169	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK169	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK170	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK170	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK171	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK171	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK172	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK172	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK44	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
ANAK44	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
ANAK44	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK143	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK143	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000

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FRAME	SPAN	DISTRI	BUTE	D	LOADS	Load Case	PELATDX1
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B	
ANAK2	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146	
ANAK2	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146	
ANAK2	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000	
ANAK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146	
ANAK3	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146	
ANAK3	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000	
ANAK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146	
ANAK4	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146	
ANAK4	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000	
ANAK9	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-450.7146	
ANAK9	FORCE	GLOBAL-Z	0.1667	-450.7146	0.8333	-450.7146	
ANAK9	FORCE	GLOBAL-Z	0.8333	-450.7146	1.0000	0.0000	





INDK192	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK204	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK204	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK205	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK205	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK51	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK52	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK53	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK53	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
ANAK54	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
ANAK54	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK144	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK144	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK145	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK145	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK146	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK146	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK147	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK147	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK169	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK169	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK170	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK170	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK171	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK171	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK172	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK172	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK173	FORCE	GLOBAL-Z	0.0000	0.0000	0.6000	-450.7146
INDK173	FORCE	GLOBAL-Z	0.6000	-450.7146	1.0000	0.0000
INDK143	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK143	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK143	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000

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FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK36	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146
ANAK36	FORCE	GLOBAL-Z	0.3333	-450.7146	0.6667	-450.7146
ANAK36	FORCE	GLOBAL-Z	0.6667	-450.7146	1.0000	0.0000
ANAK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146
ANAK35	FORCE	GLOBAL-Z	0.3333	-450.7146	0.6667	-450.7146
ANAK35	FORCE	GLOBAL-Z	0.6667	-450.7146	1.0000	0.0000
ANAK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-450.7146
ANAK34	FORCE	GLOBAL-Z	0.3333	-450.7146	0.6667	-450.7146
ANAK34	FORCE	GLOBAL-Z	0.6667	-450.7146	1.0000	0.0000
ANAK37	FORCE	GLOBAL-Z	0.0000	0.0000	0.2917	-450.7146
ANAK37	FORCE	GLOBAL-Z	0.2917	-450.7146	0.7083	-450.7146
ANAK37	FORCE	GLOBAL-Z	0.7083	-450.7146	1.0000	0.0000
INDK66	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK66	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK3	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK22	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK22	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK15	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK15	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK15	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK15	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK8	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
INDK8	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
INDK8	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK39	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK39	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK50	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK62	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK76	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK65	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK77	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK65	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK53	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK53	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK87	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK87	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000







INDK183	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK63	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK63	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK63	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK43	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK43	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK43	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
ANAK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-450.7146
ANAK62	FORCE	GLOBAL-Z	0.2500	-450.7146	0.7500	-450.7146
ANAK62	FORCE	GLOBAL-Z	0.7500	-450.7146	1.0000	0.0000
INDK176	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK176	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK150	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK150	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK140	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK140	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK162	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK162	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK188	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK188	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000
INDK132	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK132	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK178	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-450.7146
INDK178	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	-450.7146
INDK141	FORCE	GLOBAL-Z	0.0000	-450.7146	0.5000	-450.7146
INDK141	FORCE	GLOBAL-Z	0.5000	-450.7146	1.0000	0.0000

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FRAME	SPAN	DISTRI	BUTED	LOADS	Load Case	RELATLY1
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK36	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK36	FORCE	GLOBAL-Z	0.3333	-254.9290	0.6667	-254.9290
ANAK36	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000
ANAK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK35	FORCE	GLOBAL-Z	0.3333	-254.9290	0.6667	-254.9290
ANAK35	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000
ANAK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
ANAK34	FORCE	GLOBAL-Z	0.3333	-254.9290	0.6667	-254.9290
ANAK34	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000
ANAK37	FORCE	GLOBAL-Z	0.0000	0.0000	0.2917	-254.9290
ANAK37	FORCE	GLOBAL-Z	0.2917	-254.9290	0.7083	-254.9290
ANAK37	FORCE	GLOBAL-Z	0.7083	-254.9290	1.0000	0.0000
INDK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK3	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
INDK22	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
INDK22	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK15	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK15	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
INDK15	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
INDK15	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK08	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
INDK08	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
INDK08	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK39	FORCE	GLOBAL-Z	0.0000	-305.9149	0.5000	-305.9149
INDK39	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK50	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK62	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK76	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK76	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK77	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK53	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK53	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK77	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK77	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	-254.9290
INDK87	FORCE	GLOBAL-Z	0.0000	-254.9290	0.5000	-254.9290
INDK87	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK40	FORCE	GLOBAL-Z	0.0000	-407.8865	0.5000	-407.8865
INDK40	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK31	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	-407.8865
INDK31	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK35	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
INDK35	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
INDK35	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK52	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK83	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK83	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290

INDK83	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK34	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
INDK34	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
INDK34	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK82	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK82	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK82	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK85	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK85	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK74	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK74	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK95	FORCE	GLOBAL-Z	0.0000	0.0000	0.2083	-254.9290
INDK95	FORCE	GLOBAL-Z	0.2083	-254.9290	0.7917	-254.9290
INDK95	FORCE	GLOBAL-Z	0.7917	-254.9290	1.0000	0.0000
ANAK26	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK26	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK26	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK6	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
ANAK6	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
ANAK6	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
ANAK13	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
ANAK13	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
ANAK8	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
ANAK8	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
ANAK25	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK25	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK25	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK12	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
ANAK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK88	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
INDK88	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
INDK88	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK75	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	-305.9149
INDK61	FORCE	GLOBAL-Z	0.0000	-305.9149	0.0000	-305.9149
INDK75	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK61	FORCE	GLOBAL-Z	0.0000	-305.9149	0.5000	-305.9149
INDK61	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK49	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	-305.9149
INDK49	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK7	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK2	FORCE	GLOBAL-Z	1.0000	0.0000	1.0000	0.0000
INDK7	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK7	FORCE	GLOBAL-Z	1.0000	0.0000	1.0000	0.0000
INDK10	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK10	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK14	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK14	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK17	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK17	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK21	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK29	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK21	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK29	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK29	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK38	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK38	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK38	FORCE	GLOBAL-Z	1.0000	0.0000	1.0000	0.0000
INDK48	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK48	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK60	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK60	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK66	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
INDK66	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
INDK65	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
INDK65	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
INDK64	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
INDK64	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
INDK63	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
INDK63	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
ANAK20	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
ANAK20	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
ANAK19	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-509.8581
ANAK19	FORCE	GLOBAL-Z	0.5000	-509.8581	1.0000	0.0000
INDK155	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK155	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK154	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK154	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK153	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK153	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK175	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK175	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK50	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK50	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK108	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK108	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000



INDK184	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK184	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK184	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK135	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK135	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK135	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
INDK183	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
INDK183	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
INDK183	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK63	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK63	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK63	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK43	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK43	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK43	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK62	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-254.9290
ANAK62	FORCE	GLOBAL-Z	0.2500	-254.9290	0.7500	-254.9290
ANAK62	FORCE	GLOBAL-Z	0.7500	-254.9290	1.0000	0.0000
ANAK45	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
ANAK45	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000

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F R A M E S P A N D I S T R I B U T E D L O A D S Load Case PELATLX1						
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
ANAK2	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK2	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK2	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK3	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK3	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK3	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK4	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK4	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK4	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK9	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK9	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK9	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
ANAK22	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
ANAK22	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
ANAK22	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK42	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-407.8865
INDK42	FORCE	GLOBAL-Z	0.2500	-407.8865	0.7500	-407.8865
INDK42	FORCE	GLOBAL-Z	0.7500	-407.8865	1.0000	0.0000
INDK5	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK5	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK11	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK11	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK11	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK12	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK12	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK18	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK18	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK18	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK19	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK19	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK32	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK32	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK32	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK33	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK33	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK54	FORCE	GLOBAL-Z	0.0000	0.0000	0.1667	-254.9290
INDK54	FORCE	GLOBAL-Z	0.1667	-254.9290	0.8333	-254.9290
INDK54	FORCE	GLOBAL-Z	0.8333	-254.9290	1.0000	0.0000
INDK56	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK56	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK55	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-407.8865
INDK55	FORCE	GLOBAL-Z	0.5000	-407.8865	1.0000	0.0000
INDK93	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK93	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK92	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK92	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK91	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK91	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK92	FORCE	GLOBAL-Z	0.0000	0.0000	0.0000	0.0000
INDK90	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK90	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK89	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK89	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK80	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK80	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK78	FORCE	GLOBAL-Z	0.0000	0.0000	0.3333	-254.9290
INDK78	FORCE	GLOBAL-Z	0.3333	-254.9290	1.0000	-254.9290
INDK79	FORCE	GLOBAL-Z	0.0000	0.0000	0.6667	-254.9290
INDK79	FORCE	GLOBAL-Z	0.6667	-254.9290	1.0000	0.0000



INDK168	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK168	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK106	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK106	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK113	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK113	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK120	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK120	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK134	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK134	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK157	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK157	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK181	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK181	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK169	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK169	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK170	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK170	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK171	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK171	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK172	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK172	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK173	FORCE	GLOBAL-Z	0.0000	0.0000	0.6000	-305.9149
INDK173	FORCE	GLOBAL-Z	0.6000	-305.9149	1.0000	0.0000
INDK213	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK213	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000
INDK213	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
ANAK60	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
ANAK60	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
ANAK60	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
INDK158	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
INDK158	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
INDK182	FORCE	GLOBAL-Z	0.0000	0.0000	0.3000	-305.9149
INDK182	FORCE	GLOBAL-Z	0.3000	-305.9149	0.7000	-305.9149
INDK182	FORCE	GLOBAL-Z	0.7000	-305.9149	1.0000	0.0000
INDK208	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK208	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK209	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK209	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK210	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK210	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK211	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK211	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK212	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK212	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK68	FORCE	GLOBAL-Z	0.0000	0.0000	1.0000	-254.9290
ANAK69	FORCE	GLOBAL-Z	0.0000	-254.9290	0.8571	-254.9290
ANAK69	FORCE	GLOBAL-Z	0.8571	-254.9290	1.0000	-212.4416
ANAK70	FORCE	GLOBAL-Z	0.0000	-212.4416	1.0000	0.0000
INDK190	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK190	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK191	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK191	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK192	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK192	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK204	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK204	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK205	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK205	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK51	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK51	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK52	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK52	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK53	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK53	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
ANAK54	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
ANAK54	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK144	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK144	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK145	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK145	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK146	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK146	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK147	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-254.9290
INDK147	FORCE	GLOBAL-Z	0.5000	-254.9290	1.0000	0.0000
INDK143	FORCE	GLOBAL-Z	0.0000	0.0000	0.2500	-305.9149
INDK143	FORCE	GLOBAL-Z	0.2500	-305.9149	0.7500	-305.9149
INDK143	FORCE	GLOBAL-Z	0.7500	-305.9149	1.0000	0.0000
INDK151	FORCE	GLOBAL-Z	0.0000	0.0000	0.5000	-305.9149
INDK151	FORCE	GLOBAL-Z	0.5000	-305.9149	1.0000	0.0000

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FRAME SPAN POINT LOADS Load Case ATAP  
FRAME TYPE DIRECTION DISTANCE VALUE

RING15	FORCE	GLOBAL-Z	0.3333	-743.1794
RING15	FORCE	GLOBAL-Z	0.6667	-475.5956
RING1	FORCE	GLOBAL-Z	0.3333	-743.1794
RING1	FORCE	GLOBAL-Z	0.6667	-442.0164

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FRAME SPAN DISTRIBUTED LOADS Load Case DINDING						
FRAME	TYPE	DIRECTION	DISTANCE-A	VALUE-A	DISTANCE-B	VALUE-B
SLOF43	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF94	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF93	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF118	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF117	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF116	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF90	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF49	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF1	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF6	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF76	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF92	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF104	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF105	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF106	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF107	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF108	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF28	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF32	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF86	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF95	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF113	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF53	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF54	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF55	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF72	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF119	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF120	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF121	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF122	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF123	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF101	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF102	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF4	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF9	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF26	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF50	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF70	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF110	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF111	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF112	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF38	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF60	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF57	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF45	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF34	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF11	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF12	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF37	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF48	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF59	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF68	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF78	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF89	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF100	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF36	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF47	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF99	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF98	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF81	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF82	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF85	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF3	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF8	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF15	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF20	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF33	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF44	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF56	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF69	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF64	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF77	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF88	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000
SLOF97	FORCE	GLOBAL-Z	0.0000	-1000.0000	1.0000	-1000.0000





LOAD COMBINATION MULTIPLIERS

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
ULTBLK	ENVE				Gaya-gaya Ultimit Untuk Elemen Balok
		U1	1.0000	COMBO	
		U2	1.0000	COMBO	
		U3BLK	1.0000	COMBO	
		U4	1.0000	COMBO	

JOINT REACTIONS

JOINT	LOAD	F1	F2	F3	M1	M2	M3
G1	ULTBLK MAX	13808.9594	16091.5172	86448.4618	43943.6859	35478.6953	69.7758
G1	ULTBLK MIN	-11008.9350	-14865.6349	20811.4774	-45582.4559	-33519.6512	-70.3590
G2	ULTBLK MAX	17136.3649	15289.4543	119620.0081	42213.4499	38756.0706	69.7758
G2	ULTBLK MIN	-20953.5171	-13699.8542	23641.8452	-44201.6567	-43244.8032	-70.3590
G3	ULTBLK MAX	8917.5003	5713.7416	67754.9111	14348.4968	15768.5046	22.0775
G3	ULTBLK MIN	-9204.6609	-5355.4456	-29850.0537	-14840.1066	-16294.9414	-22.2620
G4	ULTBLK MAX	13568.4006	19367.7923	96546.6504	48062.3664	35229.2827	69.7758
G4	ULTBLK MIN	-10538.6068	-19092.5223	48982.2105	-48774.8598	-33043.0380	-70.3590
G5	ULTBLK MAX	16936.7926	18565.7374	118825.3160	46664.6143	38524.2832	69.7758
G5	ULTBLK MIN	-20811.3842	-18267.9632	39871.1881	-47394.0658	-43065.6715	-70.3590
G6	ULTBLK MAX	8873.0413	7745.6449	59827.6891	16635.8837	15712.8749	22.0775
G6	ULTBLK MIN	-9177.6789	-7676.2516	-24716.4308	-16842.7510	-16255.4887	-22.2620
G7	ULTBLK MAX	16266.3039	22062.9418	107524.3329	46187.8495	37833.6317	69.7758
G7	ULTBLK MIN	-7785.7200	-17168.7578	57477.0895	-51401.0127	-30332.8236	-70.3590
G8	ULTBLK MAX	16558.3366	19318.4094	120439.6902	46290.9418	38118.1904	69.7758
G8	ULTBLK MIN	-20918.2142	-17884.4728	43242.7601	-48127.4700	-43129.1280	-70.3590
G9	ULTBLK MAX	8802.3955	7698.2943	61364.3220	16537.8106	15631.4369	22.0775
G9	ULTBLK MIN	-9086.2166	-7576.7458	-28627.9787	-16796.0821	-16152.4855	-22.2620
G10	ULTBLK MAX	5821.2207	7143.1799	55626.8553	15882.9810	12687.2858	22.0775
G10	ULTBLK MIN	-5641.6786	-7018.3423	-32674.5764	-16143.6206	-12751.1195	-22.2620
G11	ULTBLK MAX	8137.1232	5756.5538	38243.1612	14390.7382	14969.8397	22.0775
G11	ULTBLK MIN	-8699.5879	-5567.8921	9001.0547	-14713.7586	-15764.9953	-22.2620
G12	ULTBLK MAX	7869.2116	6822.8379	38819.0246	15142.4208	14705.7854	22.0775
G12	ULTBLK MIN	-8124.3833	-6394.1540	752.7994	-15701.4830	-15198.0731	-22.2620
G13	ULTBLK MAX	7897.8623	2488.8584	30020.3826	11198.6148	14734.0237	22.0775
G13	ULTBLK MIN	-8200.4229	-2522.6563	8224.1753	-11301.3307	-15273.0178	-22.2620
G14	ULTBLK MAX	8379.6856	7441.8489	47636.0544	14010.0896	15208.9085	22.0775
G14	ULTBLK MIN	-8363.0668	-5372.4700	2181.1565	-16185.1726	-15433.3194	-22.2620
G15	ULTBLK MAX	5455.3054	6801.4020	53646.0451	14897.8784	12326.6396	22.0775
G15	ULTBLK MIN	-6069.4484	-6336.8255	-14402.3221	-15490.7438	-13172.7294	-22.2620
G16	ULTBLK MAX	14628.5822	19139.1800	100340.2658	48864.6015	36189.1078	69.7758
G16	ULTBLK MIN	-4700.7366	-19915.8325	54218.3909	-48552.1016	-27274.7748	-70.3590
G17	ULTBLK MAX	9732.8811	18607.4293	113205.1610	46913.9044	31430.1364	69.7758
G17	ULTBLK MIN	-16380.6353	-18523.8028	40509.2068	-47434.6905	-38667.0679	-70.3590
G18	ULTBLK MAX	6291.3445	7694.3314	57856.5957	16567.2437	13144.7342	22.0775
G18	ULTBLK MIN	-6339.2121	-7606.6080	-16481.5176	-16792.1771	-13432.1788	-22.2620
G19	ULTBLK MAX	2671.0400	10370.8393	23407.0154	19033.2353	9564.9012	22.0775
G19	ULTBLK MIN	-2813.1713	-10214.6219	2465.2539	-19324.8028	-9945.2513	-22.2620
G20	ULTBLK MAX	3235.8052	9924.2075	32468.3775	18332.3376	10133.1946	22.0775
G20	ULTBLK MIN	-4180.7088	-9821.4650	9619.9429	-18568.5794	-11304.7579	-22.2620
G21	ULTBLK MAX	6400.9981	10475.3776	45945.1146	18973.6924	13246.9037	22.0775
G21	ULTBLK MIN	-4920.1952	-10154.2103	17757.7080	-19427.8346	-12027.1664	-22.2620
G22	ULTBLK MAX	13394.4174	15977.4604	159346.4283	45573.9772	34979.2769	69.7758
G22	ULTBLK MIN	-15092.2261	-18097.4267	72124.9765	-43939.8517	-37391.3250	-70.3590

G23	ULTBLK	MAX	16240.4559	14443.5631	116876.0814	45019.2551	37752.4573	69.7758
G23	ULTBLK	MIN	-17391.8460	-17934.7373	32791.3603	-42045.7113	-39632.0751	-70.3590
G24	ULTBLK	MAX	7101.2909	9426.6443	56765.2907	17849.8678	13937.1123	22.0775
G24	ULTBLK	MIN	-7705.3836	-9331.9440	-11678.9552	-18078.1832	-14772.2482	-22.2620
G25	ULTBLK	MAX	14245.2818	18463.3683	92987.5090	49321.9727	35789.6945	69.7758
G25	ULTBLK	MIN	-8859.8041	-20385.2208	47153.6159	-47893.5898	-31298.1319	-70.3590
G26	ULTBLK	MAX	15905.6977	18243.5923	110942.8790	47312.3278	37407.6020	69.7758
G26	ULTBLK	MIN	-19786.5462	-18932.6913	38621.8472	-47080.1702	-41945.1472	-70.3590
G27	ULTBLK	MAX	10638.7694	7742.5471	59344.5779	16606.1323	17458.9135	22.0775
G27	ULTBLK	MIN	-10761.3360	-7646.0653	-7827.6517	-16839.6981	-17810.9331	-22.2620
G28	ULTBLK	MAX	6178.5705	10038.1075	75205.6254	18732.2673	13021.7736	22.0775
G28	ULTBLK	MIN	-6707.7309	-9909.2572	7520.3229	-18996.8618	-13782.5320	-22.2620
G29	ULTBLK	MAX	2952.5862	9629.0741	46308.9065	17985.7669	9832.4602	22.0775
G29	ULTBLK	MIN	-2305.2647	-9469.8291	18931.7780	-18277.6976	-9433.6781	-22.2620
G30	ULTBLK	MAX	6505.8953	10493.5585	81169.0727	18952.7550	13363.6433	22.0775
G30	ULTBLK	MIN	-3983.2581	-10132.9676	28920.7865	-19445.7532	-11116.0260	-22.2620
G31	ULTBLK	MAX	18935.4880	29699.3077	11749.9454	55940.3631	40530.7759	69.7758
G31	ULTBLK	MIN	-25581.1734	-28736.1618	6435.8438	-57310.4220	-47760.7218	-70.3590
G32	ULTBLK	MAX	24841.0410	28701.4248	12496.2133	54448.7072	46285.1432	69.7758
G32	ULTBLK	MIN	-25443.6436	-27611.9250	-6937.9885	-55938.5721	-47626.7091	-70.3590
G33	ULTBLK	MAX	7645.0701	9533.6866	64706.5102	17952.4317	14467.3230	22.0775
G33	ULTBLK	MIN	-6725.5745	-9436.0072	24635.4427	-18183.6833	-13799.7619	-22.2620
G34	ULTBLK	MAX	11702.6255	21401.0629	115945.4219	46519.0711	33298.3877	69.7758
G34	ULTBLK	MIN	-3781.6609	-17508.6805	64082.6994	-50756.0789	-26332.9334	-70.3590
G35	ULTBLK	MAX	5132.7087	18675.3643	123080.9113	46427.8367	26868.1419	69.7758
G35	ULTBLK	MIN	-10570.9149	-18024.9617	62477.7557	-47500.8895	-32919.8630	-70.3590
G36	ULTBLK	MAX	3709.9944	7844.5588	39445.6007	16713.1047	10593.8305	22.0775
G36	ULTBLK	MIN	-3735.1295	-7754.6011	5670.0880	-16940.2403	-10856.7733	-22.2620
G37	ULTBLK	MAX	3768.0316	10372.0329	46196.4818	19136.3961	10680.7932	22.0775
G37	ULTBLK	MIN	-2967.1439	-10319.2917	21690.0718	-19325.9775	-10109.8959	-22.2620
G38	ULTBLK	MAX	3134.4962	9983.5064	37271.7713	18161.3038	10010.6820	22.0775
G38	ULTBLK	MIN	-3090.4478	-9647.9314	17469.1371	-18627.0253	-10205.4376	-22.2620
G39	ULTBLK	MAX	5652.9832	6933.8290	59633.6790	16102.1654	12554.1908	22.0775
G39	ULTBLK	MIN	-5443.2661	-7240.7291	-28647.9011	-15937.2844	-12585.1389	-22.2620
G40	ULTBLK	MAX	8387.8983	4723.9964	50804.3314	15925.3759	15249.7233	22.0775
G40	ULTBLK	MIN	-8525.4925	-7124.9521	20272.5508	-13696.0695	-15622.9816	-22.2620
G41	ULTBLK	MAX	7808.5490	6695.0892	63692.1311	14976.3022	14678.7166	22.0775
G41	ULTBLK	MIN	-8328.1043	-6225.6079	33032.8964	-15575.5744	-15428.4358	-22.2620
G42	ULTBLK	MAX	7804.3846	3613.4954	54613.8939	10481.6652	14674.6115	22.0775
G42	ULTBLK	MIN	-8069.2703	-1785.3467	31111.4919	-12419.5156	-15173.3283	-22.2620
G43	ULTBLK	MAX	8291.6603	6405.1554	53402.5208	14924.9208	15154.8700	22.0775
G43	ULTBLK	MIN	-8398.6854	-6300.6670	21444.4124	-15163.4075	-15497.9994	-22.2620
G44	ULTBLK	MAX	5451.3218	6308.2998	56093.3173	15379.9262	12355.4333	22.0775
G44	ULTBLK	MIN	-6153.9980	-6825.9164	-22735.0554	-15004.7421	-13285.6364	-22.2620
G45	ULTBLK	MAX	16774.4081	12465.8366	107927.0846	47896.1547	38460.0598	69.7758
G45	ULTBLK	MIN	-5926.0894	-18921.9446	37600.9880	-42049.5933	-28638.8777	-70.3590
G46	ULTBLK	MAX	13019.6451	11690.1465	126537.3260	45969.3742	34804.1032	69.7758
G46	ULTBLK	MIN	-23499.7036	-17554.4556	37913.4536	-40694.4922	-45765.2925	-70.3590
G47	ULTBLK	MAX	8884.1460	5420.2417	51633.0845	14538.9509	15754.4134	22.0775
G47	ULTBLK	MIN	-8764.6990	-5548.6817	-38667.9245	-14550.8336	-15873.8076	-22.2620

LOAD COMBINATION MULTIPLIERS

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
ULTKLM	ENVE				Gaya-gaya Ultimit Untuk Elemen Kolom
		U1	1.0000	COMBO	
		U2	1.0000	COMBO	
		U3KLM	1.0000	COMBO	
		U4	1.0000	COMBO	

FRAME ELEMENT FORCES

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
K1	ULTKLM	MAX						
		0.00	610.31	473.03	601.16	2.75	1747.87	1343.68
		1.40	615.85	473.03	601.16	2.75	906.24	689.80
K1	ULTKLM	MIN						
		0.00	-1722.62	-500.49	-613.18	-2.75	-1763.94	-1362.89
		1.40	-1717.08	-500.49	-613.18	-2.75	-905.48	-670.57
K2	ULTKLM	MAX						
		0.00	948.01	765.79	560.78	2.75	1685.14	1630.32
		1.40	953.55	765.79	560.78	2.75	900.04	563.16
K2	ULTKLM	MIN						
		0.00	-2445.72	-728.35	-576.37	-2.75	-1704.63	-1586.30
		1.40	-2440.19	-728.35	-576.37	-2.75	-897.72	-571.55
K3	ULTKLM	MAX						
		0.00	1728.50	356.84	215.35	8.705E-01	570.07	631.45
		1.40	1731.61	356.84	215.35	8.705E-01	268.59	132.75
K3	ULTKLM	MIN						
		0.00	-2100.22	-354.03	-218.86	-8.687E-01	-574.90	-626.29
		1.40	-2097.10	-354.03	-218.86	-8.687E-01	-268.49	-131.53
K4	ULTKLM	MAX						
		0.00	-191.48	457.96	752.98	2.75	1895.80	1328.33
		1.40	-185.95	457.96	752.98	2.75	841.63	696.43
K4	ULTKLM	MIN						
		0.00	-1326.66	-487.67	-755.68	-2.75	-1902.79	-1349.77
		1.40	-1321.12	-487.67	-755.68	-2.75	-844.83	-676.27
K5	ULTKLM	MAX						
		0.00	388.71	759.36	720.97	2.75	1841.22	1622.52
		1.40	394.24	759.36	720.97	2.75	831.87	566.07
K5	ULTKLM	MIN						
		0.00	-2097.67	-721.37	-723.89	-2.75	-1848.38	-1577.98
		1.40	-2092.13	-721.37	-723.89	-2.75	-834.93	-574.73
K6	ULTKLM	MAX						
		0.00	1485.98	355.53	302.13	8.705E-01	655.61	629.67
		1.40	1489.09	355.53	302.13	8.705E-01	232.62	133.08
K6	ULTKLM	MIN						
		0.00	-1830.32	-352.54	-302.81	-8.687E-01	-657.64	-624.34
		1.40	-1827.21	-352.54	-302.81	-8.687E-01	-233.70	-131.94
K7	ULTKLM	MAX						
		0.00	-313.03	430.16	745.47	2.75	1888.48	1300.19
		1.40	-307.50	430.16	745.47	2.75	844.83	708.31
K7	ULTKLM	MIN						
		0.00	-1378.95	-513.32	-793.46	-2.75	-1939.60	-1373.75
		1.40	-1373.41	-513.32	-793.46	-2.75	-828.76	-665.43
K8	ULTKLM	MAX						
		0.00	316.91	756.42	722.64	2.75	1842.85	1618.10

		1.40	322.45	756.42	722.64	2.75	831.16	567.60
		2.80	327.98	756.42	722.64	2.75	218.56	432.97
K8	ULTKLM	MIN						
		0.00	-2079.92	-713.66	-736.70	-2.75	-1860.86	-1568.96
		1.40	-2074.39	-713.66	-736.70	-2.75	-829.48	-578.32
		2.80	-2068.85	-713.66	-736.70	-2.75	-197.19	-503.54
K9	ULTKLM	MAX						
		0.00	1604.53	352.25	299.00	8.705E-01	652.52	625.94
		1.40	1607.64	352.25	299.00	8.705E-01	233.92	134.37
		2.80	1610.76	352.25	299.00	8.705E-01	185.48	357.66
K9	ULTKLM	MIN						
		0.00	-1925.56	-349.46	-300.19	-8.687E-01	-655.05	-620.83
		1.40	-1922.45	-349.46	-300.19	-8.687E-01	-234.79	-133.16
		2.80	-1919.34	-349.46	-300.19	-8.687E-01	-184.67	-360.35
K10	ULTKLM	MAX						
		0.00	1619.34	223.94	277.14	8.705E-01	626.87	499.24
		1.43	1622.51	223.94	277.14	8.705E-01	231.94	183.35
		2.85	1625.68	223.94	277.14	8.705E-01	164.30	145.93
K10	ULTKLM	MIN						
		0.00	-1844.42	-225.71	-278.37	-8.687E-01	-629.43	-498.62
		1.43	-1841.26	-225.71	-278.37	-8.687E-01	-232.75	-180.21
		2.85	-1838.09	-225.71	-278.37	-8.687E-01	-163.36	-140.29
K11	ULTKLM	MAX						
		0.00	279.18	332.98	221.18	8.705E-01	569.25	606.71
		1.41	282.32	332.98	221.18	8.705E-01	256.83	138.43
		2.83	285.47	332.98	221.18	8.705E-01	64.85	326.18
K11	ULTKLM	MIN						
		0.00	-767.88	-327.47	-223.03	-8.687E-01	-572.42	-598.91
		1.41	-764.74	-327.47	-223.03	-8.687E-01	-257.38	-138.42
		2.83	-761.60	-327.47	-223.03	-8.687E-01	-62.79	-333.96
K12	ULTKLM	MAX						
		0.00	509.07	314.94	257.13	8.705E-01	602.21	588.93
		1.41	512.21	314.94	257.13	8.705E-01	239.02	146.31
		2.83	515.35	314.94	257.13	8.705E-01	133.65	298.53
K12	ULTKLM	MIN						
		0.00	-914.54	-312.44	-261.33	-8.687E-01	-607.69	-584.10
		1.41	-911.40	-312.44	-261.33	-8.687E-01	-238.56	-145.02
		2.83	-908.25	-312.44	-261.33	-8.687E-01	-127.25	-300.77
K13	ULTKLM	MAX						
		0.00	156.42	317.22	98.46	8.705E-01	440.79	591.18
		2.85	162.76	317.22	98.46	8.705E-01	167.60	309.74
K13	ULTKLM	MIN						
		0.00	-564.89	-314.26	-98.13	-8.687E-01	-441.80	-585.89
		1.43	-561.72	-314.26	-98.13	-8.687E-01	-305.68	-140.38
		2.85	-558.55	-314.26	-98.13	-8.687E-01	-169.56	-312.91
K14	ULTKLM	MAX						
		0.00	594.59	328.30	241.18	8.705E-01	581.56	602.10
		1.41	597.74	328.30	241.18	8.705E-01	240.89	140.47
		2.83	600.88	328.30	241.18	8.705E-01	142.59	328.01
K14	ULTKLM	MIN						
		0.00	-1104.20	-328.46	-261.48	-8.687E-01	-602.89	-599.89
		1.41	-1101.06	-328.46	-261.48	-8.687E-01	-233.56	-138.04
		2.83	-1097.91	-328.46	-261.48	-8.687E-01	-106.59	-325.35
K15	ULTKLM	MAX						
		0.00	1142.23	229.05	255.41	8.705E-01	593.11	504.28
		1.43	1145.40	229.05	255.41	8.705E-01	229.16	181.09
		2.85	1148.57	229.05	255.41	8.705E-01	145.82	140.90
K15	ULTKLM	MIN						
		0.00	-1527.88	-223.03	-259.96	-8.687E-01	-598.93	-495.98
		1.43	-1523.91	-223.03	-259.96	-8.687E-01	-228.48	-181.38
		2.85	-1520.74	-223.03	-259.96	-8.687E-01	-138.65	-149.77
K16	ULTKLM	MAX						
		0.00	-322.54	330.43	769.81	2.75	1912.20	1201.03
		1.41	-316.95	330.43	769.81	2.75	824.84	748.79
		2.83	-311.37	330.43	769.81	2.75	254.89	342.42
K16	ULTKLM	MIN						
		0.00	-1264.01	-427.79	-762.19	-2.75	-1909.13	-1288.45
		1.41	-1258.42	-427.79	-762.19	-2.75	-832.54	-698.69
		2.83	-1252.84	-427.79	-762.19	-2.75	-273.34	-154.80
K17	ULTKLM	MAX						
		0.00	287.26	544.77	727.86	2.75	1847.93	1410.32
		1.41	292.85	544.77	727.86	2.75	819.84	653.70
		2.83	298.43	544.77	727.86	2.75	221.89	47.77
K17	ULTKLM	MIN						
		0.00	-1948.62	-479.58	-728.68	-2.75	-1853.04	-1339.35
		1.41	-1943.03	-479.58	-728.68	-2.75	-823.79	-674.82
		2.83	-1937.45	-479.58	-728.68	-2.75	-224.68	-160.97

K18	ULTKLM	MAX						
		0.00	1255.14	247.96	299.67	8.705E-01	653.19	522.67
		1.43	1258.31	247.96	299.67	8.705E-01	226.15	172.58
K18	ULTKLM	MIN						
		0.00	-1660.89	-247.49	-300.53	-8.687E-01	-655.39	-519.85
		1.43	-1657.72	-247.49	-300.53	-8.687E-01	-227.13	-170.43
K19	ULTKLM	MAX						
		0.00	250.96	108.26	402.98	8.705E-01	750.90	384.52
		1.43	254.13	108.26	402.98	8.705E-01	176.65	235.49
K19	ULTKLM	MIN						
		0.00	-517.84	-106.87	-404.51	-8.687E-01	-753.76	-380.79
		1.43	-514.68	-106.87	-404.51	-8.687E-01	-177.32	-233.74
K20	ULTKLM	MAX						
		0.00	177.56	150.10	386.77	8.705E-01	722.59	426.21
		1.43	180.73	150.10	386.77	8.705E-01	171.44	216.54
K20	ULTKLM	MIN						
		0.00	-615.98	-140.83	-387.78	-8.687E-01	-724.91	-414.72
		1.43	-612.82	-140.83	-387.78	-8.687E-01	-172.32	-218.25
K21	ULTKLM	MAX						
		0.00	37.91	214.79	403.04	8.705E-01	750.95	489.73
		1.41	41.05	214.79	403.04	8.705E-01	181.66	190.45
K21	ULTKLM	MIN						
		0.00	-720.50	-229.31	-406.19	-8.687E-01	-755.41	-501.69
		1.41	-717.35	-229.31	-406.19	-8.687E-01	-181.67	-181.89
K22	ULTKLM	MAX						
		0.00	-411.44	567.04	678.72	2.75	1763.67	1431.25
		1.41	-405.86	567.04	678.72	2.75	804.99	642.85
K22	ULTKLM	MIN						
		0.00	-1936.56	-550.39	-657.93	-2.75	-1747.65	-1407.60
		1.41	-1930.97	-550.39	-657.93	-2.75	-818.33	-642.71
K23	ULTKLM	MAX						
		0.00	509.98	665.29	652.16	2.75	1722.21	1526.98
		1.41	515.57	665.29	652.16	2.75	801.03	599.32
K23	ULTKLM	MIN						
		0.00	-2139.85	-653.99	-617.93	-2.75	-1693.05	-1508.55
		1.41	-2134.27	-653.99	-617.93	-2.75	-820.23	-596.84
K24	ULTKLM	MAX						
		0.00	1121.34	293.37	367.45	8.705E-01	703.55	567.18
		1.41	1124.49	293.37	367.45	8.705E-01	184.52	155.71
K24	ULTKLM	MIN						
		0.00	-1563.49	-287.45	-368.38	-8.687E-01	-705.79	-558.99
		1.41	-1560.35	-287.45	-368.38	-8.687E-01	-185.45	-155.88
K25	ULTKLM	MAX						
		0.00	-185.06	426.76	771.37	2.75	1913.72	1293.79
		1.40	-179.53	426.76	771.37	2.75	833.80	711.07
K25	ULTKLM	MIN						
		0.00	-1276.58	-479.57	-752.53	-2.75	-1899.71	-1337.84
		1.40	-1271.04	-479.57	-752.53	-2.75	-846.18	-681.17
K26	ULTKLM	MAX						
		0.00	307.77	719.07	732.53	2.75	1852.49	1578.62
		1.40	313.30	719.07	732.53	2.75	826.95	583.95
K26	ULTKLM	MIN						
		0.00	-1925.39	-550.39	-657.93	-2.75	-194.53	-189.23
		1.41	-1925.39	-550.39	-657.93	-2.75	-194.53	-189.23
K27	ULTKLM	MAX						
		0.00	1005.29	420.33	301.35	8.705E-01	654.84	693.68
		1.40	1008.40	420.33	301.35	8.705E-01	232.95	105.28
K27	ULTKLM	MIN						
		0.00	-1534.33	-419.13	-302.29	-8.687E-01	-657.13	-690.15
		1.40	-1531.21	-419.13	-302.29	-8.687E-01	-233.92	-103.44

		2.00	-1520.10	-419.13	-302.29	-0.687E-01	-188.94	-484.64
K28	ULTKLM	MAX						
		0.00	742.29	255.34	390.60	0.705E-01	738.70	529.45
		1.40	745.41	255.34	390.60	0.705E-01	191.85	175.49
		2.00	748.52	255.34	390.60	0.705E-01	355.93	178.42
K28	ULTKLM	MIN						
		0.00	-1625.40	-250.15	-391.87	-0.687E-01	-741.29	-521.99
		1.40	-1622.29	-250.15	-391.87	-0.687E-01	-192.68	-175.29
		2.00	-1619.17	-250.15	-391.87	-0.687E-01	-354.99	-185.49
K29	ULTKLM	MAX						
		0.00	51.99	99.95	373.81	0.705E-01	709.81	375.92
		1.43	55.16	99.95	373.81	0.705E-01	177.13	239.49
		2.05	58.33	99.95	373.81	0.705E-01	357.14	111.79
K29	ULTKLM	MIN						
		0.00	-757.81	-106.30	-375.37	-0.687E-01	-712.68	-379.83
		1.43	-754.64	-106.30	-375.37	-0.687E-01	-177.77	-234.35
		2.05	-751.47	-106.30	-375.37	-0.687E-01	-355.55	-97.61
K30	ULTKLM	MAX						
		0.00	199.83	193.36	402.79	0.705E-01	750.70	469.11
		1.41	202.97	193.36	402.79	0.705E-01	181.77	199.48
		2.03	206.11	193.36	402.79	0.705E-01	392.32	129.89
K30	ULTKLM	MIN						
		0.00	-1393.49	-218.10	-406.32	-0.687E-01	-755.54	-491.15
		1.41	-1390.35	-218.10	-406.32	-0.687E-01	-181.61	-186.58
		2.03	-1387.21	-218.10	-406.32	-0.687E-01	-387.17	-82.05
K31	ULTKLM	MAX						
		0.00	-34.88	905.70	1141.39	2.75	2214.50	1767.14
		1.41	-29.30	905.70	1141.39	2.75	602.29	487.83
		2.03	-23.71	905.70	1141.39	2.75	1023.17	679.73
K31	ULTKLM	MIN						
		0.00	-137.18	-840.53	-1150.84	-2.75	-2227.94	-1696.24
		1.41	-131.60	-840.53	-1150.84	-2.75	-602.38	-508.98
		2.03	-126.01	-840.53	-1150.84	-2.75	-1009.92	-792.94
K32	ULTKLM	MAX						
		0.00	353.92	989.20	1099.15	2.75	2157.75	1848.50
		1.41	359.50	989.20	1099.15	2.75	605.21	451.25
		2.03	365.09	989.20	1099.15	2.75	962.91	942.46
		0.00	-408.42	-983.29	-1109.83	-2.75	-2172.36	-1835.34
		1.41	-402.84	-983.29	-1109.83	-2.75	-604.73	-446.44
		2.03	-397.25	-983.29	-1109.83	-2.75	-947.34	-946.00
K33	ULTKLM	MAX						
		0.00	121.43	277.35	371.58	0.705E-01	707.61	551.14
		1.41	124.57	277.35	371.58	0.705E-01	182.76	162.94
		2.03	127.71	277.35	371.58	0.705E-01	342.54	251.53
K33	ULTKLM	MIN						
		0.00	-1088.14	-286.36	-372.54	-0.687E-01	-709.88	-557.68
		1.41	-1085.00	-286.36	-372.54	-0.687E-01	-183.67	-156.75
		2.03	-1081.86	-286.36	-372.54	-0.687E-01	-342.10	-232.61
K34	ULTKLM	MAX						
		0.00	-419.56	264.86	744.06	2.75	1887.11	1135.41
		1.41	-413.97	264.86	744.06	2.75	836.12	779.17
		2.03	-408.39	264.86	744.06	2.75	292.91	443.62
K34	ULTKLM	MIN						
		0.00	-1376.37	-342.54	-782.23	-2.75	-1928.66	-1203.72
		1.41	-1370.78	-342.54	-782.23	-2.75	-823.76	-737.76
		2.03	-1365.20	-342.54	-782.23	-2.75	-226.63	-292.49
K35	ULTKLM	MAX						
		0.00	-402.62	334.67	716.63	2.75	1836.99	1202.31
		1.41	-397.04	334.67	716.63	2.75	824.76	749.28
		2.03	-391.45	334.67	716.63	2.75	213.66	317.39
K35	ULTKLM	MIN						
		0.00	-1482.71	-281.33	-723.00	-2.75	-1847.51	-1142.97
		1.41	-1477.12	-281.33	-723.00	-2.75	-826.27	-765.27
		2.03	-1471.54	-281.33	-723.00	-2.75	-206.16	-408.70
K36	ULTKLM	MAX						
		0.00	338.34	146.15	305.51	0.705E-01	658.94	422.01
		1.43	341.51	146.15	305.51	0.705E-01	223.59	218.73
		2.05	344.67	146.15	305.51	0.705E-01	212.05	34.28
K36	ULTKLM	MIN						
		0.00	-821.93	-145.90	-306.39	-0.687E-01	-661.17	-419.43
		1.43	-818.76	-145.90	-306.39	-0.687E-01	-224.56	-216.50
		2.05	-815.59	-145.90	-306.39	-0.687E-01	-211.76	-32.40
K37	ULTKLM	MAX						
		0.00	-38.67	127.68	405.57	0.705E-01	753.44	404.97
		1.43	-35.50	127.68	405.57	0.705E-01	175.51	226.79
		2.05	-32.34	127.68	405.57	0.705E-01	402.03	58.78
K37	ULTKLM	MIN						

		0.00	-679.13	-135.73	-406.08	-8.687E-01	-755.30	-410.57
		1.43	-675.96	-135.73	-406.08	-8.687E-01	-176.63	-220.91
		2.85	-672.79	-135.73	-406.08	-8.687E-01	-402.42	-41.44
K38	ULTKLM	MAX						
		0.00	3.15	121.88	383.39	8.705E-01	719.26	397.46
		1.43	6.32	121.88	383.39	8.705E-01	172.92	229.48
		2.85	9.49	121.88	383.39	8.705E-01	378.22	67.36
K38	ULTKLM	MIN						
		0.00	-586.71	-122.31	-386.60	-8.687E-01	-723.82	-395.55
		1.43	-583.54	-122.31	-386.60	-8.687E-01	-172.80	-226.96
		2.85	-580.37	-122.31	-386.60	-8.687E-01	-373.41	-64.22
K39	ULTKLM	MAX						
		0.00	1579.56	216.61	279.51	8.705E-01	629.21	493.22
		1.43	1582.73	216.61	279.51	8.705E-01	230.90	187.06
		2.85	1585.90	216.61	279.51	8.705E-01	161.02	131.83
K39	ULTKLM	MIN						
		0.00	-1883.43	-218.66	-276.51	-8.687E-01	-627.59	-492.91
		1.43	-1880.26	-218.66	-276.51	-8.687E-01	-233.57	-183.83
		2.85	-1877.09	-218.66	-276.51	-8.687E-01	-167.98	-125.67
K40	ULTKLM	MAX						
		0.00	108.36	332.40	244.17	8.705E-01	591.91	607.35
		1.43	111.51	332.40	244.17	8.705E-01	247.02	139.51
		2.83	114.65	332.40	244.17	8.705E-01	59.73	331.54
K40	ULTKLM	MIN						
		0.00	-862.17	-331.05	-220.62	-8.687E-01	-570.04	-603.69
		1.43	-859.03	-331.05	-220.62	-8.687E-01	-258.41	-137.76
		2.83	-855.89	-331.05	-220.62	-8.687E-01	-104.38	-331.69
K41	ULTKLM	MAX						
		0.00	-161.17	319.04	251.12	8.705E-01	596.28	594.18
		1.43	-158.03	319.04	251.12	8.705E-01	241.58	145.26
		2.83	-154.89	319.04	251.12	8.705E-01	125.55	300.07
K41	ULTKLM	MIN						
		0.00	-839.73	-313.95	-255.72	-8.687E-01	-602.16	-586.82
		1.43	-836.59	-313.95	-255.72	-8.687E-01	-240.96	-145.10
		2.83	-833.45	-313.95	-255.72	-8.687E-01	-118.43	-307.11
K42	ULTKLM	MAX						
		0.00	-277.46	312.63	96.93	8.705E-01	439.67	587.86
		1.43	-274.29	312.63	96.93	8.705E-01	304.70	144.21
		2.85	-271.12	312.63	96.93	8.705E-01	169.74	300.63
K42	ULTKLM	MIN						
		0.00	-577.05	-310.04	-114.85	-8.687E-01	-458.67	-582.97
		1.43	-573.88	-310.04	-114.85	-8.687E-01	-298.16	-143.02
		2.85	-570.71	-310.04	-114.85	-8.687E-01	-137.65	-303.14
K43	ULTKLM	MAX						
		0.00	105.02	327.88	248.69	8.705E-01	588.96	602.89
		1.43	108.17	327.88	248.69	8.705E-01	237.69	141.43
		2.83	111.31	327.88	248.69	8.705E-01	118.59	323.77
K43	ULTKLM	MIN						
		0.00	-900.93	-326.83	-249.72	-8.687E-01	-591.30	-599.52
		1.43	-897.79	-326.83	-249.72	-8.687E-01	-238.58	-139.55
		2.83	-894.65	-326.83	-249.72	-8.687E-01	-118.03	-323.37
K44	ULTKLM	MAX						
		0.00	1382.52	231.06	260.14	8.705E-01	597.78	507.47
		1.43	1385.69	231.06	260.14	8.705E-01	227.08	180.59
		2.85	1388.86	231.06	260.14	8.705E-01	137.36	142.20
K44	ULTKLM	MIN						
		0.00	-1709.65	-224.17	-255.07	-8.687E-01	-594.10	-498.34
		1.43	-1706.48	-224.17	-255.07	-8.687E-01	-230.63	-181.29
		2.85	-1703.31	-224.17	-255.07	-8.687E-01	-148.14	-152.71
K45	ULTKLM	MAX						
		1.40	437.72	392.04	647.27	2.75	886.62	727.65
		2.80	443.25	392.04	647.27	2.75	25.87	214.45
K45	ULTKLM	MIN						
		0.00	-1952.75	-498.42	-583.96	-2.75	-1735.47	-1364.19
		1.40	-1947.22	-498.42	-583.96	-2.75	-917.92	-675.02
		2.80	-1941.68	-498.42	-583.96	-2.75	-145.81	-12.88
K46	ULTKLM	MAX						
		0.00	632.23	767.65	602.34	2.75	1725.63	1633.98
		1.40	637.77	767.65	602.34	2.75	882.36	566.39
		2.80	643.31	767.65	602.34	2.75	77.32	335.85
K46	ULTKLM	MIN						
		0.00	-2364.79	-664.88	-544.83	-2.75	-1673.90	-1526.49
		1.40	-2359.26	-664.88	-544.83	-2.75	-911.14	-602.78
		2.80	-2353.72	-664.88	-544.83	-2.75	-186.62	-516.13
K47	ULTKLM	MAX						
		0.00	1707.53	345.57	215.77	8.705E-01	570.49	620.92
		1.40	1710.64	345.57	215.77	8.705E-01	268.42	138.65

	2.00	1713.76	345.57	215.77	0.705E-01	43.76	351.12
K47	ULTKLM MIN						
	0.00	-1834.67	-346.74	-214.51	-0.687E-01	-570.60	-619.75
	1.40	-1831.56	-346.74	-214.51	-0.687E-01	-270.30	-135.84
	2.80	-1828.45	-346.74	-214.51	-0.687E-01	-47.40	-346.67
K48	ULTKLM MAX						
	2.0E-01	457.81	384.34	549.23	3.59	610.88	449.42
	1.95	464.73	384.34	549.23	3.59	363.61	250.20
	3.70	471.65	384.34	549.23	3.59	1384.13	1009.85
K48	ULTKLM MIN						
	2.0E-01	-1362.69	-434.90	-583.16	-3.69	-656.92	-531.90
	1.95	-1355.77	-434.90	-583.16	-3.69	-350.27	-244.19
	3.70	-1348.85	-434.90	-583.16	-3.69	-1311.41	-915.35
K49	ULTKLM MAX						
	2.0E-01	439.60	731.26	587.48	3.59	667.03	1050.93
	1.95	446.52	731.26	587.48	3.59	364.63	225.94
	3.70	453.44	731.26	587.48	3.59	1434.74	1428.03
K49	ULTKLM MIN						
	2.0E-01	-1720.87	-687.06	-611.49	-3.69	-705.48	-976.67
	1.95	-1713.95	-687.06	-611.49	-3.69	-361.06	-229.02
	3.70	-1707.03	-687.06	-611.49	-3.69	-1389.16	-1508.46
K50	ULTKLM MAX						
	2.0E-01	989.89	316.22	253.03	1.14	319.04	515.49
	1.95	993.79	316.22	253.03	1.14	121.61	36.92
	3.70	997.68	316.22	253.03	1.14	565.65	584.80
K50	ULTKLM MIN						
	2.0E-01	-1334.03	-313.18	-253.74	-1.17	-322.43	-511.32
	1.95	-1330.14	-313.18	-253.74	-1.17	-123.76	-38.08
	3.70	-1326.25	-313.18	-253.74	-1.17	-566.56	-591.29
K51	ULTKLM MAX						
	2.0E-01	-181.74	408.05	812.90	3.59	1024.34	455.89
	1.95	-174.82	408.05	812.90	3.59	395.25	261.19
	3.70	-167.90	408.05	812.90	3.59	1812.05	1055.82
K51	ULTKLM MIN						
	2.0E-01	-1060.73	-454.58	-809.60	-3.69	-1021.55	-535.21
	1.95	-1053.81	-454.58	-809.60	-3.69	-398.23	-259.09
	3.70	-1046.89	-454.58	-809.60	-3.69	-1820.80	-972.30
K52	ULTKLM MAX						
	2.0E-01	-77.82	744.08	832.03	3.59	1065.78	1071.74
	1.95	-70.90	744.08	832.03	3.59	387.88	227.76
	3.70	-63.98	744.08	832.03	3.59	1842.04	1451.37
K52	ULTKLM MIN						
	2.0E-01	-1343.93	-699.21	-830.95	-3.69	-1066.29	-995.85
	1.95	-1337.01	-699.21	-830.95	-3.69	-390.27	-230.40
	3.70	-1330.10	-699.21	-830.95	-3.69	-1846.31	-1532.53
K53	ULTKLM MAX						
	2.0E-01	808.90	321.27	349.95	1.14	494.81	524.08
	1.95	812.79	321.27	349.95	1.14	118.33	36.48
	3.70	816.68	321.27	349.95	1.14	733.90	591.04
K53	ULTKLM MIN						
	2.0E-01	-1114.94	-316.92	-351.75	-1.17	-497.24	-518.18
	1.95	-1111.04	-316.92	-351.75	-1.17	-117.61	-38.19
	3.70	-1107.15	-316.92	-351.75	-1.17	-730.02	-600.36
K54	ULTKLM MAX						
	2.0E-01	-223.49	401.98	783.32	3.59	985.47	439.02
	1.95	-216.58	401.98	783.32	3.59	366.50	248.92
	3.70	-209.66	401.98	783.32	3.59	1786.14	1096.61
K54	ULTKLM MIN						
	2.0E-01	-1027.62	-484.92	-811.23	-3.69	-1053.15	-600.62
	1.95	-1020.70	-484.92	-811.23	-3.69	-385.35	-265.38
	3.70	-1013.78	-484.92	-811.23	-3.69	-1756.17	-967.92
K55	ULTKLM MAX						
	2.0E-01	-157.33	759.47	811.05	3.59	1043.72	1097.97
	1.95	-150.41	759.47	811.05	3.59	371.95	226.44
	3.70	-143.49	759.47	811.05	3.59	1810.10	1459.10
K55	ULTKLM MIN						
	2.0E-01	-1340.84	-704.49	-821.80	-3.69	-1066.19	-1006.63
	1.95	-1333.93	-704.49	-821.80	-3.69	-375.61	-231.31
	3.70	-1327.01	-704.49	-821.80	-3.69	-1794.95	-1560.18
K56	ULTKLM MAX						
	2.0E-01	883.43	324.34	339.38	1.14	480.52	528.89
	1.95	887.32	324.34	339.38	1.14	113.70	37.13
	3.70	891.21	324.34	339.38	1.14	710.70	597.44
K56	ULTKLM MIN						
	2.0E-01	-1167.81	-320.19	-341.14	-1.17	-483.30	-523.24
	1.95	-1163.92	-320.19	-341.14	-1.17	-113.40	-38.73
	3.70	-1160.03	-320.19	-341.14	-1.17	-707.31	-606.30



K57	ULTKLM MAX						
	1.5E-01	1279.26	240.89	314.27	1.14	459.16	347.93
	1.92	1283.21	240.89	314.27	1.14	99.22	78.95
	3.70	1287.16	240.89	314.27	1.14	661.42	511.00
K57	ULTKLM MIN						
	1.5E-01	-1450.52	-243.53	-316.74	-1.17	-462.99	-353.46
	1.92	-1446.58	-243.53	-316.74	-1.17	-98.67	-79.79
	3.70	-1442.63	-243.53	-316.74	-1.17	-656.50	-507.24
K58	ULTKLM MAX						
	1.8E-01	201.93	334.12	231.65	1.14	318.10	534.95
	1.94	205.85	334.12	231.65	1.14	94.98	54.97
	3.70	209.77	334.12	231.65	1.14	521.30	637.69
K58	ULTKLM MIN						
	1.8E-01	-627.54	-330.63	-241.88	-1.17	-331.33	-527.77
	1.94	-623.62	-330.63	-241.88	-1.17	-90.18	-53.94
	3.70	-619.70	-330.63	-241.88	-1.17	-498.46	-642.82
K59	ULTKLM MAX						
	1.8E-01	295.33	320.35	307.20	1.14	437.41	504.89
	1.94	299.25	320.35	307.20	1.14	103.46	58.90
	3.70	303.17	320.35	307.20	1.14	652.66	618.73
K59	ULTKLM MIN						
	1.8E-01	-665.25	-317.63	-311.60	-1.17	-445.74	-500.92
	1.94	-661.33	-317.63	-311.60	-1.17	-104.18	-59.72
	3.70	-657.41	-317.63	-311.60	-1.17	-645.76	-624.33
K60	ULTKLM MAX						
	1.5E-01	161.55	323.12	176.78	1.14	172.42	517.94
	1.92	165.49	323.12	176.78	1.14	144.06	55.43
	3.70	169.44	323.12	176.78	1.14	465.64	624.91
K60	ULTKLM MIN						
	1.5E-01	-548.25	-320.84	-181.17	-1.17	-177.51	-514.05
	1.92	-544.30	-320.84	-181.17	-1.17	-141.37	-55.59
	3.70	-540.35	-320.84	-181.17	-1.17	-455.15	-629.12
K61	ULTKLM MAX						
	1.8E-01	430.69	329.53	311.57	1.14	439.60	525.98
	1.94	434.61	329.53	311.57	1.14	102.25	52.96
	3.70	438.53	329.53	311.57	1.14	676.13	631.91
K61	ULTKLM MIN						
	1.8E-01	-802.52	-328.48	-325.60	-1.17	-471.63	-525.99
	1.94	-798.60	-328.48	-325.60	-1.17	-109.55	-54.81
	3.70	-794.68	-328.48	-325.60	-1.17	-658.69	-635.60
K62	ULTKLM MAX						
	1.5E-01	705.19	243.87	327.39	1.14	481.70	355.39
	1.92	709.13	243.87	327.39	1.14	98.85	77.82
	3.70	713.08	243.87	327.39	1.14	689.62	500.94
K62	ULTKLM MIN						
	1.5E-01	-1002.25	-238.41	-332.83	-1.17	-491.93	-345.41
	1.92	-998.31	-238.41	-332.83	-1.17	-99.43	-77.54
	3.70	-994.36	-238.41	-332.83	-1.17	-680.55	-510.36
K63	ULTKLM MAX						
	1.8E-01	-170.56	368.97	800.47	3.59	1043.77	341.47
	1.94	-163.59	368.97	800.47	3.59	372.34	276.85
	3.70	-156.62	368.97	800.47	3.59	1777.60	1058.28
K63	ULTKLM MIN						
	1.8E-01	-978.57	-444.03	-797.31	-3.69	-1032.92	-506.91
	1.94	-971.60	-444.03	-797.31	-3.69	-367.06	-310.01
	3.70	-964.64	-444.03	-797.31	-3.69	-1777.90	-959.15
K64	ULTKLM MAX						
	1.8E-01	262.03	651.13	817.77	3.59	1075.76	834.01
	1.94	269.00	651.13	817.77	3.59	366.78	326.37
	3.70	275.97	651.13	817.77	3.59	1811.73	1373.52
K64	ULTKLM MIN						
	1.8E-01	-1620.47	-594.16	-819.83	-3.69	-1078.17	-720.91
	1.94	-1613.50	-594.16	-819.83	-3.69	-365.55	-313.67
	3.70	-1606.54	-594.16	-819.83	-3.69	-1806.86	-1461.21
K65	ULTKLM MAX						
	1.5E-01	848.59	273.86	342.50	1.14	501.67	407.35
	1.92	852.54	273.86	342.50	1.14	107.09	76.13
	3.70	856.49	273.86	342.50	1.14	719.06	556.42
K65	ULTKLM MIN						
	1.5E-01	-1222.85	-270.59	-344.77	-1.17	-504.87	-404.16
	1.92	-1218.90	-270.59	-344.77	-1.17	-106.27	-78.75
	3.70	-1214.95	-270.59	-344.77	-1.17	-714.21	-564.85
K66	ULTKLM MAX						
	1.5E-01	221.05	106.01	420.31	1.14	680.59	100.08
	1.92	225.00	106.01	420.31	1.14	66.57	90.11
	3.70	228.94	106.01	420.31	1.14	819.37	282.36
K66	ULTKLM MIN						
	1.5E-01	-463.89	-108.55	-424.11	-1.17	-686.23	-102.99

	1.92	-459.94	-108.55	-424.11	-1.17	-65.46	-88.51
	3.70	-455.99	-108.55	-424.11	-1.17	-811.50	-276.26
K67	ULTKLM MAX						
	1.5E-01	149.19	120.17	434.89	1.14	709.10	149.96
	1.92	153.14	120.17	434.89	1.14	62.98	67.24
	3.70	157.09	120.17	434.89	1.14	838.67	270.22
K67	ULTKLM MIN						
	1.5E-01	-457.94	-114.88	-437.00	-1.17	-712.70	-137.62
	1.92	-453.99	-114.88	-437.00	-1.17	-62.83	-64.28
	3.70	-450.05	-114.88	-437.00	-1.17	-834.76	-276.65
K68	ULTKLM MAX						
	1.8E-01	12.03	243.33	421.30	1.14	671.26	340.49
	1.94	15.95	243.33	421.30	1.14	72.12	87.44
	3.70	19.87	243.33	421.30	1.14	824.02	547.43
K68	ULTKLM MIN						
	1.8E-01	-614.47	-261.13	-426.61	-1.17	-679.79	-373.06
	1.94	-610.55	-261.13	-426.61	-1.17	-71.27	-88.63
	3.70	-606.63	-261.13	-426.61	-1.17	-813.81	-517.26
K69	ULTKLM MAX						
	1.8E-01	-387.42	654.66	779.14	3.59	1063.58	863.47
	1.94	-380.45	654.66	779.14	3.59	368.26	294.32
	3.70	-373.48	654.66	779.14	3.59	1862.05	1430.18
K69	ULTKLM MIN						
	1.8E-01	-1741.14	-644.52	-847.54	-3.69	-1125.54	-841.76
	1.94	-1734.17	-644.52	-847.54	-3.69	-309.65	-290.48
	3.70	-1727.20	-644.52	-847.54	-3.69	-1682.88	-1444.22
K70	ULTKLM MAX						
	1.8E-01	177.81	738.95	796.03	3.59	1092.14	1037.81
	1.94	184.78	738.95	796.03	3.59	356.35	251.24
	3.70	191.74	738.95	796.03	3.59	1814.05	1497.34
K70	ULTKLM MIN						
	1.8E-01	-1581.11	-707.27	-827.07	-3.69	-1101.35	-995.80
	1.94	-1574.14	-707.27	-827.07	-3.69	-310.87	-265.06
	3.70	-1567.17	-707.27	-827.07	-3.69	-1713.87	-1566.98
K71	ULTKLM MAX						
	1.8E-01	600.40	290.65	418.16	1.14	664.12	457.57
	1.94	604.32	290.65	418.16	1.14	74.06	54.34
	3.70	608.24	290.65	418.16	1.14	817.49	554.71
K71	ULTKLM MIN						
	1.8E-01	-915.96	-283.97	-421.80	-1.17	-669.36	-446.28
	1.94	-912.04	-283.97	-421.80	-1.17	-72.88	-54.82
	3.70	-908.12	-283.97	-421.80	-1.17	-809.88	-566.96
K72	ULTKLM MAX						
	2.0E-01	-154.17	430.67	797.08	3.59	1021.21	489.69
	1.95	-147.25	430.67	797.08	3.59	384.79	254.60
	3.70	-140.33	430.67	797.08	3.59	1765.95	1099.04
K72	ULTKLM MIN						
	2.0E-01	-978.92	-483.38	-789.23	-3.69	-996.37	-592.81
	1.95	-972.00	-483.38	-789.23	-3.69	-373.67	-265.48
	3.70	-965.08	-483.38	-789.23	-3.69	-1768.56	-1017.67
K73	ULTKLM MAX						
	2.0E-01	177.41	760.61	815.18	3.59	1056.12	1092.75
	1.95	184.33	760.61	815.18	3.59	376.06	239.39
	3.70	191.25	760.61	815.18	3.59	1801.80	1496.57
K73	ULTKLM MIN						
	2.0E-01	-1540.46	-718.67	-814.71	-3.69	-1049.68	-1018.78
	1.95	-1533.54	-718.67	-814.71	-3.69	-370.44	-238.81
	3.70	-1526.62	-718.67	-814.71	-3.69	-1797.01	-1569.38
K74	ULTKLM MAX						
	2.0E-01	967.40	396.75	341.71	1.14	484.95	671.88
	1.95	971.29	396.75	341.71	1.14	113.31	20.24
	3.70	975.18	396.75	341.71	1.14	713.76	708.16
K74	ULTKLM MIN						
	2.0E-01	-1450.17	-393.11	-343.11	-1.17	-487.14	-667.74
	1.95	-1446.28	-393.11	-343.11	-1.17	-113.04	-22.46
	3.70	-1442.39	-393.11	-343.11	-1.17	-711.03	-716.76
K75	ULTKLM MAX						
	2.0E-01	746.02	263.30	412.35	1.14	641.09	391.36
	1.95	749.91	263.30	412.35	1.14	82.14	78.06
	3.70	753.80	263.30	412.35	1.14	810.98	553.80
K75	ULTKLM MIN						
	2.0E-01	-1595.27	-271.91	-416.48	-1.17	-646.69	-397.89
	1.95	-1591.38	-271.91	-416.48	-1.17	-80.52	-69.52
	3.70	-1587.49	-271.91	-416.48	-1.17	-802.13	-530.19
K76	ULTKLM MAX						
	1.5E-01	87.60	138.12	425.49	1.14	688.08	134.41
	1.92	91.55	138.12	425.49	1.14	68.62	95.25

	3.70	95.49	138.12	425.49	1.14	832.71	310.00
K76	ULTKLM MIN						
	1.5E-01	-708.76	-121.23	-430.47	-1.17	-695.47	-120.38
	1.92	-704.81	-121.23	-430.47	-1.17	-67.16	-111.20
	3.70	-700.87	-121.23	-430.47	-1.17	-822.41	-355.92
	1.8E-01	298.95	209.69	424.59	1.14	674.84	289.30
	1.94	302.87	209.69	424.59	1.14	72.54	89.06
	3.70	306.79	209.69	424.59	1.14	825.95	540.71
K77	ULTKLM MIN						
	1.8E-01	-1311.48	-256.27	-427.47	-1.17	-680.87	-362.64
	1.94	-1307.56	-256.27	-427.47	-1.17	-73.50	-80.31
	3.70	-1303.64	-256.27	-427.47	-1.17	-821.83	-449.87
K78	ULTKLM MAX						
	1.8E-01	-307.74	263.91	427.44	1.14	677.96	417.56
	1.94	-304.38	263.91	427.44	1.14	75.32	17.09
	3.70	-301.02	263.91	427.44	1.14	831.53	415.70
K78	ULTKLM MIN						
	1.8E-01	-570.07	-226.36	-429.06	-1.17	-680.89	-382.23
	1.94	-565.59	-226.36	-429.06	-1.17	-75.41	-47.95
	3.70	-561.11	-226.36	-429.06	-1.17	-828.78	-512.74
K79	ULTKLM MAX						
	1.8E-01	-244.21	349.13	802.50	3.59	1025.79	287.82
	1.94	-237.25	349.13	802.50	3.59	379.24	315.48
	3.70	-230.28	349.13	802.50	3.59	1848.70	1070.55
K79	ULTKLM MIN						
	1.8E-01	-1129.29	-429.29	-833.73	-3.69	-1090.22	-442.69
	1.94	-1122.32	-429.29	-833.73	-3.69	-388.62	-329.08
	3.70	-1115.35	-429.29	-833.73	-3.69	-1803.03	-942.87
K80	ULTKLM MAX						
	1.8E-01	-358.66	569.46	826.79	3.59	1077.18	592.58
	1.94	-351.69	569.46	826.79	3.59	383.86	411.58
	3.70	-344.72	569.46	826.79	3.59	1864.45	1301.82
K80	ULTKLM MIN						
	1.8E-01	-1258.48	-505.47	-840.05	-3.69	-1096.73	-479.97
	1.94	-1251.51	-505.47	-840.05	-3.69	-380.03	-411.75
	3.70	-1244.54	-505.47	-840.05	-3.69	-1837.24	-1414.76
K81	ULTKLM MAX						
	1.5E-01	310.38	244.75	351.16	1.14	516.32	299.60
	1.92	314.33	244.75	351.16	1.14	107.49	133.03
	3.70	318.28	244.75	351.16	1.14	733.95	563.73
K81	ULTKLM MIN						
	1.5E-01	-757.39	-242.65	-352.94	-1.17	-518.97	-297.69
	1.92	-753.44	-242.65	-352.94	-1.17	-106.98	-134.84
	3.70	-749.49	-242.65	-352.94	-1.17	-730.28	-569.26
K82	ULTKLM MAX						
	1.5E-01	-31.21	193.41	424.88	1.14	687.94	225.25
	1.92	-27.26	193.41	424.88	1.14	65.30	114.62
	3.70	-23.31	193.41	424.88	1.14	817.93	468.27
K82	ULTKLM MIN						
	1.5E-01	-545.83	-199.24	-424.02	-1.17	-687.33	-239.04
	1.92	-541.88	-199.24	-424.02	-1.17	-66.22	-118.05
	3.70	-537.93	-199.24	-424.02	-1.17	-820.37	-461.35
K83	ULTKLM MAX						
	1.5E-01	-18.64	107.77	432.96	1.14	704.23	120.12
	1.92	-14.69	107.77	432.96	1.14	62.63	66.04
	3.70	-10.75	107.77	432.96	1.14	834.77	240.89
K83	ULTKLM MIN						
	1.5E-01	-458.05	-99.14	-435.01	-1.17	-709.51	-111.07
	1.92	-454.10	-99.14	-435.01	-1.17	-64.28	-72.31
	3.70	-450.15	-99.14	-435.01	-1.17	-832.78	-262.48
K84	ULTKLM MAX						
	1.5E-01	1242.87	253.56	317.09	1.14	464.30	367.44
	1.92	1246.82	253.56	317.09	1.14	98.10	82.00
	3.70	1250.76	253.56	317.09	1.14	652.80	536.35
K84	ULTKLM MIN						
	1.5E-01	-1468.12	-256.04	-312.51	-1.17	-456.59	-372.59
	1.92	-1464.17	-256.04	-312.51	-1.17	-98.54	-82.76
	3.70	-1460.22	-256.04	-312.51	-1.17	-661.38	-532.72
K85	ULTKLM MAX						
	1.8E-01	101.47	344.82	248.15	1.14	354.77	556.64
	1.94	105.39	344.82	248.15	1.14	76.44	51.74
	3.70	109.31	344.82	248.15	1.14	444.28	660.09
K85	ULTKLM MIN						
	1.8E-01	-652.90	-345.18	-208.70	-1.17	-291.40	-556.68
	1.94	-648.98	-345.18	-208.70	-1.17	-82.60	-51.14
	3.70	-645.06	-345.18	-208.70	-1.17	-519.96	-658.85
K86	ULTKLM MAX						

	1.8E-01	-272.51	338.63	288.11	1.14	410.77	539.22
	1.94	-268.59	338.63	288.11	1.14	60.45	58.86
	3.70	-264.67	338.63	288.11	1.14	473.98	649.30
K86	ULTKLM MIN						
	1.8E-01	-575.54	-335.09	-234.63	-1.17	-353.08	-531.89
	1.94	-571.62	-335.09	-234.63	-1.17	-97.03	-57.77
	3.70	-567.70	-335.09	-234.63	-1.17	-604.82	-654.45
K87	ULTKLM MAX						
	1.5E-01	-237.84	335.61	179.62	1.14	174.87	538.95
	1.92	-233.89	335.61	179.62	1.14	105.63	56.03
	3.70	-229.94	335.61	179.62	1.14	352.89	645.09
K87	ULTKLM MIN						
	1.5E-01	-534.10	-331.94	-139.30	-1.17	-141.63	-533.30
	1.92	-530.16	-331.94	-139.30	-1.17	-143.96	-56.91
	3.70	-526.21	-331.94	-139.30	-1.17	-462.79	-652.68
K88	ULTKLM MAX						
	1.8E-01	-30.86	347.29	296.83	1.14	428.48	556.08
	1.94	-26.94	347.29	296.83	1.14	70.74	53.48
	3.70	-23.02	347.29	296.83	1.14	528.31	657.41
K88	ULTKLM MIN						
	1.8E-01	-614.70	-342.73	-259.61	-1.17	-386.83	-550.70
	1.94	-610.78	-342.73	-259.61	-1.17	-94.69	-56.14
	3.70	-606.86	-342.73	-259.61	-1.17	-617.86	-668.12
K89	ULTKLM MAX						
	1.5E-01	882.83	259.78	330.02	1.14	488.43	386.16
	1.92	886.78	259.78	330.02	1.14	97.69	74.70
	3.70	890.73	259.78	330.02	1.14	673.93	520.25
K89	ULTKLM MIN						
	1.5E-01	-1107.47	-251.17	-324.64	-1.17	-478.55	-371.41
	1.92	-1103.53	-251.17	-324.64	-1.17	-97.35	-75.23
	3.70	-1099.58	-251.17	-324.64	-1.17	-683.13	-536.05
K90	ULTKLM MAX						
	2.0E-01	331.23	409.25	615.87	3.59	721.48	460.51
	1.95	338.15	409.25	615.87	3.59	367.33	241.29
	3.70	345.07	409.25	615.87	3.59	1334.69	1146.31
K90	ULTKLM MIN						
	2.0E-01	-1467.30	-518.31	-552.78	-3.69	-600.03	-667.77
	1.95	-1460.38	-518.31	-552.78	-3.69	-356.29	-257.71
	3.70	-1453.46	-518.31	-552.78	-3.69	-1434.06	-971.88
K91	ULTKLM MAX						
	2.0E-01	327.28	822.50	637.74	3.59	755.79	1219.11
	1.95	334.20	822.50	637.74	3.59	368.49	235.65
	3.70	341.12	822.50	637.74	3.59	1380.78	1495.67
K91	ULTKLM MIN						
	2.0E-01	-1678.60	-720.60	-578.45	-3.69	-643.80	-1026.44
	1.95	-1671.68	-720.60	-578.45	-3.69	-360.26	-221.31
	3.70	-1664.76	-720.60	-578.45	-3.69	-1476.31	-1659.65
K92	ULTKLM MAX						
	2.0E-01	1032.46	340.37	260.65	1.14	327.93	554.36
	1.95	1036.35	340.37	260.65	1.14	126.66	38.61
	3.70	1040.24	340.37	260.65	1.14	575.43	630.17
K92	ULTKLM MIN						
	2.0E-01	-1154.06	-338.15	-256.44	-1.17	-322.11	-553.37
	1.95	-1150.17	-338.15	-256.44	-1.17	-128.22	-41.50
	3.70	-1146.28	-338.15	-256.44	-1.17	-584.36	-636.95
K93	ULTKLM MAX						
	3.0E-01	28.69	182.18	318.61	3.89	416.00	218.48
	2.00	35.41	182.18	318.61	3.89	157.89	143.30
	3.70	42.13	182.18	318.61	3.89	802.78	561.64
K93	ULTKLM MIN						
	3.0E-01	-519.22	-257.24	-379.70	-3.88	-515.76	-339.75
	2.00	-512.50	-257.24	-379.70	-3.88	-153.79	-136.98
	3.70	-505.77	-257.24	-379.70	-3.88	-694.82	-427.72
K94	ULTKLM MAX						
	3.0E-01	-13.37	415.46	346.75	3.89	469.31	649.45
	2.00	-6.65	415.46	346.75	3.89	132.48	57.20
	3.70	7.628E-02	415.46	346.75	3.89	779.46	668.35
K94	ULTKLM MIN						
	3.0E-01	-662.30	-361.52	-380.97	-3.88	-524.09	-561.07
	2.00	-655.58	-361.52	-380.97	-3.88	-129.08	-60.52
	3.70	-648.86	-361.52	-380.97	-3.88	-717.88	-763.36
K95	ULTKLM MAX						
	3.0E-01	289.85	152.54	173.11	1.23	269.42	252.61
	2.00	293.63	152.54	173.11	1.23	25.80	6.78
	3.70	297.41	152.54	173.11	1.23	314.93	258.64
K95	ULTKLM MIN						
	3.0E-01	-484.57	-148.27	-170.47	-1.23	-264.65	-245.48
	2.00	-480.78	-148.27	-170.47	-1.23	-25.52	-6.91

		3.70	-477.00	-148.27	-170.47	-1.23	-319.15	-266.03
K96	ULTKLM MAX	3.0E-01	-203.78	192.60	568.00	3.89	883.23	241.48
		2.00	-197.06	192.60	568.00	3.89	81.74	135.21
		3.70	-190.34	192.60	568.00	3.89	1030.29	582.00
K96	ULTKLM MIN	3.0E-01	-452.09	-268.06	-558.11	-3.88	-867.29	-356.71
		2.00	-445.37	-268.06	-558.11	-3.88	-82.61	-122.16
		3.70	-438.65	-268.06	-558.11	-3.88	-1047.96	-440.67
K97	ULTKLM MAX	3.0E-01	-182.49	425.68	590.45	3.89	918.10	662.46
		2.00	-175.77	425.68	590.45	3.89	85.06	57.11
		3.70	-169.05	425.68	590.45	3.89	1075.69	676.62
K97	ULTKLM MIN	3.0E-01	-543.30	-365.64	-582.87	-3.88	-906.07	-568.29
		2.00	-536.58	-365.64	-582.87	-3.88	-85.93	-65.00
		3.70	-529.85	-365.64	-582.87	-3.88	-1089.44	-786.56
K98	ULTKLM MAX	3.0E-01	184.40	153.76	242.24	1.23	404.31	254.80
		2.00	188.18	153.76	242.24	1.23	8.43	8.29
		3.70	191.96	153.76	242.24	1.23	423.22	257.95
K98	ULTKLM MIN	3.0E-01	-354.61	-147.81	-244.56	-1.23	-408.29	-244.60
		2.00	-350.83	-147.81	-244.56	-1.23	-8.45	-8.19
		3.70	-347.05	-147.81	-244.56	-1.23	-419.30	-267.96
K99	ULTKLM MAX	3.0E-01	-210.33	178.42	535.15	3.89	815.30	209.42
		2.00	-203.61	178.42	535.15	3.89	96.30	139.40
		3.70	-196.89	178.42	535.15	3.89	1012.46	604.67
K99	ULTKLM MIN	3.0E-01	-442.92	-278.38	-539.10	-3.88	-820.48	-358.18
		2.00	-436.20	-278.38	-539.10	-3.88	-94.76	-118.22
		3.70	-429.48	-278.38	-539.10	-3.88	-1004.20	-413.55
K100	ULTKLM MAX	3.0E-01	-128.77	437.19	558.25	3.89	855.32	677.64
		2.00	-122.05	437.19	558.25	3.89	94.24	57.52
		3.70	-115.33	437.19	558.25	3.89	1051.17	668.40
K100	ULTKLM MIN	3.0E-01	-633.01	-360.02	-563.09	-3.88	-863.32	-556.85
		2.00	-626.29	-360.02	-563.09	-3.88	-94.01	-67.91
		3.70	-619.57	-360.02	-563.09	-3.88	-1042.72	-809.99
K101	ULTKLM MAX	3.0E-01	276.29	152.25	232.01	1.23	381.93	253.83
		2.00	280.07	152.25	232.01	1.23	12.64	19.00
		3.70	283.85	152.25	232.01	1.23	409.97	255.58
K101	ULTKLM MIN	3.0E-01	-430.02	-147.21	-233.78	-1.23	-384.89	-244.94
		2.00	-426.24	-147.21	-233.78	-1.23	-12.59	-18.68
		3.70	-422.46	-147.21	-233.78	-1.23	-406.92	-263.83
K102	ULTKLM MAX	3.0E-01	955.66	143.69	189.29	1.23	313.76	230.18
		2.00	959.44	143.69	189.29	1.23	17.74	14.98
		3.70	963.22	143.69	189.29	1.23	335.57	264.85
K102	ULTKLM MIN	3.0E-01	-1063.42	-147.30	-192.18	-1.23	-318.57	-235.97
		2.00	-1059.64	-147.30	-192.18	-1.23	-17.64	-14.63
		3.70	-1055.86	-147.30	-192.18	-1.23	-330.56	-258.37
K103	ULTKLM MAX	3.0E-01	77.73	187.20	117.47	1.23	167.91	314.54
		2.00	81.52	187.20	117.47	1.23	33.02	3.86
		3.70	85.30	187.20	117.47	1.23	262.12	320.47
K103	ULTKLM MIN	3.0E-01	-300.57	-186.33	-135.28	-1.23	-197.87	-313.06
		2.00	-296.78	-186.33	-135.28	-1.23	-32.71	-3.85
		3.70	-293.00	-186.33	-135.28	-1.23	-231.54	-321.93
K104	ULTKLM MAX	3.0E-01	6.17	185.60	203.79	1.23	326.65	308.79
		2.00	9.96	185.60	203.79	1.23	19.50	6.78
		3.70	13.74	185.60	203.79	1.23	368.89	317.29
K104	ULTKLM MIN	3.0E-01	-206.19	-182.73	-205.66	-1.23	-330.36	-303.97
		2.00	-202.41	-182.73	-205.66	-1.23	-20.02	-6.86
		3.70	-198.63	-182.73	-205.66	-1.23	-366.24	-322.26
K105	ULTKLM MAX	3.0E-01	35.99	187.33	146.37	1.23	211.24	312.50
		2.00	39.77	187.33	146.37	1.23	37.72	6.04
		3.70	43.55	187.33	146.37	1.23	299.46	321.98

K105	ULTKLM MIN	3.0E-01	-243.51	-185.91	-154.06	-1.23	-224.35	-310.12
		2.00	-239.73	-185.91	-154.06	-1.23	-37.76	-6.08
		3.70	-235.95	-185.91	-154.06	-1.23	-286.43	-324.42
K106	ULTKLM MAX	3.0E-01	68.85	184.47	218.16	1.23	351.00	309.42
		2.00	72.64	184.47	218.16	1.23	19.90	4.19
		3.70	76.42	184.47	218.16	1.23	396.44	313.42
K106	ULTKLM MIN	3.0E-01	-267.72	-181.94	-221.51	-1.23	-356.69	-305.16
		2.00	-263.94	-181.94	-221.51	-1.23	-19.90	-4.23
		3.70	-260.16	-181.94	-221.51	-1.23	-390.76	-317.77
K107	ULTKLM MAX	3.0E-01	125.35	145.04	223.27	1.23	362.87	231.87
		2.00	129.13	145.04	223.27	1.23	16.85	14.71
		3.70	132.92	145.04	223.27	1.23	403.15	252.92
K107	ULTKLM MIN	3.0E-01	-292.24	-140.32	-227.27	-1.23	-369.59	-224.16
		2.00	-288.46	-140.32	-227.27	-1.23	-16.76	-15.02
		3.70	-284.68	-140.32	-227.27	-1.23	-396.26	-261.26
K108	ULTKLM MAX	3.0E-01	-201.23	196.24	534.99	3.89	819.48	229.90
		2.00	-194.51	196.24	534.99	3.89	95.11	135.83
		3.70	-187.79	196.24	534.99	3.89	1022.17	583.74
K108	ULTKLM MIN	3.0E-01	-433.82	-267.06	-545.50	-3.88	-832.54	-327.97
		2.00	-427.10	-267.06	-545.50	-3.88	-90.31	-113.50
		3.70	-420.38	-267.06	-545.50	-3.88	-999.49	-441.01
K109	ULTKLM MAX	3.0E-01	568.25	444.32	557.33	3.89	859.51	687.55
		2.00	574.97	444.32	557.33	3.89	94.01	65.61
		3.70	581.69	444.32	557.33	3.89	1059.48	718.75
K109	ULTKLM MIN	3.0E-01	-1295.17	-389.38	-568.10	-3.88	-872.05	-605.13
		2.00	-1288.45	-389.38	-568.10	-3.88	-88.25	-76.60
		3.70	-1281.73	-389.38	-568.10	-3.88	-1035.43	-823.15
K110	ULTKLM MAX	3.0E-01	731.83	167.95	229.53	1.23	383.43	261.59
		2.00	735.61	167.95	229.53	1.23	22.20	75.47
		3.70	739.39	167.95	229.53	1.23	403.46	330.22
K110	ULTKLM MIN	3.0E-01	-951.53	-163.22	-233.14	-1.23	-389.22	-254.70
		2.00	-947.75	-163.22	-233.14	-1.23	-21.84	-74.61
		3.70	-943.97	-163.22	-233.14	-1.23	-396.96	-337.40
K111	ULTKLM MAX	3.0E-01	167.78	50.81	249.08	1.23	421.73	44.99
		2.00	171.56	50.81	249.08	1.23	6.52	49.65
		3.70	175.34	50.81	249.08	1.23	434.64	143.88
K111	ULTKLM MIN	3.0E-01	-315.12	-57.91	-254.52	-1.23	-430.73	-56.78
		2.00	-311.34	-57.91	-254.52	-1.23	-6.27	-49.37
		3.70	-307.56	-57.91	-254.52	-1.23	-425.14	-131.53
K112	ULTKLM MAX	3.0E-01	76.74	44.87	271.76	1.23	456.41	67.68
		2.00	80.52	44.87	271.76	1.23	5.54	52.12
		3.70	84.30	44.87	271.76	1.23	469.51	119.42
K112	ULTKLM MIN	3.0E-01	-245.41	-42.63	-272.93	-1.23	-458.47	-65.38
		2.00	-241.63	-42.63	-272.93	-1.23	-5.61	-53.64
		3.70	-237.85	-42.63	-272.93	-1.23	-467.58	-124.75
K113	ULTKLM MAX	3.0E-01	67.03	147.44	257.10	1.23	431.20	239.57
		2.00	70.81	147.44	257.10	1.23	6.58	28.63
		3.70	74.59	147.44	257.10	1.23	455.42	293.75
K113	ULTKLM MIN	3.0E-01	-389.97	-166.41	-264.13	-1.23	-442.63	-272.03
		2.00	-386.19	-166.41	-264.13	-1.23	-6.04	-28.84
		3.70	-382.41	-166.41	-264.13	-1.23	-442.92	-261.73
K114	ULTKLM MAX	3.0E-01	-132.41	419.83	457.19	3.89	682.15	638.93
		2.00	-125.68	419.83	457.19	3.89	105.22	75.78
		3.70	-118.96	419.83	457.19	3.89	1171.27	786.40
K114	ULTKLM MIN	3.0E-01	-889.32	-418.82	-627.62	-3.88	-962.63	-637.60
		2.00	-882.60	-418.82	-627.62	-3.88	-95.96	-76.17
		3.70	-875.88	-418.82	-627.62	-3.88	-872.29	-788.51
K115	ULTKLM MAX							

	3.0E-01	-166.80	449.97	500.44	3.89	745.80	706.22
	2.00	-160.08	449.97	500.44	3.89	110.56	56.45
	3.70	-153.35	449.97	500.44	3.89	1135.64	727.45
K115	ULTKLM MIN						
	3.0E-01	-515.57	-395.36	-603.57	-3.88	-916.51	-616.76
	2.00	-508.84	-395.36	-603.57	-3.88	-105.94	-59.84
	3.70	-502.12	-395.36	-603.57	-3.88	-955.69	-823.68
K116	ULTKLM MAX						
	3.0E-01	34.45	150.43	265.78	1.23	442.62	243.84
	2.00	38.23	150.43	265.78	1.23	9.49	11.40
	3.70	42.01	150.43	265.78	1.23	469.40	254.03
K116	ULTKLM MIN						
	3.0E-01	-208.14	-142.89	-270.56	-1.23	-450.51	-231.81
	2.00	-204.36	-142.89	-270.56	-1.23	-9.24	-12.18
	3.70	-200.58	-142.89	-270.56	-1.23	-461.01	-267.61
K117	ULTKLM MAX						
	3.0E-01	-199.44	190.26	538.32	3.89	816.97	212.10
	2.00	-192.71	190.26	538.32	3.89	92.37	139.55
	3.70	-185.99	190.26	538.32	3.89	1004.04	583.33
K117	ULTKLM MIN						
	3.0E-01	-423.86	-263.77	-536.45	-3.88	-819.91	-318.22
	2.00	-417.14	-263.77	-536.45	-3.88	-98.49	-120.71
	3.70	-410.42	-263.77	-536.45	-3.88	-1013.34	-439.53
K118	ULTKLM MAX						
	3.0E-01	322.01	442.78	557.27	3.89	852.08	676.37
	2.00	328.73	442.78	557.27	3.89	89.73	68.07
	3.70	335.45	442.78	557.27	3.89	1032.08	730.02
K118	ULTKLM MIN						
	3.0E-01	-1040.44	-390.10	-554.57	-3.88	-853.46	-596.33
	2.00	-1033.72	-390.10	-554.57	-3.88	-95.70	-77.58
	3.70	-1027.00	-390.10	-554.57	-3.88	-1042.64	-829.07
K119	ULTKLM MAX						
	3.0E-01	1329.22	187.48	227.02	1.23	378.33	321.51
	2.00	1333.00	187.48	227.02	1.23	19.19	34.57
	3.70	1336.78	187.48	227.02	1.23	396.41	312.26
K119	ULTKLM MIN						
	3.0E-01	-1662.28	-184.38	-228.59	-1.23	-380.81	-314.62
	2.00	-1658.49	-184.38	-228.59	-1.23	-18.99	-32.95
	3.70	-1654.71	-184.38	-228.59	-1.23	-393.52	-315.92
K120	ULTKLM MAX						
	3.0E-01	1083.26	150.92	236.90	1.23	408.06	214.39
	2.00	1087.04	150.92	236.90	1.23	24.87	78.06
	3.70	1090.82	150.92	236.90	1.23	409.53	356.63
K120	ULTKLM MIN						
	3.0E-01	-1596.49	-173.14	-243.44	-1.23	-418.83	-253.07
	2.00	-1592.70	-173.14	-243.44	-1.23	-24.52	-78.97
	3.70	-1588.92	-173.14	-243.44	-1.23	-398.06	-319.78
K121	ULTKLM MAX						
	3.0E-01	-15.56	107.02	271.04	1.23	453.28	159.51
	2.00	-11.78	107.02	271.04	1.23	7.86	35.57
	3.70	-8.00	107.02	271.04	1.23	480.33	139.85
K121	ULTKLM MIN						
	3.0E-01	-307.46	-64.82	-277.94	-1.23	-464.66	-88.87
	2.00	-303.68	-64.82	-277.94	-1.23	-7.51	-36.67
	3.70	-299.90	-64.82	-277.94	-1.23	-468.25	-212.68
K122	ULTKLM MAX						
	3.0E-01	620.10	105.94	250.44	1.23	429.45	156.78
	2.00	623.88	105.94	250.44	1.23	20.38	61.06
	3.70	627.66	105.94	250.44	1.23	422.53	341.38
K122	ULTKLM MIN						
	3.0E-01	-1183.91	-170.58	-250.91	-1.23	-430.55	-267.32
	2.00	-1180.13	-170.58	-250.91	-1.23	-20.69	-61.70
	3.70	-1176.35	-170.58	-250.91	-1.23	-422.06	-232.13
K123	ULTKLM MAX						
	3.0E-01	-152.79	140.20	277.65	1.23	464.24	205.80
	2.00	-149.55	140.20	277.65	1.23	7.71	35.56
	3.70	-146.31	140.20	277.65	1.23	480.06	132.25
K123	ULTKLM MIN						
	3.0E-01	-262.91	-57.50	-277.86	-1.23	-464.67	-63.83
	2.00	-258.59	-57.50	-277.86	-1.23	-7.79	-34.17
	3.70	-254.27	-57.50	-277.86	-1.23	-479.78	-271.43
K124	ULTKLM MAX						
	3.0E-01	-236.46	186.14	552.30	3.89	860.09	207.48
	2.00	-229.74	186.14	552.30	3.89	84.09	137.27
	3.70	-223.02	186.14	552.30	3.89	1068.69	625.88
K124	ULTKLM MIN						
	3.0E-01	-485.96	-289.26	-579.31	-3.88	-900.98	-362.53
	2.00	-479.23	-289.26	-579.31	-3.88	-79.05	-117.03

		3.70	-472.51	-289.26	-579.31	-3.88	-1017.72	-430.36
K125	ULTKLM MAX	3.0E-01	-276.64	472.27	576.69	3.89	900.23	738.25
		2.00	-269.92	472.27	576.69	3.89	85.26	55.23
		3.70	-263.19	472.27	576.69	3.89	1108.72	718.67
K125	ULTKLM MIN	3.0E-01	-554.91	-391.06	-602.18	-3.88	-938.69	-611.93
		2.00	-548.19	-391.06	-602.18	-3.88	-80.39	-66.98
		3.70	-541.46	-391.06	-602.18	-3.88	-1060.51	-868.47
K126	ULTKLM MAX	3.0E-01	283.77	197.32	233.94	1.23	394.63	336.99
		2.00	287.55	197.32	233.94	1.23	18.49	7.42
		3.70	291.33	197.32	233.94	1.23	403.12	332.84
K126	ULTKLM MIN	3.0E-01	-564.52	-195.99	-235.53	-1.23	-397.67	-333.55
		2.00	-560.74	-195.99	-235.53	-1.23	-18.84	-6.23
		3.70	-556.95	-195.99	-235.53	-1.23	-400.77	-333.89
K127	ULTKLM MAX	3.0E-01	-7.32	145.64	260.96	1.23	438.42	229.68
		2.00	-3.54	145.64	260.96	1.23	4.76	19.04
		3.70	2.393E-01	145.64	260.96	1.23	441.84	268.52
K127	ULTKLM MIN	3.0E-01	-317.86	-147.86	-257.13	-1.23	-432.40	-234.20
		2.00	-314.08	-147.86	-257.13	-1.23	-5.24	-19.78
		3.70	-310.29	-147.86	-257.13	-1.23	-448.83	-265.50
K128	ULTKLM MAX	3.0E-01	-50.74	44.07	272.29	1.23	456.99	83.66
		2.00	-46.95	44.07	272.29	1.23	5.57	58.00
		3.70	-43.17	44.07	272.29	1.23	464.97	96.89
K128	ULTKLM MIN	3.0E-01	-214.65	-24.73	-270.26	-1.23	-453.91	-52.42
		2.00	-210.87	-24.73	-270.26	-1.23	-5.96	-59.63
		3.70	-207.09	-24.73	-270.26	-1.23	-468.81	-131.40
K129	ULTKLM MAX	3.0E-01	780.14	150.77	193.25	1.23	320.46	243.62
		2.00	783.92	150.77	193.25	1.23	18.75	13.08
		3.70	787.70	150.77	193.25	1.23	322.97	275.95
K129	ULTKLM MIN	3.0E-01	-914.16	-154.73	-185.66	-1.23	-308.27	-250.15
		2.00	-910.38	-154.73	-185.66	-1.23	-19.45	-12.86
		3.70	-906.60	-154.73	-185.66	-1.23	-336.58	-268.99
K130	ULTKLM MAX	3.0E-01	99.67	186.11	138.90	1.23	196.50	312.08
		2.00	103.45	186.11	138.90	1.23	38.24	4.69
		3.70	107.24	186.11	138.90	1.23	172.86	327.58
K130	ULTKLM MIN	3.0E-01	-393.33	-189.94	-79.77	-1.23	-100.08	-318.22
		2.00	-389.55	-189.94	-79.77	-1.23	-42.34	-4.33
		3.70	-385.77	-189.94	-79.77	-1.23	-277.47	-320.71
K131	ULTKLM MAX	3.0E-01	-147.71	191.89	203.78	1.23	305.48	319.76
		2.00	-143.93	191.89	203.78	1.23	39.29	6.39
		3.70	-140.15	191.89	203.78	1.23	187.40	332.05
K131	ULTKLM MIN	3.0E-01	-276.78	-191.56	-87.32	-1.23	-109.56	-319.26
		2.00	-273.00	-191.56	-87.32	-1.23	-41.35	-6.45
		3.70	-269.21	-191.56	-87.32	-1.23	-387.44	-332.67
K132	ULTKLM MAX	3.0E-01	-126.32	194.01	167.17	1.23	248.78	323.04
		2.00	-122.54	194.01	167.17	1.23	49.18	6.50
		3.70	-118.76	194.01	167.17	1.23	163.09	329.94
K132	ULTKLM MIN	3.0E-01	-244.89	-190.26	-67.15	-1.23	-77.09	-316.93
		2.00	-241.11	-190.26	-67.15	-1.23	-47.52	-6.77
		3.70	-237.33	-190.26	-67.15	-1.23	-331.48	-336.58
K133	ULTKLM MAX	3.0E-01	-64.14	195.50	202.19	1.23	308.13	328.26
		2.00	-60.36	195.50	202.19	1.23	38.34	3.89
		3.70	-56.58	195.50	202.19	1.23	257.71	324.02
K133	ULTKLM MIN	3.0E-01	-235.54	-188.31	-129.04	-1.23	-181.02	-316.24
		2.00	-231.75	-188.31	-129.04	-1.23	-35.59	-4.08
		3.70	-227.97	-188.31	-129.04	-1.23	-379.32	-336.43
K134	ULTKLM MAX	3.0E-01	160.46	151.30	223.78	1.23	362.71	241.06
		2.00	164.24	151.30	223.78	1.23	17.55	15.77
		3.70	168.02	151.30	223.78	1.23	385.79	256.44



K134	ULTKLM MIN						
	3.0E-01	-293.67	-141.81	-216.66	-1.23	-350.84	-225.71
	2.00	-289.89	-141.81	-216.66	-1.23	-17.78	-16.55
	3.70	-286.11	-141.81	-216.66	-1.23	-398.13	-273.36
K135	ULTKLM MAX						
	3.0E-01	-45.29	163.04	397.54	3.89	543.26	146.32
	2.00	-38.56	163.04	397.54	3.89	145.39	153.96
	3.70	-31.84	163.04	397.54	3.89	712.38	634.17
K135	ULTKLM MIN						
	3.0E-01	-559.59	-284.31	-333.78	-3.88	-442.71	-337.67
	2.00	-552.87	-284.31	-333.78	-3.88	-153.22	-139.14
	3.70	-546.15	-284.31	-333.78	-3.88	-828.60	-413.19
K136	ULTKLM MAX						
	3.0E-01	37.01	451.25	405.98	3.89	562.66	698.16
	2.00	43.73	451.25	405.98	3.89	123.72	61.47
	3.70	50.45	451.25	405.98	3.89	699.73	667.17
K136	ULTKLM MIN						
	3.0E-01	-747.89	-356.94	-339.38	-3.88	-458.57	-546.41
	2.00	-741.17	-356.94	-339.38	-3.88	-132.85	-70.04
	3.70	-734.45	-356.94	-339.38	-3.88	-822.07	-836.07
K137	ULTKLM MAX						
	3.0E-01	285.85	163.03	186.62	1.23	292.96	270.01
	2.00	289.63	163.03	186.62	1.23	24.00	7.35
	3.70	293.42	163.03	186.62	1.23	327.33	277.30
K137	ULTKLM MIN						
	3.0E-01	-368.90	-158.79	-178.52	-1.23	-279.62	-262.59
	2.00	-365.12	-158.79	-178.52	-1.23	-24.44	-7.15
	3.70	-361.34	-158.79	-178.52	-1.23	-341.55	-284.31
K138	ULTKLM MAX						
	0.00	188.25	1213.28	795.63	232.23	1573.84	2868.19
	1.97	192.62	1213.28	795.63	232.23	20.74	484.09
	3.93	196.99	1213.28	795.63	232.23	1563.24	1900.32
K138	ULTKLM MIN						
	0.00	-281.77	-1211.23	-800.23	-233.49	-1581.68	-2859.83
	1.97	-277.40	-1211.23	-800.23	-233.49	-19.54	-479.76
	3.93	-273.03	-1211.23	-800.23	-233.49	-1552.99	-1900.01
K139	ULTKLM MAX						
	0.00	1331.04	1570.86	846.50	223.37	1644.88	3160.66
	1.97	1335.41	1570.86	846.50	223.37	18.58	73.93
	3.93	1339.78	1570.86	846.50	223.37	1682.83	3002.74
K139	ULTKLM MIN						
	0.00	-1483.89	-1564.32	-846.98	-223.83	-1645.80	-3145.04
	1.97	-1479.52	-1564.32	-846.98	-223.83	-18.56	-71.15
	3.93	-1475.15	-1564.32	-846.98	-223.83	-1681.87	-3012.81
K140	ULTKLM MAX						
	0.00	1074.62	1555.82	1429.36	223.37	2785.07	3036.70
	1.97	1078.99	1555.82	1429.36	223.37	26.31	13.46
	3.93	1083.36	1555.82	1429.36	223.37	2834.46	3069.21
K140	ULTKLM MIN						
	0.00	-1225.40	-1555.56	-1432.29	-223.83	-2794.45	-3044.12
	1.97	-1221.03	-1555.56	-1432.29	-223.83	-29.92	-21.39
	3.93	-1216.66	-1555.56	-1432.29	-223.83	-2832.31	-3077.66
K141	ULTKLM MAX						
	0.00	674.45	830.36	1400.10	223.37	2766.69	1635.86
	1.97	678.82	830.36	1400.10	223.37	18.71	9.48
	3.93	683.19	830.36	1400.10	223.37	2753.22	1641.55
K141	ULTKLM MIN						
	0.00	-766.81	-849.51	-1407.02	-223.83	-2776.38	-1697.01
	1.97	-762.44	-849.51	-1407.02	-223.83	-14.80	-33.00
	3.93	-758.07	-849.51	-1407.02	-223.83	-2735.71	-1627.45
K142	ULTKLM MAX						
	0.00	315.64	261.95	803.40	223.37	1593.33	544.69
	1.97	320.01	261.95	803.40	223.37	15.08	41.06
	3.93	324.38	261.95	803.40	223.37	1560.25	487.09
K142	ULTKLM MIN						
	0.00	-433.96	-257.61	-801.73	-223.83	-1590.91	-530.69
	1.97	-429.59	-257.61	-801.73	-223.83	-15.94	-35.59
	3.93	-425.22	-257.61	-801.73	-223.83	-1564.40	-490.16
K143	ULTKLM MAX						
	0.00	-29.35	-1.20	11.55	26.65	77.43	18.80
	2.95	-17.69	-1.20	11.55	26.65	47.02	29.93
	5.90	-6.02	-1.20	11.55	26.65	29.79	46.43
K143	ULTKLM MIN						
	0.00	-56.81	-17.69	-24.25	-31.56	-130.70	-93.68
	2.95	-44.58	-17.69	-24.25	-31.56	-62.80	-49.08
	5.90	-32.92	-17.69	-24.25	-31.56	-8.08	-9.83
K144	ULTKLM MAX						

		0.00	-13.49	19.66	100.18	150.63	533.30	66.40
		2.95	-1.83	19.66	100.18	150.63	214.17	24.26
		5.90	9.84	19.66	100.18	150.63	107.41	24.33
K144	ULTKLM	MIN						
		0.00	-54.44	-1.72	-111.99	-159.39	-553.34	-3.04
		2.95	-42.78	-1.72	-111.99	-159.39	-222.96	-13.83
		5.90	-31.12	-1.72	-111.99	-159.39	-104.97	-66.82
K145	ULTKLM	MAX						
		0.00	100.36	10.13	170.03	51.51	539.33	25.27
		2.95	114.92	10.13	170.03	51.51	39.22	3.68
		5.90	121.48	10.13	170.03	51.51	467.35	23.78
K145	ULTKLM	MIN						
		0.00	-163.03	-6.81	-170.46	-51.98	-538.36	-16.42
		2.95	-156.47	-6.81	-170.46	-51.98	-36.98	-4.61
		5.90	-149.91	-6.81	-170.46	-51.98	-463.83	-34.49
K146	ULTKLM	MAX						
		0.00	-31.11	2.92	11.05	3.32	16.80	19.04
		2.95	-21.12	2.92	11.05	3.32	32.39	10.52
		5.90	-9.75	2.92	11.05	3.32	52.02	5.02
K146	ULTKLM	MIN						
		0.00	-49.74	-5.18	-9.02	-11.82	-5.01	-33.42
		2.95	-34.19	-5.18	-9.02	-11.82	-26.57	-18.24
		5.90	-18.64	-5.18	-9.02	-11.82	-52.19	-6.08
K147	ULTKLM	MAX						
		0.00	6.35	14.68	227.82	44.14	681.78	119.43
		2.95	12.91	14.68	227.82	44.14	10.15	85.90
		5.90	19.48	14.68	227.82	44.14	661.55	65.87
K147	ULTKLM	MIN						
		0.00	-64.37	-13.88	-227.68	-43.81	-681.77	-115.71
		2.95	-57.81	-13.88	-227.68	-43.81	-10.55	-84.56
		5.90	-51.25	-13.88	-227.68	-43.81	-662.36	-66.93
K148	ULTKLM	MAX						
		0.00	-32.76	-1.853E-01	8.68	1.44	9.23	-6.097E-01
		2.95	-22.77	-1.853E-01	8.68	1.44	32.85	-3.694E-02
		5.90	-12.77	-1.853E-01	8.68	1.44	56.46	1.33
K148	ULTKLM	MIN						
		0.00	-51.50	-1.45	-8.89	-3.16	-9.97	-10.93
		2.95	-35.95	-1.45	-8.89	-3.16	-32.95	-6.68
		5.90	-20.40	-1.45	-8.89	-3.16	-55.94	-3.23
K149	ULTKLM	MAX						
		0.00	49.81	112.45	210.98	142.79	652.58	560.66
		2.95	56.37	112.45	210.98	142.79	30.20	228.94
		5.90	62.93	112.45	210.98	142.79	593.33	103.13
K149	ULTKLM	MIN						
		0.00	-106.12	-112.01	-211.28	-143.43	-653.25	-557.75
		2.95	-99.56	-112.01	-211.28	-143.43	-29.96	-227.31
		5.90	-93.00	-112.01	-211.28	-143.43	-592.18	-102.77
K150	ULTKLM	MAX						
		0.00	-32.30	7.888E-01	7.36	1.39	6.77	5.17
		2.95	-22.31	7.888E-01	7.36	1.39	30.79	2.96
		5.90	-12.31	7.888E-01	7.36	1.39	54.80	8.451E-01
K150	ULTKLM	MIN						
		0.00	-50.31	-3.959E-02	-9.44	-2.750E-01	-16.50	-1.60
		2.95	-34.76	-3.959E-02	-9.44	-2.750E-01	-34.39	-1.60
		5.90	-19.21	-3.959E-02	-9.44	-2.750E-01	-52.28	-1.69
K151	ULTKLM	MAX						
		0.00	-33.18	1.29	9.79	3.29	14.91	9.16
		2.95	-23.18	1.29	9.79	3.29	35.70	5.37
		5.90	-13.18	1.29	9.79	3.29	56.49	1.73
K151	ULTKLM	MIN						
		0.00	-52.20	-5.419E-01	-7.90	-2.80	-3.84	-6.78
		2.95	-36.64	-5.419E-01	-7.90	-2.80	-30.18	-5.21
		5.90	-21.09	-5.419E-01	-7.90	-2.80	-56.53	-3.79
K152	ULTKLM	MAX						
		0.00	-30.64	2.13	7.95	13.75	-7.042E-01	12.61
		2.95	-20.65	2.13	7.95	13.75	24.68	6.73
		5.90	-9.22	2.13	7.95	13.75	56.39	4.48
K152	ULTKLM	MIN						
		0.00	-49.04	-7.39	-12.99	-5.92	-22.85	-45.52
		2.95	-33.48	-7.39	-12.99	-5.92	-33.35	-24.11
		5.90	-17.93	-7.39	-12.99	-5.92	-50.17	-6.34
K153	ULTKLM	MAX						
		0.00	-21.64	9.28	24.83	38.79	132.55	32.35
		2.95	-9.98	9.28	24.83	38.79	63.37	21.83
		5.90	1.69	9.28	24.83	38.79	10.57	78.14
K153	ULTKLM	MIN						
		0.00	-64.62	-36.85	-9.68	-33.87	-65.85	-151.23
		2.95	-52.96	-36.85	-9.68	-33.87	-41.35	-59.37

		5.90	-41.29	-36.85	-9.68	-33.87	-33.21	-34.33
K154	ULTKLM	MAX						
		0.00	-3.00	49.28	127.72	157.69	644.34	156.98
		2.95	8.66	49.28	127.72	157.69	267.56	31.25
		5.90	20.33	49.28	127.72	157.69	107.54	73.11
K154	ULTKLM	MIN						
		0.00	-55.08	-21.05	-120.33	-154.47	-602.42	-51.11
		2.95	-43.42	-21.05	-120.33	-154.47	-247.44	-8.64
		5.90	-31.75	-21.05	-120.33	-154.47	-109.22	-133.75
K155	ULTKLM	MAX						
		0.00	32.18	18.60	166.25	29.56	548.46	52.37
		2.95	38.74	18.60	166.25	29.56	58.03	1.08
		5.90	45.30	18.60	166.25	29.56	422.75	41.87
K155	ULTKLM	MIN						
		0.00	-97.59	-14.11	-162.60	-26.65	-536.62	-41.43
		2.95	-91.03	-14.11	-162.60	-26.65	-56.94	-3.39
		5.90	-84.47	-14.11	-162.60	-26.65	-432.39	-57.43
K156	ULTKLM	MAX						
		0.00	446.39	10.98	258.67	108.83	837.24	27.93
		3.10	453.29	10.98	258.67	108.83	35.71	8.70
		6.20	460.18	10.98	258.67	108.83	769.27	46.24
K156	ULTKLM	MIN						
		0.00	-491.44	-12.93	-259.64	-109.06	-840.49	-34.36
		3.10	-484.55	-12.93	-259.64	-109.06	-35.94	-9.11
		6.20	-477.65	-12.93	-259.64	-109.06	-766.48	-40.62
K157	ULTKLM	MAX						
		0.00	35.25	11.42	65.62	92.55	277.49	34.06
		3.10	42.15	11.42	65.62	92.55	74.20	1.41
		6.20	49.04	11.42	65.62	92.55	132.50	37.49
K157	ULTKLM	MIN						
		0.00	-69.71	-11.66	-68.19	-92.19	-290.25	-34.81
		3.10	-62.81	-11.66	-68.19	-92.19	-79.00	-1.42
		6.20	-55.92	-11.66	-68.19	-92.19	-129.35	-36.75
K158	ULTKLM	MAX						
		0.00	-3.31	12.18	21.47	52.18	123.19	37.55
		3.10	3.58	12.18	21.47	52.18	57.38	2.03
		6.20	10.48	12.18	21.47	52.18	10.12	36.01
K158	ULTKLM	MIN						
		0.00	-43.82	-11.54	-21.00	-52.30	-122.09	-35.56
		3.10	-36.92	-11.54	-21.00	-52.30	-57.73	-2.02
		6.20	-30.03	-11.54	-21.00	-52.30	-11.92	-37.99
K159	ULTKLM	MAX						
		0.00	-3.10	11.90	3.66	27.24	22.05	36.45
		3.10	3.79	11.90	3.66	27.24	19.33	1.69
		6.20	10.69	11.90	3.66	27.24	25.75	37.30
K159	ULTKLM	MIN						
		0.00	-39.18	-11.87	-4.58	-27.74	-27.06	-36.38
		3.10	-32.28	-11.87	-4.58	-27.74	-21.50	-1.72
		6.20	-25.39	-11.87	-4.58	-27.74	-25.10	-37.43
K160	ULTKLM	MAX						
		0.00	7.802E-01	11.62	1.83	15.51	6.65	35.92
		3.10	7.68	11.62	1.83	15.51	7.52	1.25
		6.20	14.57	11.62	1.83	15.51	14.94	34.81
K160	ULTKLM	MIN						
		0.00	-41.94	-11.18	-2.70	-16.14	-10.60	-34.53
		3.10	-35.05	-11.18	-2.70	-16.14	-8.77	-1.21
		6.20	-28.15	-11.18	-2.70	-16.14	-13.49	-36.13
K161	ULTKLM	MAX						
		0.00	-1.60	8.79	4.44	6.66	19.54	31.19
		3.10	5.29	8.79	4.44	6.66	6.19	5.28
		6.20	12.19	8.79	4.44	6.66	15.37	22.77
K161	ULTKLM	MIN						
		0.00	-44.22	-7.38	-6.61	-6.06	-26.79	-26.67
		3.10	-37.32	-7.38	-6.61	-6.06	-6.72	-5.12
		6.20	-30.43	-7.38	-6.61	-6.06	-9.18	-26.98
K162	ULTKLM	MAX						
		0.00	53.51	40.77	312.73	128.18	975.64	205.55
		3.10	60.40	40.77	312.73	128.18	6.28	80.06
		6.20	67.30	40.77	312.73	128.18	970.23	53.54
K162	ULTKLM	MIN						
		0.00	-103.88	-41.57	-315.00	-129.32	-982.76	-209.89
		3.10	-96.99	-41.57	-315.00	-129.32	-6.39	-81.90
		6.20	-90.09	-41.57	-315.00	-129.32	-963.32	-52.88
K163	ULTKLM	MAX						
		0.00	16.26	7.42	2.78	5.60	7.01	38.34
		3.10	23.16	7.42	2.78	5.60	2.00	15.34
		6.20	30.05	7.42	2.78	5.60	15.03	7.07

K163	ULTKLM	MIN						
		0.00	-55.12	-7.47	-4.28	-3.41	-11.55	-39.28
		3.10	-48.22	-7.47	-4.28	-3.41	-1.90	-16.12
		6.20	-41.33	-7.47	-4.28	-3.41	-10.28	-7.69
K164	ULTKLM	MAX						
		0.00	319.52	169.07	299.49	132.31	956.96	671.70
		3.10	326.42	169.07	299.49	132.31	28.57	147.59
		6.20	333.31	169.07	299.49	132.31	909.33	376.74
K164	ULTKLM	MIN						
		0.00	-356.13	-170.61	-302.58	-132.94	-966.68	-681.04
		3.10	-349.23	-170.61	-302.58	-132.94	-28.70	-152.15
		6.20	-342.34	-170.61	-302.58	-132.94	-899.86	-376.51
K165	ULTKLM	MAX						
		0.00	13.69	1.51	3.78	3.89	8.18	5.57
		3.10	20.58	1.51	3.78	3.89	3.21	2.23
		6.20	27.48	1.51	3.78	3.89	23.60	8.97
K165	ULTKLM	MIN						
		0.00	-62.70	-3.01	-6.58	-1.21	-17.18	-11.25
		3.10	-55.81	-3.01	-6.58	-1.21	-3.55	-3.26
		6.20	-48.91	-3.01	-6.58	-1.21	-15.27	-5.34
K166	ULTKLM	MAX						
		0.00	-9.846E-01	3.16	4.02	2.57	10.19	21.57
		3.10	5.91	3.16	4.02	2.57	2.44	11.77
		6.20	12.81	3.16	4.02	2.57	27.04	3.35
K166	ULTKLM	MIN						
		0.00	-43.57	-1.39	-7.96	-1.29	-22.53	-8.34
		3.10	-36.67	-1.39	-7.96	-1.29	-2.58	-4.04
		6.20	-29.78	-1.39	-7.96	-1.29	-14.99	-1.11
K167	ULTKLM	MAX						
		0.00	-1.09	5.86	6.88	1.12	18.83	32.81
		3.10	5.80	5.86	6.88	1.12	2.57	15.90
		6.20	12.70	5.86	6.88	1.12	27.24	2.98
K167	ULTKLM	MIN						
		0.00	-26.50	1.87	-7.96	-3.58	-22.10	9.39
		3.10	-19.60	1.87	-7.96	-3.58	-2.51	2.33
		6.20	-12.71	1.87	-7.96	-3.58	-23.84	-8.71
K168	ULTKLM	MAX						
		0.00	444.86	48.66	311.76	117.41	988.50	198.65
		3.10	451.75	48.66	311.76	117.41	22.03	47.82
		6.20	458.65	48.66	311.76	117.41	937.75	104.12
K168	ULTKLM	MIN						
		0.00	-494.99	-49.40	-309.66	-115.32	-982.13	-202.32
		3.10	-488.09	-49.40	-309.66	-115.32	-22.19	-49.18
		6.20	-481.20	-49.40	-309.66	-115.32	-944.44	-103.18
K169	ULTKLM	MAX						
		0.00	2.52	8.29	3.63	2.69	9.28	43.52
		3.10	9.42	8.29	3.63	2.69	1.98	18.58
		6.20	16.31	8.29	3.63	2.69	11.83	8.07
K169	ULTKLM	MIN						
		0.00	-54.18	-6.74	-3.26	-6.58	-8.41	-34.42
		3.10	-47.29	-6.74	-3.26	-6.58	-2.25	-14.29
		6.20	-40.39	-6.74	-3.26	-6.58	-13.24	-8.59
K170	ULTKLM	MAX						
		0.00	442.26	10.95	261.92	43.93	845.79	35.89
		3.10	449.16	10.95	261.92	43.93	34.29	6.06
		6.20	456.05	10.95	261.92	43.93	771.84	40.09
K170	ULTKLM	MIN						
		0.00	-489.02	-13.62	-259.49	-47.85	-836.98	-44.59
		3.10	-482.12	-13.62	-259.49	-47.85	-33.03	-6.49
		6.20	-475.23	-13.62	-259.49	-47.85	-778.14	-32.27
K171	ULTKLM	MAX						
		0.00	28.51	13.54	95.40	79.59	410.41	40.95
		3.10	35.41	13.54	95.40	79.59	114.66	1.46
		6.20	42.30	13.54	95.40	79.59	180.13	51.51
K171	ULTKLM	MIN						
		0.00	-71.55	-16.38	-90.69	-87.57	-382.18	-50.06
		3.10	-64.65	-16.38	-90.69	-87.57	-101.03	-1.74
		6.20	-57.76	-16.38	-90.69	-87.57	-181.08	-42.98
K172	ULTKLM	MAX						
		0.00	-4.07	11.25	37.86	62.73	216.19	34.84
		3.10	2.82	11.25	37.86	62.73	98.82	1.71
		6.20	9.72	11.25	37.86	62.73	18.39	37.80
K172	ULTKLM	MIN						
		0.00	-29.74	-12.19	-29.66	-66.01	-165.83	-37.95
		3.10	-22.85	-12.19	-29.66	-66.01	-73.88	-1.90
		6.20	-15.96	-12.19	-29.66	-66.01	-18.87	-35.08
K173	ULTKLM	MAX						

		0.00	-12.70	11.91	9.08	41.62	73.62	36.50
		3.10	-5.81	11.91	9.08	41.62	48.96	1.94
		6.20	1.09	11.91	9.08	41.62	25.05	36.32
K173	ULTKLM	MIN						
		0.00	-36.53	-11.53	-4.18	-37.90	-39.13	-35.28
		3.10	-29.64	-11.53	-4.18	-37.90	-29.67	-1.89
		6.20	-22.74	-11.53	-4.18	-37.90	-20.98	-37.43
K174	ULTKLM	MAX						
		0.00	8.15	11.40	7.38	27.90	38.86	35.53
		3.10	15.04	11.40	7.38	27.90	23.02	1.26
		6.20	21.94	11.40	7.38	27.90	18.88	30.73
K174	ULTKLM	MIN						
		0.00	-41.93	-9.88	-1.76	-20.48	-6.76	-30.51
		3.10	-35.04	-9.88	-1.76	-20.48	-8.33	-9.552E-01
		6.20	-28.14	-9.88	-1.76	-20.48	-21.59	-35.14
K175	ULTKLM	MAX						
		0.00	6.82	9.79	7.25	12.82	29.54	34.07
		3.10	13.72	9.79	7.25	12.82	7.19	5.78
		6.20	20.61	9.79	7.25	12.82	14.09	19.76
K175	ULTKLM	MIN						
		0.00	-52.60	-7.10	-6.27	-10.34	-25.30	-25.28
		3.10	-45.70	-7.10	-6.27	-10.34	-5.99	-5.30
		6.20	-38.81	-7.10	-6.27	-10.34	-15.92	-27.61
K176	ULTKLM	MAX						
		0.00	71.05	208.29	361.74	200.26	503.43	538.79
		9.9E-01	73.24	208.29	361.74	200.26	149.18	333.62
		1.97	75.43	208.29	361.74	200.26	215.40	128.45
K176	ULTKLM	MIN						
		0.00	-110.01	-209.09	-372.02	-200.18	-517.47	-540.93
		9.9E-01	-107.82	-209.09	-372.02	-200.18	-153.11	-334.98
		1.97	-105.63	-209.09	-372.02	-200.18	-209.21	-129.02
K177	ULTKLM	MAX						
		0.00	11.05	71.66	329.19	64.63	367.16	203.22
		9.9E-01	13.24	71.66	329.19	64.63	42.92	132.64
		1.97	15.43	71.66	329.19	64.63	282.87	63.33
K177	ULTKLM	MIN						
		0.00	-47.77	-70.56	-330.34	-65.34	-367.89	-201.31
		9.9E-01	-45.58	-70.56	-330.34	-65.34	-42.53	-131.81
		1.97	-43.39	-70.56	-330.34	-65.34	-281.36	-63.59
K178	ULTKLM	MAX						
		0.00	139.01	103.88	330.29	120.93	495.80	192.85
		9.9E-01	141.20	103.88	330.29	120.93	170.46	90.78
		1.97	143.39	103.88	330.29	120.93	151.43	22.09
K178	ULTKLM	MIN						
		0.00	-178.07	-105.26	-324.50	-119.31	-487.84	-199.56
		9.9E-01	-175.88	-105.26	-324.50	-119.31	-168.20	-96.13
		1.97	-173.69	-105.26	-324.50	-119.31	-154.87	-26.08
K179	ULTKLM	MAX						
		0.00	444.61	404.71	796.65	289.56	995.00	571.83
		1.14	447.13	404.71	796.65	289.56	105.03	112.48
		2.27	449.65	404.71	796.65	289.56	818.31	344.59
K179	ULTKLM	MIN						
		0.00	-475.75	-403.07	-795.50	-288.76	-987.48	-570.38
		1.14	-473.22	-403.07	-795.50	-288.76	-98.82	-112.90
		2.27	-470.70	-403.07	-795.50	-288.76	-813.39	-346.86
K180	ULTKLM	MAX						
		0.00	471.49	45.05	862.94	31.97	1126.42	41.35
		1.14	474.01	45.05	862.94	31.97	146.98	9.09
		2.27	476.54	45.05	862.94	31.97	834.88	65.37
K180	ULTKLM	MIN						
		0.00	-481.27	-51.56	-871.71	-27.33	-1143.91	-51.94
		1.14	-478.75	-51.56	-871.71	-27.33	-154.51	-12.29
		2.27	-476.22	-51.56	-871.71	-27.33	-832.45	-61.18

LOAD COMBINATION MULTIPLIERS

COMBO	TYPE	CASE	FACTOR	TYPE	TITLE
ULTBLK	ENVE				Gaya-gaya Ultimit Untuk Elemen Balok
		U1	1.0000	COMBO	
		U2	1.0000	COMBO	
		U3BLK	1.0000	COMBO	
		U4	1.0000	COMBO	

FRAME ELEMENT FORCES

FRAME	LOAD	LOC	P	V2	V3	T	M2	M3
ANAK2	ULTBLK	MAX						
		0.00	0.00	-76.88	0.00	8.677E-02	0.00	29.52
		4.50	0.00	14.89	0.00	8.677E-02	0.00	292.55
ANAK2	ULTBLK	MIN						
		0.00	0.00	-148.46	0.00	-3.557E-01	0.00	-128.26
		4.50	0.00	-13.41	0.00	-3.557E-01	0.00	158.52
ANAK3	ULTBLK	MAX						
		0.00	0.00	-37.37	0.00	3.189E-01	0.00	52.79
		4.50	0.00	14.65	0.00	3.189E-01	0.00	202.96
ANAK3	ULTBLK	MIN						
		0.00	0.00	-95.79	0.00	-1.298E-01	0.00	-103.47
		4.50	0.00	-13.67	0.00	-1.298E-01	0.00	90.95
ANAK4	ULTBLK	MAX						
		0.00	0.00	-37.53	0.00	3.407E-01	0.00	50.67
		4.50	0.00	14.46	0.00	3.407E-01	0.00	201.23
ANAK4	ULTBLK	MIN						
		0.00	0.00	-95.97	0.00	-2.402E-01	0.00	-105.70
		4.50	0.00	-13.78	0.00	-2.402E-01	0.00	89.48
ANAK5	ULTBLK	MAX						
		1.5E-01	0.00	-5.94	0.00	8.22	0.00	105.31
		2.33	0.00	28.87	0.00	8.22	0.00	89.74
ANAK5	ULTBLK	MIN						
		1.5E-01	0.00	-85.60	0.00	-5.72	0.00	-181.87
		2.33	0.00	-44.72	0.00	-5.72	0.00	-37.37
ANAK6	ULTBLK	MAX						
		0.00	0.00	-6.75	0.00	5.85	0.00	-17.74
		2.93	0.00	19.19	0.00	5.85	0.00	30.47
ANAK6	ULTBLK	MIN						
		0.00	0.00	-98.54	0.00	-6.70	0.00	-208.45
		2.93	0.00	-57.63	0.00	-6.70	0.00	-29.93
ANAK7	ULTBLK	MAX						
		0.00	0.00	1.87	0.00	2.73	0.00	24.39
		1.50	0.00	9.37	0.00	2.73	0.00	19.81
ANAK7	ULTBLK	MIN						
		0.00	0.00	-30.75	0.00	-1.34	0.00	-47.38
		1.50	0.00	-19.91	0.00	-1.34	0.00	-8.17
ANAK8	ULTBLK	MAX						
		0.00	0.00	76.09	0.00	1.65	0.00	9.37
		7.5E-01	0.00	93.02	0.00	1.65	0.00	1.63
ANAK8	ULTBLK	MIN						
		0.00	0.00	2.81	0.00	-7.79	0.00	-19.52
		7.5E-01	0.00	15.30	0.00	-7.79	0.00	-82.77
ANAK9	ULTBLK	MAX						
		0.00	0.00	-37.37	0.00	3.558E-02	0.00	49.17

		4.50	0.00	14.65	0.00	3.558E-02	0.00	198.33
		9.00	0.00	96.99	0.00	3.558E-02	0.00	18.78
ANAK9	ULTBLK	MIN						
		0.00	0.00	-95.95	0.00	-1.983E-01	0.00	-109.05
		4.50	0.00	-13.94	0.00	-1.983E-01	0.00	87.28
		9.00	0.00	37.83	0.00	-1.983E-01	0.00	-82.65
INDK1	ULTBLK	MAX						
		0.00	0.00	-4.59	0.00	11.87	0.00	7.98
		1.50	0.00	4.46	0.00	11.87	0.00	11.35
		3.00	0.00	16.03	0.00	11.87	0.00	12.78
INDK1	ULTBLK	MIN						
		0.00	0.00	-22.43	0.00	-7.13	0.00	-24.46
		1.50	0.00	-10.86	0.00	-7.13	0.00	4.072E-01
		3.00	0.00	-3.147E-01	0.00	-7.13	0.00	-10.05
INDK2	ULTBLK	MAX						
		0.00	0.00	22.43	0.00	7.98	0.00	7.13
		1.40	0.00	32.72	0.00	7.98	0.00	-6.18
		2.80	0.00	47.41	0.00	7.98	0.00	-30.57
INDK2	ULTBLK	MIN						
		0.00	0.00	4.59	0.00	-24.46	0.00	-11.87
		1.40	0.00	12.52	0.00	-24.46	0.00	-48.20
		2.80	0.00	21.18	0.00	-24.46	0.00	-102.68
INDK3	ULTBLK	MAX						
		1.5E-01	0.00	-16.49	0.00	10.05	0.00	-14.05
		1.58	0.00	-7.81	0.00	10.05	0.00	4.11
		3.00	0.00	3.147E-01	0.00	10.05	0.00	11.87
INDK3	ULTBLK	MIN						
		1.5E-01	0.00	-40.63	0.00	-12.78	0.00	-82.52
		1.58	0.00	-26.79	0.00	-12.78	0.00	-35.25
		3.00	0.00	-16.03	0.00	-12.78	0.00	-7.13
INDK4	ULTBLK	MAX						
		2.0E-01	0.00	-15.68	0.00	2.28	0.00	199.06
		4.50	0.00	62.84	0.00	2.28	0.00	121.11
		8.80	0.00	149.47	0.00	2.28	0.00	114.73
INDK4	ULTBLK	MIN						
		2.0E-01	0.00	-143.07	0.00	4.126E-01	0.00	-370.61
		4.50	0.00	-56.43	0.00	4.126E-01	0.00	49.02
		8.80	0.00	20.51	0.00	4.126E-01	0.00	-341.38
INDK5	ULTBLK	MAX						
		2.0E-01	0.00	153.47	0.00	26.21	0.00	231.23
		1.53	0.00	169.31	0.00	26.21	0.00	19.06
		2.85	0.00	184.58	0.00	26.21	0.00	200.05
INDK5	ULTBLK	MIN						
		2.0E-01	0.00	-213.28	0.00	-13.37	0.00	-323.54
		1.53	0.00	-197.44	0.00	-13.37	0.00	-49.75
		2.85	0.00	-182.17	0.00	-13.37	0.00	-217.08
INDK6	ULTBLK	MAX						
		2.0E-01	0.00	54.42	0.00	64.46	0.00	400.48
		1.60	0.00	80.24	0.00	64.46	0.00	307.14
		3.00	0.00	104.94	0.00	64.46	0.00	177.12
INDK6	ULTBLK	MIN						
		2.0E-01	0.00	-257.35	0.00	-16.74	0.00	-563.11
		1.60	0.00	-231.53	0.00	-16.74	0.00	-219.97
		3.00	0.00	-206.82	0.00	-16.74	0.00	63.62
INDK7	ULTBLK	MAX						
		2.0E-01	0.00	35.49	0.00	-3.547E-01	0.00	346.04
		1.60	0.00	60.37	0.00	-3.547E-01	0.00	285.56
		3.00	0.00	94.22	0.00	-3.547E-01	0.00	176.63
INDK7	ULTBLK	MIN						
		2.0E-01	0.00	-273.47	0.00	-52.31	0.00	-585.75
		1.60	0.00	-242.18	0.00	-52.31	0.00	-223.12
		3.00	0.00	-208.33	0.00	-52.31	0.00	66.44
INDK8	ULTBLK	MAX						
		1.5E-01	0.00	58.66	0.00	-1.987E-01	0.00	169.41
		3.00	0.00	85.99	0.00	-1.987E-01	0.00	55.40
		5.85	0.00	113.31	0.00	-1.987E-01	0.00	234.45
INDK8	ULTBLK	MIN						
		1.5E-01	0.00	-105.17	0.00	-7.639E-01	0.00	-209.26
		3.00	0.00	-77.84	0.00	-7.639E-01	0.00	-32.85
		5.85	0.00	-50.52	0.00	-7.639E-01	0.00	-320.72
INDK9	ULTBLK	MAX						
		0.00	0.00	219.45	0.00	12.78	0.00	177.45
		1.40	0.00	244.16	0.00	12.78	0.00	195.43
		2.80	0.00	269.98	0.00	12.78	0.00	267.93
INDK9	ULTBLK	MIN						
		0.00	0.00	-90.19	0.00	-63.80	0.00	63.55
		1.40	0.00	-65.48	0.00	-63.80	0.00	-146.31
		2.80	0.00	-41.52	0.00	-63.80	0.00	-506.95

RING1	ULTBLK	MAX						
		0.00	-6.89	-7.73	4.961E-01	12.07	3.11	-5.03
		4.50	-6.89	2.12	4.961E-01	12.07	7.85	12.25
		9.00	-6.89	15.00	4.961E-01	12.07	14.86	-6.91
RING1	ULTBLK	MIN						
		0.00	-13.67	-14.65	-1.56	-12.15	-6.95	-24.62
		4.50	-13.67	-1.82	-1.56	-12.15	-6.91	7.31
		9.00	-13.67	7.95	-1.56	-12.15	-9.14	-24.97
RING2	ULTBLK	MAX						
		0.00	1.15	-1.41	29.92	13.17	44.96	5.00
		1.50	1.15	1.77	29.92	13.17	4.48	8.17
		3.00	1.15	5.20	29.92	13.17	40.21	12.58
RING2	ULTBLK	MIN						
		0.00	-5.24	-13.27	-27.17	-15.70	-41.31	-17.20
		1.50	-5.24	-9.56	-27.17	-15.70	-4.96	-2.71
		3.00	-5.24	-5.86	-27.17	-15.70	-44.81	-1.49
RING3	ULTBLK	MAX						
		0.00	-7.398E-01	-4.81	2.67	3.57	10.11	-1.66
		3.00	-7.398E-01	1.62	2.67	3.57	3.09	3.80
		6.00	-7.398E-01	9.07	2.67	3.57	-1.12	1.160E-01
RING3	ULTBLK	MIN						
		0.00	-12.39	-10.70	1.859E-01	-4.247E-01	-2.441E-01	-19.04
		3.00	-12.39	-3.19	1.859E-01	-4.247E-01	-1.87	1.41
		6.00	-12.39	3.77	1.859E-01	-4.247E-01	-6.16	-12.33
RING4	ULTBLK	MAX						
		0.00	69.52	30.42	4.34	16.95	29.11	127.81
		3.00	69.52	37.84	4.34	16.95	16.87	25.43
		6.00	69.52	45.25	4.34	16.95	12.99	81.83
RING4	ULTBLK	MIN						
		0.00	-72.70	-43.36	-5.11	-15.45	-32.29	-133.86
		3.00	-72.70	-35.95	-5.11	-15.45	-17.73	-14.89
		6.00	-72.70	-28.54	-5.11	-15.45	-11.52	-99.20
RING5	ULTBLK	MAX						
		0.00	-1.98	-3.92	5.704E-01	1.86	4.969E-01	2.08
		3.00	-1.98	2.87	5.704E-01	1.86	-4.664E-01	5.65
		6.00	-1.98	10.29	5.704E-01	1.86	-1.34	-6.591E-02
RING5	ULTBLK	MIN						
		0.00	-8.88	-9.75	2.893E-01	2.331E-01	-1.403E-01	-14.13
		3.00	-8.88	-2.34	2.893E-01	2.331E-01	-1.62	3.38
		6.00	-8.88	4.33	2.893E-01	2.331E-01	-3.20	-15.17
RING6	ULTBLK	MAX						
		0.00	126.53	20.52	1.21	29.82	23.82	66.69
		3.00	126.53	27.94	1.21	29.82	27.22	12.37
		6.00	126.53	35.35	1.21	29.82	30.63	85.75
RING6	ULTBLK	MIN						
		0.00	-129.57	-35.58	-1.18	-29.37	-22.68	-83.25
		3.00	-129.57	-28.17	-1.18	-29.37	-26.18	-6.00
		6.00	-129.57	-20.75	-1.18	-29.37	-29.69	-100.93
RING7	ULTBLK	MAX						
		0.00	-3.76	-4.67	-2.170E-01	3.650E-01	-1.01	-1.12
		3.00	-3.76	1.95	-2.170E-01	3.650E-01	-1.953E-01	5.31
		6.00	-3.76	9.57	-2.170E-01	3.650E-01	1.11	2.961E-01
RING7	ULTBLK	MIN						
		0.00	-7.62	-10.20	-4.998E-01	1.466E-02	-2.08	-14.43
		3.00	-7.62	-2.45	-4.998E-01	1.466E-02	-6.862E-01	3.34
		6.00	-7.62	4.27	-4.998E-01	1.466E-02	1.981E-01	-13.09
RING8	ULTBLK	MAX						
		0.00	179.15	8.472E-01	27.14	4.29	66.73	46.68
		3.00	179.15	8.26	27.14	4.29	15.45	33.09
		6.00	179.15	15.67	27.14	4.29	94.89	-2.34
RING8	ULTBLK	MIN						
		0.00	-182.50	-16.32	-26.67	-3.47	-65.15	-63.01
		3.00	-182.50	-8.91	-26.67	-3.47	-15.26	-25.24
		6.00	-182.50	-1.49	-26.67	-3.47	-96.09	-9.73
RING9	ULTBLK	MAX						
		0.00	-4.40	-4.31	6.363E-02	4.049E-03	4.401E-01	-7.982E-01
		3.00	-4.40	2.38	6.363E-02	4.049E-03	4.319E-01	3.90
		6.00	-4.40	10.14	6.363E-02	4.049E-03	5.143E-01	-1.94
RING9	ULTBLK	MIN						
		0.00	-8.83	-9.63	-7.035E-02	-3.843E-01	-2.497E-01	-14.35
		3.00	-8.83	-2.02	-7.035E-02	-3.843E-01	-2.213E-01	2.43
		6.00	-8.83	4.63	-7.035E-02	-3.843E-01	-2.836E-01	-15.24
SLOF1	ULTBLK	MAX						
		2.0E-01	0.00	-17.96	0.00	1.201E-01	0.00	73.34
		4.50	0.00	31.80	0.00	1.201E-01	0.00	59.11
		8.80	0.00	84.58	0.00	1.201E-01	0.00	57.59
SLOF1	ULTBLK	MIN						



	2.0E-01	0.00	-83.62	0.00	-2.118E-01	0.00	-207.61
	4.50	0.00	-30.84	0.00	-2.118E-01	0.00	33.02
	8.80	0.00	18.83	0.00	-2.118E-01	0.00	-200.14
SLOF2	ULTBLK MAX						
	2.0E-01	0.00	178.56	0.00	2.39	0.00	254.30
	1.53	0.00	181.18	0.00	2.39	0.00	15.97
	2.85	0.00	183.80	0.00	2.39	0.00	218.38
SLOF2	ULTBLK MIN						
	2.0E-01	0.00	-185.34	0.00	-2.04	0.00	-265.85
	1.53	0.00	-182.72	0.00	-2.04	0.00	-22.00
	2.85	0.00	-180.11	0.00	-2.04	0.00	-225.83
SLOF3	ULTBLK MAX						
	2.0E-01	0.00	32.73	0.00	1.731E-01	0.00	160.48
	3.00	0.00	66.41	0.00	1.731E-01	0.00	24.65
	5.80	0.00	100.08	0.00	1.731E-01	0.00	155.30
SLOF3	ULTBLK MIN						
	2.0E-01	0.00	-100.54	0.00	-1.056E-01	0.00	-219.16
	3.00	0.00	-66.87	0.00	-1.056E-01	0.00	13.07
	5.80	0.00	-33.19	0.00	-1.056E-01	0.00	-211.39
SLOF4	ULTBLK MAX						
	2.0E-01	0.00	32.57	0.00	7.229E-02	0.00	160.32
	3.00	0.00	66.24	0.00	7.229E-02	0.00	24.83
	5.80	0.00	99.92	0.00	7.229E-02	0.00	153.47
SLOF4	ULTBLK MIN						
	2.0E-01	0.00	-99.89	0.00	-9.155E-02	0.00	-217.33
	3.00	0.00	-66.21	0.00	-9.155E-02	0.00	13.06
	5.80	0.00	-32.54	0.00	-9.155E-02	0.00	-210.64
SLOF5	ULTBLK MAX						
	1.5E-01	0.00	32.89	0.00	2.757E-02	0.00	98.58
	3.00	0.00	37.12	0.00	2.757E-02	0.00	6.13
	5.85	0.00	41.35	0.00	2.757E-02	0.00	105.43
SLOF5	ULTBLK MIN						
	1.5E-01	0.00	-41.18	0.00	-4.025E-02	0.00	-105.22
	3.00	0.00	-36.96	0.00	-4.025E-02	0.00	-1.19
	5.85	0.00	-32.73	0.00	-4.025E-02	0.00	-113.00
SLOF6	ULTBLK MAX						
	2.0E-01	0.00	-17.64	0.00	1.099E-01	0.00	75.19
	4.50	0.00	32.16	0.00	1.099E-01	0.00	59.35
	8.80	0.00	84.94	0.00	1.099E-01	0.00	58.46
SLOF6	ULTBLK MIN						
	2.0E-01	0.00	-83.83	0.00	-1.177E-01	0.00	-208.56
	4.50	0.00	-31.05	0.00	-1.177E-01	0.00	33.04
	8.80	0.00	18.66	0.00	-1.177E-01	0.00	-201.42
SLOF7	ULTBLK MAX						
	2.0E-01	0.00	180.94	0.00	4.32	0.00	257.62
	1.53	0.00	183.56	0.00	4.32	0.00	16.14
	2.85	0.00	186.18	0.00	4.32	0.00	219.21
SLOF7	ULTBLK MIN						
	2.0E-01	0.00	-186.13	0.00	-4.26	0.00	-267.10
	1.53	0.00	-183.51	0.00	-4.26	0.00	-22.21
	2.85	0.00	-180.89	0.00	-4.26	0.00	-228.81
SLOF8	ULTBLK MAX						
	2.0E-01	0.00	31.13	0.00	1.10	0.00	150.68
	3.00	0.00	64.80	0.00	1.10	0.00	21.39
	5.80	0.00	98.48	0.00	1.10	0.00	142.05
SLOF8	ULTBLK MIN						
	2.0E-01	0.00	-95.63	0.00	6.088E-01	0.00	-204.91
	3.00	0.00	-61.96	0.00	6.088E-01	0.00	13.46
	5.80	0.00	-28.28	0.00	6.088E-01	0.00	-212.21
SLOF9	ULTBLK MAX						
	2.0E-01	0.00	29.34	0.00	7.528E-03	0.00	147.02
	3.00	0.00	63.02	0.00	7.528E-03	0.00	23.40
	5.80	0.00	96.69	0.00	7.528E-03	0.00	146.67
SLOF9	ULTBLK MIN						
	2.0E-01	0.00	-96.68	0.00	-1.561E-01	0.00	-206.18
	3.00	0.00	-63.01	0.00	-1.561E-01	0.00	14.90
	5.80	0.00	-29.33	0.00	-1.561E-01	0.00	-205.89
ANAK10	ULTBLK MAX						
	0.00	0.00	14.81	0.00	6.09	0.00	25.88
	2.43	0.00	26.07	0.00	6.09	0.00	10.60
	4.85	0.00	37.59	0.00	6.09	0.00	20.07
ANAK10	ULTBLK MIN						
	0.00	0.00	-19.07	0.00	-7.17	0.00	-23.01
	2.43	0.00	-8.20	0.00	-7.17	0.00	-22.68
	4.85	0.00	-1.27	0.00	-7.17	0.00	-100.74
ANAK12	ULTBLK MAX						
	0.00	0.00	-35.98	0.00	33.50	0.00	-46.83

		1.50	0.00	-12.49	0.00	33.50	0.00	-4.95
		3.00	0.00	11.01	0.00	33.50	0.00	36.23
ANAK12	ULTBLK	MIN						
		0.00	0.00	-91.15	0.00	14.02	0.00	-130.47
		1.50	0.00	-53.87	0.00	14.02	0.00	-23.20
		3.00	0.00	-22.68	0.00	14.02	0.00	-9.36
ANAK13	ULTBLK	MAX						
		0.00	0.00	74.23	0.00	-3.61	0.00	102.80
		1.50	0.00	95.77	0.00	-3.61	0.00	-10.69
		3.00	0.00	119.04	0.00	-3.61	0.00	-100.42
ANAK13	ULTBLK	MIN						
		0.00	0.00	22.94	0.00	-10.41	0.00	-4.05
		1.50	0.00	33.20	0.00	-10.41	0.00	-57.30
		3.00	0.00	43.45	0.00	-10.41	0.00	-215.21
ANAK14	ULTBLK	MAX						
		0.00	0.00	7.520E-01	0.00	-9.42	0.00	47.98
		1.50	0.00	30.45	0.00	-9.42	0.00	44.63
		3.00	0.00	63.20	0.00	-9.42	0.00	11.29
ANAK14	ULTBLK	MIN						
		0.00	0.00	-30.07	0.00	-25.40	0.00	6.95
		1.50	0.00	-1.44	0.00	-25.40	0.00	20.00
		3.00	0.00	21.57	0.00	-25.40	0.00	-43.37
ANAK15	ULTBLK	MAX						
		0.00	0.00	-26.18	0.00	6.39	0.00	7.67
		1.50	0.00	-3.16	0.00	6.39	0.00	54.47
		3.00	0.00	23.47	0.00	6.39	0.00	72.92
ANAK15	ULTBLK	MIN						
		0.00	0.00	-73.86	0.00	-2.64	0.00	-47.08
		1.50	0.00	-39.37	0.00	-2.64	0.00	23.16
		3.00	0.00	-8.26	0.00	-2.64	0.00	15.53
ANAK16	ULTBLK	MAX						
		0.00	0.00	11.01	0.00	15.51	0.00	74.94
		1.50	0.00	42.12	0.00	15.51	0.00	57.51
		3.00	0.00	73.54	0.00	15.51	0.00	15.26
ANAK16	ULTBLK	MIN						
		0.00	0.00	-26.56	0.00	6.57	0.00	16.73
		1.50	0.00	6.036E-01	0.00	6.57	0.00	20.88
		3.00	0.00	23.62	0.00	6.57	0.00	-51.82
ANAK17	ULTBLK	MAX						
		0.00	0.00	40.60	0.00	30.78	0.00	41.08
		1.43	0.00	69.62	0.00	30.78	0.00	29.11
		2.85	0.00	100.71	0.00	30.78	0.00	25.01
ANAK17	ULTBLK	MIN						
		0.00	0.00	-46.49	0.00	7.04	0.00	-42.41
		1.43	0.00	-18.33	0.00	7.04	0.00	-58.58
		2.85	0.00	4.36	0.00	7.04	0.00	-169.78
ANAK19	ULTBLK	MAX						
		0.00	0.00	-15.84	0.00	20.35	0.00	41.40
		1.50	0.00	-5.58	0.00	20.35	0.00	68.52
		3.00	0.00	12.67	0.00	20.35	0.00	69.76
ANAK19	ULTBLK	MIN						
		0.00	0.00	-38.68	0.00	3.39	0.00	-8.04
		1.50	0.00	-15.29	0.00	3.39	0.00	19.46
		3.00	0.00	-2.61	0.00	3.39	0.00	23.70
ANAK20	ULTBLK	MAX						
		0.00	0.00	20.18	0.00	-3.19	0.00	144.13
		1.50	0.00	36.87	0.00	-3.19	0.00	126.01
		3.00	0.00	53.92	0.00	-3.19	0.00	88.26
ANAK20	ULTBLK	MIN						
		0.00	0.00	-9.20	0.00	-7.85	0.00	67.52
		1.50	0.00	4.65	0.00	-7.85	0.00	46.13
		3.00	0.00	14.90	0.00	-7.85	0.00	-7.49
ANAK22	ULTBLK	MAX						
		0.00	0.00	-37.26	0.00	4.080E-01	0.00	53.39
		4.50	0.00	14.76	0.00	4.080E-01	0.00	201.86
		9.00	0.00	97.14	0.00	4.080E-01	0.00	20.53
ANAK22	ULTBLK	MIN						
		0.00	0.00	-95.80	0.00	-4.272E-01	0.00	-105.46
		4.50	0.00	-13.76	0.00	-4.272E-01	0.00	89.78
		9.00	0.00	38.00	0.00	-4.272E-01	0.00	-79.44
ANAK23	ULTBLK	MAX						
		0.00	0.00	28.83	0.00	5.56	0.00	31.22
		2.43	0.00	43.26	0.00	5.56	0.00	-1.76
		4.85	0.00	61.16	0.00	5.56	0.00	-13.87
ANAK23	ULTBLK	MIN						
		0.00	0.00	-8.21	0.00	-5.13	0.00	-6.82
		2.43	0.00	1.53	0.00	-5.13	0.00	-54.17
		4.85	0.00	8.46	0.00	-5.13	0.00	-178.96

ANAK25	ULTBLK	MAX	0.00	0.00	15.73	0.00	-11.01	0.00	80.80
			2.93	0.00	51.08	0.00	-11.01	0.00	101.44
			5.85	0.00	89.65	0.00	-11.01	0.00	55.10
ANAK25	ULTBLK	MIN	0.00	0.00	-41.71	0.00	-24.76	0.00	16.30
			2.93	0.00	-6.60	0.00	-24.76	0.00	-13.05
			5.85	0.00	20.21	0.00	-24.76	0.00	-220.45
ANAK26	ULTBLK	MAX	1.5E-01	0.00	-65.97	0.00	12.80	0.00	-2.76
			3.08	0.00	-13.35	0.00	12.80	0.00	147.75
			6.00	0.00	45.67	0.00	12.80	0.00	144.42
ANAK26	ULTBLK	MIN	1.5E-01	0.00	-147.42	0.00	-1.436E-01	0.00	-281.54
			3.08	0.00	-67.63	0.00	-1.436E-01	0.00	12.39
			6.00	0.00	-1.62	0.00	-1.436E-01	0.00	66.23
ANAK27	ULTBLK	MAX	0.00	0.00	19.81	0.00	3.15	0.00	35.30
			1.50	0.00	27.26	0.00	3.15	0.00	16.22
			3.00	0.00	34.70	0.00	3.15	0.00	-4.672E-01
ANAK27	ULTBLK	MIN	0.00	0.00	5.000E-01	0.00	-2.82	0.00	14.83
			1.50	0.00	5.87	0.00	-2.82	0.00	-2.10
			3.00	0.00	11.23	0.00	-2.82	0.00	-49.15
ANAK28	ULTBLK	MAX	0.00	0.00	-94.51	0.00	14.12	0.00	26.94
			1.00	0.00	-79.25	0.00	14.12	0.00	138.05
			2.00	0.00	-63.99	0.00	14.12	0.00	229.53
ANAK28	ULTBLK	MIN	0.00	0.00	-155.20	0.00	-17.54	0.00	-128.66
			1.00	0.00	-132.85	0.00	-17.54	0.00	-11.87
			2.00	0.00	-110.50	0.00	-17.54	0.00	66.83
ANAK29	ULTBLK	MAX	0.00	0.00	-37.83	0.00	-3.124E-01	0.00	228.82
			1.00	0.00	-22.57	0.00	-3.124E-01	0.00	269.99
			2.00	0.00	-7.30	0.00	-3.124E-01	0.00	315.92
ANAK29	ULTBLK	MIN	0.00	0.00	-80.23	0.00	-13.50	0.00	66.12
			1.00	0.00	-59.33	0.00	-13.50	0.00	121.05
			2.00	0.00	-40.74	0.00	-13.50	0.00	160.05
ANAK30	ULTBLK	MAX	0.00	0.00	15.87	0.00	-1.73	0.00	315.49
			2.5E-01	0.00	19.94	0.00	-1.73	0.00	316.09
			5.0E-01	0.00	24.39	0.00	-1.73	0.00	315.44
ANAK30	ULTBLK	MIN	0.00	0.00	-21.19	0.00	-28.14	0.00	162.64
			2.5E-01	0.00	-17.12	0.00	-28.14	0.00	166.49
			5.0E-01	0.00	-12.67	0.00	-28.14	0.00	169.46
ANAK31	ULTBLK	MAX	0.00	0.00	15.87	0.00	18.13	0.00	315.17
			7.5E-01	0.00	32.40	0.00	18.13	0.00	312.74
			1.50	0.00	49.44	0.00	18.13	0.00	293.98
ANAK31	ULTBLK	MIN	0.00	0.00	-24.65	0.00	3.71	0.00	171.93
			7.5E-01	0.00	-8.12	0.00	3.71	0.00	181.93
			1.50	0.00	6.21	0.00	3.71	0.00	174.29
ANAK32	ULTBLK	MAX	0.00	0.00	70.54	0.00	13.82	0.00	293.93
			8.8E-01	0.00	95.22	0.00	13.82	0.00	223.63
			1.75	0.00	123.41	0.00	13.82	0.00	135.94
ANAK32	ULTBLK	MIN	0.00	0.00	27.37	0.00	-4.48	0.00	172.09
			8.8E-01	0.00	44.21	0.00	-4.48	0.00	115.22
			1.75	0.00	60.96	0.00	-4.48	0.00	43.12
ANAK33	ULTBLK	MAX	0.00	0.00	154.10	0.00	17.14	0.00	136.99
			6.3E-01	0.00	164.66	0.00	17.14	0.00	66.97
			1.25	0.00	172.59	0.00	17.14	0.00	-2.39
ANAK33	ULTBLK	MIN	0.00	0.00	83.83	0.00	-17.79	0.00	45.68
			6.3E-01	0.00	88.60	0.00	-17.79	0.00	-21.47
			1.25	0.00	93.14	0.00	-17.79	0.00	-111.77
ANAK34	ULTBLK	MAX	0.00	0.00	-9.17	0.00	-3.817E-01	0.00	21.93
			1.50	0.00	17.34	0.00	-3.817E-01	0.00	36.16
			3.00	0.00	48.61	0.00	-3.817E-01	0.00	8.06
ANAK34	ULTBLK	MIN							

		0.00	0.00	-33.24	0.00	-1.25	0.00	-11.23
		1.50	0.00	-2.66	0.00	-1.25	0.00	1.13
		3.00	0.00	20.91	0.00	-1.25	0.00	-41.42
ANAK35	ULTBLK	MAX						
		0.00	0.00	-14.58	0.00	2.90	0.00	20.33
		1.50	0.00	11.11	0.00	2.90	0.00	36.02
		3.00	0.00	48.07	0.00	2.90	0.00	3.05
ANAK35	ULTBLK	MIN						
		0.00	0.00	-30.81	0.00	-3.39	0.00	-3.52
		1.50	0.00	1.64	0.00	-3.39	0.00	7.62
		3.00	0.00	25.21	0.00	-3.39	0.00	-26.32
ANAK36	ULTBLK	MAX						
		0.00	0.00	-15.26	0.00	2.53	0.00	17.15
		1.50	0.00	10.72	0.00	2.53	0.00	35.33
		3.00	0.00	48.90	0.00	2.53	0.00	3.12
ANAK36	ULTBLK	MIN						
		0.00	0.00	-31.14	0.00	-2.59	0.00	-3.23
		1.50	0.00	2.00	0.00	-2.59	0.00	6.05
		3.00	0.00	25.82	0.00	-2.59	0.00	-29.40
ANAK37	ULTBLK	MAX						
		0.00	0.00	-10.48	0.00	3.20	0.00	15.29
		1.50	0.00	17.35	0.00	3.20	0.00	36.74
		3.00	0.00	52.83	0.00	3.20	0.00	8.51
ANAK37	ULTBLK	MIN						
		0.00	0.00	-32.40	0.00	7.177E-01	0.00	-5.31
		1.50	0.00	-9.342E-01	0.00	7.177E-01	0.00	-1.59
		3.00	0.00	23.64	0.00	7.177E-01	0.00	-49.09
ANAK39	ULTBLK	MAX						
		0.00	0.00	-83.85	0.00	9.341E-01	0.00	-8.01
		4.50	0.00	6.80	0.00	9.341E-01	0.00	298.70
		9.00	0.00	150.84	0.00	9.341E-01	0.00	-21.54
ANAK39	ULTBLK	MIN						
		0.00	0.00	-148.01	0.00	-1.13	0.00	-72.48
		4.50	0.00	-4.63	0.00	-1.13	0.00	171.71
		9.00	0.00	85.49	0.00	-1.13	0.00	-74.98
ANAK40	ULTBLK	MAX						
		0.00	0.00	-44.14	0.00	1.269E-01	0.00	16.29
		4.50	0.00	6.81	0.00	1.269E-01	0.00	213.56
		9.00	0.00	98.01	0.00	-1.269E-01	0.00	1.40
ANAK40	ULTBLK	MIN						
		0.00	0.00	-94.93	0.00	-1.029E-01	0.00	-43.68
		4.50	0.00	-4.49	0.00	-1.029E-01	0.00	105.80
		9.00	0.00	45.88	0.00	-1.029E-01	0.00	-45.87
ANAK41	ULTBLK	MAX						
		0.00	0.00	-43.99	0.00	5.306E-01	0.00	17.90
		4.50	0.00	7.01	0.00	5.306E-01	0.00	214.15
		9.00	0.00	98.24	0.00	5.306E-01	0.00	5.363E-01
ANAK41	ULTBLK	MIN						
		0.00	0.00	-94.70	0.00	-4.414E-01	0.00	-43.20
		4.50	0.00	-4.33	0.00	-4.414E-01	0.00	103.28
		9.00	0.00	46.00	0.00	-4.414E-01	0.00	-45.54
ANAK42	ULTBLK	MAX						
		1.5E-01	0.00	-18.54	0.00	4.31	0.00	49.88
		2.33	0.00	14.57	0.00	4.31	0.00	64.97
		4.50	0.00	57.74	0.00	4.31	0.00	1.14
ANAK42	ULTBLK	MIN						
		1.5E-01	0.00	-66.78	0.00	-1.46	0.00	-117.99
		2.33	0.00	-27.38	0.00	-1.46	0.00	-14.72
		4.50	0.00	11.23	0.00	-1.46	0.00	-16.69
ANAK43	ULTBLK	MAX						
		0.00	0.00	-25.78	0.00	2.08	0.00	-59.04
		2.93	0.00	-1.066E-01	0.00	2.08	0.00	11.34
		5.85	0.00	36.45	0.00	2.08	0.00	47.79
ANAK43	ULTBLK	MIN						
		0.00	0.00	-75.31	0.00	-2.98	0.00	-156.84
		2.93	0.00	-34.47	0.00	-2.98	0.00	-15.71
		5.85	0.00	-1.03	0.00	-2.98	0.00	-73.15
ANAK44	ULTBLK	MAX						
		0.00	0.00	-4.90	0.00	1.81	0.00	8.72
		1.50	0.00	1.96	0.00	1.81	0.00	14.81
		3.00	0.00	11.85	0.00	1.81	0.00	7.41
ANAK44	ULTBLK	MIN						
		0.00	0.00	-21.78	0.00	-3.991E-01	0.00	-30.09
		1.50	0.00	-11.65	0.00	-3.991E-01	0.00	-4.27
		3.00	0.00	-2.65	0.00	-3.991E-01	0.00	6.677E-01
ANAK45	ULTBLK	MAX						
		0.00	0.00	65.60	0.00	9.224E-01	0.00	2.44

		7.5E-01	0.00	80.03	0.00	9.224E-01	0.00	-13.05
		1.50	0.00	92.13	0.00	9.224E-01	0.00	-33.96
ANAK45	ULTBLK	MIN						
		0.00	0.00	12.00	0.00	-6.22	0.00	-16.81
		7.5E-01	0.00	23.00	0.00	-6.22	0.00	-68.85
		1.50	0.00	32.51	0.00	-6.22	0.00	-133.64
ANAK46	ULTBLK	MAX						
		0.00	0.00	-83.88	0.00	2.056E-01	0.00	-5.57
		4.50	0.00	6.82	0.00	2.056E-01	0.00	301.91
		9.00	0.00	151.09	0.00	2.056E-01	0.00	-22.44
ANAK46	ULTBLK	MIN						
		0.00	0.00	-147.76	0.00	-2.748E-01	0.00	-71.40
		4.50	0.00	-4.33	0.00	-2.748E-01	0.00	166.56
		9.00	0.00	85.71	0.00	-2.748E-01	0.00	-72.54
ANAK47	ULTBLK	MAX						
		0.00	0.00	21.15	0.00	5.28	0.00	63.95
		2.43	0.00	40.18	0.00	5.28	0.00	9.61
		4.85	0.00	60.15	0.00	5.28	0.00	29.04
ANAK47	ULTBLK	MIN						
		0.00	0.00	-37.44	0.00	-6.89	0.00	-62.42
		2.43	0.00	-18.41	0.00	-6.89	0.00	-7.75
		4.85	0.00	-2.84	0.00	-6.89	0.00	-131.94
ANAK49	ULTBLK	MAX						
		0.00	0.00	-30.23	0.00	31.32	0.00	-39.03
		1.50	0.00	-6.74	0.00	31.32	0.00	-7.28
		3.00	0.00	18.53	0.00	31.32	0.00	48.30
ANAK49	ULTBLK	MIN						
		0.00	0.00	-87.96	0.00	16.11	0.00	-125.62
		1.50	0.00	-57.95	0.00	16.11	0.00	-16.93
		3.00	0.00	-27.94	0.00	16.11	0.00	-20.48
ANAK50	ULTBLK	MAX						
		0.00	0.00	66.52	0.00	-3.56	0.00	76.54
		1.50	0.00	86.19	0.00	-3.56	0.00	-15.67
		3.00	0.00	105.87	0.00	-3.56	0.00	-101.32
ANAK50	ULTBLK	MIN						
		0.00	0.00	32.86	0.00	-11.11	0.00	26.09
		1.50	0.00	43.12	0.00	-11.11	0.00	-39.70
		3.00	0.00	53.37	0.00	-11.11	0.00	-187.24
ANAK51	ULTBLK	MAX						
		0.00	0.00	-3.25	0.00	-10.78	0.00	48.97
		1.50	0.00	24.43	0.00	-10.78	0.00	43.38
		3.00	0.00	53.88	0.00	-10.78	0.00	4.83
ANAK51	ULTBLK	MIN						
		0.00	0.00	-28.53	0.00	-22.38	0.00	3.70
		1.50	0.00	-3.759E-01	0.00	-22.38	0.00	22.67
		3.00	0.00	22.64	0.00	-22.38	0.00	-24.31
ANAK52	ULTBLK	MAX						
		0.00	0.00	-32.66	0.00	5.37	0.00	-1.90
		1.50	0.00	-9.64	0.00	5.37	0.00	50.53
		3.00	0.00	15.82	0.00	5.37	0.00	58.11
ANAK52	ULTBLK	MIN						
		0.00	0.00	-63.42	0.00	-7.945E-01	0.00	-27.68
		1.50	0.00	-26.24	0.00	-7.945E-01	0.00	23.63
		3.00	0.00	2.58	0.00	-7.945E-01	0.00	22.86
ANAK53	ULTBLK	MAX						
		0.00	0.00	-3.106E-01	0.00	14.22	0.00	60.37
		1.50	0.00	28.99	0.00	14.22	0.00	50.10
		3.00	0.00	65.21	0.00	14.22	0.00	-2.06
ANAK53	ULTBLK	MIN						
		0.00	0.00	-15.69	0.00	6.57	0.00	24.34
		1.50	0.00	9.66	0.00	6.57	0.00	23.38
		3.00	0.00	32.68	0.00	6.57	0.00	-32.72
ANAK54	ULTBLK	MAX						
		0.00	0.00	11.40	0.00	23.95	0.00	15.79
		1.43	0.00	38.93	0.00	23.95	0.00	6.09
		2.85	0.00	68.22	0.00	23.95	0.00	-18.38
ANAK54	ULTBLK	MIN						
		0.00	0.00	-22.18	0.00	10.51	0.00	-18.23
		1.43	0.00	2.29	0.00	10.51	0.00	-27.86
		2.85	0.00	24.98	0.00	10.51	0.00	-101.81
ANAK56	ULTBLK	MAX						
		0.00	0.00	-13.26	0.00	17.01	0.00	50.35
		1.50	0.00	-3.00	0.00	17.01	0.00	72.12
		3.00	0.00	10.89	0.00	17.01	0.00	66.97
ANAK56	ULTBLK	MIN						
		0.00	0.00	-33.36	0.00	4.73	0.00	-17.57
		1.50	0.00	-16.94	0.00	4.73	0.00	11.77
		3.00	0.00	-3.91	0.00	4.73	0.00	21.67

ANAK57	ULTBLK	MAX						
		0.00	0.00	10.43	0.00	-3.33	0.00	135.47
		1.50	0.00	25.23	0.00	-3.33	0.00	117.27
		3.00	0.00	45.97	0.00	-3.33	0.00	66.21
ANAK57	ULTBLK	MIN						
		0.00	0.00	-1.14	0.00	-8.28	0.00	72.13
		1.50	0.00	9.94	0.00	-8.28	0.00	59.41
		3.00	0.00	20.20	0.00	-8.28	0.00	20.92
ANAK59	ULTBLK	MAX						
		0.00	0.00	-44.13	0.00	3.918E-01	0.00	18.24
		4.50	0.00	6.82	0.00	3.918E-01	0.00	213.76
		9.00	0.00	98.11	0.00	3.918E-01	0.00	2.907E-02
ANAK59	ULTBLK	MIN						
		0.00	0.00	-94.83	0.00	-4.301E-01	0.00	-43.72
		4.50	0.00	-4.29	0.00	-4.301E-01	0.00	103.39
		9.00	0.00	46.06	0.00	-4.301E-01	0.00	-44.00
ANAK60	ULTBLK	MAX						
		0.00	0.00	29.83	0.00	10.92	0.00	44.92
		2.43	0.00	59.80	0.00	10.92	0.00	28.13
		4.85	0.00	91.63	0.00	10.92	0.00	12.78
ANAK60	ULTBLK	MIN						
		0.00	0.00	-35.59	0.00	-10.19	0.00	-28.82
		2.43	0.00	-7.92	0.00	-10.19	0.00	-56.79
		4.85	0.00	13.47	0.00	-10.19	0.00	-246.45
ANAK62	ULTBLK	MAX						
		0.00	0.00	10.84	0.00	-12.21	0.00	88.97
		2.93	0.00	44.63	0.00	-12.21	0.00	85.09
		5.85	0.00	83.20	0.00	-12.21	0.00	42.07
ANAK62	ULTBLK	MIN						
		0.00	0.00	-43.07	0.00	-22.97	0.00	2.870E-01
		2.93	0.00	-7.12	0.00	-22.97	0.00	9.65
		5.85	0.00	19.68	0.00	-22.97	0.00	-174.48
ANAK63	ULTBLK	MAX						
		1.5E-01	0.00	-46.05	0.00	10.35	0.00	-31.68
		3.08	0.00	-19.25	0.00	10.35	0.00	90.89
		6.00	0.00	10.09	0.00	10.35	0.00	141.29
ANAK63	ULTBLK	MIN						
		1.5E-01	0.00	-102.82	0.00	2.86	0.00	-165.05
		3.08	0.00	-48.55	0.00	2.86	0.00	24.20
		6.00	0.00	-11.69	0.00	2.86	0.00	77.84
ANAK64	ULTBLK	MAX						
		0.00	0.00	11.82	0.00	1.61	0.00	30.32
		1.50	0.00	19.50	0.00	1.61	0.00	10.96
		3.00	0.00	29.97	0.00	1.61	0.00	-9.61
ANAK64	ULTBLK	MIN						
		0.00	0.00	3.54	0.00	-9.388E-01	0.00	16.48
		1.50	0.00	8.91	0.00	-9.388E-01	0.00	2.95
		3.00	0.00	14.28	0.00	-9.388E-01	0.00	-31.77
ANAK65	ULTBLK	MAX						
		0.00	0.00	-97.64	0.00	4.54	0.00	-7.47
		1.00	0.00	-82.38	0.00	4.54	0.00	102.40
		2.00	0.00	-67.12	0.00	4.54	0.00	217.71
ANAK65	ULTBLK	MIN						
		0.00	0.00	-157.35	0.00	-7.10	0.00	-69.56
		1.00	0.00	-135.00	0.00	-7.10	0.00	38.05
		2.00	0.00	-112.65	0.00	-7.10	0.00	116.50
ANAK66	ULTBLK	MAX						
		0.00	0.00	-45.85	0.00	-2.64	0.00	216.65
		1.00	0.00	-30.58	0.00	-2.64	0.00	287.61
		2.00	0.00	-15.32	0.00	-2.64	0.00	334.67
ANAK66	ULTBLK	MIN						
		0.00	0.00	-81.36	0.00	-8.83	0.00	116.18
		1.00	0.00	-59.01	0.00	-8.83	0.00	164.69
		2.00	0.00	-36.66	0.00	-8.83	0.00	197.28
ANAK67	ULTBLK	MAX						
		0.00	0.00	4.75	0.00	-6.60	0.00	334.13
		2.5E-01	0.00	8.44	0.00	-6.60	0.00	334.74
		5.0E-01	0.00	12.90	0.00	-6.60	0.00	334.10
ANAK67	ULTBLK	MIN						
		0.00	0.00	-9.84	0.00	-18.45	0.00	198.21
		2.5E-01	0.00	-5.78	0.00	-18.45	0.00	199.53
		5.0E-01	0.00	-1.32	0.00	-18.45	0.00	199.47
ANAK68	ULTBLK	MAX						
		0.00	0.00	5.77	0.00	13.35	0.00	333.62
		7.5E-01	0.00	22.24	0.00	13.35	0.00	328.69
		1.50	0.00	39.18	0.00	13.35	0.00	307.65
ANAK68	ULTBLK	MIN						

		0.00	0.00	-9.81	0.00	6.15	0.00	199.98
		7.5E-01	0.00	5.20	0.00	6.15	0.00	199.53
		1.50	0.00	18.51	0.00	6.15	0.00	183.87
ANAK69	ULTBLK MAX							
		0.00	0.00	70.28	0.00	8.57	0.00	307.39
		8.8E-01	0.00	97.97	0.00	8.57	0.00	234.38
		1.75	0.00	125.48	0.00	8.57	0.00	135.96
ANAK69	ULTBLK MIN							
		0.00	0.00	38.89	0.00	-7.507E-01	0.00	183.13
		8.8E-01	0.00	55.73	0.00	-7.507E-01	0.00	132.87
		1.75	0.00	72.48	0.00	-7.507E-01	0.00	67.37
ANAK70	ULTBLK MAX							
		0.00	0.00	156.56	0.00	9.75	0.00	138.39
		6.3E-01	0.00	166.81	0.00	9.75	0.00	47.05
		1.25	0.00	174.64	0.00	9.75	0.00	-25.46
ANAK70	ULTBLK MIN							
		0.00	0.00	92.34	0.00	-12.99	0.00	69.26
		6.3E-01	0.00	97.92	0.00	-12.99	0.00	5.65
		1.25	0.00	102.46	0.00	-12.99	0.00	-76.47
ANAK71	ULTBLK MAX							
		0.00	0.00	-15.27	0.00	-1.302E-01	0.00	10.66
		1.50	0.00	10.19	0.00	-1.302E-01	0.00	26.64
		3.00	0.00	47.59	0.00	-1.302E-01	0.00	-3.14
ANAK71	ULTBLK MIN							
		0.00	0.00	-31.29	0.00	-1.07	0.00	-1.20
		1.50	0.00	2.04	0.00	-1.07	0.00	10.44
		3.00	0.00	25.62	0.00	-1.07	0.00	-24.55
ANAK72	ULTBLK MAX							
		0.00	0.00	-17.85	0.00	1.07	0.00	12.09
		1.50	0.00	7.53	0.00	1.07	0.00	31.09
		3.00	0.00	46.96	0.00	1.07	0.00	-2.70
ANAK72	ULTBLK MIN							
		0.00	0.00	-31.91	0.00	-1.73	0.00	1.85
		1.50	0.00	3.51	0.00	-1.73	0.00	14.17
		3.00	0.00	27.08	0.00	-1.73	0.00	-16.54
ANAK73	ULTBLK MAX							
		0.00	0.00	-17.50	0.00	9.052E-01	0.00	12.76
		1.50	0.00	8.21	0.00	9.052E-01	0.00	29.86
		3.00	0.00	48.23	0.00	9.052E-01	0.00	-3.47
ANAK73	ULTBLK MIN							
		0.00	0.00	-31.81	0.00	-1.30	0.00	6.422E-02
		1.50	0.00	3.43	0.00	-1.30	0.00	12.16
		3.00	0.00	27.26	0.00	-1.30	0.00	-19.29
ANAK74	ULTBLK MAX							
		0.00	0.00	-14.99	0.00	2.44	0.00	12.33
		1.50	0.00	12.05	0.00	2.44	0.00	29.25
		3.00	0.00	52.44	0.00	2.44	0.00	-3.80
ANAK74	ULTBLK MIN							
		0.00	0.00	-31.08	0.00	9.936E-01	0.00	-1.37
		1.50	0.00	3.13	0.00	9.936E-01	0.00	6.52
		3.00	0.00	27.70	0.00	9.936E-01	0.00	-31.93
INDK10	ULTBLK MAX							
		0.00	0.00	212.42	0.00	52.39	0.00	176.30
		1.40	0.00	246.27	0.00	52.39	0.00	197.79
		2.80	0.00	277.56	0.00	52.39	0.00	256.02
INDK10	ULTBLK MIN							
		0.00	0.00	-92.45	0.00	1.03	0.00	66.50
		1.40	0.00	-58.64	0.00	1.03	0.00	-143.84
		2.80	0.00	-34.30	0.00	1.03	0.00	-512.42
INDK11	ULTBLK MAX							
		2.0E-01	0.00	5.21	0.00	3.095E-01	0.00	209.12
		4.50	0.00	60.35	0.00	3.095E-01	0.00	107.65
		8.80	0.00	125.93	0.00	3.095E-01	0.00	136.52
INDK11	ULTBLK MIN							
		2.0E-01	0.00	-121.05	0.00	-5.747E-01	0.00	-340.51
		4.50	0.00	-55.47	0.00	-5.747E-01	0.00	31.57
		8.80	0.00	-1.82	0.00	-5.747E-01	0.00	-309.91
INDK12	ULTBLK MAX							
		2.0E-01	0.00	164.20	0.00	18.85	0.00	248.69
		1.53	0.00	180.04	0.00	18.85	0.00	22.31
		2.85	0.00	195.31	0.00	18.85	0.00	206.01
INDK12	ULTBLK MIN							
		2.0E-01	0.00	-214.44	0.00	-23.40	0.00	-320.64
		1.53	0.00	-198.60	0.00	-23.40	0.00	-45.32
		2.85	0.00	-183.33	0.00	-23.40	0.00	-228.05
INDK13	ULTBLK MAX							
		2.0E-01	0.00	32.54	0.00	52.47	0.00	222.34

		1.60	0.00	55.35	0.00	52.47	0.00	163.85
		3.00	0.00	80.05	0.00	52.47	0.00	99.72
INDK13	ULTBLK MIN	2.0E-01	0.00	-212.86	0.00	-25.04	0.00	-441.84
		1.60	0.00	-187.04	0.00	-25.04	0.00	-161.00
		3.00	0.00	-162.33	0.00	-25.04	0.00	45.13
INDK14	ULTBLK MAX	2.0E-01	0.00	24.54	0.00	9.53	0.00	213.11
		1.60	0.00	48.88	0.00	9.53	0.00	170.90
		3.00	0.00	81.10	0.00	9.53	0.00	115.26
INDK14	ULTBLK MIN	2.0E-01	0.00	-226.26	0.00	-40.41	0.00	-454.34
		1.60	0.00	-194.97	0.00	-40.41	0.00	-157.72
		3.00	0.00	-161.12	0.00	-40.41	0.00	52.83
INDK15	ULTBLK MAX	1.5E-01	0.00	24.79	0.00	4.530E-01	0.00	130.41
		3.00	0.00	52.05	0.00	4.530E-01	0.00	24.86
		5.85	0.00	79.38	0.00	4.530E-01	0.00	114.05
INDK15	ULTBLK MIN	1.5E-01	0.00	-79.32	0.00	-1.647E-01	0.00	-182.34
		3.00	0.00	-52.00	0.00	-1.647E-01	0.00	4.99
		5.85	0.00	-24.82	0.00	-1.647E-01	0.00	-166.29
INDK16	ULTBLK MAX	0.00	0.00	148.80	0.00	27.75	0.00	99.61
		1.40	0.00	173.51	0.00	27.75	0.00	194.87
		2.80	0.00	199.33	0.00	27.75	0.00	270.07
INDK16	ULTBLK MIN	0.00	0.00	-92.12	0.00	-51.01	0.00	45.06
		1.40	0.00	-67.41	0.00	-51.01	0.00	-156.38
		2.80	0.00	-42.49	0.00	-51.01	0.00	-418.10
INDK17	ULTBLK MAX	0.00	0.00	152.27	0.00	38.63	0.00	115.37
		1.40	0.00	186.11	0.00	38.63	0.00	195.42
		2.80	0.00	217.40	0.00	38.63	0.00	252.13
INDK17	ULTBLK MIN	0.00	0.00	-91.36	0.00	-11.84	0.00	52.98
		1.40	0.00	-57.51	0.00	-11.84	0.00	-155.28
		2.80	0.00	-33.08	0.00	-11.84	0.00	-439.64
INDK18	ULTBLK MAX	2.0E-01	0.00	-32.10	0.00	3.705E-02	0.00	157.03
		4.50	0.00	61.08	0.00	3.705E-02	0.00	153.10
		8.80	0.00	170.94	0.00	3.705E-02	0.00	86.56
INDK18	ULTBLK MIN	2.0E-01	0.00	-166.25	0.00	-3.577E-01	0.00	-400.07
		4.50	0.00	-56.39	0.00	-3.577E-01	0.00	65.53
		8.80	0.00	35.36	0.00	-3.577E-01	0.00	-368.26
INDK19	ULTBLK MAX	2.0E-01	0.00	157.95	0.00	19.55	0.00	232.58
		1.53	0.00	173.79	0.00	19.55	0.00	14.57
		2.85	0.00	189.06	0.00	19.55	0.00	207.39
INDK19	ULTBLK MIN	2.0E-01	0.00	-222.65	0.00	-19.82	0.00	-341.03
		1.53	0.00	-206.81	0.00	-19.82	0.00	-54.83
		2.85	0.00	-191.54	0.00	-19.82	0.00	-227.59
INDK20	ULTBLK MAX	2.0E-01	0.00	40.24	0.00	50.46	0.00	257.99
		1.60	0.00	64.41	0.00	50.46	0.00	186.81
		3.00	0.00	89.11	0.00	50.46	0.00	102.81
INDK20	ULTBLK MIN	2.0E-01	0.00	-212.89	0.00	-28.07	0.00	-447.09
		1.60	0.00	-187.07	0.00	-28.07	0.00	-166.20
		3.00	0.00	-162.37	0.00	-28.07	0.00	49.15
INDK21	ULTBLK MAX	2.0E-01	0.00	31.40	0.00	12.18	0.00	245.63
		1.60	0.00	55.74	0.00	12.18	0.00	192.23
		3.00	0.00	89.13	0.00	12.18	0.00	119.45
INDK21	ULTBLK MIN	2.0E-01	0.00	-226.85	0.00	-38.27	0.00	-458.69
		1.60	0.00	-195.56	0.00	-38.27	0.00	-161.29
		3.00	0.00	-161.71	0.00	-38.27	0.00	56.28
INDK22	ULTBLK MAX	1.5E-01	0.00	29.38	0.00	1.24	0.00	130.94
		3.00	0.00	56.71	0.00	1.24	0.00	20.41
		5.85	0.00	84.03	0.00	1.24	0.00	132.89
INDK22	ULTBLK MIN	1.5E-01	0.00	-82.76	0.00	-1.50	0.00	-183.12
		3.00	0.00	-55.44	0.00	-1.50	0.00	7.20
		5.85	0.00	-28.12	0.00	-1.50	0.00	-192.30



INDK23	ULTBLK MAX						
	1.5E-01	0.00	111.99	0.00	19.02	0.00	229.22
	1.50	0.00	131.90	0.00	19.02	0.00	64.59
	2.85	0.00	151.80	0.00	19.02	0.00	125.53
INDK23	ULTBLK MIN						
	1.5E-01	0.00	-151.85	0.00	-34.14	0.00	-230.71
	1.50	0.00	-131.94	0.00	-34.14	0.00	-39.15
	2.85	0.00	-112.03	0.00	-34.14	0.00	-126.90
INDK24	ULTBLK MAX						
	1.5E-01	0.00	70.16	0.00	31.97	0.00	114.98
	1.50	0.00	95.39	0.00	31.97	0.00	17.82
	2.85	0.00	120.61	0.00	31.97	0.00	106.10
INDK24	ULTBLK MIN						
	1.5E-01	0.00	-104.07	0.00	-16.78	0.00	-106.80
	1.50	0.00	-78.85	0.00	-16.78	0.00	2.59
INDK25	ULTBLK MAX						
	1.5E-01	0.00	67.18	0.00	18.98	0.00	115.00
	1.50	0.00	92.40	0.00	18.98	0.00	8.26
	2.85	0.00	117.63	0.00	18.98	0.00	108.08
INDK25	ULTBLK MIN						
	1.5E-01	0.00	-117.31	0.00	-24.26	0.00	-140.55
	1.50	0.00	-92.09	0.00	-24.26	0.00	8.141E-01
	2.85	0.00	-66.86	0.00	-24.26	0.00	-134.49
INDK26	ULTBLK MAX						
	1.5E-01	0.00	61.37	0.00	26.37	0.00	107.82
	1.50	0.00	86.59	0.00	26.37	0.00	14.27
	2.85	0.00	111.81	0.00	26.37	0.00	111.41
INDK26	ULTBLK MIN						
	1.5E-01	0.00	-113.58	0.00	-21.82	0.00	-127.16
	1.50	0.00	-88.36	0.00	-21.82	0.00	3.12
	2.85	0.00	-63.13	0.00	-21.82	0.00	-125.97
INDK27	ULTBLK MAX						
	1.5E-01	0.00	109.75	0.00	3.22	0.00	123.98
	1.50	0.00	134.97	0.00	3.22	0.00	61.79
	2.85	0.00	160.20	0.00	3.22	0.00	224.01
INDK27	ULTBLK MIN						
	1.5E-01	0.00	-158.72	0.00	-3.95	0.00	-136.44
	1.50	0.00	-133.50	0.00	-3.95	0.00	-40.23
	2.85	0.00	-108.28	0.00	-3.95	0.00	-240.45
INDK28	ULTBLK MAX						
	0.00	0.00	158.16	0.00	22.60	0.00	102.75
	1.40	0.00	182.87	0.00	22.60	0.00	189.82
	2.80	0.00	208.69	0.00	22.60	0.00	265.07
INDK28	ULTBLK MIN						
	0.00	0.00	-92.15	0.00	-55.23	0.00	49.18
	1.40	0.00	-67.44	0.00	-55.23	0.00	-159.18
	2.80	0.00	-42.58	0.00	-55.23	0.00	-434.02
INDK29	ULTBLK MAX						
	0.00	0.00	160.04	0.00	41.17	0.00	119.51
	1.40	0.00	193.89	0.00	41.17	0.00	193.52
	2.80	0.00	225.18	0.00	41.17	0.00	251.12
INDK29	ULTBLK MIN						
	0.00	0.00	-91.99	0.00	-8.14	0.00	56.40
	1.40	0.00	-58.15	0.00	-8.14	0.00	-156.14
	2.80	0.00	-33.64	0.00	-8.14	0.00	-451.39
INDK30	ULTBLK MAX						
	1.5E-01	0.00	163.62	0.00	37.57	0.00	285.54
	1.50	0.00	169.62	0.00	37.57	0.00	60.95
	2.85	0.00	175.63	0.00	37.57	0.00	142.26
INDK30	ULTBLK MIN						
	1.5E-01	0.00	-163.05	0.00	-33.86	0.00	-281.76
	1.50	0.00	-157.04	0.00	-33.86	0.00	-66.04
	2.85	0.00	-151.04	0.00	-33.86	0.00	-172.43
INDK31	ULTBLK MAX						
	1.5E-01	0.00	140.17	0.00	43.22	0.00	275.30
	1.50	0.00	165.39	0.00	43.22	0.00	70.46
	2.85	0.00	194.97	0.00	43.22	0.00	158.87
INDK31	ULTBLK MIN						
	1.5E-01	0.00	-190.91	0.00	-38.84	0.00	-286.53
	1.50	0.00	-165.69	0.00	-38.84	0.00	-45.28
	2.85	0.00	-136.12	0.00	-38.84	0.00	-173.22
INDK32	ULTBLK MAX						
	2.0E-01	0.00	4.17	0.00	2.948E-01	0.00	199.28
	4.50	0.00	59.11	0.00	2.948E-01	0.00	101.46
	8.80	0.00	124.70	0.00	2.948E-01	0.00	134.10
INDK32	ULTBLK MIN						
	2.0E-01	0.00	-121.93	0.00	-1.800E-01	0.00	-350.49

		4.50	0.00	-56.35	0.00	-1.000E-01	0.00	26.29
		8.80	0.00	-2.55	0.00	-1.000E-01	0.00	-309.10
INDK33	ULTBLK MAX							
		2.0E-01	0.00	153.50	0.00	19.66	0.00	246.43
		1.53	0.00	169.34	0.00	19.66	0.00	34.23
		2.85	0.00	184.61	0.00	19.66	0.00	185.62
INDK33	ULTBLK MIN							
		2.0E-01	0.00	-199.98	0.00	-22.08	0.00	-302.72
		1.53	0.00	-184.14	0.00	-22.08	0.00	-46.56
		2.85	0.00	-168.87	0.00	-22.08	0.00	-201.95
INDK34	ULTBLK MAX							
		1.5E-01	0.00	104.82	0.00	10.69	0.00	316.56
		2.98	0.00	149.15	0.00	10.69	0.00	4.37
		5.80	0.00	194.11	0.00	10.69	0.00	173.80
INDK34	ULTBLK MIN							
		1.5E-01	0.00	-128.66	0.00	-9.35	0.00	-304.87
		2.98	0.00	-84.34	0.00	-9.35	0.00	-33.80
		5.80	0.00	-48.23	0.00	-9.35	0.00	-526.55
INDK35	ULTBLK MAX							
		1.5E-01	0.00	92.31	0.00	5.69	0.00	291.77
		2.98	0.00	136.64	0.00	5.69	0.00	29.54
		5.80	0.00	181.59	0.00	5.69	0.00	224.63
INDK35	ULTBLK MIN							
		1.5E-01	0.00	-138.66	0.00	-12.65	0.00	-307.93
		2.98	0.00	-94.33	0.00	-12.65	0.00	-25.05
		5.80	0.00	-55.33	0.00	-12.65	0.00	-480.64
INDK36	ULTBLK MAX							
		1.5E-01	0.00	91.95	0.00	69.51	0.00	139.31
		8.3E-01	0.00	94.96	0.00	69.51	0.00	76.22
		1.50	0.00	97.96	0.00	69.51	0.00	17.01
INDK36	ULTBLK MIN							
		1.5E-01	0.00	-141.73	0.00	-45.01	0.00	-185.35
		8.3E-01	0.00	-138.73	0.00	-45.01	0.00	-90.69
		1.50	0.00	-135.73	0.00	-45.01	0.00	-4.68
INDK37	ULTBLK MAX							
		2.0E-01	0.00	41.24	0.00	54.40	0.00	258.70
		1.60	0.00	65.55	0.00	54.40	0.00	185.93
		3.00	0.00	90.25	0.00	54.40	0.00	102.16
INDK37	ULTBLK MIN							
		2.0E-01	0.00	-211.47	0.00	-23.18	0.00	-441.80
		1.60	0.00	-185.65	0.00	-23.18	0.00	-162.90
		3.00	0.00	-160.94	0.00	-23.18	0.00	48.76
INDK38	ULTBLK MAX							
		2.0E-01	0.00	30.81	0.00	8.62	0.00	239.67
		1.60	0.00	55.14	0.00	8.62	0.00	187.19
		3.00	0.00	88.40	0.00	8.62	0.00	117.73
INDK38	ULTBLK MIN							
		2.0E-01	0.00	-226.73	0.00	-40.47	0.00	-457.63
		1.60	0.00	-195.44	0.00	-40.47	0.00	-160.30
		3.00	0.00	-161.59	0.00	-40.47	0.00	54.85
INDK39	ULTBLK MAX							
		0.00	0.00	64.16	0.00	15.99	0.00	36.57
		1.43	0.00	79.81	0.00	15.99	0.00	84.00
		2.85	0.00	91.48	0.00	15.99	0.00	132.48
INDK39	ULTBLK MIN							
		0.00	0.00	-56.24	0.00	-17.17	0.00	1.33
		1.43	0.00	-40.59	0.00	-17.17	0.00	-75.03
		2.85	0.00	-29.38	0.00	-17.17	0.00	-198.11
INDK40	ULTBLK MAX							
		1.5E-01	0.00	105.36	0.00	39.44	0.00	155.46
		1.50	0.00	134.93	0.00	39.44	0.00	11.13
		2.85	0.00	160.16	0.00	39.44	0.00	162.42
INDK40	ULTBLK MIN							
		1.5E-01	0.00	-154.98	0.00	-46.04	0.00	-178.14
		1.50	0.00	-125.41	0.00	-46.04	0.00	-6.74
		2.85	0.00	-100.18	0.00	-46.04	0.00	-206.91
INDK41	ULTBLK MAX							
		0.00	0.00	117.65	0.00	22.13	0.00	16.22
		6.8E-01	0.00	122.83	0.00	22.13	0.00	84.93
		1.35	0.00	128.92	0.00	22.13	0.00	162.32
INDK41	ULTBLK MIN							
		0.00	0.00	-123.20	0.00	-20.62	0.00	-5.14
		6.8E-01	0.00	-118.03	0.00	-20.62	0.00	-72.53
		1.35	0.00	-111.94	0.00	-20.62	0.00	-157.72
INDK42	ULTBLK MAX							
		1.5E-01	0.00	-7.03	0.00	-1.62	0.00	113.42
		1.58	0.00	6.36	0.00	-1.62	0.00	134.48

INDK42	ULTBLK	3.00	0.00	18.66	0.00	-1.62	0.00	172.09
		MIN						
		1.5E-01	0.00	-154.29	0.00	-21.83	0.00	-249.66
		1.50	0.00	-133.63	0.00	-21.83	0.00	-43.14
		3.00	0.00	-114.92	0.00	-21.83	0.00	66.46
INDK43	ULTBLK	MAX						
		0.00	0.00	182.92	0.00	32.55	0.00	209.24
		1.40	0.00	198.51	0.00	32.55	0.00	139.56
		2.80	0.00	216.67	0.00	32.55	0.00	100.71
INDK43	ULTBLK	MIN						
		0.00	0.00	-9.49	0.00	-52.42	0.00	80.18
		1.40	0.00	1.05	0.00	-52.42	0.00	-105.20
		2.80	0.00	13.02	0.00	-52.42	0.00	-390.77
INDK44	ULTBLK	MAX						
		2.0E-01	0.00	11.33	0.00	25.04	0.00	150.39
		1.60	0.00	23.30	0.00	25.04	0.00	153.58
		3.00	0.00	33.84	0.00	25.04	0.00	204.15
INDK44	ULTBLK	MIN						
		2.0E-01	0.00	-217.92	0.00	-46.01	0.00	-403.72
		1.60	0.00	-199.76	0.00	-46.01	0.00	-109.22
		3.00	0.00	-184.18	0.00	-46.01	0.00	56.73
INDK45	ULTBLK	MAX						
		0.00	0.00	155.92	0.00	57.49	0.00	194.28
		1.40	0.00	171.51	0.00	57.49	0.00	160.27
		2.80	0.00	189.67	0.00	57.49	0.00	150.82
INDK45	ULTBLK	MIN						
		0.00	0.00	-32.39	0.00	-16.49	0.00	50.60
		1.40	0.00	-21.86	0.00	-16.49	0.00	-89.09
		2.80	0.00	-9.89	0.00	-16.49	0.00	-336.51
INDK46	ULTBLK	MAX						
		2.0E-01	0.00	178.42	0.00	46.25	0.00	248.36
		1.53	0.00	195.22	0.00	46.25	0.00	4.09
		2.85	0.00	211.39	0.00	46.25	0.00	268.43
INDK46	ULTBLK	MIN						
		2.0E-01	0.00	-247.60	0.00	-18.91	0.00	-343.60
		1.53	0.00	-230.80	0.00	-18.91	0.00	-24.81
		2.85	0.00	-214.63	0.00	-18.91	0.00	-268.57
INDK47	ULTBLK	MAX						
		0.00	0.00	159.56	0.00	25.99	0.00	102.25
		1.40	0.00	184.26	0.00	25.99	0.00	189.54
		2.80	0.00	210.08	0.00	25.99	0.00	263.18
INDK47	ULTBLK	MIN						
		0.00	0.00	-91.01	0.00	-54.65	0.00	48.91
		1.40	0.00	-66.30	0.00	-54.65	0.00	-163.34
		2.80	0.00	-41.57	0.00	-54.65	0.00	-440.12
INDK48	ULTBLK	MAX						
		0.00	0.00	159.00	0.00	42.18	0.00	117.64
		1.40	0.00	192.84	0.00	42.18	0.00	193.64
		2.80	0.00	224.13	0.00	42.18	0.00	250.59
INDK48	ULTBLK	MIN						
		0.00	0.00	-91.53	0.00	-10.15	0.00	54.86
		1.40	0.00	-57.68	0.00	-10.15	0.00	-158.90
		2.80	0.00	-33.22	0.00	-10.15	0.00	-452.68
INDK49	ULTBLK	MAX						
		1.5E-01	0.00	26.82	0.00	8.71	0.00	138.95
		1.58	0.00	40.95	0.00	8.71	0.00	94.97
		3.00	0.00	61.01	0.00	8.71	0.00	35.44
INDK49	ULTBLK	MIN						
		1.5E-01	0.00	-94.42	0.00	-7.02	0.00	-196.94
		1.58	0.00	-77.42	0.00	-7.02	0.00	-72.61
		3.00	0.00	-57.35	0.00	-7.02	0.00	3.15
INDK50	ULTBLK	MAX						
		1.5E-01	0.00	107.39	0.00	5.19	0.00	156.48
		1.50	0.00	123.56	0.00	5.19	0.00	13.06
		2.85	0.00	139.74	0.00	5.19	0.00	145.53
INDK50	ULTBLK	MIN						
		1.5E-01	0.00	-126.49	0.00	-7.749E-01	0.00	-152.32
		1.50	0.00	-110.32	0.00	-7.749E-01	0.00	-2.46
		2.85	0.00	-94.14	0.00	-7.749E-01	0.00	-177.14
INDK51	ULTBLK	MAX						
		2.0E-01	0.00	-93.77	0.00	46.57	0.00	-59.02
		1.60	0.00	-81.80	0.00	46.57	0.00	65.06
		3.00	0.00	-71.26	0.00	46.57	0.00	222.22
INDK51	ULTBLK	MIN						
		2.0E-01	0.00	-293.64	0.00	-14.37	0.00	-699.29
		1.60	0.00	-267.95	0.00	-14.37	0.00	-309.32
		3.00	0.00	-252.37	0.00	-14.37	0.00	25.70

INDK52	ULTBLK MAX						
	2.0E-01	0.00	-32.47	0.00	-7.56	0.00	50.01
	1.60	0.00	-20.50	0.00	-7.56	0.00	102.45
	3.00	0.00	-9.96	0.00	-7.56	0.00	151.31
INDK52	ULTBLK MIN						
	2.0E-01	0.00	-210.75	0.00	-61.65	0.00	-551.70
	1.60	0.00	-200.59	0.00	-61.65	0.00	-256.12
	3.00	0.00	-185.00	0.00	-61.65	0.00	-3.37
INDK53	ULTBLK MAX						
	1.5E-01	0.00	97.10	0.00	0.91	0.00	159.06
	1.50	0.00	122.33	0.00	0.91	0.00	13.55
	2.85	0.00	147.55	0.00	0.91	0.00	150.94
INDK53	ULTBLK MIN						
	1.5E-01	0.00	-153.27	0.00	-43.79	0.00	-194.79
	1.50	0.00	-128.05	0.00	-43.79	0.00	-5.55
	2.85	0.00	-102.82	0.00	-43.79	0.00	-171.22
INDK54	ULTBLK MAX						
	2.0E-01	0.00	6.96	0.00	2.241E-01	0.00	214.78
	4.50	0.00	62.42	0.00	2.241E-01	0.00	102.96
	8.80	0.00	120.00	0.00	2.241E-01	0.00	142.30
INDK54	ULTBLK MIN						
	2.0E-01	0.00	-123.45	0.00	-1.195E-01	0.00	-355.33
	4.50	0.00	-57.86	0.00	-1.195E-01	0.00	27.84
	8.80	0.00	-3.90	0.00	-1.195E-01	0.00	-322.05
INDK55	ULTBLK MAX						
	1.5E-01	0.00	-35.01	0.00	-5.42	0.00	-36.19
	1.58	0.00	-24.90	0.00	-5.42	0.00	7.83
	3.00	0.00	-15.90	0.00	-5.42	0.00	57.60
INDK55	ULTBLK MIN						
	1.5E-01	0.00	-96.07	0.00	-22.46	0.00	-151.82
	1.58	0.00	-70.84	0.00	-22.46	0.00	-44.34
	3.00	0.00	-51.27	0.00	-22.46	0.00	24.81
INDK56	ULTBLK MAX						
	2.0E-01	0.00	134.88	0.00	20.74	0.00	257.77
	1.53	0.00	150.72	0.00	20.74	0.00	70.25
	2.85	0.00	165.99	0.00	20.74	0.00	146.80
INDK56	ULTBLK MIN						
	2.0E-01	0.00	-190.82	0.00	-20.00	0.00	-338.48
	2.85	0.00	-167.71	0.00	-20.00	0.00	-141.25
INDK57	ULTBLK MAX						
	1.5E-01	0.00	62.45	0.00	2.80	0.00	113.10
	2.50	0.00	79.49	0.00	2.80	0.00	9.09
	4.85	0.00	96.53	0.00	2.80	0.00	78.86
INDK57	ULTBLK MIN						
	1.5E-01	0.00	-54.38	0.00	-5.75	0.00	-103.68
	2.50	0.00	-37.34	0.00	-5.75	0.00	-55.34
	4.85	0.00	-26.04	0.00	-5.75	0.00	-263.56
INDK58	ULTBLK MAX						
	1.5E-01	0.00	-13.94	0.00	19.40	0.00	-8.82
	1.33	0.00	-7.16	0.00	19.40	0.00	7.50
	2.50	0.00	-4.025E-02	0.00	19.40	0.00	18.64
INDK58	ULTBLK MIN						
	1.5E-01	0.00	-33.70	0.00	7.82	0.00	-30.49
	1.33	0.00	-20.04	0.00	7.82	0.00	-1.92
	2.50	0.00	-5.22	0.00	7.82	0.00	2.76
INDK59	ULTBLK MAX						
	2.0E-01	0.00	38.79	0.00	55.38	0.00	256.52
	1.60	0.00	62.79	0.00	55.38	0.00	187.61
	3.00	0.00	87.50	0.00	55.38	0.00	99.04
INDK59	ULTBLK MIN						
	2.0E-01	0.00	-203.89	0.00	-24.79	0.00	-431.51
	1.60	0.00	-178.07	0.00	-24.79	0.00	-163.22
	3.00	0.00	-153.36	0.00	-24.79	0.00	45.20
INDK60	ULTBLK MAX						
	2.0E-01	0.00	28.74	0.00	9.46	0.00	239.35
	1.60	0.00	53.07	0.00	9.46	0.00	189.75
	3.00	0.00	86.33	0.00	9.46	0.00	114.19
INDK60	ULTBLK MIN						
	2.0E-01	0.00	-219.28	0.00	-42.99	0.00	-447.15
	1.60	0.00	-187.99	0.00	-42.99	0.00	-160.24
	3.00	0.00	-154.14	0.00	-42.99	0.00	51.24
INDK61	ULTBLK MAX						
	0.00	0.00	44.75	0.00	5.01	0.00	30.71
	1.43	0.00	64.81	0.00	5.01	0.00	82.55
	2.85	0.00	81.82	0.00	5.01	0.00	116.49
INDK61	ULTBLK MIN						
	0.00	0.00	-54.07	0.00	-15.98	0.00	-10.86
	1.43	0.00	-34.00	0.00	-15.98	0.00	-71.60

		2.85	0.00	-21.58	0.00	-15.98	0.00	-177.82
INDK62	ULTBLK MAX							
	1.5E-01	0.00		83.05	0.00	29.07	0.00	144.02
	1.50	0.00		99.68	0.00	29.07	0.00	26.72
	2.85	0.00		116.32	0.00	29.07	0.00	157.13
INDK62	ULTBLK MIN							
	1.5E-01	0.00		-137.39	0.00	11.23	0.00	-169.06
	1.50	0.00		-120.75	0.00	11.23	0.00	7.927E-03
	2.85	0.00		-104.11	0.00	11.23	0.00	-125.28
INDK63	ULTBLK MAX							
	0.00	0.00		-23.32	0.00	19.84	0.00	209.21
	1.40	0.00		-12.78	0.00	19.84	0.00	297.98
	2.80	0.00		-8.130E-01	0.00	19.84	0.00	389.70
INDK63	ULTBLK MIN							
	0.00	0.00		-120.56	0.00	2.08	0.00	3.58
	1.40	0.00		-104.15	0.00	2.08	0.00	127.90
	2.80	0.00		-84.94	0.00	2.08	0.00	197.30
INDK64	ULTBLK MAX							
	0.00	0.00		-6.17	0.00	-8.14	0.00	153.03
	1.40	0.00		4.36	0.00	-8.14	0.00	178.09
	2.80	0.00		20.90	0.00	-8.14	0.00	211.97
INDK64	ULTBLK MIN							
	0.00	0.00		-82.67	0.00	-27.74	0.00	-19.53
	1.40	0.00		-66.26	0.00	-27.74	0.00	54.65
	2.80	0.00		-47.05	0.00	-27.74	0.00	79.08
INDK65	ULTBLK MAX							
	1.5E-01	0.00		87.58	0.00	-9.22	0.00	148.04
	1.50	0.00		105.15	0.00	-9.22	0.00	25.62
	2.85	0.00		122.73	0.00	-9.22	0.00	178.41
INDK65	ULTBLK MIN							
	1.5E-01	0.00		-149.80	0.00	-31.92	0.00	-178.61
	1.50	0.00		-132.23	0.00	-31.92	0.00	6.11
	2.85	0.00		-114.66	0.00	-31.92	0.00	-135.87
INDK66	ULTBLK MAX							
	0.00	0.00		-13.93	0.00	-2.76	0.00	-7.61
	1.50	0.00		-5.22	0.00	-2.76	0.00	16.60
	3.00	0.00		5.22	0.00	-2.76	0.00	19.48
INDK66	ULTBLK MIN							
	0.00	0.00		-29.98	0.00	-18.64	0.00	-17.67
	1.50	0.00		-12.38	0.00	-18.64	0.00	6.94
	3.00	0.00		4.025E-02	0.00	-18.64	0.00	7.82
INDK67	ULTBLK MAX							
	1.5E-01	0.00		-80.61	0.00	20.37	0.00	-87.83
	1.50	0.00		-56.11	0.00	20.37	0.00	25.02
	3.00	0.00		-32.71	0.00	20.37	0.00	132.34
INDK67	ULTBLK MIN							
	1.5E-01	0.00		-202.66	0.00	-25.08	0.00	-382.48
	1.50	0.00		-160.21	0.00	-25.08	0.00	-160.12
	3.00	0.00		-120.89	0.00	-25.08	0.00	-1.14
INDK68	ULTBLK MAX							
	0.00	0.00		-36.16	0.00	3.01	0.00	100.42
	1.40	0.00		-13.26	0.00	3.01	0.00	157.59
	2.80	0.00		12.77	0.00	3.01	0.00	192.43
INDK68	ULTBLK MIN							
	0.00	0.00		-86.85	0.00	-9.95	0.00	-24.06
	1.40	0.00		-55.35	0.00	-9.95	0.00	54.71
	2.80	0.00		-23.03	0.00	-9.95	0.00	95.50
INDK69	ULTBLK MAX							
	2.0E-01	0.00		-32.36	0.00	1.785E-01	0.00	174.94
	1.60	0.00		-8.03	0.00	1.785E-01	0.00	252.79
INDK69	ULTBLK MIN							
	2.0E-01	0.00		-74.43	0.00	-1.35	0.00	79.06
	1.60	0.00		-37.01	0.00	-1.35	0.00	129.56
	3.00	0.00		-7.22	0.00	-1.35	0.00	128.91
INDK70	ULTBLK MAX							
	0.00	0.00		45.98	0.00	4.14	0.00	284.37
	1.40	0.00		75.78	0.00	4.14	0.00	217.40
	2.80	0.00		111.91	0.00	4.14	0.00	140.77
INDK70	ULTBLK MIN							
	0.00	0.00		-4.91	0.00	-3.78	0.00	142.02
	1.40	0.00		17.99	0.00	-3.78	0.00	87.11
	2.80	0.00		42.31	0.00	-3.78	0.00	-13.38
INDK71	ULTBLK MAX							
	2.0E-01	0.00		144.53	0.00	33.06	0.00	165.06
	1.53	0.00		174.74	0.00	33.06	0.00	73.10
	2.85	0.00		211.92	0.00	33.06	0.00	-21.54
INDK71	ULTBLK MIN							

		2.0E-01	0.00	35.79	0.00	-20.14	0.00	-11.56
		1.53	0.00	58.60	0.00	-20.14	0.00	-213.91
		2.85	0.00	81.05	0.00	-20.14	0.00	-466.85
INDK72	ULTBLK MAX							
		1.5E-01	0.00	-27.83	0.00	17.67	0.00	-58.88
		1.33	0.00	-21.05	0.00	17.67	0.00	-26.76
		2.50	0.00	-13.93	0.00	17.67	0.00	-2.76
INDK72	ULTBLK MIN							
		1.5E-01	0.00	-58.46	0.00	7.61	0.00	-119.69
		1.33	0.00	-44.80	0.00	7.61	0.00	-57.83
		2.50	0.00	-29.98	0.00	7.61	0.00	-18.64
INDK73	ULTBLK MAX							
		0.00	0.00	156.99	0.00	28.61	0.00	99.06
		1.40	0.00	181.69	0.00	28.61	0.00	168.55
		2.80	0.00	207.51	0.00	28.61	0.00	232.25
INDK73	ULTBLK MIN							
		0.00	0.00	-83.90	0.00	-50.09	0.00	45.36
		1.40	0.00	-59.20	0.00	-50.09	0.00	-154.25
		2.80	0.00	-35.58	0.00	-50.09	0.00	-427.43
INDK74	ULTBLK MAX							
		0.00	0.00	156.71	0.00	36.46	0.00	114.17
		1.40	0.00	190.55	0.00	36.46	0.00	172.19
		2.80	0.00	221.84	0.00	36.46	0.00	218.00
INDK74	ULTBLK MIN							
		0.00	0.00	-83.57	0.00	-11.07	0.00	51.34
		1.40	0.00	-51.02	0.00	-11.07	0.00	-150.16
		2.80	0.00	-26.68	0.00	-11.07	0.00	-440.74
INDK75	ULTBLK MAX							
		1.5E-01	0.00	25.54	0.00	15.24	0.00	111.60
		1.58	0.00	38.96	0.00	15.24	0.00	70.50
		3.00	0.00	59.03	0.00	15.24	0.00	31.57
INDK75	ULTBLK MIN							
		1.5E-01	0.00	-84.79	0.00	-1.84	0.00	-167.71
		1.58	0.00	-67.79	0.00	-1.84	0.00	-57.15
		3.00	0.00	-47.72	0.00	-1.84	0.00	-11.90
INDK76	ULTBLK MAX							
		1.5E-01	0.00	107.56	0.00	-20.11	0.00	176.45
		1.50	0.00	137.63	0.00	-20.11	0.00	23.35
		2.85	0.00	172.06	0.00	-20.11	0.00	139.22
INDK76	ULTBLK MIN							
		1.5E-01	0.00	-135.37	0.00	-43.21	0.00	-143.12
		1.50	0.00	-105.29	0.00	-43.21	0.00	7.38
		2.85	0.00	-70.87	0.00	-43.21	0.00	-197.11
INDK77	ULTBLK MAX							
		1.5E-01	0.00	107.08	0.00	61.53	0.00	167.89
		1.50	0.00	131.61	0.00	61.53	0.00	14.80
		2.85	0.00	159.90	0.00	61.53	0.00	132.51
INDK77	ULTBLK MIN							
		1.5E-01	0.00	-126.48	0.00	3.60	0.00	-141.08
		1.50	0.00	-101.96	0.00	3.60	0.00	5.54
		2.85	0.00	-73.66	0.00	3.60	0.00	-189.14
INDK78	ULTBLK MAX							
		2.0E-01	0.00	-25.47	0.00	-1.413E-01	0.00	167.35
		2.35	0.00	8.02	0.00	-1.413E-01	0.00	205.72
		4.50	0.00	45.56	0.00	-1.413E-01	0.00	161.80
INDK78	ULTBLK MIN							
		2.0E-01	0.00	-155.45	0.00	-24.46	0.00	-389.20
		2.35	0.00	-113.89	0.00	-24.46	0.00	-97.41
		4.50	0.00	-72.30	0.00	-24.46	0.00	75.15
INDK79	ULTBLK MAX							
		0.00	0.00	68.97	0.00	24.69	0.00	162.08
		2.15	0.00	119.70	0.00	24.69	0.00	145.89
		4.30	0.00	171.63	0.00	24.69	0.00	76.15
INDK79	ULTBLK MIN							
		0.00	0.00	-45.43	0.00	3.259E-01	0.00	72.69
		2.15	0.00	-1.05	0.00	3.259E-01	0.00	-44.39
		4.30	0.00	38.75	0.00	3.259E-01	0.00	-362.18
INDK80	ULTBLK MAX							
		2.0E-01	0.00	113.72	0.00	22.11	0.00	210.08
		1.53	0.00	129.56	0.00	22.11	0.00	50.58
		2.85	0.00	144.83	0.00	22.11	0.00	108.68
INDK80	ULTBLK MIN							
		2.0E-01	0.00	-183.72	0.00	-18.19	0.00	-336.57
		1.53	0.00	-167.88	0.00	-18.19	0.00	-101.95
		2.85	0.00	-152.61	0.00	-18.19	0.00	-132.89
INDK81	ULTBLK MAX							
		1.5E-01	0.00	50.90	0.00	4.27	0.00	91.90

		2.50	0.00	64.65	0.00	4.27	0.00	42.14
		4.85	0.00	78.40	0.00	4.27	0.00	166.04
INDK81	ULTBLK MIN							
		1.5E-01	0.00	-73.70	0.00	-1.06	0.00	-115.73
		2.50	0.00	-59.95	0.00	-1.06	0.00	-43.04
		4.85	0.00	-46.21	0.00	-1.06	0.00	-211.96
INDK82	ULTBLK MAX							
		2.0E-01	0.00	53.55	0.00	-2.93	0.00	391.39
		3.03	0.00	123.33	0.00	-2.93	0.00	282.27
		5.85	0.00	205.59	0.00	-2.93	0.00	47.25
INDK82	ULTBLK MIN							
		2.0E-01	0.00	-18.66	0.00	-22.74	0.00	191.98
		3.03	0.00	35.04	0.00	-22.74	0.00	2.00
		5.85	0.00	88.38	0.00	-22.74	0.00	-432.78
INDK83	ULTBLK MAX							
		2.0E-01	0.00	21.03	0.00	41.43	0.00	210.72
		3.03	0.00	90.80	0.00	41.43	0.00	236.58
		5.85	0.00	160.03	0.00	41.43	0.00	97.47
INDK83	ULTBLK MIN							
		2.0E-01	0.00	-57.81	0.00	20.73	0.00	79.34
		3.03	0.00	4.71	0.00	20.73	0.00	-8.23
		5.85	0.00	58.06	0.00	20.73	0.00	-357.16
INDK84	ULTBLK MAX							
		2.0E-01	0.00	38.55	0.00	64.41	0.00	251.72
		1.60	0.00	58.99	0.00	64.41	0.00	183.58
		3.00	0.00	79.63	0.00	64.41	0.00	189.41
INDK84	ULTBLK MIN							
		2.0E-01	0.00	-271.61	0.00	-9.82	0.00	-513.28
		1.60	0.00	-250.96	0.00	-9.82	0.00	-147.49
		3.00	0.00	-230.32	0.00	-9.82	0.00	66.37
INDK85	ULTBLK MAX							
		2.0E-01	0.00	45.83	0.00	-3.95	0.00	245.35
		1.60	0.00	57.81	0.00	-3.95	0.00	182.24
		3.00	0.00	74.49	0.00	-3.95	0.00	196.51
INDK85	ULTBLK MIN							
		2.0E-01	0.00	-272.18	0.00	-55.60	0.00	-517.51
		1.60	0.00	-255.31	0.00	-55.60	0.00	-146.64
		3.00	0.00	-235.87	0.00	-55.60	0.00	62.71
INDK86	ULTBLK MAX							
		1.5E-01	0.00	121.97	0.00	4.20	0.00	132.20
		1.50	0.00	151.54	0.00	4.20	0.00	80.68
		2.85	0.00	176.77	0.00	4.20	0.00	302.65
INDK86	ULTBLK MIN							
		1.5E-01	0.00	-207.38	0.00	-3.88	0.00	-179.39
		1.50	0.00	-177.81	0.00	-3.88	0.00	-52.49
		2.85	0.00	-152.58	0.00	-3.88	0.00	-275.01
INDK87	ULTBLK MAX							
		1.5E-01	0.00	125.22	0.00	49.94	0.00	143.74
		1.50	0.00	153.52	0.00	49.94	0.00	79.13
		2.85	0.00	178.04	0.00	49.94	0.00	319.14
INDK87	ULTBLK MIN							
		1.5E-01	0.00	-219.25	0.00	-41.06	0.00	-198.13
		1.50	0.00	-190.95	0.00	-41.06	0.00	-44.78
		2.85	0.00	-166.43	0.00	-41.06	0.00	-269.06
INDK88	ULTBLK MAX							
		1.5E-01	0.00	55.13	0.00	6.13	0.00	254.71
		3.00	0.00	82.45	0.00	6.13	0.00	62.53
		5.85	0.00	109.77	0.00	6.13	0.00	152.36
INDK88	ULTBLK MIN							
		3.00	0.00	-73.01	0.00	-6.89	0.00	-14.11
		5.85	0.00	-45.68	0.00	-6.89	0.00	-215.31
INDK89	ULTBLK MAX							
		1.5E-01	0.00	103.59	0.00	57.53	0.00	207.07
		1.50	0.00	128.11	0.00	57.53	0.00	51.51
		2.85	0.00	152.64	0.00	57.53	0.00	107.02
INDK89	ULTBLK MIN							
		1.5E-01	0.00	-143.13	0.00	-11.42	0.00	-213.21
		1.50	0.00	-118.60	0.00	-11.42	0.00	-35.69
		2.85	0.00	-94.08	0.00	-11.42	0.00	-138.84
INDK90	ULTBLK MAX							
		1.5E-01	0.00	68.60	0.00	40.55	0.00	122.95
		1.50	0.00	93.12	0.00	40.55	0.00	19.35
		2.85	0.00	117.64	0.00	40.55	0.00	118.71
INDK90	ULTBLK MIN							
		1.5E-01	0.00	-115.94	0.00	16.36	0.00	-128.13
		1.50	0.00	-91.42	0.00	16.36	0.00	5.81
		2.85	0.00	-66.90	0.00	16.36	0.00	-128.47

INDK91	ULTBLK MAX						
	1.5E-01	0.00	77.52	0.00	5.67	0.00	133.34
	1.50	0.00	102.04	0.00	5.67	0.00	16.24
	2.85	0.00	126.56	0.00	5.67	0.00	102.81
INDK91	ULTBLK MIN						
	1.5E-01	0.00	-104.07	0.00	-16.75	0.00	-111.98
	1.50	0.00	-79.55	0.00	-16.75	0.00	9.33
	2.85	0.00	-55.03	0.00	-16.75	0.00	-142.17
INDK92	ULTBLK MAX						
	1.5E-01	0.00	55.23	0.00	4.24	0.00	107.27
	1.50	0.00	79.75	0.00	4.24	0.00	19.14
	2.85	0.00	104.27	0.00	4.24	0.00	130.48
INDK92	ULTBLK MIN						
	1.5E-01	0.00	-126.40	0.00	-29.34	0.00	-144.60
	1.50	0.00	-101.88	0.00	-29.34	0.00	5.88
	2.85	0.00	-77.36	0.00	-29.34	0.00	-108.06
INDK93	ULTBLK MAX						
	1.5E-01	0.00	116.05	0.00	-9.39	0.00	124.82
	1.50	0.00	140.57	0.00	-9.39	0.00	67.28
	2.85	0.00	165.10	0.00	-9.39	0.00	235.22
INDK93	ULTBLK MIN						
	1.5E-01	0.00	-161.81	0.00	-57.26	0.00	-135.47
	1.50	0.00	-137.29	0.00	-57.26	0.00	-47.56
	2.85	0.00	-112.77	0.00	-57.26	0.00	-254.73
INDK94	ULTBLK MAX						
	0.00	0.00	202.42	0.00	17.69	0.00	176.72
	1.40	0.00	228.66	0.00	17.69	0.00	306.19
	2.80	0.00	256.01	0.00	17.69	0.00	396.14
INDK94	ULTBLK MIN						
	0.00	0.00	-104.78	0.00	-64.25	0.00	79.98
	1.40	0.00	-78.55	0.00	-64.25	0.00	-197.95
	2.80	0.00	-51.19	0.00	-64.25	0.00	-538.08
INDK95	ULTBLK MAX						
	0.00	0.00	204.71	0.00	56.17	0.00	187.38
	1.40	0.00	226.84	0.00	56.17	0.00	299.57
	2.80	0.00	246.34	0.00	56.17	0.00	389.18
INDK95	ULTBLK MIN						
	0.00	0.00	-96.94	0.00	-1.56	0.00	77.49
	1.40	0.00	-74.81	0.00	-1.56	0.00	-193.33
	2.80	0.00	-58.27	0.00	-1.56	0.00	-526.04
INDK96	ULTBLK MAX						
	2.0E-01	0.00	-48.17	0.00	63.65	0.00	151.36
	1.10	0.00	-34.51	0.00	63.65	0.00	203.59
	2.00	0.00	-21.52	0.00	63.65	0.00	240.40
INDK96	ULTBLK MIN						
	2.0E-01	0.00	-215.59	0.00	-10.45	0.00	-482.72
	1.10	0.00	-198.74	0.00	-10.45	0.00	-295.92
	2.00	0.00	-182.95	0.00	-10.45	0.00	-124.54
INDK97	ULTBLK MAX						
	0.00	0.00	-6.107E-01	0.00	22.52	0.00	241.11
	1.00	0.00	14.02	0.00	22.52	0.00	238.05
	2.00	0.00	30.36	0.00	22.52	0.00	216.10
INDK97	ULTBLK MIN						
	0.00	0.00	-134.95	0.00	-2.63	0.00	-123.52
	1.00	0.00	-117.10	0.00	-2.63	0.00	-5.51
	2.00	0.00	-99.25	0.00	-2.63	0.00	83.92
INDK98	ULTBLK MAX						
	0.00	0.00	63.53	0.00	7.52	0.00	219.48
	1.00	0.00	81.38	0.00	7.52	0.00	190.60
	2.00	0.00	99.24	0.00	7.52	0.00	187.03
INDK98	ULTBLK MIN						
	0.00	0.00	-57.48	0.00	-10.71	0.00	81.34
	1.00	0.00	-39.63	0.00	-10.71	0.00	115.76
	2.00	0.00	-21.78	0.00	-10.71	0.00	40.11
INDK99	ULTBLK MAX						
	0.00	0.00	140.23	0.00	3.46	0.00	184.51
	8.8E-01	0.00	155.85	0.00	3.46	0.00	166.61
	1.75	0.00	171.47	0.00	3.46	0.00	134.25
INDK99	ULTBLK MIN						
	0.00	0.00	5.87	0.00	-33.11	0.00	42.32
	8.8E-01	0.00	18.67	0.00	-33.11	0.00	-69.83
	1.75	0.00	31.47	0.00	-33.11	0.00	-213.43
RING10	ULTBLK MAX						
	0.00	83.55	6.73	25.10	28.45	144.90	41.87
	3.00	83.55	14.15	25.10	28.45	69.60	11.45
	6.00	83.55	21.56	25.10	28.45	6.43	31.48
RING10	ULTBLK MIN						
	0.00	-97.17	-22.75	-25.44	-28.20	-146.19	-60.53



		3.00	-97.17	-15.33	-25.44	-28.20	-69.88	-4.30
		6.00	-97.17	-7.92	-25.44	-28.20	-5.70	-43.00
RING11	ULTBLK	MAX						
		0.00	-1.69	-4.78	5.776E-01	-1.741E-01	1.10	-9.397E-01
		6.00	-1.69	9.25	5.776E-01	-1.741E-01	-1.63	4.38
RING11	ULTBLK	MIN						
		0.00	-9.59	-10.95	1.675E-01	-2.10	-1.29	-16.33
		3.00	-9.59	-3.45	1.675E-01	-2.10	-1.85	3.86
		6.00	-9.59	3.40	1.675E-01	-2.10	-3.15	-12.08
RING12	ULTBLK	MAX						
		0.00	12.42	9.00	9.82	12.78	12.69	31.70
		3.00	12.42	16.42	9.82	12.78	15.93	14.13
		6.00	12.42	23.83	9.82	12.78	43.10	50.75
RING12	ULTBLK	MIN						
		0.00	-27.19	-23.33	-9.06	-12.78	-11.25	-44.73
		3.00	-27.19	-15.91	-9.06	-12.78	-16.77	-6.43
		6.00	-27.19	-8.50	-9.06	-12.78	-46.22	-66.80
RING13	ULTBLK	MAX						
		0.00	-1.64	-3.63	-5.474E-01	1.814E-01	-2.63	-4.741E-01
		3.00	-1.64	3.29	-5.474E-01	1.814E-01	3.56	3.48
		6.00	-1.64	10.70	-5.474E-01	1.814E-01	13.25	-1.27
RING13	ULTBLK	MIN						
		0.00	-14.73	-9.33	-3.65	-4.25	-8.90	-13.45
		3.00	-14.73	-1.92	-3.65	-4.25	-2.57	7.224E-01
		6.00	-14.73	4.62	-3.65	-4.25	4.204E-01	-20.22
RING14	ULTBLK	MAX						
		0.00	69.44	15.99	16.49	7.99	72.29	14.18
		3.00	69.44	23.40	16.49	7.99	38.95	54.94
		6.00	69.44	30.82	16.49	7.99	53.35	114.43
RING14	ULTBLK	MIN						
		0.00	-78.42	-30.95	-17.11	-11.99	-77.04	-26.80
		3.00	-78.42	-23.54	-17.11	-11.99	-41.84	-44.91
		6.00	-78.42	-16.12	-17.11	-11.99	-54.38	-126.24
RING15	ULTBLK	MAX						
		0.00	-7.67	-6.69	2.85	13.90	7.12	-2.26
		4.50	-7.67	3.40	2.85	13.90	6.61	10.78
		9.00	-7.67	15.49	2.85	13.90	10.17	-4.91
RING15	ULTBLK	MIN						
		0.00	-22.05	-14.17	-7.924E-01	-13.41	1.06	-26.58
		4.50	-22.05	-2.24	-7.924E-01	-13.41	-7.00	6.13
		9.00	-22.05	7.54	-7.924E-01	-13.41	-19.80	-33.16
RING16	ULTBLK	MAX						
		0.00	11.29	-3.46	30.16	14.52	58.86	-3.762E-01
		1.50	11.29	-2.818E-01	30.16	14.52	13.63	10.54
		3.00	11.29	2.90	30.16	14.52	43.68	29.90
RING16	ULTBLK	MIN						
		0.00	-15.16	-19.55	-35.49	-12.36	-62.80	-18.34
		1.50	-15.16	-15.84	-35.49	-12.36	-9.56	4.217E-01
		3.00	-15.16	-12.13	-35.49	-12.36	-31.61	-1.576E-01
RING17	ULTBLK	MAX						
		0.00	11.60	7.00	20.44	20.73	39.28	28.48
		1.50	11.60	10.71	20.44	20.73	23.45	15.20
		3.00	11.60	14.41	20.44	20.73	41.19	13.46
RING17	ULTBLK	MIN						
		0.00	-15.41	-18.32	-22.65	-18.72	-43.93	-35.23
		1.50	-15.41	-14.61	-22.65	-18.72	-24.78	-10.53
		3.00	-15.41	-10.90	-22.65	-18.72	-39.21	-8.50
RING18	ULTBLK	MAX						
		0.00	8.63	2.95	6.07	13.75	19.16	11.14
		1.50	8.63	6.66	6.07	13.75	23.50	4.27
		3.00	8.63	10.36	6.07	13.75	29.09	1.22
RING18	ULTBLK	MIN						
		0.00	-12.68	-6.31	-5.71	-14.89	-17.54	-6.91
		1.50	-12.68	-2.61	-5.71	-14.89	-22.41	-5.613E-01
		3.00	-12.68	9.178E-01	-5.71	-14.89	-28.53	-9.14
RING19	ULTBLK	MAX						
		0.00	6.12	-1.02	1.50	14.54	16.20	1.37
		1.50	6.12	2.46	1.50	14.54	15.40	4.993E-01
		3.00	6.12	6.17	1.50	14.54	14.61	2.09
RING19	ULTBLK	MIN						
		0.00	-9.52	-6.84	-1.61	-13.89	-15.52	-7.31
		1.50	-9.52	-3.13	-1.61	-13.89	-14.56	7.852E-02
		3.00	-9.52	5.412E-01	-1.61	-13.89	-13.60	-6.01
RING20	ULTBLK	MAX						
		0.00	3.40	3.387E-01	1.31	8.24	8.54	3.65
		1.50	3.40	4.05	1.31	8.24	7.63	3.11
		3.00	3.40	7.75	1.31	8.24	7.33	6.56

RING20	ULTBLK	MIN	0.00	-6.78	-8.30	-5.151E-01	-8.24	-7.04	-7.44
			1.50	-6.78	-4.59	-5.151E-01	-8.24	-7.33	-5.326E-01
			3.00	-6.78	-8.839E-01	-5.151E-01	-8.24	-8.22	-8.72
RING21	ULTBLK	MAX	0.00	1.83	3.684E-01	2.07	4.20	4.02	5.20
			1.50	1.83	4.08	2.07	4.20	4.22	3.73
			3.00	1.83	7.78	2.07	4.20	4.76	5.44
RING21	ULTBLK	MIN	0.00	-4.76	-7.08	-4.910E-01	-5.66	-4.29	-6.03
			1.50	-4.76	-3.37	-4.910E-01	-5.66	-7.00	-7.967E-02
			3.00	-4.76	1.723E-01	-4.910E-01	-5.66	-10.05	-8.38
RING22	ULTBLK	MAX	0.00	83.98	106.73	13.27	36.79	14.43	118.51
			1.50	83.98	110.44	13.27	36.79	23.87	43.24
			3.00	83.98	114.15	13.27	36.79	38.27	208.00
RING22	ULTBLK	MIN	0.00	-87.16	-115.40	-11.41	-37.92	-13.71	-127.09
			1.50	-87.16	-111.70	-11.41	-37.92	-25.95	-44.37
			3.00	-87.16	-107.99	-11.41	-37.92	-43.14	-212.81
RING23	ULTBLK	MAX	0.00	8.451E-01	1.05	1.17	3.659E-01	3.59	7.33
			1.50	8.451E-01	4.75	1.17	3.659E-01	5.57	4.22
			3.00	8.451E-01	8.46	1.17	3.659E-01	8.86	9.733E-03
RING23	ULTBLK	MIN	0.00	-4.53	-5.75	-2.70	-1.64	-2.28	-6.85
			1.50	-4.53	-2.05	-2.70	-1.64	-1.97	-2.24
			3.00	-4.53	1.22	-2.70	-1.64	-2.98	-7.25
RING24	ULTBLK	MAX	0.00	161.31	91.31	22.88	25.81	32.71	158.40
			1.50	161.31	95.01	22.88	25.81	9.35	18.85
			3.00	161.31	98.72	22.88	25.81	35.51	111.15
RING24	ULTBLK	MIN	0.00	-166.76	-92.01	-21.82	-26.28	-29.95	-153.76
			1.50	-166.76	-88.30	-21.82	-26.28	-8.18	-18.72
			3.00	-166.76	-84.60	-21.82	-26.28	-35.93	-126.64
RING25	ULTBLK	MAX	0.00	-4.660E-01	1.59	8.878E-02	8.286E-01	7.593E-01	5.20
			1.50	-4.660E-01	5.30	8.878E-02	8.286E-01	2.07	1.78
			3.00	-4.660E-01	9.00	8.878E-02	8.286E-01	3.92	6.42
RING25	ULTBLK	MIN	0.00	-4.41	-9.85	-1.56	-2.72	-2.00	-12.01
			1.50	-4.41	-6.14	-1.56	-2.72	-9.470E-01	-1.76
			3.00	-4.41	-2.44	-1.56	-2.72	-5.728E-01	-10.69
RING26	ULTBLK	MAX	0.00	235.02	10.28	64.57	67.99	192.94	47.88
			1.50	235.02	13.99	64.57	67.99	96.09	60.31
			3.00	235.02	17.69	64.57	67.99	8.41	67.65
RING26	ULTBLK	MIN	0.00	-243.57	-16.78	-65.05	-68.23	-192.27	-49.99
			1.50	-243.57	-13.08	-65.05	-68.23	-94.69	-58.22
			3.00	-243.57	-9.37	-65.05	-68.23	-6.27	-72.48
RING27	ULTBLK	MAX	0.00	-2.08	3.01	-7.157E-01	1.52	-1.51	5.33
			1.50	-2.08	6.72	-7.157E-01	1.52	-2.469E-01	1.08
			3.00	-2.08	10.43	-7.157E-01	1.52	1.69	5.217E-01
RING27	ULTBLK	MIN	0.00	-5.44	-4.66	-2.07	1.182E-01	-5.57	-3.19
			1.50	-5.44	-1.23	-2.07	1.182E-01	-2.68	-2.01
			3.00	-5.44	1.95	-2.07	1.182E-01	-2.450E-01	-14.87
RING28	ULTBLK	MAX	0.00	36.58	107.70	36.74	17.07	15.45	175.19
			1.50	36.58	111.40	36.74	17.07	67.67	13.35
			3.00	36.58	115.11	36.74	17.07	121.05	151.99
RING28	ULTBLK	MIN	0.00	-43.98	-107.99	-35.59	-19.57	-10.52	-160.84
			1.50	-43.98	-104.28	-35.59	-19.57	-64.47	-4.13
			3.00	-43.98	-100.57	-35.59	-19.57	-119.58	-159.02
RING29	ULTBLK	MAX	0.00	-2.76	2.60	-2.896E-01	2.75	-2.84	9.62
			1.50	-2.76	6.31	-2.896E-01	2.75	-2.01	4.92
			3.00	-2.76	10.01	-2.896E-01	2.75	-1.14	-2.711E-01
RING29	ULTBLK	MIN	0.00	-8.07	-2.22	-8.977E-01	8.533E-01	-6.82	2.60
			1.50	-8.07	9.610E-01	-8.977E-01	8.533E-01	-5.62	1.93
			3.00	-8.07	4.14	-8.977E-01	8.533E-01	-4.78	-9.31
RING30	ULTBLK	MAX	0.00	168.47	4.67	23.80	6.56	56.95	68.09

		1.50	168.47	8.38	23.80	6.56	28.99	60.00
		3.00	168.47	12.09	23.80	6.56	25.00	46.63
		0.00	-184.64	-20.11	-29.16	-4.87	-63.46	-80.23
		1.50	-184.64	-16.40	-29.16	-4.87	-27.46	-54.56
		3.00	-184.64	-12.69	-29.16	-4.87	-15.43	-34.71
RING31	ULTBLK	MAX						
		0.00	-2.07	-2.11	4.22	7.111E-01	6.09	3.62
		1.50	-2.07	1.07	4.22	7.111E-01	4.196E-01	5.36
		3.00	-2.07	4.40	4.22	7.111E-01	-3.40	8.89
RING31	ULTBLK	MIN						
		0.00	-9.87	-11.31	1.81	-2.46	-1.108E-01	-13.91
		1.50	-9.87	-7.60	1.81	-2.46	-3.57	1.697E-02
		3.00	-9.87	-3.90	1.81	-2.46	-8.44	3.928E-01
RING32	ULTBLK	MAX						
		0.00	91.84	124.88	11.43	22.51	69.79	221.93
		1.50	91.84	128.59	11.43	22.51	52.77	31.83
		3.00	91.84	132.30	11.43	22.51	35.74	158.39
RING32	ULTBLK	MIN						
		0.00	-105.91	-132.59	-17.53	-19.88	-92.53	-228.26
		1.50	-105.91	-128.88	-17.53	-19.88	-66.35	-32.15
		3.00	-105.91	-125.18	-17.53	-19.88	-40.16	-163.83
RING33	ULTBLK	MAX						
		0.00	-1.44	9.078E-01	6.41	7.208E-02	20.69	4.49
		1.50	-1.44	4.61	6.41	7.208E-02	12.56	3.60
		3.00	-1.44	8.32	6.41	7.208E-02	4.88	2.64
RING33	ULTBLK	MIN						
		0.00	-10.29	-5.98	9.256E-01	-2.22	3.48	-6.36
		1.50	-10.29	-2.28	9.256E-01	-2.22	8.282E-01	-3.42
		3.00	-10.29	1.14	9.256E-01	-2.22	-2.40	-11.53
RING34	ULTBLK	MAX						
		0.00	8.50	6.66	39.77	31.34	99.68	19.16
		1.50	8.50	10.37	39.77	31.34	40.13	7.52
		3.00	8.50	14.08	39.77	31.34	16.13	16.31
RING34	ULTBLK	MIN						
		0.00	-17.27	-18.13	-28.14	-31.37	-73.03	-29.61
		1.50	-17.27	-14.42	-28.14	-31.37	-30.93	-6.34
		3.00	-17.27	-10.72	-28.14	-31.37	-24.37	-14.61
RING35	ULTBLK	MAX						
		0.00	3.77	-2.03	14.16	14.26	10.99	3.83
		1.50	3.77	1.15	14.16	14.26	6.73	6.27
		3.00	3.77	4.86	14.16	14.26	16.26	7.87
RING35	ULTBLK	MIN						
		0.00	-15.36	-9.54	-7.23	-13.34	-11.26	-10.67
		1.50	-15.36	-5.83	-7.23	-13.34	-17.38	-6.253E-01
		3.00	-15.36	-2.12	-7.23	-13.34	-37.30	-9.913E-01
RING36	ULTBLK	MAX						
		0.00	1.02	1.46	1.62	19.14	2.43	7.26
		1.50	1.02	5.16	1.62	19.14	6.15	2.62
		3.00	1.02	8.87	1.62	19.14	10.49	9.650E-01
RING36	ULTBLK	MIN						
		0.00	-13.02	-4.96	-2.90	-17.74	-19.57	-2.78
		1.50	-13.02	-1.25	-2.90	-17.74	-21.99	1.43
		3.00	-13.02	2.00	-2.90	-17.74	-24.42	-8.22
RING37	ULTBLK	MAX						
		0.00	-3.745E-01	-6.304E-01	-1.23	11.35	-8.401E-02	1.83
		1.50	-3.745E-01	2.84	-1.23	11.35	4.84	4.21
		3.00	-3.745E-01	6.54	-1.23	11.35	10.92	9.50
RING37	ULTBLK	MIN						
		0.00	-11.03	-9.46	-4.37	-14.02	-16.41	-7.98
		1.50	-11.03	-5.75	-4.37	-14.02	-13.21	-4.969E-01
		3.00	-11.03	-2.05	-4.37	-14.02	-10.02	-6.90
RING38	ULTBLK	MAX						
		0.00	-9.481E-01	3.23	-2.46	7.65	1.53	9.69
		1.50	-9.481E-01	6.94	-2.46	7.65	12.74	3.81
		3.00	-9.481E-01	10.64	-2.46	7.65	24.77	1.31
RING38	ULTBLK	MIN						
		0.00	-8.94	-4.94	-8.17	-7.61	-7.84	-2.84
		1.50	-8.94	-1.38	-8.17	-7.61	-1.92	1.162E-01
		3.00	-8.94	1.79	-8.17	-7.61	1.97	-11.13
SLOF10	ULTBLK	MAX						
		1.5E-01	0.00	29.79	0.00	6.904E-02	0.00	93.22
		3.00	0.00	34.01	0.00	6.904E-02	0.00	2.91
		5.85	0.00	38.24	0.00	6.904E-02	0.00	91.38
SLOF10	ULTBLK	MIN						
		1.5E-01	0.00	-37.68	0.00	-5.531E-02	0.00	-99.31
		3.00	0.00	-33.45	0.00	-5.531E-02	0.00	1.76
		5.85	0.00	-29.23	0.00	-5.531E-02	0.00	-100.66

SLOF11	ULTBLK MAX						
	2.0E-01	0.00	-52.96	0.00	-23.84	0.00	18.92
	1.10	0.00	-43.50	0.00	-23.84	0.00	69.60
	2.00	0.00	-34.03	0.00	-23.84	0.00	110.34
SLOF11	ULTBLK MIN						
	2.0E-01	0.00	-125.75	0.00	-58.08	0.00	-262.30
	1.10	0.00	-114.70	0.00	-58.08	0.00	-154.10
	2.00	0.00	-103.66	0.00	-58.08	0.00	-55.83
SLOF12	ULTBLK MAX						
	0.00	0.00	-10.13	0.00	-13.78	0.00	117.56
	1.00	0.00	4.203E-01	0.00	-13.78	0.00	123.28
	2.00	0.00	12.69	0.00	-13.78	0.00	123.09
SLOF12	ULTBLK MIN						
	0.00	0.00	-70.87	0.00	-26.17	0.00	-49.58
	1.00	0.00	-59.60	0.00	-26.17	0.00	13.15
	2.00	0.00	-46.33	0.00	-26.17	0.00	58.09
SLOF13	ULTBLK MAX						
	0.00	0.00	67.19	0.00	34.39	0.00	130.12
	2.40	0.00	71.94	0.00	34.39	0.00	63.83
	4.80	0.00	76.68	0.00	34.39	0.00	44.65
SLOF13	ULTBLK MIN						
	0.00	0.00	7.871E-01	0.00	15.76	0.00	61.53
	2.40	0.00	4.85	0.00	15.76	0.00	-43.72
	4.80	0.00	8.92	0.00	15.76	0.00	-222.07
SLOF14	ULTBLK MAX						
	1.53	0.00	184.30	0.00	4.37	0.00	15.19
	2.85	0.00	186.92	0.00	4.37	0.00	221.50
SLOF14	ULTBLK MIN						
	2.0E-01	0.00	-188.19	0.00	-3.59	0.00	-270.27
	1.53	0.00	-185.57	0.00	-3.59	0.00	-22.65
	2.85	0.00	-182.95	0.00	-3.59	0.00	-230.74
SLOF15	ULTBLK MAX						
	2.0E-01	0.00	-6.79	0.00	49.56	0.00	107.71
	8.5E-01	0.00	-9.275E-02	0.00	49.56	0.00	110.34
	1.50	0.00	7.69	0.00	49.56	0.00	107.88
SLOF15	ULTBLK MIN						
	2.0E-01	0.00	-135.31	0.00	24.03	0.00	-243.49
	8.5E-01	0.00	-127.49	0.00	24.03	0.00	-158.08
	1.50	0.00	-119.68	0.00	24.03	0.00	-77.75
SLOF16	ULTBLK MAX						
	0.00	0.00	18.36	0.00	8.99	0.00	18.79
	7.5E-01	0.00	29.40	0.00	8.99	0.00	6.64
	1.50	0.00	40.44	0.00	8.99	0.00	-9.99
SLOF16	ULTBLK MIN						
	0.00	0.00	8.99	0.00	5.36	0.00	6.082E-01
	7.5E-01	0.00	16.00	0.00	5.36	0.00	-14.01
	1.50	0.00	23.10	0.00	5.36	0.00	-34.99
SLOF17	ULTBLK MAX						
	0.00	0.00	45.74	0.00	7.03	0.00	24.61
	7.5E-01	0.00	56.77	0.00	7.03	0.00	-1.63
	1.50	0.00	67.81	0.00	7.03	0.00	-29.56
SLOF17	ULTBLK MIN						
	0.00	0.00	26.20	0.00	3.44	0.00	10.61
	7.5E-01	0.00	33.30	0.00	3.44	0.00	-18.86
	1.50	0.00	40.39	0.00	3.44	0.00	-60.56
SLOF18	ULTBLK MAX						
	0.00	0.00	-19.56	0.00	-5.32	0.00	-11.85
	1.00	0.00	-10.10	0.00	-5.32	0.00	5.40
	2.00	0.00	-6.368E-01	0.00	-5.32	0.00	14.25
SLOF18	ULTBLK MIN						
	0.00	0.00	-33.61	0.00	-9.66	0.00	-29.40
	1.00	0.00	-18.89	0.00	-9.66	0.00	-9.26
	2.00	0.00	-5.51	0.00	-9.66	0.00	-8.165E-01
SLOF19	ULTBLK MAX						
	0.00	0.00	-6.02	0.00	-4.37	0.00	12.74
	1.0E+00	0.00	4.01	0.00	-4.37	0.00	14.25
	2.00	0.00	16.03	0.00	-4.37	0.00	5.12
SLOF19	ULTBLK MIN						
	0.00	0.00	-13.41	0.00	-7.73	0.00	-1.18
	1.0E+00	0.00	-2.06	0.00	-7.73	0.00	5.50
	2.00	0.00	7.70	0.00	-7.73	0.00	2.53
SLOF20	ULTBLK MAX						
	0.00	0.00	30.51	0.00	20.77	0.00	116.16
	7.5E-01	0.00	39.53	0.00	20.77	0.00	89.90
	1.50	0.00	48.55	0.00	20.77	0.00	73.28
SLOF20	ULTBLK MIN						
	0.00	0.00	-92.09	0.00	10.66	0.00	-71.54
	7.5E-01	0.00	-83.07	0.00	10.66	0.00	-5.86

		1.50	0.00	-74.05	0.00	10.66	0.00	45.47
SLOF21	ULTBLK MAX	0.00	0.00	-4.45	0.00	7.75	0.00	8.19
		7.5E-01	0.00	3.09	0.00	7.75	0.00	15.05
		1.50	0.00	11.37	0.00	7.75	0.00	16.42
SLOF21	ULTBLK MIN	0.00	0.00	-14.25	0.00	3.96	0.00	4.13
		7.5E-01	0.00	-5.97	0.00	3.96	0.00	4.81
		1.50	0.00	1.98	0.00	3.96	0.00	1.590E-01
SLOF22	ULTBLK MAX	0.00	0.00	8.56	0.00	1.91	0.00	44.88
		7.5E-01	0.00	18.67	0.00	1.91	0.00	35.02
		1.50	0.00	29.71	0.00	1.91	0.00	18.59
SLOF22	ULTBLK MIN	0.00	0.00	2.48	0.00	9.093E-01	0.00	26.86
		7.5E-01	0.00	9.57	0.00	9.093E-01	0.00	19.24
		1.50	0.00	16.67	0.00	9.093E-01	0.00	5.76
SLOF23	ULTBLK MAX	0.00	0.00	-31.79	0.00	-3.51	0.00	-27.76
		1.00	0.00	-22.33	0.00	-3.51	0.00	9.681E-01
		2.00	0.00	-12.87	0.00	-3.51	0.00	25.05
SLOF23	ULTBLK MIN	0.00	0.00	-54.90	0.00	-7.85	0.00	-55.35
		1.00	0.00	-40.19	0.00	-7.85	0.00	-12.70
		2.00	0.00	-25.47	0.00	-7.85	0.00	10.69
SLOF24	ULTBLK MAX	0.00	0.00	-6.71	0.00	7.248E-01	0.00	18.42
		1.00	0.00	3.21	0.00	7.248E-01	0.00	22.43
		2.00	0.00	16.93	0.00	7.248E-01	0.00	12.86
SLOF24	ULTBLK MIN	0.00	0.00	-12.51	0.00	-2.180E-01	0.00	6.42
		1.00	0.00	8.642E-02	0.00	-2.180E-01	0.00	11.06
		2.00	0.00	9.55	0.00	-2.180E-01	0.00	6.24
SLOF25	ULTBLK MAX	0.00	0.00	10.29	0.00	45.22	0.00	10.95
		2.5E-01	0.00	13.05	0.00	45.22	0.00	8.17
		5.0E-01	0.00	16.65	0.00	45.22	0.00	4.46
SLOF25	ULTBLK MIN	0.00	0.00	3.13	0.00	27.37	0.00	5.14
		2.5E-01	0.00	5.49	0.00	27.37	0.00	4.03
		5.0E-01	0.00	7.86	0.00	27.37	0.00	1.95
SLOF26	ULTBLK MAX	2.0E-01	0.00	29.17	0.00	1.41	0.00	147.40
		3.00	0.00	62.84	0.00	1.41	0.00	24.83
		5.80	0.00	96.52	0.00	1.41	0.00	147.62
SLOF26	ULTBLK MIN	2.0E-01	0.00	-96.57	0.00	-2.10	0.00	-204.61
		3.00	0.00	-62.90	0.00	-2.10	0.00	15.94
		5.80	0.00	-29.22	0.00	-2.10	0.00	-204.51
SLOF27	ULTBLK MAX	1.5E-01	0.00	29.88	0.00	2.05	0.00	93.40
		3.00	0.00	34.10	0.00	2.05	0.00	3.00
		5.85	0.00	38.33	0.00	2.05	0.00	91.68
SLOF27	ULTBLK MIN	1.5E-01	0.00	-37.71	0.00	-1.88	0.00	-99.17
		3.00	0.00	-33.48	0.00	-1.88	0.00	1.91
		5.85	0.00	-29.26	0.00	-1.88	0.00	-100.98
SLOF28	ULTBLK MAX	1.5E-01	0.00	72.84	0.00	1.85	0.00	123.98
		1.50	0.00	88.74	0.00	1.85	0.00	14.92
		2.85	0.00	104.64	0.00	1.85	0.00	102.90
SLOF28	ULTBLK MIN	1.5E-01	0.00	-102.73	0.00	-1.94	0.00	-131.54
		1.50	0.00	-86.83	0.00	-1.94	0.00	-3.59
		2.85	0.00	-70.93	0.00	-1.94	0.00	-115.62
SLOF29	ULTBLK MAX	1.5E-01	0.00	73.03	0.00	1.39	0.00	98.53
		1.50	0.00	75.03	0.00	1.39	0.00	1.49
		2.85	0.00	77.04	0.00	1.39	0.00	99.66
SLOF29	ULTBLK MIN	1.5E-01	0.00	-75.72	0.00	-1.74	0.00	-99.38
		1.50	0.00	-73.72	0.00	-1.74	0.00	-1.42
		2.85	0.00	-71.72	0.00	-1.74	0.00	-104.06
SLOF30	ULTBLK MAX	1.5E-01	0.00	76.03	0.00	6.25	0.00	104.80
		1.50	0.00	78.03	0.00	6.25	0.00	8.447E-01
		2.85	0.00	80.03	0.00	6.25	0.00	101.13

SLOF30	ULTBLK MIN						
	1.5E-01	0.00	-77.57	0.00	-5.58	0.00	-102.92
	1.50	0.00	-75.57	0.00	-5.58	0.00	3.892E-01
	2.85	0.00	-73.57	0.00	-5.58	0.00	-105.87
SLOF31	ULTBLK MAX						
	1.5E-01	0.00	74.12	0.00	4.44	0.00	102.54
	1.50	0.00	76.12	0.00	4.44	0.00	1.13
	2.85	0.00	78.12	0.00	4.44	0.00	95.47
SLOF31	ULTBLK MIN						
	1.5E-01	0.00	-74.53	0.00	-7.52	0.00	-100.35
	1.50	0.00	-72.52	0.00	-7.52	0.00	-1.09
	2.85	0.00	-70.52	0.00	-7.52	0.00	-102.99
SLOF32	ULTBLK MAX						
	1.5E-01	0.00	72.97	0.00	1.63	0.00	105.75
	1.50	0.00	88.88	0.00	1.63	0.00	14.45
	2.85	0.00	104.78	0.00	1.63	0.00	119.62
SLOF32	ULTBLK MIN						
	1.5E-01	0.00	-101.76	0.00	6.177E-01	0.00	-112.18
	1.50	0.00	-85.85	0.00	6.177E-01	0.00	-3.50
	2.85	0.00	-69.95	0.00	6.177E-01	0.00	-134.22
SLOF33	ULTBLK MAX						
	0.00	0.00	93.81	0.00	-16.19	0.00	81.14
	1.40	0.00	110.65	0.00	-16.19	0.00	97.11
	2.80	0.00	127.49	0.00	-16.19	0.00	113.48
SLOF33	ULTBLK MIN						
	0.00	0.00	-36.95	0.00	-34.58	0.00	48.99
	1.40	0.00	-20.12	0.00	-34.58	0.00	-78.58
	2.80	0.00	-3.28	0.00	-34.58	0.00	-245.27
SLOF34	ULTBLK MAX						
	0.00	0.00	-36.24	0.00	-1.95	0.00	-38.14
	1.50	0.00	-22.05	0.00	-1.95	0.00	6.51
	3.00	0.00	-7.86	0.00	-1.95	0.00	45.22
SLOF34	ULTBLK MIN						
	0.00	0.00	-60.81	0.00	-4.46	0.00	-70.97
	1.50	0.00	-38.73	0.00	-4.46	0.00	-9.853E-01
	3.00	0.00	-16.65	0.00	-4.46	0.00	27.37
SLOF35	ULTBLK MAX						
	1.5E-01	0.00	110.01	0.00	4.24	0.00	161.18
	1.50	0.00	112.02	0.00	4.24	0.00	11.31
	2.85	0.00	114.02	0.00	4.24	0.00	142.18
SLOF35	ULTBLK MIN						
	1.5E-01	0.00	-115.95	0.00	-4.71	0.00	-165.48
	1.50	0.00	-113.95	0.00	-4.71	0.00	-10.30
	2.85	0.00	-111.94	0.00	-4.71	0.00	-141.27
SLOF36	ULTBLK MAX						
	1.5E-01	0.00	19.43	0.00	6.59	0.00	131.34
	1.50	0.00	36.57	0.00	6.59	0.00	91.50
	3.00	0.00	53.71	0.00	6.59	0.00	44.82
SLOF36	ULTBLK MIN						
	1.5E-01	0.00	-99.11	0.00	-6.40	0.00	-198.58
	1.50	0.00	-81.97	0.00	-6.40	0.00	-69.62
	3.00	0.00	-64.84	0.00	-6.40	0.00	14.85
SLOF37	ULTBLK MAX						
	1.5E-01	0.00	95.83	0.00	2.83	0.00	156.24
	1.50	0.00	111.73	0.00	2.83	0.00	16.14
	2.85	0.00	127.63	0.00	2.83	0.00	134.11
SLOF37	ULTBLK MIN						
	1.5E-01	0.00	-127.70	0.00	-3.31	0.00	-167.75
	1.50	0.00	-111.80	0.00	-3.31	0.00	-6.08
	2.85	0.00	-95.90	0.00	-3.31	0.00	-145.43
SLOF38	ULTBLK MAX						
	2.0E-01	0.00	-60.21	0.00	12.02	0.00	-57.72
	2.35	0.00	-38.50	0.00	12.02	0.00	56.37
	4.50	0.00	-16.79	0.00	12.02	0.00	163.39
SLOF38	ULTBLK MIN						
	2.0E-01	0.00	-112.85	0.00	-5.91	0.00	-197.74
	2.35	0.00	-79.08	0.00	-5.91	0.00	-12.04
	4.50	0.00	-48.38	0.00	-5.91	0.00	102.22
SLOF39	ULTBLK MAX						
	0.00	0.00	72.69	0.00	5.72	0.00	169.96
	2.15	0.00	76.94	0.00	5.72	0.00	38.24
	4.30	0.00	81.19	0.00	5.72	0.00	-45.22
SLOF39	ULTBLK MIN						
	0.00	0.00	32.19	0.00	-12.10	0.00	104.95
	2.15	0.00	34.92	0.00	-12.10	0.00	-24.64
	4.30	0.00	37.66	0.00	-12.10	0.00	-188.58
SLOF40	ULTBLK MAX						

	2.0E-01	0.00	105.89	0.00	2.54	0.00	143.16
	1.53	0.00	107.86	0.00	2.54	0.00	1.55
	2.85	0.00	109.82	0.00	2.54	0.00	140.53
SLOF40	ULTBLK MIN						
	2.0E-01	0.00	-114.58	0.00	-2.63	0.00	-157.90
	1.53	0.00	-112.61	0.00	-2.63	0.00	-7.38
	2.85	0.00	-110.65	0.00	-2.63	0.00	-142.66
SLOF41	ULTBLK MAX						
	1.5E-01	0.00	21.88	0.00	8.98	0.00	100.12
	3.08	0.00	26.94	0.00	8.98	0.00	28.71
	6.00	0.00	32.00	0.00	8.98	0.00	29.58
SLOF41	ULTBLK MIN						
	1.5E-01	0.00	-29.95	0.00	-8.77	0.00	-116.02
	3.08	0.00	-24.89	0.00	-8.77	0.00	-35.82
	6.00	0.00	-19.83	0.00	-8.77	0.00	-57.50
SLOF42	ULTBLK MAX						
	1.5E-01	0.00	52.61	0.00	3.10	0.00	158.10
	2.98	0.00	57.49	0.00	3.10	0.00	5.50
	5.00	0.00	62.38	0.00	3.10	0.00	170.53
SLOF42	ULTBLK MIN						
	1.5E-01	0.00	-65.75	0.00	-3.37	0.00	-173.34
	2.98	0.00	-60.86	0.00	-3.37	0.00	2.10
	5.00	0.00	-55.98	0.00	-3.37	0.00	-166.74
SLOF43	ULTBLK MAX						
	1.5E-01	0.00	-2.78	0.00	4.70	0.00	16.31
	1.58	0.00	12.44	0.00	4.70	0.00	9.79
	3.00	0.00	28.17	0.00	4.70	0.00	18.04
SLOF43	ULTBLK MIN						
	1.5E-01	0.00	-36.29	0.00	-4.63	0.00	-40.55
	1.58	0.00	-20.56	0.00	-4.63	0.00	-4.698E-02
	3.00	0.00	-4.83	0.00	-4.63	0.00	-19.15
SLOF44	ULTBLK MAX						
	2.0E-01	0.00	11.29	0.00	21.43	0.00	121.92
	1.60	0.00	28.12	0.00	21.43	0.00	94.33
	3.00	0.00	44.96	0.00	21.43	0.00	58.36
SLOF44	ULTBLK MIN						
	2.0E-01	0.00	-115.75	0.00	8.88	0.00	-232.58
	1.60	0.00	-98.91	0.00	8.88	0.00	-82.31
	3.00	0.00	-82.08	0.00	8.88	0.00	36.09
SLOF45	ULTBLK MAX						
	0.00	0.00	13.29	0.00	2.27	0.00	42.73
	1.50	0.00	35.12	0.00	2.27	0.00	8.90
	3.00	0.00	57.20	0.00	2.27	0.00	-32.37
SLOF45	ULTBLK MIN						
	0.00	0.00	5.38	0.00	7.636E-01	0.00	25.97
	1.50	0.00	19.57	0.00	7.636E-01	0.00	8.601E-01
	3.00	0.00	33.76	0.00	7.636E-01	0.00	-62.63
	1.5E-01	0.00	91.58	0.00	5.53	0.00	125.33
	1.50	0.00	93.58	0.00	5.53	0.00	3.832E-01
	2.85	0.00	95.58	0.00	5.53	0.00	129.33
SLOF46	ULTBLK MIN						
	1.5E-01	0.00	-98.65	0.00	-3.16	0.00	-131.62
	1.50	0.00	-96.65	0.00	-3.16	0.00	1.505E-01
	2.85	0.00	-94.65	0.00	-3.16	0.00	-127.33
SLOF47	ULTBLK MAX						
	0.00	0.00	67.50	0.00	11.64	0.00	44.56
	1.40	0.00	84.34	0.00	11.64	0.00	95.84
	2.80	0.00	101.17	0.00	11.64	0.00	137.88
SLOF47	ULTBLK MIN						
	0.00	0.00	-55.29	0.00	-12.56	0.00	15.01
	1.40	0.00	-38.45	0.00	-12.56	0.00	-74.42
	2.80	0.00	-21.61	0.00	-12.56	0.00	-204.28
SLOF48	ULTBLK MAX						
	1.5E-01	0.00	79.05	0.00	5.78	0.00	120.23
	1.50	0.00	94.95	0.00	5.78	0.00	6.09
	2.85	0.00	110.86	0.00	5.78	0.00	126.47
SLOF48	ULTBLK MIN						
	1.5E-01	0.00	-113.02	0.00	-5.28	0.00	-135.75
	1.50	0.00	-97.12	0.00	-5.28	0.00	2.37
	2.85	0.00	-81.22	0.00	-5.28	0.00	-136.15
SLOF49	ULTBLK MAX						
	0.00	0.00	-26.51	0.00	1.98	0.00	-19.93
	2.25	0.00	-5.22	0.00	1.98	0.00	18.40
	4.50	0.00	22.40	0.00	1.98	0.00	4.20
SLOF49	ULTBLK MIN						
	0.00	0.00	-43.83	0.00	2.959E-01	0.00	-44.21
	2.25	0.00	-10.72	0.00	2.959E-01	0.00	6.28
	4.50	0.00	12.73	0.00	2.959E-01	0.00	1.56

SLOF50	ULTBLK MAX						
	2.0E-01	0.00	28.20	0.00	1.91	0.00	144.49
	3.00	0.00	61.87	0.00	1.91	0.00	24.50
	5.80	0.00	95.55	0.00	1.91	0.00	149.81
SLOF50	ULTBLK MIN						
	2.0E-01	0.00	-97.46	0.00	-1.07	0.00	-207.39
	3.00	0.00	-63.78	0.00	-1.07	0.00	15.73
	5.80	0.00	-30.11	0.00	-1.07	0.00	-201.99
SLOF51	ULTBLK MAX						
	1.5E-01	0.00	29.91	0.00	3.27	0.00	93.41
	3.00	0.00	34.14	0.00	3.27	0.00	2.96
	5.85	0.00	38.36	0.00	3.27	0.00	91.58
SLOF51	ULTBLK MIN						
	1.5E-01	0.00	-37.67	0.00	-3.32	0.00	-99.05
	3.00	0.00	-33.44	0.00	-3.32	0.00	1.84
	5.85	0.00	-29.22	0.00	-3.32	0.00	-101.17
SLOF52	ULTBLK MAX						
	1.5E-01	0.00	21.58	0.00	11.35	0.00	102.10
	1.58	0.00	24.05	0.00	11.35	0.00	69.62
	3.00	0.00	26.51	0.00	11.35	0.00	66.24
SLOF52	ULTBLK MIN						
	1.5E-01	0.00	-79.41	0.00	-19.61	0.00	-165.99
	1.58	0.00	-76.95	0.00	-19.61	0.00	-54.62
	3.00	0.00	-74.48	0.00	-19.61	0.00	17.78
SLOF53	ULTBLK MAX						
	0.00	0.00	64.02	0.00	29.08	0.00	64.87
	1.40	0.00	80.86	0.00	29.08	0.00	75.19
	2.80	0.00	97.69	0.00	29.08	0.00	83.75
SLOF53	ULTBLK MIN						
	0.00	0.00	-31.71	0.00	-18.94	0.00	17.95
	1.40	0.00	-14.88	0.00	-18.94	0.00	-58.34
	2.80	0.00	1.85	0.00	-18.94	0.00	-182.85
SLOF54	ULTBLK MAX						
	2.0E-01	0.00	14.03	0.00	3.952E-01	0.00	106.47
	3.00	0.00	47.70	0.00	3.952E-01	0.00	23.81
	5.80	0.00	81.38	0.00	3.952E-01	0.00	100.42
SLOF54	ULTBLK MIN						
	2.0E-01	0.00	-80.82	0.00	1.724E-02	0.00	-163.59
	3.00	0.00	-47.14	0.00	1.724E-02	0.00	13.38
	5.80	0.00	-13.47	0.00	1.724E-02	0.00	-160.66
SLOF55	ULTBLK MAX						
	2.0E-01	0.00	135.32	0.00	6.83	0.00	201.99
	1.53	0.00	151.25	0.00	6.83	0.00	12.14
	2.85	0.00	167.19	0.00	6.83	0.00	181.26
SLOF55	ULTBLK MIN						
	2.0E-01	0.00	-162.21	0.00	-9.12	0.00	-206.37
	1.53	0.00	-146.27	0.00	-9.12	0.00	-2.00
	2.85	0.00	-130.34	0.00	-9.12	0.00	-198.83
SLOF56	ULTBLK MAX						
	0.00	0.00	77.70	0.00	-11.05	0.00	56.81
	1.40	0.00	94.53	0.00	-11.05	0.00	99.29
	2.80	0.00	111.37	0.00	-11.05	0.00	132.61
SLOF56	ULTBLK MIN						
	0.00	0.00	-49.06	0.00	-23.02	0.00	35.23
	1.40	0.00	-32.22	0.00	-23.02	0.00	-77.74
	2.80	0.00	-15.38	0.00	-23.02	0.00	-221.87
SLOF57	ULTBLK MAX						
	0.00	0.00	-31.26	0.00	-7.965E-01	0.00	-20.95
	1.50	0.00	-17.07	0.00	-7.965E-01	0.00	17.87
	3.00	0.00	-2.87	0.00	-7.965E-01	0.00	44.28
SLOF57	ULTBLK MIN						
	0.00	0.00	-53.51	0.00	-1.93	0.00	-50.58
	1.50	0.00	-31.43	0.00	-1.93	0.00	2.28
	3.00	0.00	-10.68	0.00	-1.93	0.00	26.62
SLOF58	ULTBLK MAX						
	1.5E-01	0.00	94.18	0.00	-4.830E-02	0.00	128.23
	1.50	0.00	96.18	0.00	-4.830E-02	0.00	2.03
	2.85	0.00	98.18	0.00	-4.830E-02	0.00	133.03
SLOF58	ULTBLK MIN						
	1.5E-01	0.00	-100.04	0.00	-2.89	0.00	-131.68
	1.50	0.00	-98.04	0.00	-2.89	0.00	-2.677E-01
	2.85	0.00	-96.04	0.00	-2.89	0.00	-131.47
SLOF59	ULTBLK MAX						
	1.5E-01	0.00	80.04	0.00	8.09	0.00	123.67
	1.50	0.00	95.94	0.00	8.09	0.00	5.75
	2.85	0.00	111.84	0.00	8.09	0.00	127.22
SLOF59	ULTBLK MIN						



	1.5E-01	0.00	-115.32	0.00	-6.27	0.00	-141.21
	1.50	0.00	-99.42	0.00	-6.27	0.00	3.20
	2.85	0.00	-83.52	0.00	-6.27	0.00	-135.37
SLOF60	ULTBLK MAX						
	2.0E-01	0.00	-25.87	0.00	25.21	0.00	61.48
	2.35	0.00	-3.25	0.00	25.21	0.00	98.08
	4.50	0.00	22.56	0.00	25.21	0.00	96.78
SLOF60	ULTBLK MIN						
	2.0E-01	0.00	-95.14	0.00	10.28	0.00	-228.66
	2.35	0.00	-68.75	0.00	10.28	0.00	-52.48
	4.50	0.00	-42.36	0.00	10.28	0.00	55.70
SLOF61	ULTBLK MAX						
	0.00	0.00	62.86	0.00	-10.67	0.00	98.69
	2.15	0.00	67.11	0.00	-10.67	0.00	68.50
	4.30	0.00	71.36	0.00	-10.67	0.00	59.97
SLOF61	ULTBLK MIN						
	0.00	0.00	-2.41	0.00	-25.37	0.00	56.75
	2.15	0.00	1.61	0.00	-25.37	0.00	-59.84
	4.30	0.00	5.26	0.00	-25.37	0.00	-208.70
SLOF62	ULTBLK MAX						
	2.0E-01	0.00	163.00	0.00	3.76	0.00	250.13
	1.53	0.00	165.61	0.00	3.76	0.00	32.43
	2.85	0.00	168.23	0.00	3.76	0.00	179.02
SLOF62	ULTBLK MIN						
	2.0E-01	0.00	-169.19	0.00	-4.49	0.00	-262.39
	1.53	0.00	-166.57	0.00	-4.49	0.00	-39.95
	2.85	0.00	-163.95	0.00	-4.49	0.00	-188.74
SLOF63	ULTBLK MAX						
	1.5E-01	0.00	55.17	0.00	3.37	0.00	117.24
	2.50	0.00	59.81	0.00	3.37	0.00	23.93
	4.85	0.00	64.46	0.00	3.37	0.00	158.14
SLOF63	ULTBLK MIN						
	1.5E-01	0.00	-64.08	0.00	-3.42	0.00	-121.19
	2.50	0.00	-59.43	0.00	-3.42	0.00	-17.87
	4.85	0.00	-54.79	0.00	-3.42	0.00	-163.89
SLOF64	ULTBLK MAX						
	0.00	0.00	-27.79	0.00	-8.608E-02	0.00	-15.49
	3.00	0.00	3.69	0.00	-8.608E-02	0.00	33.08
	6.00	0.00	50.78	0.00	-8.608E-02	0.00	-26.18
SLOF64	ULTBLK MIN						
	0.00	0.00	-45.44	0.00	-8.825E-01	0.00	-31.07
	3.00	0.00	2.967E-01	0.00	-8.825E-01	0.00	20.63
	6.00	0.00	31.22	0.00	-8.825E-01	0.00	-47.09
SLOF65	ULTBLK MAX						
	2.0E-01	0.00	46.96	0.00	1.83	0.00	150.04
	3.00	0.00	51.80	0.00	1.83	0.00	11.78
	5.80	0.00	56.64	0.00	1.83	0.00	131.22
SLOF65	ULTBLK MIN						
	2.0E-01	0.00	-57.43	0.00	-3.33	0.00	-163.28
	3.00	0.00	-52.59	0.00	-3.33	0.00	-9.25
	5.80	0.00	-47.75	0.00	-3.33	0.00	-140.04
SLOF66	ULTBLK MAX						
	2.0E-01	0.00	46.47	0.00	2.73	0.00	147.85
	3.00	0.00	51.31	0.00	2.73	0.00	10.95
	5.80	0.00	56.16	0.00	2.73	0.00	133.58
SLOF66	ULTBLK MIN						
	2.0E-01	0.00	-58.44	0.00	-2.57	0.00	-166.57
	3.00	0.00	-53.60	0.00	-2.57	0.00	-9.71
	5.80	0.00	-48.76	0.00	-2.57	0.00	-139.51
SLOF67	ULTBLK MAX						
	1.5E-01	0.00	93.89	0.00	4.04	0.00	129.41
	1.50	0.00	95.89	0.00	4.04	0.00	1.31
	2.85	0.00	97.89	0.00	4.04	0.00	130.24
SLOF67	ULTBLK MIN						
	1.5E-01	0.00	-100.20	0.00	4.253E-01	0.00	-134.89
	1.50	0.00	-98.20	0.00	4.253E-01	0.00	-9.757E-01
	2.85	0.00	-96.20	0.00	4.253E-01	0.00	-129.49
SLOF68	ULTBLK MAX						
	1.5E-01	0.00	79.97	0.00	7.03	0.00	123.00
	1.50	0.00	95.88	0.00	7.03	0.00	6.03
	2.85	0.00	111.78	0.00	7.03	0.00	128.08
SLOF68	ULTBLK MIN						
	1.5E-01	0.00	-115.22	0.00	-6.64	0.00	-140.07
	1.50	0.00	-99.32	0.00	-6.64	0.00	3.69
	2.85	0.00	-83.41	0.00	-6.64	0.00	-135.86
SLOF69	ULTBLK MAX						
	2.0E-01	0.00	29.68	0.00	1.57	0.00	145.82

		3.00	0.00	63.36	0.00	1.57	0.00	20.70
		5.80	0.00	97.03	0.00	1.57	0.00	145.78
SLOF69	ULTBLK MIN	2.0E-01	0.00	-97.04	0.00	-8.075E-01	0.00	-209.07
		3.00	0.00	-63.37	0.00	-8.075E-01	0.00	13.24
		5.80	0.00	-29.69	0.00	-8.075E-01	0.00	-208.99
SLOF70	ULTBLK MAX	2.0E-01	0.00	28.55	0.00	2.88	0.00	144.33
		3.00	0.00	62.22	0.00	2.88	0.00	23.26
		5.80	0.00	95.90	0.00	2.88	0.00	149.39
SLOF70	ULTBLK MIN	2.0E-01	0.00	-97.56	0.00	-3.36	0.00	-208.35
		3.00	0.00	-63.88	0.00	-3.36	0.00	14.78
		5.80	0.00	-30.21	0.00	-3.36	0.00	-204.11
SLOF71	ULTBLK MAX	1.5E-01	0.00	29.47	0.00	5.28	0.00	92.05
		3.00	0.00	33.69	0.00	5.28	0.00	2.98
		5.85	0.00	37.92	0.00	5.28	0.00	90.84
SLOF71	ULTBLK MIN	1.5E-01	0.00	-37.37	0.00	-5.21	0.00	-98.07
		3.00	0.00	-33.14	0.00	-5.21	0.00	1.76
		5.85	0.00	-28.92	0.00	-5.21	0.00	-99.99
SLOF72	ULTBLK MAX	1.5E-01	0.00	-21.67	0.00	16.39	0.00	57.50
		1.58	0.00	-6.98	0.00	16.39	0.00	81.62
		3.00	0.00	8.92	0.00	16.39	0.00	98.04
SLOF72	ULTBLK MIN	1.5E-01	0.00	-102.86	0.00	-15.03	0.00	-178.61
		1.58	0.00	-85.73	0.00	-15.03	0.00	-44.44
		3.00	0.00	-68.59	0.00	-15.03	0.00	47.40
SLOF73	ULTBLK MAX	0.00	0.00	92.07	0.00	16.24	0.00	101.81
		1.40	0.00	94.50	0.00	16.24	0.00	58.02
		2.80	0.00	96.92	0.00	16.24	0.00	47.81
SLOF73	ULTBLK MIN	0.00	0.00	3.01	0.00	-17.51	0.00	46.90
		1.40	0.00	5.09	0.00	-17.51	0.00	-42.78
		2.80	0.00	7.16	0.00	-17.51	0.00	-176.41
SLOF74	ULTBLK MAX	2.0E-01	0.00	25.94	0.00	1.216E-01	0.00	81.88
		3.00	0.00	30.78	0.00	1.216E-01	0.00	2.48
		5.80	0.00	35.63	0.00	1.216E-01	0.00	87.14
SLOF74	ULTBLK MIN	2.0E-01	0.00	-39.28	0.00	-1.616E-01	0.00	-105.71
		3.00	0.00	-34.44	0.00	-1.616E-01	0.00	-2.51
		5.80	0.00	-29.59	0.00	-1.616E-01	0.00	-90.49
SLOF75	ULTBLK MAX	2.0E-01	0.00	126.74	0.00	1.40	0.00	158.45
		1.53	0.00	129.03	0.00	1.40	0.00	6.34
		2.85	0.00	131.33	0.00	1.40	0.00	165.78
SLOF75	ULTBLK MIN	2.0E-01	0.00	-123.79	0.00	-9.277E-01	0.00	-156.34
		1.53	0.00	-121.50	0.00	-9.277E-01	0.00	-11.18
		2.85	0.00	-119.21	0.00	-9.277E-01	0.00	-183.64
SLOF76	ULTBLK MAX	1.5E-01	0.00	80.57	0.00	1.59	0.00	124.55
		1.50	0.00	96.47	0.00	1.59	0.00	6.56
		2.85	0.00	112.38	0.00	1.59	0.00	121.24
SLOF76	ULTBLK MIN	1.5E-01	0.00	-110.09	0.00	-4.08	0.00	-133.06
		1.50	0.00	-94.18	0.00	-4.08	0.00	4.08
		2.85	0.00	-78.28	0.00	-4.08	0.00	-135.93
SLOF77	ULTBLK MAX	0.00	0.00	-14.52	0.00	6.04	0.00	3.27
		1.50	0.00	1.17	0.00	6.04	0.00	17.37
		3.00	0.00	19.21	0.00	6.04	0.00	60.67
SLOF77	ULTBLK MIN	0.00	0.00	-62.05	0.00	-1.39	0.00	-71.35
		1.50	0.00	-44.01	0.00	-1.39	0.00	5.10
		3.00	0.00	-25.97	0.00	-1.39	0.00	-2.453E-01
SLOF78	ULTBLK MAX	1.5E-01	0.00	80.82	0.00	5.46	0.00	124.97
		1.50	0.00	96.72	0.00	5.46	0.00	5.33
		2.85	0.00	112.62	0.00	5.46	0.00	120.20
SLOF78	ULTBLK MIN	1.5E-01	0.00	-110.74	0.00	-6.74	0.00	-135.86
		1.50	0.00	-94.84	0.00	-6.74	0.00	2.47
		2.85	0.00	-78.93	0.00	-6.74	0.00	-136.18

SLOF79	ULTBLK MAX						
	2.0E-01	0.00	40.99	0.00	2.46	0.00	119.86
	2.35	0.00	44.71	0.00	2.46	0.00	27.74
	4.50	0.00	48.42	0.00	2.46	0.00	95.44
SLOF79	ULTBLK MIN						
	2.0E-01	0.00	-59.16	0.00	-5.44	0.00	-142.96
	2.35	0.00	-55.44	0.00	-5.44	0.00	-19.76
	4.50	0.00	-51.72	0.00	-5.44	0.00	-72.37
SLOF80	ULTBLK MAX						
	2.0E-01	0.00	39.69	0.00	5.58	0.00	118.41
	2.35	0.00	43.40	0.00	5.58	0.00	29.09
	4.50	0.00	47.12	0.00	5.58	0.00	89.78
SLOF80	ULTBLK MIN						
	2.0E-01	0.00	-57.22	0.00	-2.73	0.00	-140.27
	2.35	0.00	-53.50	0.00	-2.73	0.00	-21.24
	4.50	0.00	-49.78	0.00	-2.73	0.00	-68.23
SLOF81	ULTBLK MAX						
	2.0E-01	0.00	-51.68	0.00	-5.707E-01	0.00	-58.94
	1.10	0.00	-43.16	0.00	-5.707E-01	0.00	-16.25
	2.00	0.00	-34.65	0.00	-5.707E-01	0.00	21.89
SLOF81	ULTBLK MIN						
	2.0E-01	0.00	-84.84	0.00	-10.97	0.00	-111.49
	1.10	0.00	-71.60	0.00	-10.97	0.00	-42.71
	2.00	0.00	-58.35	0.00	-10.97	0.00	3.56
SLOF82	ULTBLK MAX						
	0.00	0.00	-17.73	0.00	3.22	0.00	25.86
	3.40	0.00	16.87	0.00	3.22	0.00	47.26
	6.80	0.00	66.91	0.00	3.22	0.00	-46.33
SLOF82	ULTBLK MIN						
	0.00	0.00	-33.17	0.00	2.365E-01	0.00	2.96
	3.40	0.00	7.25	0.00	2.365E-01	0.00	27.76
	6.80	0.00	39.42	0.00	2.365E-01	0.00	-95.17
SLOF83	ULTBLK MAX						
	2.0E-01	0.00	30.69	0.00	7.752E-01	0.00	41.06
	1.53	0.00	31.67	0.00	7.752E-01	0.00	-2.093E-01
	2.85	0.00	32.65	0.00	7.752E-01	0.00	41.34
SLOF83	ULTBLK MIN						
	2.0E-01	0.00	-33.04	0.00	-7.301E-01	0.00	-43.60
	1.53	0.00	-32.05	0.00	-7.301E-01	0.00	-5.065E-01
	2.85	0.00	-31.07	0.00	-7.301E-01	0.00	-42.86
SLOF84	ULTBLK MAX						
	1.5E-01	0.00	9.89	0.00	6.282E-01	0.00	25.71
	2.50	0.00	11.63	0.00	6.282E-01	0.00	7.748E-01
	4.85	0.00	13.38	0.00	6.282E-01	0.00	24.05
SLOF84	ULTBLK MIN						
	1.5E-01	0.00	-12.53	0.00	-6.202E-01	0.00	-26.65
	2.50	0.00	-10.79	0.00	-6.202E-01	0.00	3.548E-01
	4.85	0.00	-9.04	0.00	-6.202E-01	0.00	-28.97
SLOF85	ULTBLK MAX						
	1.5E-01	0.00	-7.86	0.00	3.99	0.00	9.91
	1.58	0.00	6.61	0.00	3.99	0.00	13.03
	3.00	0.00	22.34	0.00	3.99	0.00	12.66
SLOF85	ULTBLK MIN						
	1.5E-01	0.00	-34.33	0.00	-2.83	0.00	-40.35
	1.58	0.00	-18.60	0.00	-2.83	0.00	-3.97
	3.00	0.00	-2.87	0.00	-2.83	0.00	-8.94
SLOF86	ULTBLK MAX						
	2.0E-01	0.00	-19.82	0.00	94.11	0.00	101.14
	7.3E-01	0.00	-14.40	0.00	94.11	0.00	111.61
	1.25	0.00	-8.99	0.00	94.11	0.00	118.76
SLOF86	ULTBLK MIN						
	2.0E-01	0.00	-165.57	0.00	48.82	0.00	-271.31
	7.3E-01	0.00	-159.25	0.00	48.82	0.00	-186.04
	1.25	0.00	-152.94	0.00	48.82	0.00	-104.09
SLOF87	ULTBLK MAX						
	0.00	0.00	6.78	0.00	4.05	0.00	14.19
	6.3E-01	0.00	15.98	0.00	4.05	0.00	8.77
	1.25	0.00	25.18	0.00	4.05	0.00	-8.072E-01
SLOF87	ULTBLK MIN						
	0.00	0.00	3.62	0.00	-7.922E-01	0.00	5.530E-01
	6.3E-01	0.00	9.54	0.00	-7.922E-01	0.00	-4.61
	1.25	0.00	15.45	0.00	-7.922E-01	0.00	-14.19
SLOF88	ULTBLK MAX						
	0.00	0.00	34.83	0.00	11.66	0.00	57.84
	7.5E-01	0.00	43.85	0.00	11.66	0.00	70.89
	1.50	0.00	52.87	0.00	11.66	0.00	77.18
SLOF88	ULTBLK MIN						

		0.00	0.00	-22.11	0.00	-10.73	0.00	3.37
		7.5E-01	0.00	-13.09	0.00	-10.73	0.00	-25.61
		1.50	0.00	-4.07	0.00	-10.73	0.00	-61.73
SLOF89	ULTLK MAX							
		1.5E-01	0.00	88.47	0.00	10.30	0.00	129.60
		8.3E-01	0.00	96.42	0.00	10.30	0.00	67.19
		1.50	0.00	104.38	0.00	10.30	0.00	25.33
SLOF89	ULTLK MIN							
		1.5E-01	0.00	-140.57	0.00	-18.73	0.00	-153.71
		8.3E-01	0.00	-132.62	0.00	-18.73	0.00	-61.51
		1.50	0.00	-124.67	0.00	-18.73	0.00	-5.752E-01
SLOF90	ULTLK MAX							
		0.00	0.00	-30.20	0.00	-2.34	0.00	-37.74
		1.00	0.00	-20.74	0.00	-2.34	0.00	-12.19
		2.00	0.00	-11.28	0.00	-2.34	0.00	7.47
SLOF90	ULTLK MIN							
		0.00	0.00	-54.42	0.00	-4.41	0.00	-74.56
		1.00	0.00	-39.70	0.00	-4.41	0.00	-27.51
		2.00	0.00	-24.98	0.00	-4.41	0.00	-2.341E-01
SLOF91	ULTLK MAX							
		2.0E-01	0.00	34.41	0.00	-19.97	0.00	141.38
		1.60	0.00	36.83	0.00	-19.97	0.00	91.51
		3.00	0.00	39.25	0.00	-19.97	0.00	56.47
SLOF91	ULTLK MIN							
		2.0E-01	0.00	-98.88	0.00	-43.13	0.00	-223.79
		1.60	0.00	-96.46	0.00	-43.13	0.00	-87.05
		3.00	0.00	-94.04	0.00	-43.13	0.00	32.83
SLOF92	ULTLK MAX							
		1.5E-01	0.00	95.45	0.00	2.82	0.00	133.66
		1.50	0.00	111.35	0.00	2.82	0.00	15.98
		2.85	0.00	127.26	0.00	2.82	0.00	158.92
SLOF92	ULTLK MIN							
		1.5E-01	0.00	-129.73	0.00	-3.71	0.00	-148.42
		1.50	0.00	-113.83	0.00	-3.71	0.00	-5.94
		2.85	0.00	-97.93	0.00	-3.71	0.00	-167.00
SLOF93	ULTLK MAX							
		0.00	0.00	-6.47	0.00	-6.199E-02	0.00	5.40
		1.50	0.00	9.01	0.00	-6.199E-02	0.00	8.49
		3.00	0.00	25.57	0.00	-6.199E-02	0.00	3.67
SLOF93	ULTLK MIN							
		0.00	0.00	-21.70	0.00	-2.29	0.00	-11.77
		1.50	0.00	-5.14	0.00	-2.29	0.00	3.57
		3.00	0.00	9.79	0.00	-2.29	0.00	-21.66
SLOF94	ULTLK MAX							
		0.00	0.00	-4.21	0.00	1.05	0.00	13.66
		1.50	0.00	11.65	0.00	1.05	0.00	8.60
		3.00	0.00	28.21	0.00	1.05	0.00	10.22
SLOF94	ULTLK MIN							
		0.00	0.00	-29.40	0.00	-1.41	0.00	-28.32
		1.50	0.00	-12.85	0.00	-1.41	0.00	2.89
		3.00	0.00	3.17	0.00	-1.41	0.00	-21.31
SLOF95	ULTLK MAX							
		0.00	0.00	25.79	0.00	19.55	0.00	121.71
		8.8E-01	0.00	36.31	0.00	19.55	0.00	94.54
		1.75	0.00	46.83	0.00	19.55	0.00	85.10
SLOF95	ULTLK MIN							
		0.00	0.00	-107.56	0.00	10.15	0.00	-100.42
		8.8E-01	0.00	-97.04	0.00	10.15	0.00	-10.90
		1.75	0.00	-86.52	0.00	10.15	0.00	49.89
SLOF96	ULTLK MAX							
		0.00	0.00	9.29	0.00	-4.781E-01	0.00	38.52
		8.8E-01	0.00	18.94	0.00	-4.781E-01	0.00	27.63
		1.75	0.00	31.76	0.00	-4.781E-01	0.00	11.25
SLOF96	ULTLK MIN							
		0.00	0.00	-2.744E-01	0.00	-3.42	0.00	22.62
		8.8E-01	0.00	8.04	0.00	-3.42	0.00	15.01
		1.75	0.00	16.32	0.00	-3.42	0.00	-3.05
SLOF97	ULTLK MAX							
		0.00	0.00	70.20	0.00	14.94	0.00	79.47
		6.7E-01	0.00	78.32	0.00	14.94	0.00	71.44
		1.35	0.00	86.44	0.00	14.94	0.00	57.93
SLOF97	ULTLK MIN							
		0.00	0.00	6.62	0.00	-20.39	0.00	-61.65
		6.7E-01	0.00	13.58	0.00	-20.39	0.00	-111.78
		1.35	0.00	20.54	0.00	-20.39	0.00	-167.39
SLOF98	ULTLK MAX							
		0.00	0.00	64.01	0.00	16.30	0.00	93.15

		6.7E-01	0.00	72.12	0.00	16.30	0.00	110.87
		1.35	0.00	80.24	0.00	16.30	0.00	123.11
SLOF98	ULTBLK	MIN						
		0.00	0.00	-30.31	0.00	-1.29	0.00	-72.45
		6.7E-01	0.00	-22.20	0.00	-1.29	0.00	-118.39
		1.35	0.00	-14.08	0.00	-1.29	0.00	-169.82
SLOF99	ULTBLK	MAX						
		0.00	0.00	66.85	0.00	7.59	0.00	91.20
		6.7E-01	0.00	74.97	0.00	7.59	0.00	113.83
		1.35	0.00	83.09	0.00	7.59	0.00	130.98
SLOF99	ULTBLK	MIN						
		0.00	0.00	-37.59	0.00	-15.83	0.00	-69.28
		6.7E-01	0.00	-29.47	0.00	-15.83	0.00	-117.14
		1.35	0.00	-21.35	0.00	-15.83	0.00	-170.49
INDK100	ULTBLK	MAX						
		0.00	0.00	217.01	0.00	11.84	0.00	133.20
		5.3E-01	0.00	226.12	0.00	11.84	0.00	88.73
		1.05	0.00	236.10	0.00	11.84	0.00	46.72
INDK100	ULTBLK	MIN						
		0.00	0.00	58.56	0.00	-82.06	0.00	-216.63
		5.3E-01	0.00	66.07	0.00	-82.06	0.00	-332.83
		1.05	0.00	74.19	0.00	-82.06	0.00	-454.28
INDK101	ULTBLK	MAX						
		2.0E-01	0.00	166.47	0.00	16.97	0.00	233.59
		1.53	0.00	177.34	0.00	16.97	0.00	8.37
		2.85	0.00	187.92	0.00	16.97	0.00	215.23
INDK101	ULTBLK	MIN						
		2.0E-01	0.00	-237.12	0.00	-26.92	0.00	-384.54
		1.53	0.00	-226.26	0.00	-26.92	0.00	-76.71
		2.85	0.00	-215.67	0.00	-26.92	0.00	-236.17
INDK102	ULTBLK	MAX						
		0.00	0.00	-9.52	0.00	6.53	0.00	-3.66
		1.50	0.00	-8.217E-01	0.00	6.53	0.00	8.22
		3.00	0.00	10.41	0.00	6.53	0.00	5.59
INDK102	ULTBLK	MIN						
		0.00	0.00	-20.00	0.00	-1.02	0.00	-14.31
		1.50	0.00	-6.24	0.00	-1.02	0.00	2.99
		3.00	0.00	3.65	0.00	-1.02	0.00	-2.36
INDK103	ULTBLK	MAX						
		0.00	0.00	20.00	0.00	-3.66	0.00	1.02
		1.40	0.00	33.72	0.00	-3.66	0.00	-17.69
		2.80	0.00	49.26	0.00	-3.66	0.00	-48.89
INDK103	ULTBLK	MIN						
		0.00	0.00	9.52	0.00	-14.31	0.00	-6.53
		1.40	0.00	17.46	0.00	-14.31	0.00	-39.62
		2.80	0.00	26.11	0.00	-14.31	0.00	-99.20
INDK104	ULTBLK	MAX						
		1.5E-01	0.00	-20.45	0.00	2.36	0.00	-29.10
		1.58	0.00	-11.77	0.00	2.36	0.00	-5.40
		3.00	0.00	-3.65	0.00	2.36	0.00	6.53
INDK104	ULTBLK	MIN						
		1.5E-01	0.00	-39.97	0.00	-5.59	0.00	-67.21
		1.58	0.00	-24.49	0.00	-5.59	0.00	-21.68
		3.00	0.00	-10.41	0.00	-5.59	0.00	-1.02
INDK105	ULTBLK	MAX						
		2.0E-01	0.00	-46.03	0.00	6.53	0.00	30.58
		4.50	0.00	27.52	0.00	6.53	0.00	122.57
		8.80	0.00	114.15	0.00	6.53	0.00	-7.52
INDK105	ULTBLK	MIN						
		2.0E-01	0.00	-105.92	0.00	-3.46	0.00	-183.45
		4.50	0.00	-19.29	0.00	-3.46	0.00	71.47
		8.80	0.00	52.28	0.00	-3.46	0.00	-206.12
INDK106	ULTBLK	MAX						
		2.0E-01	0.00	25.71	0.00	15.10	0.00	31.07
		1.53	0.00	41.52	0.00	15.10	0.00	-9.36
		2.85	0.00	56.78	0.00	15.10	0.00	58.37
INDK106	ULTBLK	MIN						
		2.0E-01	0.00	-90.33	0.00	-4.534E-01	0.00	-139.49
		1.53	0.00	-74.49	0.00	-4.534E-01	0.00	-28.88
		2.85	0.00	-59.22	0.00	-4.534E-01	0.00	-78.66
INDK107	ULTBLK	MAX						
		2.0E-01	0.00	-28.94	0.00	36.92	0.00	105.87
		1.60	0.00	-7.93	0.00	36.92	0.00	146.51
		3.00	0.00	12.36	0.00	36.92	0.00	170.37
INDK107	ULTBLK	MIN						
		2.0E-01	0.00	-157.23	0.00	4.25	0.00	-248.18
		1.60	0.00	-131.40	0.00	4.25	0.00	-45.22
		3.00	0.00	-106.70	0.00	4.25	0.00	93.39

INDK108	ULTBLK MAX						
	2.0E-01	0.00	-34.43	0.00	-11.00	0.00	120.39
	1.60	0.00	-10.09	0.00	-11.00	0.00	173.91
	3.00	0.00	15.77	0.00	-11.00	0.00	178.99
INDK108	ULTBLK MIN						
	2.0E-01	0.00	-188.41	0.00	-38.81	0.00	-342.75
	1.60	0.00	-157.12	0.00	-38.81	0.00	-98.97
	3.00	0.00	-123.28	0.00	-38.81	0.00	70.91
INDK109	ULTBLK MAX						
	1.5E-01	0.00	35.40	0.00	8.282E-01	0.00	118.69
	3.00	0.00	62.72	0.00	8.282E-01	0.00	41.43
	5.85	0.00	90.04	0.00	8.282E-01	0.00	158.75
INDK109	ULTBLK MIN						
	1.5E-01	0.00	-83.51	0.00	-1.53	0.00	-161.50
	3.00	0.00	-56.18	0.00	-1.53	0.00	-17.26
	5.85	0.00	-28.86	0.00	-1.53	0.00	-238.82
INDK110	ULTBLK MAX						
	0.00	0.00	123.25	0.00	-3.72	0.00	170.53
	1.40	0.00	147.96	0.00	-3.72	0.00	90.87
	2.80	0.00	173.78	0.00	-3.72	0.00	28.76
INDK110	ULTBLK MIN						
	0.00	0.00	2.78	0.00	-35.60	0.00	93.71
	1.40	0.00	23.07	0.00	-35.60	0.00	-39.17
	2.80	0.00	44.08	0.00	-35.60	0.00	-265.30
INDK111	ULTBLK MAX						
	0.00	0.00	128.65	0.00	36.17	0.00	179.92
	1.40	0.00	162.50	0.00	36.17	0.00	93.15
	2.80	0.00	193.79	0.00	36.17	0.00	32.38
INDK111	ULTBLK MIN						
	0.00	0.00	-9.16	0.00	10.55	0.00	69.97
	1.40	0.00	16.70	0.00	10.55	0.00	-37.27
	2.80	0.00	41.04	0.00	10.55	0.00	-284.39
INDK112	ULTBLK MAX						
	2.0E-01	0.00	-23.21	0.00	5.158E-01	0.00	60.67
	4.50	0.00	27.44	0.00	5.158E-01	0.00	123.10
	8.80	0.00	97.27	0.00	5.158E-01	0.00	21.89
INDK112	ULTBLK MIN						
	2.0E-01	0.00	-85.51	0.00	-7.810E-01	0.00	-152.72
	4.50	0.00	-18.89	0.00	-7.810E-01	0.00	56.40
	8.80	0.00	29.33	0.00	-7.810E-01	0.00	-175.38
INDK113	ULTBLK MAX						
	2.0E-01	0.00	24.78	0.00	3.78	0.00	24.54
	1.53	0.00	38.05	0.00	3.78	0.00	-5.86
	2.85	0.00	53.32	0.00	3.78	0.00	65.15
INDK113	ULTBLK MIN						
	2.0E-01	0.00	-95.60	0.00	-9.08	0.00	-146.94
	1.53	0.00	-79.76	0.00	-9.08	0.00	-39.31
	2.85	0.00	-64.49	0.00	-9.08	0.00	-83.56
INDK114	ULTBLK MAX						
	2.0E-01	0.00	-28.85	0.00	24.58	0.00	30.13
	1.60	0.00	-7.85	0.00	24.58	0.00	66.53
	3.00	0.00	12.45	0.00	24.58	0.00	96.66
INDK114	ULTBLK MIN						
	2.0E-01	0.00	-139.45	0.00	-5.41	0.00	-244.31
	1.60	0.00	-113.62	0.00	-5.41	0.00	-66.24
	3.00	0.00	-88.92	0.00	-5.41	0.00	50.14
INDK115	ULTBLK MAX						
	2.0E-01	0.00	-39.38	0.00	-7.537E-01	0.00	19.31
	1.60	0.00	-15.05	0.00	-7.537E-01	0.00	70.27
	3.00	0.00	10.82	0.00	-7.537E-01	0.00	114.95
INDK115	ULTBLK MIN						
	2.0E-01	0.00	-153.71	0.00	-24.68	0.00	-255.86
	1.60	0.00	-122.42	0.00	-24.68	0.00	-60.67
	3.00	0.00	-88.58	0.00	-24.68	0.00	55.83
INDK116	ULTBLK MAX						
	1.5E-01	0.00	10.90	0.00	6.09	0.00	73.39
	3.00	0.00	35.86	0.00	6.09	0.00	22.89
	5.85	0.00	63.18	0.00	6.09	0.00	79.22
INDK116	ULTBLK MIN						
	1.5E-01	0.00	-63.42	0.00	-5.46	0.00	-126.56
	3.00	0.00	-36.10	0.00	-5.46	0.00	7.32
	5.85	0.00	-11.20	0.00	-5.46	0.00	-130.99
INDK117	ULTBLK MAX						
	0.00	0.00	76.13	0.00	11.02	0.00	96.65
	1.40	0.00	100.83	0.00	11.02	0.00	84.81
	2.80	0.00	126.66	0.00	11.02	0.00	57.75
INDK117	ULTBLK MIN						

	0.00	0.00	-21.06	0.00	-19.10	0.00	50.11
	1.40	0.00	-7.624E-01	0.00	-19.10	0.00	-51.99
	2.80	0.00	20.25	0.00	-19.10	0.00	-212.16
INDK118	ULTBLK MAX						
	0.00	0.00	78.83	0.00	21.19	0.00	114.98
	1.40	0.00	112.68	0.00	21.19	0.00	89.34
	2.80	0.00	143.97	0.00	21.19	0.00	49.64
INDK118	ULTBLK MIN						
	0.00	0.00	-20.98	0.00	-2.16	0.00	55.81
	1.40	0.00	4.88	0.00	-2.16	0.00	-49.17
	2.80	0.00	29.22	0.00	-2.16	0.00	-230.73
INDK119	ULTBLK MAX						
	2.0E-01	0.00	-59.23	0.00	3.518E-01	0.00	26.61
	4.50	0.00	29.79	0.00	3.518E-01	0.00	175.71
	8.80	0.00	150.21	0.00	3.518E-01	0.00	-26.57
INDK119	ULTBLK MIN						
	2.0E-01	0.00	-133.78	0.00	-2.493E-01	0.00	-196.15
	4.50	0.00	-17.35	0.00	-2.493E-01	0.00	93.89
	8.80	0.00	68.52	0.00	-2.493E-01	0.00	-234.20
INDK120	ULTBLK MAX						
	2.0E-01	0.00	33.30	0.00	6.49	0.00	5.354E-01
	1.53	0.00	47.86	0.00	6.49	0.00	18.80
	2.85	0.00	63.13	0.00	6.49	0.00	145.16
INDK120	ULTBLK MIN						
	2.0E-01	0.00	-127.28	0.00	-6.68	0.00	-175.62
	1.53	0.00	-111.44	0.00	-6.68	0.00	-95.96
	2.85	0.00	-96.17	0.00	-6.68	0.00	-162.59
INDK121	ULTBLK MAX						
	2.0E-01	0.00	-20.89	0.00	19.01	0.00	54.73
	1.60	0.00	1.186E-01	0.00	19.01	0.00	82.49
	3.00	0.00	20.41	0.00	19.01	0.00	98.71
INDK121	ULTBLK MIN						
	2.0E-01	0.00	-130.10	0.00	-10.73	0.00	-217.71
	1.60	0.00	-104.28	0.00	-10.73	0.00	-52.72
	3.00	0.00	-79.57	0.00	-10.73	0.00	51.78
INDK122	ULTBLK MAX						
	2.0E-01	0.00	-29.40	0.00	2.25	0.00	48.45
	1.60	0.00	-5.07	0.00	2.25	0.00	87.95
	3.00	0.00	20.80	0.00	2.25	0.00	115.04
INDK122	ULTBLK MIN						
	2.0E-01	0.00	-146.83	0.00	-21.57	0.00	-237.70
	1.60	0.00	-115.54	0.00	-21.57	0.00	-52.15
	3.00	0.00	-81.69	0.00	-21.57	0.00	58.14
INDK123	ULTBLK MAX						
	1.5E-01	0.00	32.38	0.00	22.06	0.00	168.58
	3.00	0.00	59.71	0.00	22.06	0.00	42.18
	5.85	0.00	87.03	0.00	22.06	0.00	114.14
INDK123	ULTBLK MIN						
	1.5E-01	0.00	-86.97	0.00	-21.50	0.00	-225.85
	3.00	0.00	-59.65	0.00	-21.50	0.00	-14.05
	5.85	0.00	-32.32	0.00	-21.50	0.00	-171.76
INDK124	ULTBLK MAX						
	1.5E-01	0.00	20.34	0.00	1.82	0.00	78.35
	1.50	0.00	40.24	0.00	1.82	0.00	40.61
	2.85	0.00	60.15	0.00	1.82	0.00	39.20
INDK124	ULTBLK MIN						
	1.5E-01	0.00	-64.36	0.00	-17.13	0.00	-81.91
	1.50	0.00	-44.45	0.00	-17.13	0.00	-111.60
	2.85	0.00	-24.55	0.00	-17.13	0.00	-31.38
INDK125	ULTBLK MAX						
	1.5E-01	0.00	23.65	0.00	29.12	0.00	63.73
	1.50	0.00	48.17	0.00	29.12	0.00	18.63
	2.85	0.00	72.69	0.00	29.12	0.00	30.26
INDK125	ULTBLK MIN						
	1.5E-01	0.00	-55.24	0.00	-11.38	0.00	-52.67
	1.50	0.00	-30.71	0.00	-11.38	0.00	2.51
	2.85	0.00	-6.65	0.00	-11.38	0.00	-66.33
INDK126	ULTBLK MAX						
	1.5E-01	0.00	6.94	0.00	4.46	0.00	30.65
	1.50	0.00	31.34	0.00	4.46	0.00	6.17
	2.85	0.00	55.86	0.00	4.46	0.00	31.67
INDK126	ULTBLK MIN						
	1.5E-01	0.00	-58.42	0.00	-11.24	0.00	-59.85
	1.50	0.00	-33.90	0.00	-11.24	0.00	1.94
	2.85	0.00	-9.37	0.00	-11.24	0.00	-53.97
INDK127	ULTBLK MAX						
	1.5E-01	0.00	11.29	0.00	12.89	0.00	38.05

					12.89	0.00	14.84
	1.50	0.00	35.81	0.00	12.89	0.00	48.95
	2.85	0.00	60.33	0.00			
INDK127	ULTBLK MIN						
	1.5E-01	0.00	-62.81	0.00	-8.47	0.00	-57.56
	1.50	0.00	-38.29	0.00	-8.47	0.00	2.43
	2.85	0.00	-13.77	0.00	-8.47	0.00	-61.78
INDK128	ULTBLK MAX						
	1.5E-01	0.00	15.25	0.00	1.11	0.00	25.49
	1.50	0.00	39.77	0.00	1.11	0.00	34.72
	2.85	0.00	64.29	0.00	1.11	0.00	74.23
INDK128	ULTBLK MIN						
	1.5E-01	0.00	-66.68	0.00	-2.08	0.00	-39.61
	1.50	0.00	-42.16	0.00	-2.08	0.00	-10.80
	2.85	0.00	-17.64	0.00	-2.08	0.00	-81.89
INDK129	ULTBLK MAX						
	0.00	0.00	85.73	0.00	7.26	0.00	98.65
	1.40	0.00	110.43	0.00	7.26	0.00	73.10
	2.80	0.00	136.25	0.00	7.26	0.00	36.86
INDK129	ULTBLK MIN						
	0.00	0.00	-13.60	0.00	-24.20	0.00	51.77
	1.40	0.00	6.70	0.00	-24.20	0.00	-62.83
	2.80	0.00	27.71	0.00	-24.20	0.00	-236.43
INDK130	ULTBLK MAX						
	0.00	0.00	90.27	0.00	25.40	0.00	115.09
	1.40	0.00	124.12	0.00	25.40	0.00	77.65
	2.80	0.00	155.41	0.00	25.40	0.00	30.77
INDK130	ULTBLK MIN						
	0.00	0.00	-14.62	0.00	4.939E-01	0.00	58.21
	1.40	0.00	11.24	0.00	4.939E-01	0.00	-63.61
	2.80	0.00	35.58	0.00	4.939E-01	0.00	-261.19
INDK131	ULTBLK MAX						
	1.5E-01	0.00	141.79	0.00	25.20	0.00	251.84
	1.50	0.00	147.79	0.00	25.20	0.00	56.37
	2.85	0.00	153.80	0.00	25.20	0.00	111.42
INDK131	ULTBLK MIN						
	1.5E-01	0.00	-138.25	0.00	-21.70	0.00	-245.65
	1.50	0.00	-132.25	0.00	-21.70	0.00	-63.06
	2.85	0.00	-126.24	0.00	-21.70	0.00	-147.21
INDK132	ULTBLK MAX						
	1.5E-01	0.00	30.92	0.00	12.68	0.00	98.13
	1.50	0.00	55.44	0.00	12.68	0.00	41.02
	2.85	0.00	83.74	0.00	12.68	0.00	43.72
INDK132	ULTBLK MIN						
	1.5E-01	0.00	-79.84	0.00	-11.96	0.00	-106.61
	1.50	0.00	-55.32	0.00	-11.96	0.00	-14.85
	2.85	0.00	-27.03	0.00	-11.96	0.00	-55.92
INDK133	ULTBLK MAX						
	2.0E-01	0.00	-22.23	0.00	3.476E-01	0.00	70.30
	4.50	0.00	28.69	0.00	3.476E-01	0.00	125.21
	8.80	0.00	98.79	0.00	3.476E-01	0.00	16.86
INDK133	ULTBLK MIN						
	2.0E-01	0.00	-84.00	0.00	-5.391E-01	0.00	-148.78
	4.50	0.00	-17.73	0.00	-5.391E-01	0.00	47.17
	8.80	0.00	30.24	0.00	-5.391E-01	0.00	-176.42
INDK134	ULTBLK MAX						
	2.0E-01	0.00	200.53	0.00	16.49	0.00	35.30
	1.53	0.00	216.37	0.00	16.49	0.00	212.83
	2.85	0.00	231.64	0.00	16.49	0.00	546.96
INDK134	ULTBLK MIN						
	2.0E-01	0.00	-279.02	0.00	-14.44	0.00	-173.40
	1.53	0.00	-263.18	0.00	-14.44	0.00	-270.60
	2.85	0.00	-247.91	0.00	-14.44	0.00	-566.32
INDK135	ULTBLK MAX						
	1.5E-01	0.00	45.86	0.00	4.54	0.00	148.81
	2.98	0.00	86.00	0.00	4.54	0.00	-13.85
	5.80	0.00	126.68	0.00	4.54	0.00	-21.36
INDK135	ULTBLK MIN						
	1.5E-01	0.00	-53.64	0.00	-3.27	0.00	-125.12
	2.98	0.00	-15.05	0.00	-3.27	0.00	-37.16
	5.80	0.00	13.72	0.00	-3.27	0.00	-338.58
INDK136	ULTBLK MAX						
	1.5E-01	0.00	28.55	0.00	9.462E-02	0.00	117.71
	2.98	0.00	68.69	0.00	9.462E-02	0.00	5.60
	5.80	0.00	109.37	0.00	9.462E-02	0.00	15.19
INDK136	ULTBLK MIN						
	1.5E-01	0.00	-61.24	0.00	-8.03	0.00	-118.09
	2.98	0.00	-21.11	0.00	-8.03	0.00	-12.93
	5.80	0.00	8.33	0.00	-8.03	0.00	-270.73



INDK137	ULTBLK MAX						136.38
	1.5E-01	0.00	81.93	0.00	33.22	0.00	80.06
	8.3E-01	0.00	84.93	0.00	33.22	0.00	30.48
	1.50	0.00	87.93	0.00	33.22	0.00	
INDK137	ULTBLK MIN						-187.01
	1.5E-01	0.00	-132.21	0.00	-10.91	0.00	-98.78
	8.3E-01	0.00	-129.21	0.00	-10.91	0.00	-21.34
	1.50	0.00	-126.21	0.00	-10.91	0.00	
INDK138	ULTBLK MAX						26.79
	2.0E-01	0.00	-45.15	0.00	35.44	0.00	89.47
	1.60	0.00	-24.14	0.00	35.44	0.00	151.61
	3.00	0.00	-3.85	0.00	35.44	0.00	
INDK138	ULTBLK MIN						-250.77
	2.0E-01	0.00	-158.28	0.00	2.69	0.00	-46.33
	1.60	0.00	-132.46	0.00	2.69	0.00	91.37
	3.00	0.00	-107.75	0.00	2.69	0.00	
INDK139	ULTBLK MAX						19.07
	2.0E-01	0.00	-54.29	0.00	-10.99	0.00	94.37
	1.60	0.00	-29.95	0.00	-10.99	0.00	169.65
	3.00	0.00	-4.09	0.00	-10.99	0.00	
INDK139	ULTBLK MIN						-268.24
	2.0E-01	0.00	-174.90	0.00	-35.88	0.00	-43.38
	1.60	0.00	-143.61	0.00	-35.88	0.00	99.17
	3.00	0.00	-109.76	0.00	-35.88	0.00	
INDK140	ULTBLK MAX						56.10
	0.00	0.00	89.54	0.00	48.64	0.00	122.49
	1.43	0.00	105.19	0.00	48.64	0.00	200.64
	2.85	0.00	116.86	0.00	48.64	0.00	
INDK140	ULTBLK MIN						-7.42
	0.00	0.00	-77.17	0.00	-48.00	0.00	-110.32
	1.43	0.00	-61.53	0.00	-48.00	0.00	-269.41
	2.85	0.00	-49.85	0.00	-48.00	0.00	
INDK141	ULTBLK MAX						66.32
	1.5E-01	0.00	33.96	0.00	9.57	0.00	2.93
	1.50	0.00	62.26	0.00	9.57	0.00	48.77
	2.85	0.00	86.78	0.00	9.57	0.00	
INDK141	ULTBLK MIN						-87.23
	1.5E-01	0.00	-78.04	0.00	-13.92	0.00	-2.54
	1.50	0.00	-49.74	0.00	-13.92	0.00	-100.09
	2.85	0.00	-25.22	0.00	-13.92	0.00	
INDK142	ULTBLK MAX						28.89
	0.00	0.00	100.05	0.00	9.33	0.00	58.62
	6.8E-01	0.00	105.04	0.00	9.33	0.00	126.08
	1.35	0.00	110.86	0.00	9.33	0.00	
INDK142	ULTBLK MIN						-21.16
	0.00	0.00	-108.15	0.00	-8.63	0.00	-48.35
	6.8E-01	0.00	-103.16	0.00	-8.63	0.00	-121.42
	1.35	0.00	-97.34	0.00	-8.63	0.00	
INDK143	ULTBLK MAX						57.04
	1.5E-01	0.00	-42.45	0.00	-4.56	0.00	136.97
	1.58	0.00	-29.06	0.00	-4.56	0.00	189.61
	3.00	0.00	-16.75	0.00	-4.56	0.00	
INDK143	ULTBLK MIN						-191.68
	1.5E-01	0.00	-112.53	0.00	-18.72	0.00	-53.87
	1.58	0.00	-89.53	0.00	-18.72	0.00	32.56
	3.00	0.00	-71.91	0.00	-18.72	0.00	
INDK144	ULTBLK MAX						216.33
	0.00	0.00	140.91	0.00	3.62	0.00	61.35
	1.40	0.00	155.26	0.00	3.62	0.00	-14.42
	2.80	0.00	171.85	0.00	3.62	0.00	
INDK144	ULTBLK MIN						53.31
	0.00	0.00	17.93	0.00	-30.37	0.00	-23.14
	1.40	0.00	28.46	0.00	-30.37	0.00	-235.01
	2.80	0.00	40.43	0.00	-30.37	0.00	
INDK145	ULTBLK MAX						1.99
	2.0E-01	0.00	-43.91	0.00	9.19	0.00	69.95
	1.60	0.00	-31.94	0.00	9.19	0.00	184.00
	3.00	0.00	-21.41	0.00	9.19	0.00	
INDK145	ULTBLK MIN						-227.59
	2.0E-01	0.00	-149.78	0.00	-20.94	0.00	-27.97
	1.60	0.00	-133.19	0.00	-20.94	0.00	85.41
	3.00	0.00	-118.84	0.00	-20.94	0.00	
INDK146	ULTBLK MAX						174.15
	0.00	0.00	97.26	0.00	32.77	0.00	95.27
	1.40	0.00	111.61	0.00	32.77	0.00	34.74
	2.80	0.00	128.20	0.00	32.77	0.00	
INDK146	ULTBLK MIN						

	0.00	0.00	9.70	0.00	1.49	0.00	79.56
	1.40	0.00	20.24	0.00	1.49	0.00	-19.19
	2.80	0.00	32.21	0.00	1.49	0.00	-181.55
INDK147	ULTBLK MAX						
	2.0E-01	0.00	24.97	0.00	29.11	0.00	29.20
	1.53	0.00	39.82	0.00	29.11	0.00	-7.30
	2.85	0.00	54.63	0.00	29.11	0.00	96.06
INDK147	ULTBLK MIN						
	2.0E-01	0.00	-106.13	0.00	3.211E-01	0.00	-144.84
	1.53	0.00	-90.77	0.00	3.211E-01	0.00	-16.54
	2.85	0.00	-75.96	0.00	3.211E-01	0.00	-77.33
INDK148	ULTBLK MAX						
	0.00	0.00	104.11	0.00	-2.88	0.00	151.65
	1.40	0.00	128.82	0.00	-2.88	0.00	93.66
	2.80	0.00	154.64	0.00	-2.88	0.00	32.80
INDK148	ULTBLK MIN						
	0.00	0.00	1.83	0.00	-35.97	0.00	91.49
	1.40	0.00	22.13	0.00	-35.97	0.00	-41.61
	2.80	0.00	43.14	0.00	-35.97	0.00	-240.95
INDK149	ULTBLK MAX						
	0.00	0.00	107.13	0.00	36.73	0.00	169.61
	1.40	0.00	140.98	0.00	36.73	0.00	100.01
	2.80	0.00	172.26	0.00	36.73	0.00	27.53
INDK149	ULTBLK MIN						
	0.00	0.00	1.25	0.00	11.39	0.00	99.26
	1.40	0.00	27.11	0.00	11.39	0.00	-40.35
	2.80	0.00	51.45	0.00	11.39	0.00	-261.52
INDK150	ULTBLK MAX						
	1.5E-01	0.00	42.77	0.00	15.95	0.00	194.09
	1.58	0.00	59.41	0.00	15.95	0.00	123.96
	3.00	0.00	79.47	0.00	15.95	0.00	54.12
INDK150	ULTBLK MIN						
	1.5E-01	0.00	-120.46	0.00	-13.78	0.00	-263.63
	1.58	0.00	-103.46	0.00	-13.78	0.00	-102.34
	3.00	0.00	-83.39	0.00	-13.78	0.00	-4.43
INDK151	ULTBLK MAX						
	1.5E-01	0.00	-13.97	0.00	-7.178E-01	0.00	30.75
	1.58	0.00	-3.86	0.00	-7.178E-01	0.00	50.25
	3.00	0.00	5.15	0.00	-7.178E-01	0.00	53.86
INDK151	ULTBLK MIN						
	1.5E-01	0.00	-105.09	0.00	-26.88	0.00	-231.64
	1.58	0.00	-90.21	0.00	-26.88	0.00	-90.42
	3.00	0.00	-77.15	0.00	-26.88	0.00	19.26
INDK152	ULTBLK MAX						
	1.5E-01	0.00	158.26	0.00	41.22	0.00	165.02
	1.50	0.00	173.97	0.00	41.22	0.00	74.84
	2.85	0.00	189.67	0.00	41.22	0.00	279.82
INDK152	ULTBLK MIN						
	1.5E-01	0.00	-177.52	0.00	-38.94	0.00	-159.94
	1.50	0.00	-161.81	0.00	-38.94	0.00	-61.40
	2.85	0.00	-146.11	0.00	-38.94	0.00	-307.55
INDK153	ULTBLK MAX						
	2.0E-01	0.00	-120.34	0.00	26.89	0.00	-177.06
	1.60	0.00	-100.37	0.00	26.89	0.00	-10.38
	3.00	0.00	-97.84	0.00	26.89	0.00	179.11
INDK153	ULTBLK MIN						
	2.0E-01	0.00	-249.55	0.00	5.606E-01	0.00	-462.10
	1.60	0.00	-226.93	0.00	5.606E-01	0.00	-168.86
	3.00	0.00	-207.66	0.00	5.606E-01	0.00	66.41
INDK154	ULTBLK MAX						
	2.0E-01	0.00	-66.79	0.00	-17.12	0.00	-64.46
	1.60	0.00	-54.82	0.00	-17.12	0.00	21.85
	3.00	0.00	-44.29	0.00	-17.12	0.00	114.42
INDK154	ULTBLK MIN						
	2.0E-01	0.00	-167.08	0.00	-43.46	0.00	-348.13
	1.60	0.00	-145.51	0.00	-43.46	0.00	-130.97
	3.00	0.00	-131.16	0.00	-43.46	0.00	44.07
INDK155	ULTBLK MAX						
	1.5E-01	0.00	16.66	0.00	-7.47	0.00	45.11
	1.50	0.00	41.18	0.00	-7.47	0.00	10.40
	2.85	0.00	65.70	0.00	-7.47	0.00	49.20
INDK155	ULTBLK MIN						
	1.5E-01	0.00	-74.08	0.00	-25.78	0.00	-84.84
	1.50	0.00	-49.56	0.00	-25.78	0.00	-4.01
	2.85	0.00	-25.04	0.00	-25.78	0.00	-66.30
INDK156	ULTBLK MAX						
	2.0E-01	0.00	-22.55	0.00	6.034E-01	0.00	68.42

	4.50	0.00	28.36	0.00	6.034E-01	0.00	123.38
	8.80	0.00	99.02	0.00	6.034E-01	0.00	13.05
INDK156	ULTBLK MIN						
	2.0E-01	0.00	-83.77	0.00	-5.472E-01	0.00	-148.26
	4.50	0.00	-17.10	0.00	-5.472E-01	0.00	45.80
	8.80	0.00	30.74	0.00	-5.472E-01	0.00	-175.47
INDK157	ULTBLK MAX						
	2.0E-01	0.00	129.88	0.00	10.49	0.00	48.76
	1.53	0.00	145.72	0.00	10.49	0.00	93.19
	2.85	0.00	160.99	0.00	10.49	0.00	339.86
INDK157	ULTBLK MIN						
	2.0E-01	0.00	-213.75	0.00	-16.23	0.00	-199.45
	1.53	0.00	-197.91	0.00	-16.23	0.00	-155.57
	2.85	0.00	-182.64	0.00	-16.23	0.00	-356.71
INDK158	ULTBLK MAX						
	1.5E-01	0.00	164.45	0.00	11.91	0.00	337.51
	2.50	0.00	197.66	0.00	11.91	0.00	70.41
	4.85	0.00	230.88	0.00	11.91	0.00	388.33
INDK158	ULTBLK MIN						
	1.5E-01	0.00	-187.55	0.00	-15.14	0.00	-337.07
	2.50	0.00	-154.34	0.00	-15.14	0.00	-82.22
	4.85	0.00	-121.13	0.00	-15.14	0.00	-591.50
INDK159	ULTBLK MAX						
	1.5E-01	0.00	-15.81	0.00	16.41	0.00	-12.92
	1.33	0.00	-9.03	0.00	16.41	0.00	3.18
	2.50	0.00	-1.90	0.00	16.41	0.00	12.90
INDK159	ULTBLK MIN						
	1.5E-01	0.00	-29.74	0.00	7.46	0.00	-28.41
	1.33	0.00	-17.93	0.00	7.46	0.00	-2.55
	2.50	0.00	-5.26	0.00	7.46	0.00	5.13
INDK160	ULTBLK MAX						
	2.0E-01	0.00	-23.85	0.00	24.55	0.00	39.29
	1.60	0.00	-2.84	0.00	24.55	0.00	69.39
	3.00	0.00	17.45	0.00	24.55	0.00	87.49
INDK160	ULTBLK MIN						
	2.0E-01	0.00	-132.63	0.00	-6.73	0.00	-235.92
	1.60	0.00	-106.81	0.00	-6.73	0.00	-67.40
	3.00	0.00	-82.10	0.00	-6.73	0.00	43.10
INDK161	ULTBLK MAX						
	2.0E-01	0.00	-34.85	0.00	-1.12	0.00	28.94
	1.60	0.00	-10.51	0.00	-1.12	0.00	74.02
	3.00	0.00	15.35	0.00	-1.12	0.00	104.22
INDK161	ULTBLK MIN						
	2.0E-01	0.00	-148.57	0.00	-25.98	0.00	-254.39
	1.60	0.00	-117.28	0.00	-25.98	0.00	-66.40
INDK162	ULTBLK MAX						
	0.00	0.00	77.41	0.00	25.50	0.00	54.38
	1.43	0.00	97.48	0.00	25.50	0.00	117.79
	2.85	0.00	114.49	0.00	25.50	0.00	179.68
INDK162	ULTBLK MIN						
	0.00	0.00	-73.45	0.00	-32.95	0.00	-12.23
	1.43	0.00	-53.39	0.00	-32.95	0.00	-102.90
	2.85	0.00	-38.55	0.00	-32.95	0.00	-256.00
INDK163	ULTBLK MAX						
	1.5E-01	0.00	235.19	0.00	39.89	0.00	366.96
	1.50	0.00	250.90	0.00	39.89	0.00	40.88
	2.85	0.00	266.60	0.00	39.89	0.00	355.96
INDK163	ULTBLK MIN						
	1.5E-01	0.00	-291.70	0.00	1.68	0.00	-389.40
	1.50	0.00	-276.00	0.00	1.68	0.00	-6.37
	2.85	0.00	-260.29	0.00	1.68	0.00	-310.64
INDK164	ULTBLK MAX						
	0.00	0.00	-36.48	0.00	11.58	0.00	161.80
	1.40	0.00	-25.94	0.00	11.58	0.00	265.77
	2.80	0.00	-13.97	0.00	11.58	0.00	344.35
INDK164	ULTBLK MIN						
	0.00	0.00	-90.56	0.00	4.07	0.00	49.67
	1.40	0.00	-70.24	0.00	4.07	0.00	120.91
	2.80	0.00	-53.06	0.00	4.07	0.00	154.73
INDK165	ULTBLK MAX						
	0.00	0.00	-17.25	0.00	-9.50	0.00	111.94
	1.40	0.00	-6.72	0.00	-9.50	0.00	166.79
	2.80	0.00	5.99	0.00	-9.50	0.00	194.57
INDK165	ULTBLK MIN						
	0.00	0.00	-55.03	0.00	-21.28	0.00	34.22
	1.40	0.00	-40.27	0.00	-21.28	0.00	85.16
	2.80	0.00	-23.16	0.00	-21.28	0.00	100.51

INDK166	ULTBLK MAX						51.47
	1.5E-01	0.00	17.13	0.00	-11.18	0.00	26.17
	1.50	0.00	31.12	0.00	-11.18	0.00	86.08
	2.85	0.00	46.83	0.00	-11.18	0.00	
INDK166	ULTBLK MIN						-80.03
	1.5E-01	0.00	-77.15	0.00	-24.98	0.00	8.78
	1.50	0.00	-61.44	0.00	-24.98	0.00	-32.78
	2.85	0.00	-45.74	0.00	-24.98	0.00	
INDK167	ULTBLK MAX						-6.10
	0.00	0.00	-13.32	0.00	-5.13	0.00	14.77
	1.50	0.00	-4.62	0.00	-5.13	0.00	16.41
	3.00	0.00	5.26	0.00	-5.13	0.00	
INDK167	ULTBLK MIN						-13.47
	0.00	0.00	-25.16	0.00	-12.90	0.00	7.33
	1.50	0.00	-9.96	0.00	-12.90	0.00	7.46
	3.00	0.00	1.90	0.00	-12.90	0.00	
INDK168	ULTBLK MAX						2.58
	1.5E-01	0.00	-73.96	0.00	24.66	0.00	98.02
	1.58	0.00	-49.46	0.00	24.66	0.00	178.76
	3.00	0.00	-26.06	0.00	24.66	0.00	
INDK168	ULTBLK MIN						-490.20
	1.5E-01	0.00	-196.70	0.00	-32.91	0.00	-231.55
	1.58	0.00	-164.39	0.00	-32.91	0.00	-26.47
	3.00	0.00	-134.75	0.00	-32.91	0.00	
INDK169	ULTBLK MAX						144.41
	0.00	0.00	-22.33	0.00	2.99	0.00	170.51
	1.40	0.00	5.627E-01	0.00	2.99	0.00	198.78
	2.80	0.00	28.57	0.00	2.99	0.00	
INDK169	ULTBLK MIN						-45.33
	0.00	0.00	-102.36	0.00	-7.36	0.00	56.41
	1.40	0.00	-73.38	0.00	-7.36	0.00	107.87
	2.80	0.00	-42.12	0.00	-7.36	0.00	
INDK170	ULTBLK MAX						184.02
	2.0E-01	0.00	-21.60	0.00	5.60	0.00	230.36
	1.60	0.00	2.73	0.00	5.60	0.00	217.64
	3.00	0.00	29.81	0.00	5.60	0.00	
INDK170	ULTBLK MIN						99.15
	2.0E-01	0.00	-50.93	0.00	2.33	0.00	118.89
	1.60	0.00	-14.65	0.00	2.33	0.00	100.72
	3.00	0.00	12.35	0.00	2.33	0.00	
INDK171	ULTBLK MAX						235.18
	0.00	0.00	26.00	0.00	1.23	0.00	179.20
	1.40	0.00	60.23	0.00	1.23	0.00	79.49
	2.80	0.00	100.00	0.00	1.23	0.00	
INDK171	ULTBLK MIN						115.35
	0.00	0.00	3.94	0.00	-3.24	0.00	80.35
	1.40	0.00	26.83	0.00	-3.24	0.00	7.49
	2.80	0.00	51.16	0.00	-3.24	0.00	
INDK172	ULTBLK MAX						94.45
	2.0E-01	0.00	100.60	0.00	12.81	0.00	1.91
	1.53	0.00	137.71	0.00	12.81	0.00	-101.83
	2.85	0.00	173.97	0.00	12.81	0.00	
INDK172	ULTBLK MIN						16.83
	2.0E-01	0.00	43.48	0.00	-6.63	0.00	-107.37
	1.53	0.00	66.28	0.00	-6.63	0.00	-284.62
	2.85	0.00	88.74	0.00	-6.63	0.00	
INDK173	ULTBLK MAX						54.55
	1.5E-01	0.00	-27.22	0.00	13.47	0.00	-25.58
	1.33	0.00	-20.44	0.00	13.47	0.00	-5.13
	2.50	0.00	-13.32	0.00	13.47	0.00	
INDK173	ULTBLK MIN						-101.02
	1.5E-01	0.00	-49.66	0.00	6.10	0.00	-48.69
	1.33	0.00	-37.85	0.00	6.10	0.00	-12.90
	2.50	0.00	-25.16	0.00	6.10	0.00	
INDK174	ULTBLK MAX						87.53
	0.00	0.00	82.70	0.00	11.52	0.00	65.48
	1.40	0.00	107.41	0.00	11.52	0.00	33.91
	2.80	0.00	133.23	0.00	11.52	0.00	
INDK174	ULTBLK MIN						43.22
	0.00	0.00	-16.03	0.00	-19.17	0.00	-66.60
	1.40	0.00	4.27	0.00	-19.17	0.00	-235.97
	2.80	0.00	25.27	0.00	-19.17	0.00	
INDK175	ULTBLK MAX						104.18
	0.00	0.00	84.00	0.00	19.69	0.00	68.29
	1.40	0.00	117.85	0.00	19.69	0.00	26.07
	2.80	0.00	149.14	0.00	19.69	0.00	
INDK175	ULTBLK MIN						48.17
	0.00	0.00	-16.28	0.00	-2.59	0.00	

		0.00	0.00	92.80	0.00	4.90	0.00	124.63
		1.50	0.00	99.47	0.00	4.90	0.00	67.33
		3.00	0.00	106.15	0.00	4.90	0.00	151.35
INDK195	ULTBLK	MIN						
		0.00	0.00	-78.49	0.00	-9.20	0.00	-87.23
		1.50	0.00	-71.82	0.00	-9.20	0.00	-61.40
		3.00	0.00	-65.15	0.00	-9.20	0.00	-196.92
INDK196	ULTBLK	MAX						
		0.00	0.00	52.90	0.00	38.60	0.00	163.01
		1.50	0.00	59.57	0.00	38.60	0.00	80.55
		3.00	0.00	66.24	0.00	38.60	0.00	25.32
INDK196	ULTBLK	MIN						
		0.00	0.00	-99.37	0.00	-44.15	0.00	-252.88
		1.50	0.00	-92.70	0.00	-44.15	0.00	-110.72
		3.00	0.00	-86.02	0.00	-44.15	0.00	-15.81
INDK197	ULTBLK	MAX						
		0.00	0.00	248.97	0.00	6.68	0.00	587.48
		2.50	0.00	260.09	0.00	6.68	0.00	78.67
		5.00	0.00	271.22	0.00	6.68	0.00	729.99
INDK197	ULTBLK	MIN						
		0.00	0.00	-277.21	0.00	-3.37	0.00	-600.45
		2.50	0.00	-266.09	0.00	-3.37	0.00	-48.86
		5.00	0.00	-254.97	0.00	-3.37	0.00	-712.99
INDK198	ULTBLK	MAX						
		0.00	0.00	54.07	0.00	81.55	0.00	148.95
		1.50	0.00	60.74	0.00	81.55	0.00	66.83
		3.00	0.00	67.41	0.00	81.55	0.00	110.51
INDK198	ULTBLK	MIN						
		0.00	0.00	-95.46	0.00	-80.82	0.00	-199.52
		1.50	0.00	-88.79	0.00	-80.82	0.00	-65.32
		3.00	0.00	-82.12	0.00	-80.82	0.00	-76.93
INDK199	ULTBLK	MAX						
		0.00	0.00	223.12	0.00	7.90	0.00	384.76
		1.50	0.00	229.79	0.00	7.90	0.00	69.96
		3.00	0.00	236.46	0.00	7.90	0.00	245.43
INDK199	ULTBLK	MIN						
		0.00	0.00	-222.35	0.00	-10.37	0.00	-423.63
		1.50	0.00	-215.68	0.00	-10.37	0.00	-119.97
		3.00	0.00	-209.01	0.00	-10.37	0.00	-326.62
INDK200	ULTBLK	MAX						
		0.00	0.00	85.29	0.00	14.88	0.00	371.05
		2.50	0.00	96.41	0.00	14.88	0.00	143.92
		5.00	0.00	107.53	0.00	14.88	0.00	118.82
INDK200	ULTBLK	MIN						
		0.00	0.00	-107.17	0.00	-20.41	0.00	-361.42
		2.50	0.00	-96.05	0.00	-20.41	0.00	-107.40
		5.00	0.00	-84.93	0.00	-20.41	0.00	-111.01
INDK201	ULTBLK	MAX						
		0.00	0.00	93.82	0.00	37.99	0.00	95.95
		1.50	0.00	100.50	0.00	37.99	0.00	153.81
		3.00	0.00	107.17	0.00	37.99	0.00	245.96
INDK201	ULTBLK	MIN						
		0.00	0.00	-85.92	0.00	-29.47	0.00	-56.83
		1.50	0.00	-79.25	0.00	-29.47	0.00	-136.56
		3.00	0.00	-72.58	0.00	-29.47	0.00	-270.58
INDK202	ULTBLK	MAX						
		0.00	0.00	38.48	0.00	47.95	0.00	25.76
		1.50	0.00	45.16	0.00	47.95	0.00	13.54
		3.00	0.00	51.83	0.00	47.95	0.00	30.32
INDK202	ULTBLK	MIN						
		0.00	0.00	-21.19	0.00	-35.36	0.00	-13.25
		1.50	0.00	-14.52	0.00	-35.36	0.00	-36.97
		3.00	0.00	-7.85	0.00	-35.36	0.00	-109.71
INDK203	ULTBLK	MAX						
		0.00	0.00	16.24	0.00	13.25	0.00	101.46
		2.50	0.00	27.36	0.00	13.25	0.00	46.95
		5.00	0.00	38.48	0.00	13.25	0.00	47.95
INDK203	ULTBLK	MIN						
		0.00	0.00	-43.44	0.00	-25.76	0.00	-113.63
		2.50	0.00	-32.32	0.00	-25.76	0.00	-18.94
		5.00	0.00	-21.19	0.00	-25.76	0.00	-35.36
INDK204	ULTBLK	MAX						
		1.5E-01	0.00	4.08	0.00	-3.27	0.00	28.51
		1.50	0.00	26.87	0.00	-3.27	0.00	20.23
		2.85	0.00	51.40	0.00	-3.27	0.00	68.46
INDK204	ULTBLK	MIN						
		1.5E-01	0.00	-75.50	0.00	-23.77	0.00	-69.26
		1.50	0.00	-50.98	0.00	-23.77	0.00	4.27

	2.85	0.00	-26.46	0.00	-23.77	0.00	-44.12
INDK205	ULTBLK MAX						
	1.5E-01	0.00	16.72	0.00	-17.81	0.00	26.30
	1.50	0.00	41.24	0.00	-17.81	0.00	38.00
	2.85	0.00	65.76	0.00	-17.81	0.00	75.71
INDK205	ULTBLK MIN						
	1.5E-01	0.00	-65.34	0.00	-42.42	0.00	-34.51
	1.50	0.00	-40.82	0.00	-42.42	0.00	-11.97
	2.85	0.00	-16.30	0.00	-42.42	0.00	-85.05
INDK206	ULTBLK MAX						
	0.00	0.00	104.53	0.00	-3.14	0.00	189.53
	1.40	0.00	130.77	0.00	-3.14	0.00	159.69
INDK206	ULTBLK MIN						
	0.00	0.00	-10.15	0.00	-33.57	0.00	111.04
	1.40	0.00	11.12	0.00	-33.57	0.00	-25.16
	2.80	0.00	33.11	0.00	-33.57	0.00	-227.56
INDK207	ULTBLK MAX						
	0.00	0.00	120.89	0.00	38.55	0.00	202.81
	1.40	0.00	143.02	0.00	38.55	0.00	205.09
	2.80	0.00	162.51	0.00	38.55	0.00	183.38
INDK207	ULTBLK MIN						
	0.00	0.00	-18.73	0.00	11.15	0.00	85.15
	1.40	0.00	-3.50	0.00	11.15	0.00	-66.91
	2.80	0.00	10.16	0.00	11.15	0.00	-282.27
INDK208	ULTBLK MAX						
	2.0E-01	0.00	-84.93	0.00	36.88	0.00	-11.94
	1.10	0.00	-71.27	0.00	36.88	0.00	66.38
	2.00	0.00	-58.28	0.00	36.88	0.00	141.63
INDK208	ULTBLK MIN						
	2.0E-01	0.00	-170.30	0.00	7.78	0.00	-257.10
	1.10	0.00	-149.78	0.00	7.78	0.00	-115.30
	2.00	0.00	-132.96	0.00	7.78	0.00	4.74
INDK209	ULTBLK MAX						
	0.00	0.00	-32.66	0.00	13.37	0.00	142.53
	1.00	0.00	-18.04	0.00	13.37	0.00	176.72
	2.00	0.00	-3.41	0.00	13.37	0.00	219.61
INDK209	ULTBLK MIN						
	0.00	0.00	-92.11	0.00	3.74	0.00	5.00
	1.00	0.00	-74.26	0.00	3.74	0.00	73.12
	2.00	0.00	-56.40	0.00	3.74	0.00	125.93
INDK210	ULTBLK MAX						
	0.00	0.00	28.40	0.00	5.60	0.00	220.16
	1.00	0.00	46.25	0.00	5.60	0.00	203.47
	2.00	0.00	64.10	0.00	5.60	0.00	163.72
INDK210	ULTBLK MIN						
	0.00	0.00	-18.53	0.00	-7.35	0.00	124.91
	1.00	0.00	-1.91	0.00	-7.35	0.00	123.97
	2.00	0.00	12.71	0.00	-7.35	0.00	78.04
INDK211	ULTBLK MAX						
	0.00	0.00	102.90	0.00	5.851E-01	0.00	163.98
	8.8E-01	0.00	118.52	0.00	5.851E-01	0.00	106.60
	1.75	0.00	135.58	0.00	5.851E-01	0.00	39.15
INDK211	ULTBLK MIN						
	0.00	0.00	40.23	0.00	-25.97	0.00	79.07
	8.8E-01	0.00	53.03	0.00	-25.97	0.00	1.24
	1.75	0.00	65.83	0.00	-25.97	0.00	-104.97
INDK212	ULTBLK MAX						
	0.00	0.00	188.03	0.00	-3.25	0.00	37.75
	5.3E-01	0.00	198.93	0.00	-3.25	0.00	-17.74
	1.05	0.00	211.24	0.00	-3.25	0.00	-73.93
INDK212	ULTBLK MIN						
	0.00	0.00	95.34	0.00	-57.86	0.00	-107.35
	5.3E-01	0.00	102.86	0.00	-57.86	0.00	-202.17
	1.05	0.00	110.97	0.00	-57.86	0.00	-302.25
INDK213	ULTBLK MAX						
	2.0E-01	0.00	18.84	0.00	3.82	0.00	-2.52
	1.53	0.00	28.92	0.00	3.82	0.00	-32.29
	2.85	0.00	39.50	0.00	3.82	0.00	59.08
INDK213	ULTBLK MIN						
	2.0E-01	0.00	-106.36	0.00	-20.92	0.00	-194.22
	1.53	0.00	-95.49	0.00	-20.92	0.00	-62.68
	2.85	0.00	-84.91	0.00	-20.92	0.00	-87.28
SLOF100	ULTBLK MAX						
	0.00	0.00	117.76	0.00	9.60	0.00	23.93
	6.7E-01	0.00	125.72	0.00	9.60	0.00	91.26
	1.35	0.00	133.67	0.00	9.60	0.00	153.24
SLOF100	ULTBLK MIN						

	0.00	0.00	-103.75	0.00	-3.36	0.00	4.268E-01
	6.7E-01	0.00	-95.80	0.00	-3.36	0.00	-81.70
	1.35	0.00	-87.85	0.00	-3.36	0.00	-169.25
SLOF101	ULTBLK MAX						
	0.00	0.00	-37.65	0.00	4.23	0.00	-38.22
	1.00	0.00	-28.19	0.00	4.23	0.00	-3.65
	2.00	0.00	-18.73	0.00	4.23	0.00	25.05
SLOF101	ULTBLK MIN						
	0.00	0.00	-60.27	0.00	1.08	0.00	-69.00
	1.00	0.00	-45.55	0.00	1.08	0.00	-19.88
	2.00	0.00	-30.84	0.00	1.08	0.00	6.94
SLOF102	ULTBLK MAX						
	0.00	0.00	-22.16	0.00	-3.707E-01	0.00	14.60
	3.50	0.00	13.27	0.00	-3.707E-01	0.00	52.35
	7.00	0.00	64.78	0.00	-3.707E-01	0.00	-44.14
SLOF102	ULTBLK MIN						
	0.00	0.00	-38.24	0.00	-1.30	0.00	-1.65
	3.50	0.00	6.11	0.00	-1.30	0.00	32.06
	7.00	0.00	39.22	0.00	-1.30	0.00	-84.25
SLOF103	ULTBLK MAX						
	1.5E-01	0.00	33.11	0.00	3.84	0.00	106.69
	3.00	0.00	37.34	0.00	3.84	0.00	6.30
	5.85	0.00	41.56	0.00	3.84	0.00	97.00
SLOF103	ULTBLK MIN						
	1.5E-01	0.00	-40.90	0.00	-3.73	0.00	-112.01
	3.00	0.00	-36.67	0.00	-3.73	0.00	-1.49
	5.85	0.00	-32.44	0.00	-3.73	0.00	-106.13
SLOF104	ULTBLK MAX						
	1.5E-01	0.00	74.24	0.00	3.05	0.00	125.90
	1.50	0.00	90.14	0.00	3.05	0.00	14.95
	2.85	0.00	106.04	0.00	3.05	0.00	101.16
SLOF104	ULTBLK MIN						
	1.5E-01	0.00	-102.45	0.00	8.880E-03	0.00	-132.51
	1.50	0.00	-86.54	0.00	8.880E-03	0.00	-4.94
	2.85	0.00	-70.64	0.00	8.880E-03	0.00	-117.48
SLOF105	ULTBLK MAX						
	1.5E-01	0.00	58.11	0.00	-9.127E-01	0.00	92.93
	1.50	0.00	74.01	0.00	-9.127E-01	0.00	6.74
	2.85	0.00	89.91	0.00	-9.127E-01	0.00	95.35
SLOF105	ULTBLK MIN						
	1.5E-01	0.00	-89.77	0.00	-3.06	0.00	-104.09
	1.50	0.00	-73.87	0.00	-3.06	0.00	3.21
	2.85	0.00	-57.96	0.00	-3.06	0.00	-106.89
SLOF106	ULTBLK MAX						
	1.5E-01	0.00	62.34	0.00	4.41	0.00	98.42
	1.50	0.00	78.25	0.00	4.41	0.00	5.31
	2.85	0.00	94.15	0.00	4.41	0.00	96.85
SLOF106	ULTBLK MIN						
	1.5E-01	0.00	-92.29	0.00	-6.40	0.00	-109.39
	1.50	0.00	-76.39	0.00	-6.40	0.00	3.01
	2.85	0.00	-60.48	0.00	-6.40	0.00	-112.85
SLOF107	ULTBLK MAX						
	1.5E-01	0.00	61.96	0.00	6.86	0.00	99.95
	1.50	0.00	77.87	0.00	6.86	0.00	5.57
	2.85	0.00	93.77	0.00	6.86	0.00	91.74
SLOF107	ULTBLK MIN						
	1.5E-01	0.00	-89.78	0.00	-4.34	0.00	-107.73
	1.50	0.00	-73.88	0.00	-4.34	0.00	2.35
	2.85	0.00	-57.97	0.00	-4.34	0.00	-110.29
SLOF108	ULTBLK MAX						
	1.5E-01	0.00	73.62	0.00	1.05	0.00	106.85
	1.50	0.00	89.53	0.00	1.05	0.00	14.11
	2.85	0.00	105.43	0.00	1.05	0.00	119.13
SLOF108	ULTBLK MIN						
	1.5E-01	0.00	-101.64	0.00	-2.033E-01	0.00	-112.37
	1.50	0.00	-85.74	0.00	-2.033E-01	0.00	-3.28
	2.85	0.00	-69.84	0.00	-2.033E-01	0.00	-134.87
SLOF109	ULTBLK MAX						
	0.00	0.00	4.58	0.00	-8.60	0.00	41.14
	6.0E-01	0.00	5.03	0.00	-8.60	0.00	42.32
	1.20	0.00	5.47	0.00	-8.60	0.00	43.34
SLOF109	ULTBLK MIN						
	0.00	0.00	-8.47	0.00	-16.10	0.00	17.37
	6.0E-01	0.00	-8.03	0.00	-16.10	0.00	21.58
	1.20	0.00	-7.58	0.00	-16.10	0.00	24.98
SLOF110	ULTBLK MAX						
	0.00	0.00	-14.48	0.00	11.86	0.00	7.75

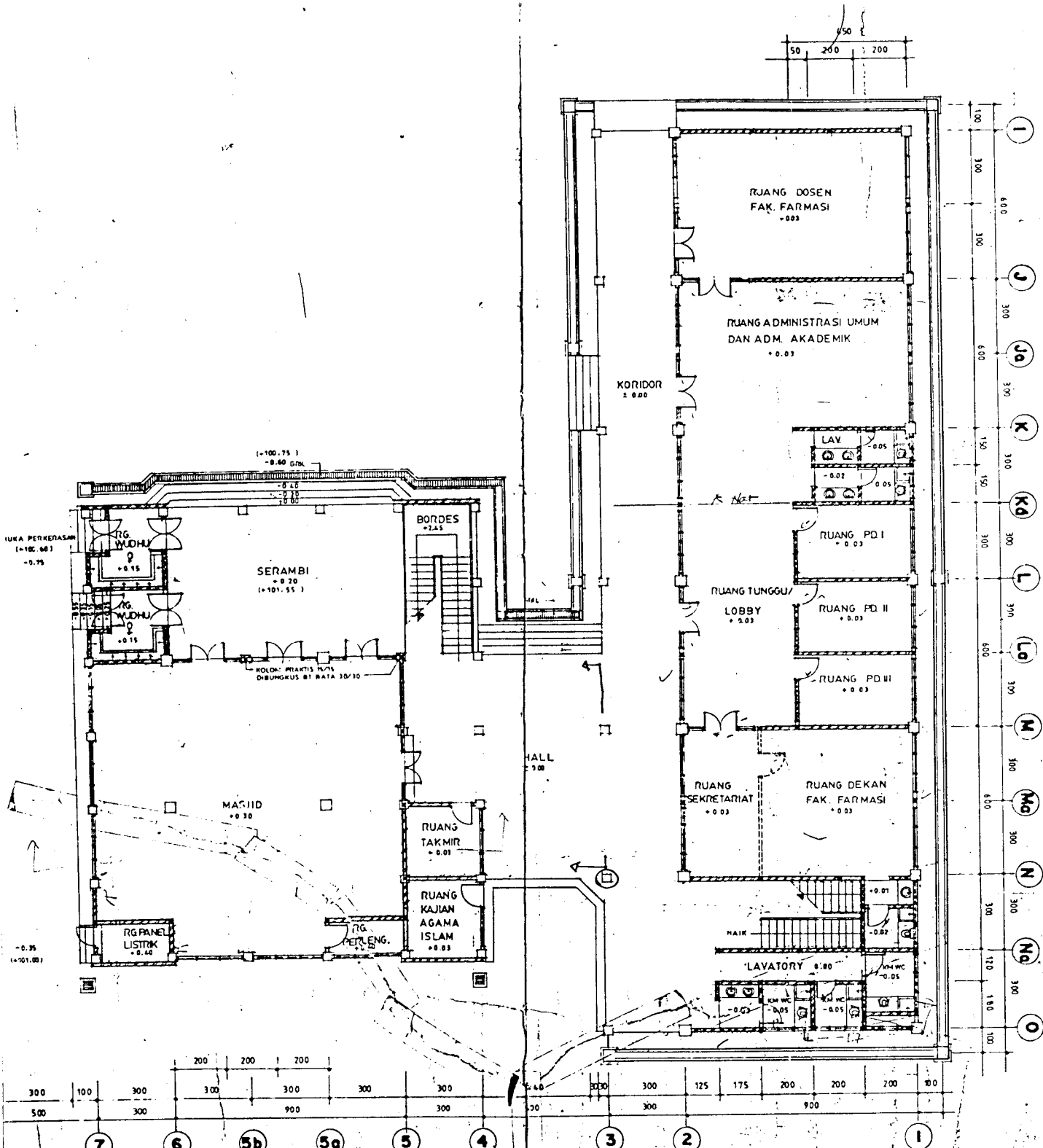
		1.00	0.00	-5.02	0.00	11.86	0.00	23.42	
		2.00	0.00	5.19	0.00	11.86	0.00	26.85	
SLOF110	ULTBLK	MIN	0.00	0.00	-25.51	0.00	4.25	1.238E-01	
		1.00	0.00	-10.79	0.00	4.25	0.00	13.15	
		2.00	0.00	6.042E-01	0.00	4.25	0.00	15.40	
SLOF111	ULTBLK	MAX	0.00	0.00	-6.25	0.00	3.61	0.00	22.48
		1.00	0.00	3.74	0.00	3.61	0.00	26.87	
		2.00	0.00	17.69	0.00	3.61	0.00	16.54	
SLOF111	ULTBLK	MIN	1.00	0.00	6.122E-01	0.00	-6.934E-02	0.00	16.48
		2.00	0.00	10.07	0.00	-6.934E-02	0.00	8.55	
SLOF112	ULTBLK	MAX	0.00	0.00	1.15	0.00	-7.894E-02	0.00	18.63
		8.8E-01	0.00	13.91	0.00	-7.894E-02	0.00	12.09	
		1.75	0.00	26.78	0.00	-7.894E-02	0.00	-2.02	
SLOF112	ULTBLK	MIN	0.00	0.00	3.309E-01	0.00	-1.91	0.00	9.96
		8.8E-01	0.00	8.61	0.00	-1.91	0.00	6.03	
		1.75	0.00	16.89	0.00	-1.91	0.00	-6.21	
SLOF113	ULTBLK	MAX	0.00	0.00	90.75	0.00	-27.43	0.00	81.44
		1.40	0.00	107.59	0.00	-27.43	0.00	109.44	
		2.80	0.00	124.43	0.00	-27.43	0.00	130.13	
SLOF113	ULTBLK	MIN	0.00	0.00	-40.04	0.00	-49.45	0.00	48.81
		1.40	0.00	-23.20	0.00	-49.45	0.00	-81.94	
		2.80	0.00	-6.36	0.00	-49.45	0.00	-244.35	
SLOF114	ULTBLK	MAX	0.00	0.00	87.05	0.00	41.11	0.00	55.32
		1.40	0.00	89.47	0.00	41.11	0.00	105.85	
		2.80	0.00	91.90	0.00	41.11	0.00	163.30	
SLOF114	ULTBLK	MIN	0.00	0.00	-44.67	0.00	24.17	0.00	32.46
		1.40	0.00	-42.25	0.00	24.17	0.00	-85.75	
		2.80	0.00	-39.82	0.00	24.17	0.00	-212.71	
SLOF115	ULTBLK	MAX	0.00	0.00	-31.40	0.00	-5.46	0.00	-16.09
		9.0E-01	0.00	-22.89	0.00	-5.46	0.00	9.72	
		1.80	0.00	-14.37	0.00	-5.46	0.00	29.74	
SLOF115	ULTBLK	MIN	0.00	0.00	-54.59	0.00	-10.84	0.00	-48.25
		9.0E-01	0.00	-41.34	0.00	-10.84	0.00	-12.00	
		1.80	0.00	-28.09	0.00	-10.84	0.00	13.11	
SLOF116	ULTBLK	MAX	0.00	0.00	15.67	0.00	-1.35	0.00	8.84
		9.0E-01	0.00	28.92	0.00	-1.35	0.00	-4.41	
		1.80	0.00	42.16	0.00	-1.35	0.00	-23.56	
SLOF116	ULTBLK	MIN	0.00	0.00	8.50	0.00	-4.97	0.00	4.29
		9.0E-01	0.00	17.01	0.00	-4.97	0.00	-11.69	
		1.80	0.00	25.53	0.00	-4.97	0.00	-43.21	
SLOF117	ULTBLK	MAX	0.00	0.00	16.66	0.00	2.66	0.00	3.97
		9.0E-01	0.00	29.91	0.00	2.66	0.00	-10.11	
		1.80	0.00	43.15	0.00	2.66	0.00	-30.01	
SLOF117	ULTBLK	MIN	0.00	0.00	9.14	0.00	4.048E-01	0.00	1.35
		9.0E-01	0.00	17.65	0.00	4.048E-01	0.00	-17.26	
		1.80	0.00	26.17	0.00	4.048E-01	0.00	-50.13	
SLOF118	ULTBLK	MAX	0.00	0.00	24.78	0.00	6.21	0.00	-7.894E-02
		9.0E-01	0.00	40.03	0.00	6.21	0.00	-19.17	
		1.80	0.00	53.28	0.00	6.21	0.00	-45.92	
SLOF118	ULTBLK	MIN	0.00	0.00	16.89	0.00	2.02	0.00	-1.91
		9.0E-01	0.00	25.40	0.00	2.02	0.00	-31.40	
		1.80	0.00	33.92	0.00	2.02	0.00	-73.39	
SLOF119	ULTBLK	MAX	2.0E-01	0.00	-69.57	0.00	85.57	0.00	-14.74
		1.10	0.00	-60.10	0.00	85.57	0.00	50.65	
		2.00	0.00	-50.64	0.00	85.57	0.00	108.96	
SLOF119	ULTBLK	MIN	2.0E-01	0.00	-154.22	0.00	42.35	0.00	-313.49
		1.10	0.00	-139.50	0.00	42.35	0.00	-183.28	
		2.00	0.00	-128.11	0.00	42.35	0.00	-63.14	



SLOF120	ULTBLK	MAX						
		0.00	0.00	-17.32	0.00	40.89	0.00	116.36
		1.00	0.00	-6.80	0.00	40.89	0.00	130.51
		2.00	0.00	4.31	0.00	40.89	0.00	149.28
SLOF120	ULTBLK	MIN						
		0.00	0.00	-85.11	0.00	25.80	0.00	-54.27
		1.00	0.00	-72.83	0.00	25.80	0.00	21.26
		2.00	0.00	-60.56	0.00	25.80	0.00	78.35
SLOF121	ULTBLK	MAX						
		0.00	0.00	34.76	0.00	3.13	0.00	153.64
		1.00	0.00	47.03	0.00	3.13	0.00	140.75
		2.00	0.00	59.30	0.00	3.13	0.00	124.77
SLOF121	ULTBLK	MIN						
		0.00	0.00	-27.75	0.00	-6.63	0.00	80.46
		1.00	0.00	-15.48	0.00	-6.63	0.00	81.93
		2.00	0.00	-3.20	0.00	-6.63	0.00	36.34
SLOF122	ULTBLK	MAX						
		0.00	0.00	93.50	0.00	-28.61	0.00	122.66
		8.8E-01	0.00	104.24	0.00	-28.61	0.00	94.02
		1.75	0.00	114.98	0.00	-28.61	0.00	56.01
SLOF122	ULTBLK	MIN						
		0.00	0.00	23.45	0.00	-52.45	0.00	35.47
		8.8E-01	0.00	32.66	0.00	-52.45	0.00	-45.17
		1.75	0.00	41.86	0.00	-52.45	0.00	-141.07
SLOF123	ULTBLK	MAX						
		0.00	0.00	162.51	0.00	-74.53	0.00	53.44
		5.3E-01	0.00	171.11	0.00	-74.53	0.00	4.95
		1.05	0.00	179.70	0.00	-74.53	0.00	-40.25
SLOF123	ULTBLK	MIN						
		0.00	0.00	76.43	0.00	-125.84	0.00	-147.07
		5.3E-01	0.00	81.95	0.00	-125.84	0.00	-229.91
		1.05	0.00	87.48	0.00	-125.84	0.00	-316.13
SLOF124	ULTBLK	MAX						
		2.0E-01	0.00	176.33	0.00	-1.081E-02	0.00	241.30
		2.85	0.00	181.57	0.00	-1.081E-02	0.00	233.69
SLOF124	ULTBLK	MIN						
		2.0E-01	0.00	-204.33	0.00	-4.02	0.00	-300.83
		1.53	0.00	-201.71	0.00	-4.02	0.00	-31.84
		2.85	0.00	-199.09	0.00	-4.02	0.00	-232.92

# LAMPIRAN ii

# LAMPIRAN iii

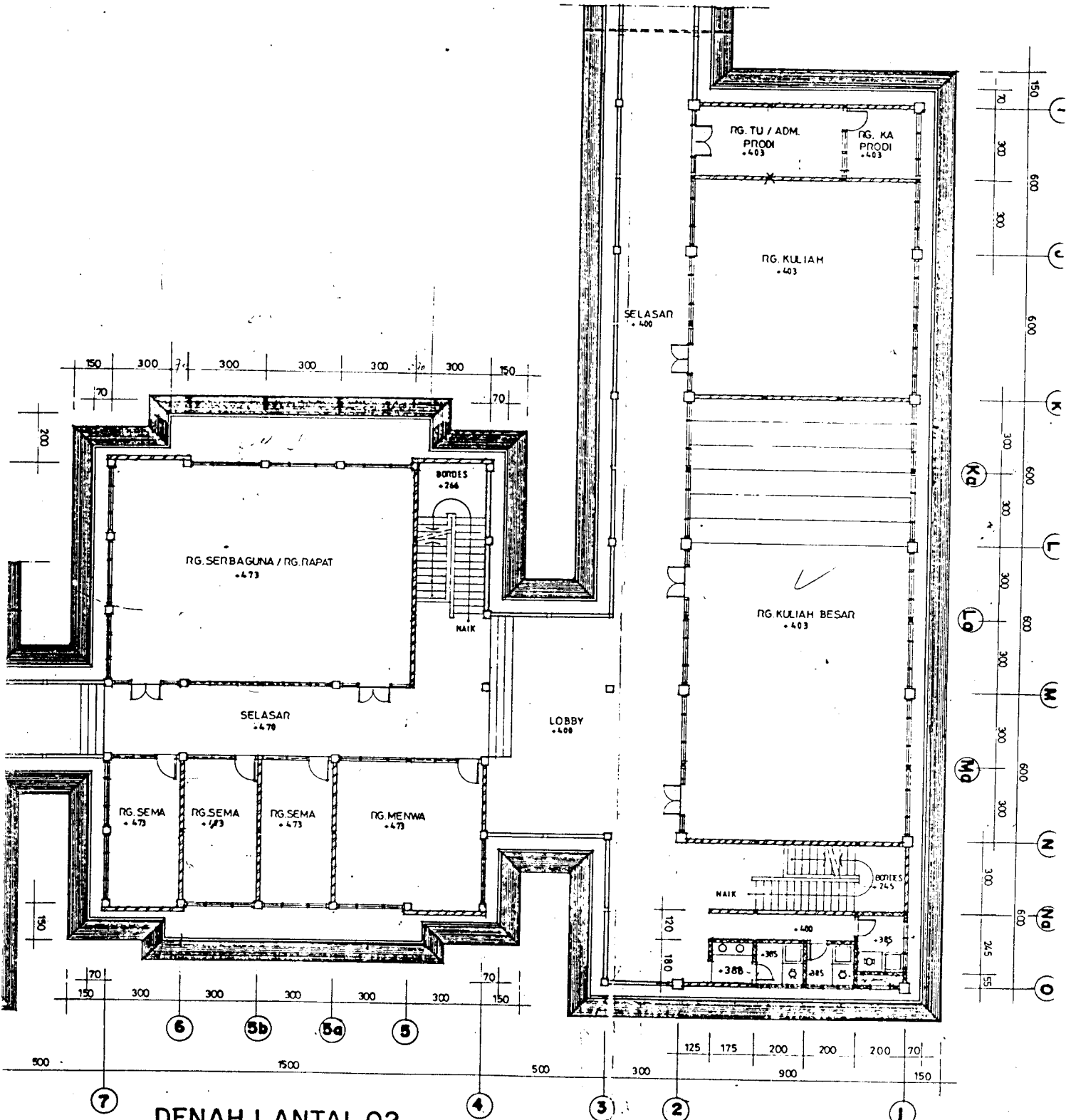


**DENAH LANTAI 01 (UNIT B DAN C)**

SKALA 1:100

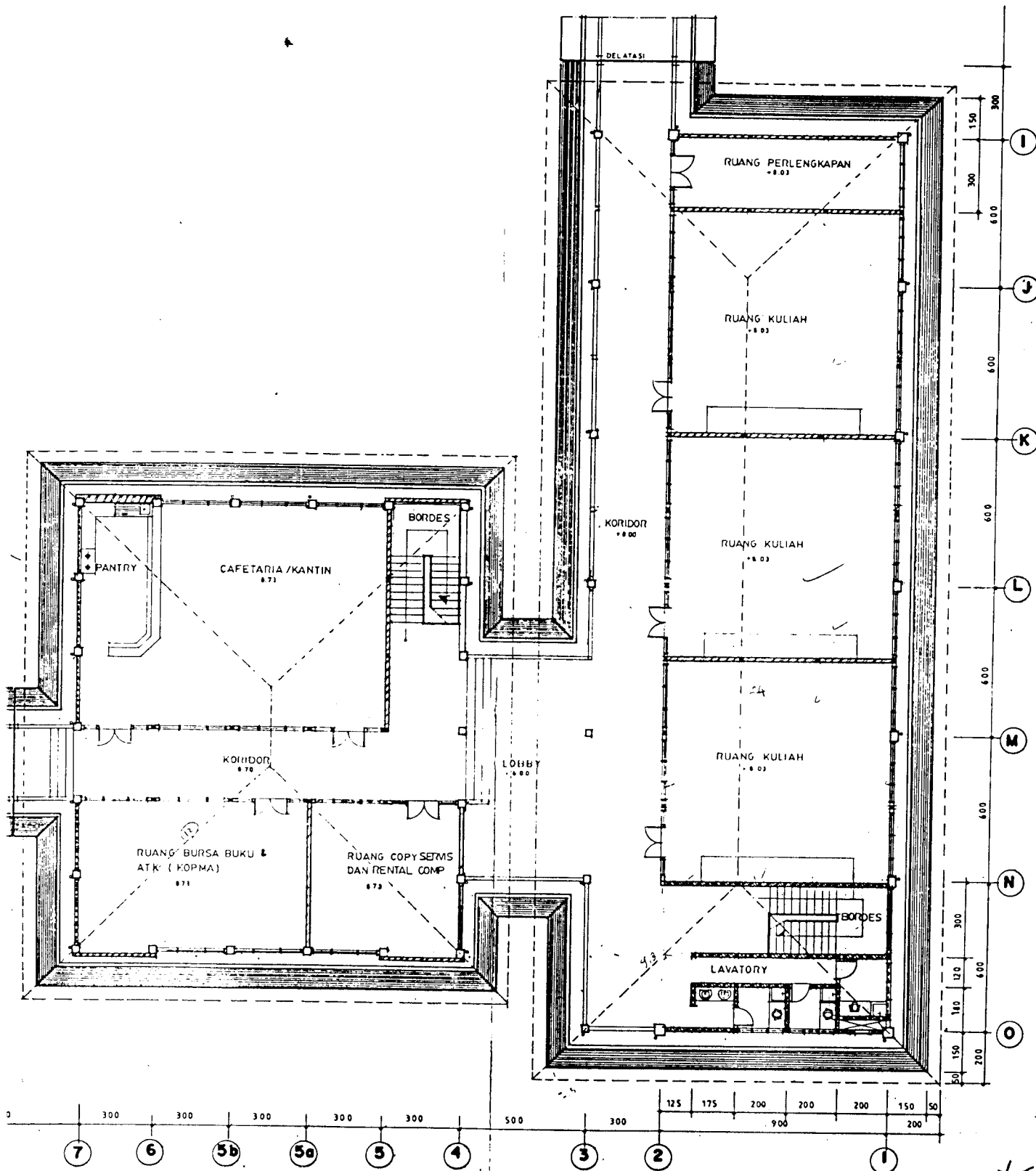
3/4 = 13/1  
 1/2 = 14/1  
 3/3 = 1/2

# LAMPIRAN iv



**DENAH LANTAI 02**  
 (UNIT B DAN C)  
 SKALA 1:100

# LAMPIRAN V

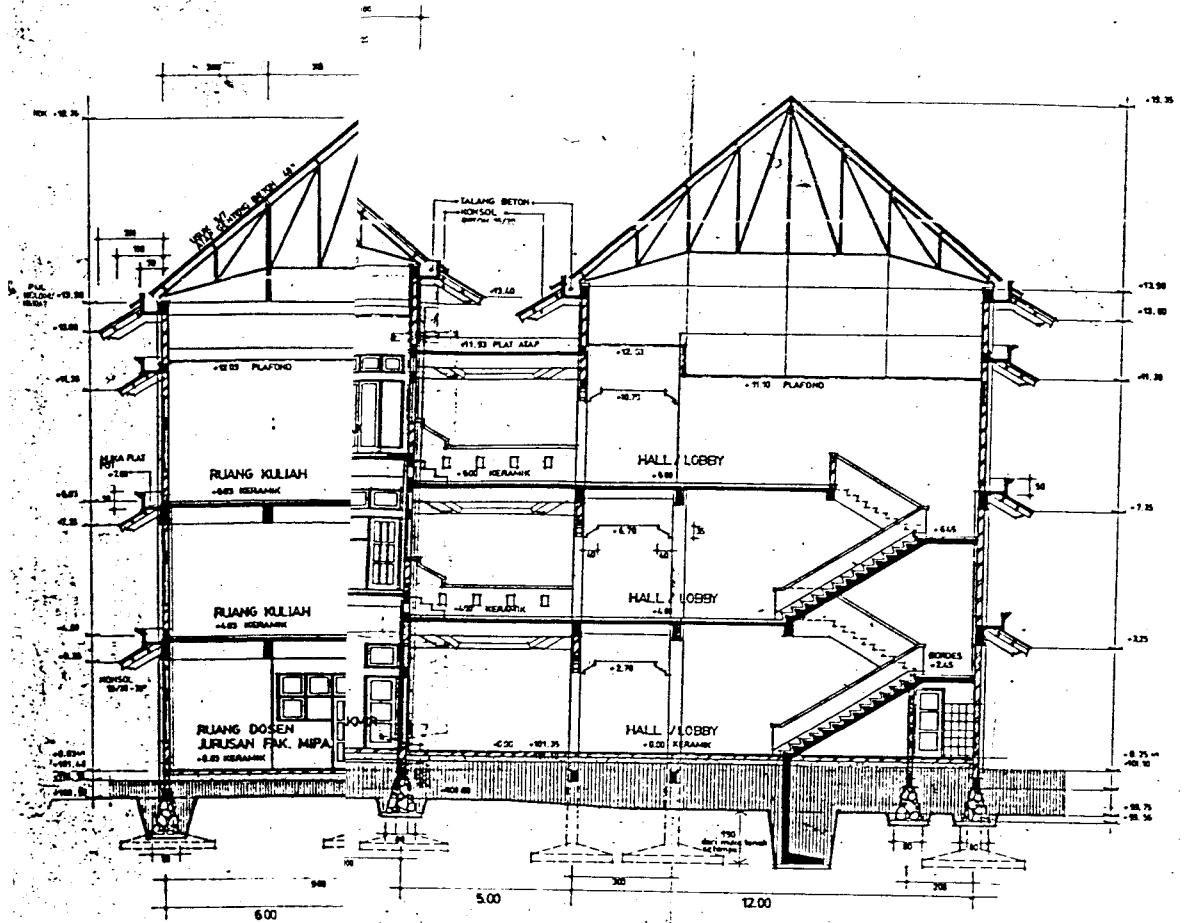


DENAH LANTAI 03 (UNIT B DAN C)

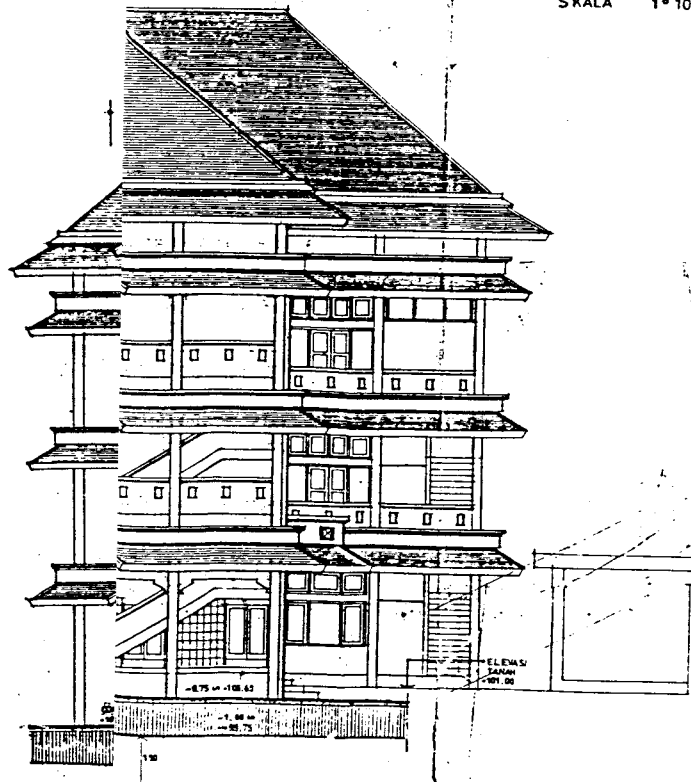
SKALA 1:100



# LAMPIRAN VI



**POTONGAN 01**  
SKALA 1:100



**POTONGAN 03**  
SKALA 1:100

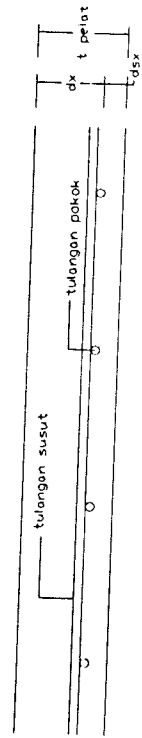
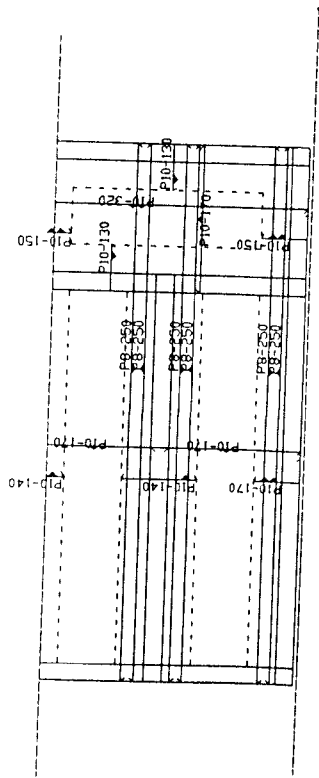
# LAMPIRAN vii

# LAMPIRAN viii

# LAMPIRAN IX

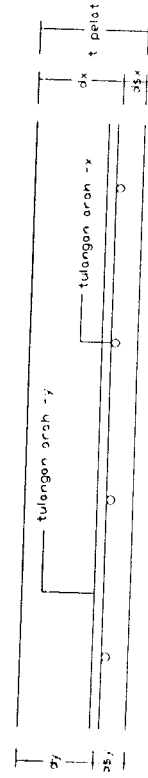
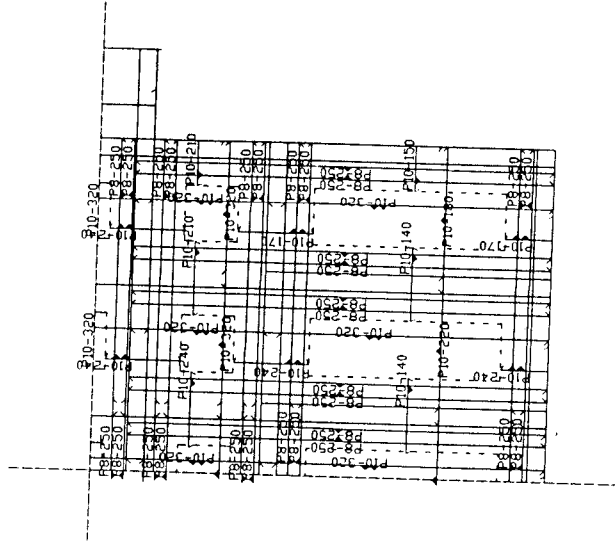
# DETAIL PELAT

A



Tulangan pelat satu arah

B



Tulangan pelat dua arah

# LAMPIRAN X

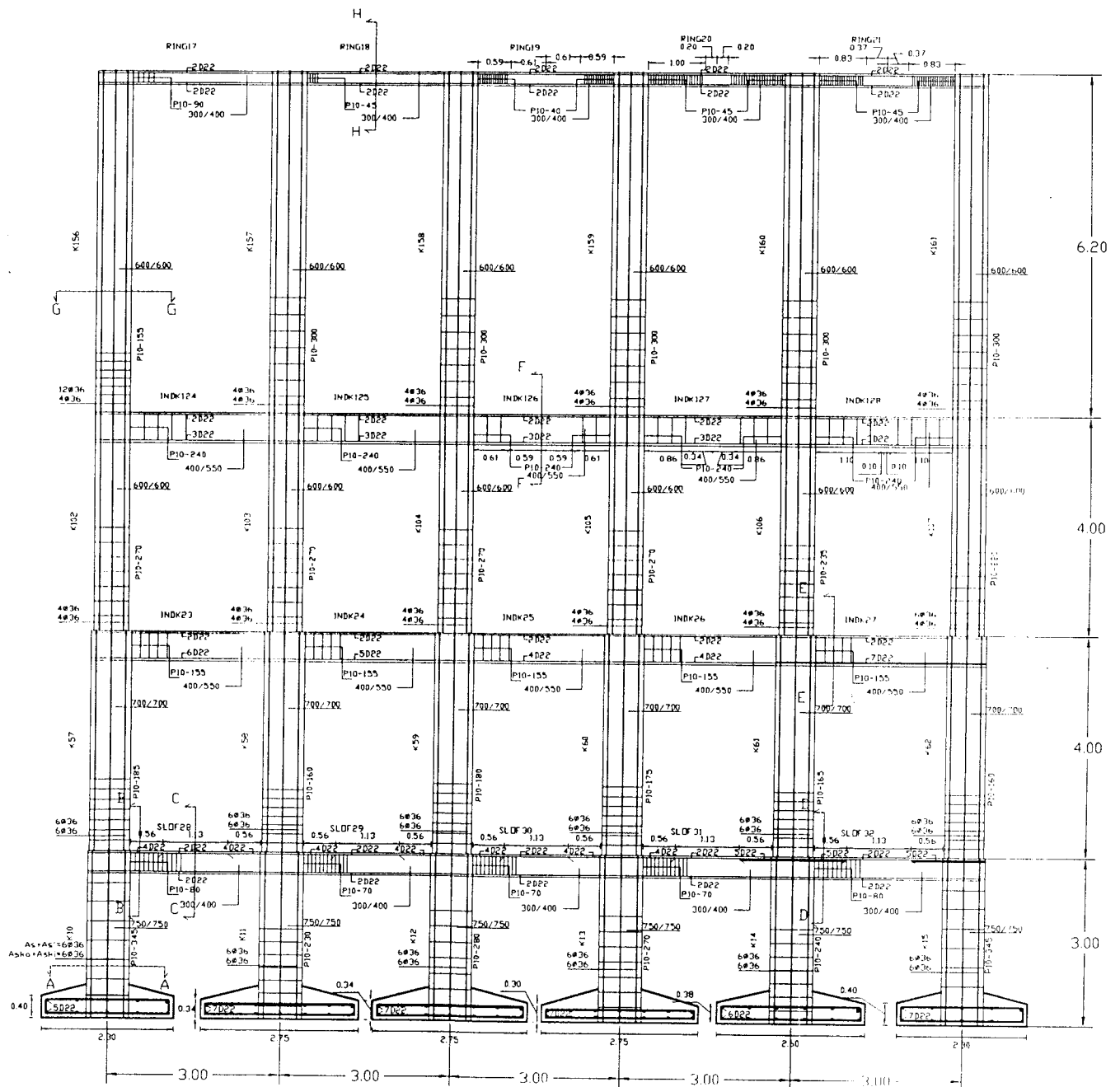






# LAMPIRAN XI

# Penulangan Struktur

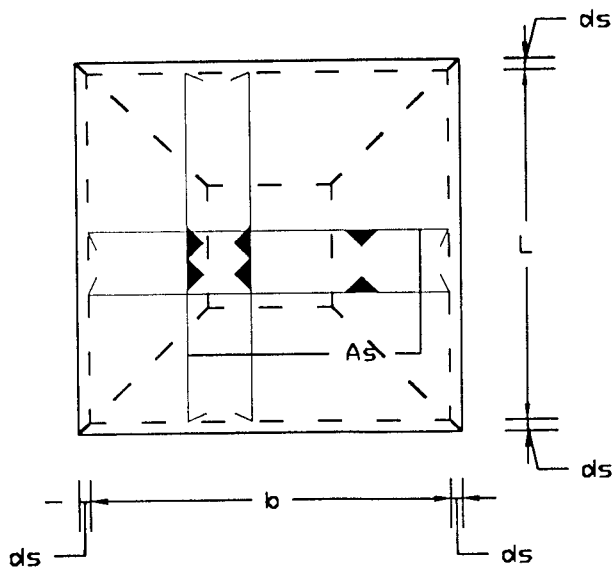
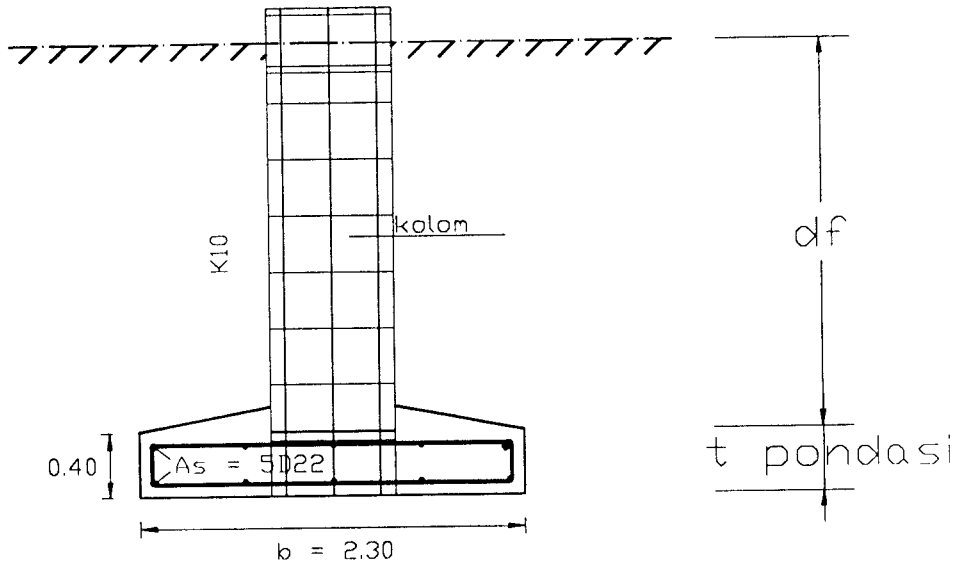


Keti. Jarak antar pondasi sangat dekat, lebih baik bila menggunakan pondasi gabungan

# LAMPIRAN xii



# LAMPIRAN xiii



DETAIL  
PONDASI

# LAMPIRAN XIV



# LAPORAN PENYELIDIKAN TANAH

PROYEK : KAMPUS III UNIVERSITAS ACHMAD DAHLAN  
ALAMAT : JL. PROF. DR. SOEPOMO - JANTURAN YOGYAKARTA

## PENDAHULUAN

1. Atas Permintaan :  
Nama : UNIVERSITAS ACHMAD DAHLAN  
Alamat : YOGYAKARTA  
Oleh laboratorium Mekanika Tanah Universitas Atma Jaya Yogyakarta telah dilaksanakan penyelidikan tanah di lokasi tersebut di atas.
2. Maksud penyelidikan tanah adalah untuk mengetahui keadaan dan situasi serta sifat-sifat tanah setempat yang akan digunakan sebagai data perencanaan pondasi beserta daya dukungnya.
3. Pelaksanaan penyelidikan yang meliputi pekerjaan lapangan dan laboratorium telah dilaksanakan pada bulan Februari - Maret 1999.

## UMUM

1. Rencana bangunan yang tanahnya diselidiki terletak di :  
Lokasi tersebut berupa : Tanah kosong  
Batas - batas Bangunan :  
Sebelah Utara : Perkampungan  
Sebelah Barat : Jalan Kampung  
Sebelah Selatan : Perkampungan  
Sebelah Timur : Jl. Prof. Dr. Soepomo  
Luas rencana Bangunan : + 9.500 m<sup>2</sup>  
Direncanakan bertingkat : 3 ( tiga ) lantai
2. Penyelidikan tanah yang telah dilaksanakan :

- a. Sondir = 14 titik, menggunakan biconus untuk mengukur nilai sondir lapisan - lapisan tanah. Penyondiran dilaksanakan sampai kedalaman tanah padat/keras dengan nilai sondir lebih dari  $200 \text{ kg/cm}^2$ .
  - b. Bor = 5 titik, dengan bor tangan untuk mengetahui jenis, keadaan, dan perubahan lapisan tanah serta mengambil contoh - contoh tanah asli untuk diperiksa di laboratorium.
3. Pekerjaan laboratorium berupa pemeriksaan contoh - contoh tanah serta sifat - sifat mekanisnya, seperti kadar air, berat volume, berat jenis tanah, gradasi butiran, sudut gesek dalam tanah dan kegunaannya.
  4. Data mengenai situasi titik - titik penyelidikan lapangan hasil bor serta contoh - contoh tanah dapat dilihat pada gambar/diagram terlampir.
  5. Pada penyelidikan ini dipakai pada dasar elevasi + 0,00 meter adalah dari permukaan Jl. Prof. Dr. Soepomo.  
Elevasi yang tertulis pada gambar - gambar penyelidikan tanah dinyatakan terhadap elevasi dasar penyelidikan tersebut, sedangkan kedalaman lapisan tanah pada hasil sondir dan boor dinyatakan terhadap muka tanah di setiap titik penyelidikan yang bersangkutan.
  6. Muka air tanah setempat pada saat penyelidikan ada pada kedalaman - 30 meter dari elevasi + 0,00 meter.

#### KEADAAN LAPISAN TANAH

Dari data-data hasil pengeboran yang telah dilakukan, maka dapat dilihat bahwa lapisan-lapisan tanah terdapat banyak kesamaan dan sedikit variasi mengenai jenis tebal dan kepadatannya.

Umumnya terdiri dari jenis tanah pasir berkerikil

Lapisan atas terdiri dari : Pasir Lanau warna coklat abu - abu

Di bawahnya terdiri dari : Pasir Berlanau warna coklat abu - abu

Di bawahnya terdiri dari : Pasir Sedang warna coklat abu - abu

Lapisan tanah padat/keras dengan nilai sondir lebih besar dari  $200 \text{ kg/cm}^2$ , dijumpai pada kedalaman 1,60 meter sampai dengan 7,30 meter.

## KONSTRUKSI PONDASI

Bangunan direncanakan bertingkat 3 lantai  
Dari data-data tersebut di atas, maka dasar bangunan & dasar pondasi selanjutnya terletak pada :

Kedalaman berdasarkan profil = 0,00 meter dari permukaan tanah setempat.

## DAYA DUKUNG TANAH

Pondasi diletakkan pada kedalaman -1.50 meter.  
Pondasi berupa pondasi Telapak bujur-sangkar  
Daya dukung l/jn tanah  $\sigma = 1,252 \text{ kg/cm}^2$ .  
Angka Aman = 3,00

## PENUTUP

Apabila ternyata dalam pelaksanaan pekerjaan atau pembuatan pondasi nantinya dijumpai hal-hal yang menyimpang/meragukan atau tidak terduga, maka perlulah diadakan penyesuaian dengan keadaan tersebut dan keputusan hendaknya diambil oleh pihak - pihak yang menguasai persoalannya.

Yogyakarta, 2 Maret 1999

Laboratorium Mekanika Tanah FT-UAJY.



*[Signature]*  
M. Sc

## Perhitungan Beban Kuda-kuda KK10

### Data Teknis

Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Berat jurai, <b>Wj</b>	=	3,000 kg/m
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Panjang jurai antar kuda-kuda, <b>lj</b>	=	4,924 m
Berat Gording, <b>Wgording</b>	=	2,728 kg/m
Bentang kuda-kuda, <b>L</b>	=	15,000 m
Berat Eternit + Plafon, <b>Wp</b>	=	18,000 kg/m <sup>2</sup>
Taksiran berat Kuda-kuda, <b>Wk</b>	=	45,000 kg/m
$= \left( 10 + \frac{L - 12}{3} \times 5 \right) \times l_k$	=	$= \left( 10 + \frac{15 - 12}{3,000} \times 5 \right) \times 3,000$
	=	45,000 kg/m
	=	<b>45,000 kg/m</b>
Kemiringan plafond, <b>α1</b> =	0,261 rad	= 14,931 °
Panjang batang bawah 1 (datar)	=	1,500 m
Panjang batang bawah 2 (miring)	=	1,552 m

### Beban masing - masing join

#### Pembebanan atas:

P1 (tepi) =		
~ Luas atap =	$\frac{1}{2} \times 1,953 \times 3,000 =$	<b>2,929 m<sup>2</sup></b>
- Berat Gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat Atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	178,512 kg
	<b>P =</b>	<b>179,000 kg</b>

P2-P5 (tengah) =		
~ Luas atap =	$1,953 \times 3,000 =$	<b>5,858 m<sup>2</sup></b>
- Berat Gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat Atap =	$50,000 \times 5,858 =$	292,884 kg
- Beban hidup =	$8,156 \times 5,858 =$	47,773 kg +
	=	348,841 kg
	<b>P =</b>	<b>349,000 kg</b>

P6 (puncak) =		
~ Luas atap =	$1,953 \times (\frac{1}{2} \times 3,000) =$	<b>2,929 m<sup>2</sup></b>
- Berat Gording =	$2,728 \times 3,000 \times 2 =$	16,368 kg
- Berat Atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	186,696 kg
	<b>P =</b>	<b>187,000 kg</b>

#### Pembebanan bawah:

P' 1 (tepi) =		
~ Luas plafond =	$(\frac{1}{2} \times 1,552) \times 3,000 =$	<b>2,329 m<sup>2</sup></b>
- Berat Eternit + Plafon =	$18,000 \times 2,329 =$	41,915 kg
- Berat taksiran Kuda-kuda =	$45,000 \times \frac{1}{2} \times 1,500 =$	33,750 kg +
	=	75,665 kg
	<b>P =</b>	<b>76,000 kg</b>

P' 2 (sisi miring) =

$$\begin{aligned}
 \sim \text{Luas plafond} &= 1,552 \times 3,000 = \mathbf{4,657 \text{ m}^2} \\
 - \text{Berat Eternit + Plafon} &= 18,000 \times 4,657 = 83,831 \text{ kg} \\
 - \text{Berat taksiran Kuda-kuda} &= 45,000 \times 1,500 = 67,500 \text{ kg} \quad + \\
 &= 151,331 \text{ kg} \\
 P &= \mathbf{152,000 \text{ kg}}
 \end{aligned}$$

$$\begin{aligned}
 P' 3 \text{ (pertemuan sisi miring \& datar)} &= \\
 \sim \text{Luas plafond} &= \frac{1}{2} \times (1,500 + 1,552) \times 3,000 = \mathbf{4,579 \text{ m}^2} \\
 - \text{Berat Eternit + Plafon} &= 18,000 \times 4,579 = 82,415 \text{ kg} \\
 - \text{Berat taksiran Kuda-kuda} &= 45,000 \times 1,500 = 67,500 \text{ kg} \quad + \\
 &= 149,915 \text{ kg} \\
 P &= \mathbf{150,000 \text{ kg}}
 \end{aligned}$$

$$\begin{aligned}
 P' 4-P' 5 \text{ (datar)} &= \\
 \sim \text{Luas plafond} &= 1,500 \times 3,000 = \mathbf{4,500 \text{ m}^2} \\
 - \text{Berat Eternit + Plafon} &= 18,000 \times 4,500 = 81,000 \text{ kg} \\
 - \text{Berat taksiran Kuda-kuda} &= 45,000 \times 1,500 = 67,500 \text{ kg} \quad + \\
 &= 148,500 \text{ kg} \\
 P &= \mathbf{149,000 \text{ kg}}
 \end{aligned}$$

$$\begin{aligned}
 P' 6 \text{ (datar)} &= \\
 \sim \text{Luas plafond} &= 1,500 \times (\frac{1}{2} \times 3,000) = \mathbf{4,500 \text{ m}^2} \\
 - \text{Berat Eternit + Plafon} &= 18,000 \times 4,500 = 81,000 \text{ kg} \\
 - \text{Berat taksiran Kuda-kuda} &= 45,000 \times 1,500 = 67,500 \text{ kg} \quad + \\
 &= 148,500 \text{ kg} \\
 P &= \mathbf{149,000 \text{ kg}}
 \end{aligned}$$

#### Beban angin

$$\begin{aligned}
 \text{Muatan angin yang bekerja, } q_A &= 25,000 \text{ kg/m}^2 \\
 \alpha &= 39,806
 \end{aligned}$$

#### Koefisien angin menurut PBI 87 untuk $\alpha < 65$

$$\begin{aligned}
 1. \text{ Angin tekan (Wt)} \\
 C1 &= (0,02 \alpha - 0,4) \\
 &= (0,02 \times 39,806 - 0,4) \\
 &= 0,600
 \end{aligned}$$

$$\begin{aligned}
 Wt &= \\
 &= 0,600 \times 25,000 \\
 &= 15,000 \text{ kg/m}^2
 \end{aligned}$$

$$\begin{aligned}
 2. \text{ Angin hisap (Wh)} \\
 C2 &= -0,400 \\
 Wh &= C2 \times q_A \\
 &= -0,400 \times 25,000 \\
 &= -10,000 \text{ kg/m}^2
 \end{aligned}$$

#### Angin tekan kiri = tekan kanan

$$\begin{aligned}
 P1, P5 \text{ (tepi):} \\
 \sim \text{Luas atap} &= \frac{1}{2} \times 1,953 \times 3,000 = \mathbf{2,929 \text{ m}^2} \\
 P &= 15,000 \times 2,929 = 43,933 \text{ kg} \\
 &\approx \mathbf{44,000 \text{ kg}} \\
 P_x &= 28,125 \text{ kg} \\
 P_y &= 43,488 \text{ kg}
 \end{aligned}$$

$$\begin{aligned}
 P2-P4 \text{ (tengah):} \\
 \sim \text{Luas atap} &= 1,953 \times 3,000 = \mathbf{5,858 \text{ m}^2} \\
 P &= 15,000 \times 5,858 = 87,865 \text{ kg}
 \end{aligned}$$

$$\approx 88,000 \text{ kg}$$

$$P_x = 12,465 \text{ kg}$$

$$P_y = 86,977 \text{ kg}$$

Angin hisap kiri = hisap kanan

P1,P5 (tepi):

$$\sim \text{Luas atap} = \frac{1}{2} \times 1,953 \times 3,000 = 2,929 \text{ m}^2$$

$$P = -10,000 \times 2,929 = -29,288 \text{ kg}$$

$$\approx -30,000 \text{ kg}$$

$$P_x = -18,750 \text{ kg}$$

$$P_y = -28,992 \text{ kg}$$

P2-P4 (tengah):

$$\sim \text{Luas atap} = 1,953 \times 3,000 = 5,858 \text{ m}^2$$

$$P = -10,000 \times 5,858 = -58,577 \text{ kg}$$

$$\approx -59,000 \text{ kg}$$

$$P_x = -8,310 \text{ kg}$$

$$P_y = -57,984 \text{ kg}$$

## Perhitungan Beban Kuda-kuda KK11

### Data Teknis

Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Berat jurai, <b>Wj</b>	=	3,000 kg/m
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Panjang jurai antar kuda-kuda, <b>lj</b>	=	4,924 m
Berat gording, <b>Wgording</b>	=	2,728 kg/m
Bentang kuda-kuda, <b>L</b>	=	15,000 m
Berat Plafon + Plafon, <b>Wp</b>	=	18,000 kg/m <sup>2</sup>
Taksiran berat Kuda-kuda, <b>Wk</b>	=	45,000 kg/m
$= \left( 10 + \frac{L-12}{3} \times 5 \right) \times lk$	=	$\left( 10 + \frac{15-12}{3,000} \times 5 \right) \times 3,000$
	=	45,000 kg/m
	=	45,000 kg/m
Kemiringan plafond, <b><math>\alpha 1</math></b>	0,261 rad	= 14,931 °
Panjang batang bawah 1 (datar)	=	1,500 m
Panjang batang bawah 2 (miring)	=	1,552 m

### Beban masing - masing join

#### Pembebanan atas:

P1 (tepi) =

~ Luas atap =	$\frac{1}{2} \times 1,953 \times 3,000 =$	<b>2,929 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	178,512 kg
	<b>P =</b>	<b>179,000 kg</b>

P2-P3 (tengah) =

~ Luas atap =	$1,953 \times 3,000 =$	<b>5,858 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 5,858 =$	292,884 kg
- Beban hidup =	$8,156 \times 5,858 =$	47,773 kg +
	=	348,841 kg
	<b>P =</b>	<b>349,000 kg</b>

P4 (tengah) =

~ Luas atap =	$1,953 \times \frac{1}{2} \times (\frac{3}{4} \times 3,000 + (3,000 + (\frac{1}{4} \times 3,000))) =$	<b>5,858 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg
- Berat atap =	$50,000 \times 5,858 =$	292,884 kg
- Beban hidup =	$8,156 \times 5,858 =$	47,773 kg +
	=	352,534 kg
	<b>P =</b>	<b>353,000 kg</b>

P5 (sudut) =

~ Luas atap =	$1,953 \times (\frac{3}{4} \times 3,000) =$	<b>4,393 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{3}{4} \times 3,000) =$	6,138 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg
- Berat atap =	$50,000 \times 4,393 =$	219,663 kg
- Beban hidup =	$8,156 \times 4,393 =$	35,829 kg +

$$= 265,324 \text{ kg}$$

$$P = 266,000 \text{ kg}$$

P6 (datar) =

~ Luas atap =	$1,953 \times (\frac{3}{4} \times 3,000) =$	<b>4,393 m<sup>2</sup></b>	
- Berat gording =	$2,728 \times \frac{1}{2} \times 3,000 =$	4,092 kg	
- Berat atap =	$50,000 \times 4,393 =$	219,663 kg	
- Beban hidup =	$8,156 \times 4,393 =$	35,829 kg	+
		<hr/>	
		259,585 kg	
		<b>P = 260,000 kg</b>	

Pembebanan bawah:

P' 1 (tepi) =

~ Luas plafond =	$(\frac{1}{2} \times 1,552) \times 3,000 =$	<b>2,329 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 2,329 =$	41,915 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times \frac{1}{2} \times 1,500 =$	33,750 kg	+
		<hr/>	
		75,665 kg	
		<b>P = 76,000 kg</b>	

P' 2 (sisi miring) =

~ Luas plafond =	$1,552 \times 3,000 =$	<b>4,657 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 4,657 =$	83,831 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times 1,500 =$	67,500 kg	+
		<hr/>	
		151,331 kg	
		<b>P = 152,000 kg</b>	

P' 3 (pertemuan sisi miring & datar) =

~ Luas plafond =	$\frac{1}{2} \times (1,500 + 1,552) \times 3,000 =$	<b>4,579 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 4,579 =$	82,415 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times 1,500 =$	67,500 kg	+
		<hr/>	
		149,915 kg	
		<b>P = 150,000 kg</b>	

P' 4 (datar) =

~ Luas plafond =	$1,500 \times 3,000 =$	<b>4,500 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 4,500 =$	81,000 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times 1,500 =$	67,500 kg	+
		<hr/>	
		148,500 kg	
		<b>P = 149,000 kg</b>	

P' 5 (datar) =

~ Luas plafond =	$1,500 \times (\frac{3}{4} \times 3,000) =$	<b>3,375 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 3,375 =$	60,750 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times 1,500 =$	67,500 kg	+
		<hr/>	
		128,250 kg	
		<b>P = 129,000 kg</b>	

P' 6 (datar) =

~ Luas plafond =	$1,500 \times (\frac{3}{4} \times 3,000) =$	<b>3,375 m<sup>2</sup></b>	
- Berat Eternit + Plafon =	$18,000 \times 3,375 =$	60,750 kg	
- Berat taksiran Kuda-kuda =	$45,000 \times 1,500 =$	67,500 kg	+
		<hr/>	
		128,250 kg	
		<b>P = 129,000 kg</b>	

Beban angin

Muatan angin yang bekerja, qA = 25,000 kg/m<sup>2</sup>

$\alpha = 39,806$

Koefisien angin menurut PBI 87 untuk  $\alpha < 65$



## Perhitungan Beban Kuda-kuda KK13

### Data Teknis

Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Berat jurai, <b>Wj</b>	=	3,000 kg/m
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Panjang jurai antar kuda-kuda, <b>lj</b>	=	4,924 m
Berat gording, <b>Wgording</b>	=	2,728 kg/m
Bentang kuda-kuda, <b>L</b>	=	15,000 m
Berat Eternit + Plafon, <b>Wp</b>	=	18,000 kg/m <sup>2</sup>
Taksiran berat Kuda-kuda, <b>Wk</b>	=	45,000 kg/m
$= \left( 10 + \frac{L-12}{3} \times 5 \right) \times l_k$	=	$\left( 10 + \frac{15-12}{3,000} \times 5 \right) \times 3,000$
	=	45,000 kg/m
	=	45,000 kg/m
Kemiringan plafond, <b>α1</b>	0,261 rad	= 14,931 °
Panjang batang bawah 1 (datar)	=	1,500 m
Panjang batang bawah 2 (miring)	=	1,552 m

### Beban masing - masing join

#### Pembebanan atas:

P1 (tepi) =

~ Luas atap =	$\frac{1}{2} \times 1,953 \times 3,000 =$	<b>2,929 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	178,512 kg
	<b>P =</b>	<b>179,000 kg</b>

P2 (tengah) =

~ Luas atap =	$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2} (\frac{1}{4} \times 1,953) \times (\frac{1}{4} \times 1,953) =$	<b>4,274 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{4} \times 4,924) =$	1,847 kg
- Berat atap =	$50,000 \times 4,274 =$	213,706 kg
- Beban hidup =	$8,156 \times 4,274 =$	34,858 kg +
	=	258,595 kg
	<b>P =</b>	<b>259,000 kg</b>

P3 (sudut) =

~ Luas atap =	$1,953 \times (\frac{3}{4} \times 3,000) =$	<b>4,393 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{3}{4} \times 3,000) =$	6,138 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg
- Berat atap =	$50,000 \times 4,393 =$	219,663 kg
- Beban hidup =	$8,156 \times 4,393 =$	35,829 kg +
	=	265,324 kg
	<b>P =</b>	<b>266,000 kg</b>

P4 (datar) =

~ Luas atap =	$1,953 \times \frac{1}{2} \times ((\frac{1}{2} \times 3,000) + (\frac{3}{4} \times 3,000)) =$	<b>3,661 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{1}{2} \times 3,000) =$	4,092 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg

- Berat atap =	50,000 x 3,661 =	183,053 kg
- Beban hidup =	8,156 x 3,661 =	29,858 kg +
	=	220,696 kg
	<b>P =</b>	<b>221,000 kg</b>

P5-P6 (datar) =		
~ Luas atap =	1,953 x (1/2 x 3,000) =	<b>2,929 m<sup>2</sup></b>
- Berat gording =	2,728 x (1/2 x 3,000) =	4,092 kg
- Berat atap =	50,000 x 2,929 =	146,442 kg
- Beban hidup =	8,156 x 2,929 =	23,886 kg +
	=	174,420 kg
	<b>P =</b>	<b>175,000 kg</b>

Pembebanan bawah:

P' 1 (tepi) =		
~ Luas plafond =	(1/2 x 1,552) x 3,000 =	<b>2,329 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 2,329 =	41,915 kg
- Berat taksiran Kuda-kuda =	45,000 x 1/2 x 1,500 =	33,750 kg +
	=	75,665 kg
	<b>P =</b>	<b>76,000 kg</b>

P' 2 (sisi miring) =		
~ Luas plafond =	(1,552 x 3,000) - 1/2 x (1/2 x 1,552) x (1/4 x 3,000) =	<b>4,366 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 4,366 =	78,591 kg
- Berat taksiran Kuda-kuda =	45,000 x 1,500 =	67,500 kg +
	=	146,091 kg
	<b>P =</b>	<b>147,000 kg</b>

P' 3 (pertemuan sisi miring & datar) =		
~ Luas plafond =	(1/2 x 1,552 x 5/8 x 3,000) + (1/2 x 1,500 x 1/8 x 3,000) =	<b>4,579 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 4,579 =	82,415 kg
- Berat taksiran Kuda-kuda =	45,000 x 1,500 =	67,500 kg +
	=	149,915 kg
	<b>P =</b>	<b>150,000 kg</b>

P' 4 (datar) =		
~ Luas plafond =	(1/2 x 1,552 + 1,500) x (1/2 x 3,000) =	<b>3,414 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 3,414 =	61,458 kg
- Berat taksiran Kuda-kuda =	45,000 x 1,500 =	67,500 kg +
	=	128,958 kg
	<b>P =</b>	<b>129,000 kg</b>

P' 5 (datar) =		
~ Luas plafond =	1/2 x (1,500 + 1,552) x (1/2 x 3,000) =	<b>2,289 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 2,289 =	41,208 kg
- Berat taksiran Kuda-kuda =	45,000 x 1,500 =	67,500 kg +
	=	108,708 kg
	<b>P =</b>	<b>109,000 kg</b>

P' 6 (datar) =		
~ Luas plafond =	(1/2 x 1,552 + 1,500) x (1/2 x 3,000) =	<b>3,414 m<sup>2</sup></b>
- Berat Eternit + Plafon =	18,000 x 3,414 =	61,458 kg
- Berat taksiran Kuda-kuda =	45,000 x 1,500 =	67,500 kg +

$$= 128,958 \text{ kg}$$

$$P = 129,000 \text{ kg}$$

### Beban angin

Muatan angin yang bekerja,  $qA = 25,000 \text{ kg/m}^2$   
 $\alpha = 39,806$

#### Koefisien angin menurut PBI 87 untuk $\alpha < 65$

##### 1. Angin tekan (Wt)

$$C1 = (0,02 \alpha - 0,4)$$

$$= (0,02 \times 39,806 - 0,4)$$

$$= 0,600$$

$$Wt =$$

$$= 0,600 \times 25,000$$

$$= 15,000 \text{ kg/m}^2$$

##### 2. Angin hisap (Wh)

$$C2 = -0,400$$

$$Wh = C2 \times qA$$

$$= -0,400 \times 25,000$$

$$= -10,000 \text{ kg/m}^2$$

#### Angin tekan kiri = tekan kanan

P1 (tepi bawah):

$$\sim \text{Luas atap} = \frac{1}{2} \times 1,953 \times 3,000 = 2,929 \text{ m}^2$$

$$P = 15,000 \times 2,929 = 43,933 \text{ kg}$$

$$\approx 44,000 \text{ kg}$$

$$Px = 28,125 \text{ kg}$$

$$Py = 43,488 \text{ kg}$$

P2 (tengah):

$$\sim \text{Luas atap} =$$

$$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2} (\frac{1}{4} \times 1,953) \times (\frac{1}{4} \times 1,953) = 4,274 \text{ m}^2$$

$$P = 15,000 \times 4,274 = 64,112 \text{ kg}$$

$$\approx 65,000 \text{ kg}$$

$$Px = 9,095 \text{ kg}$$

$$Py = 63,463 \text{ kg}$$

P3 (sudut):

$$\sim \text{Luas atap} =$$

$$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2} (\frac{1}{2} \times 1,953) \times (\frac{1}{2} \times 1,953) = 3,917 \text{ m}^2$$

$$P = 15,000 \times 3,917 = 58,751 \text{ kg}$$

$$\approx 59,000 \text{ kg}$$

$$Px = 8,334 \text{ kg}$$

$$Py = 58,156 \text{ kg}$$

#### Angin hisap kiri = hisap kanan

P1 (tepi bawah):

$$\sim \text{Luas atap} = \frac{1}{2} \times 1,953 \times 3,000 = 2,929 \text{ m}^2$$

$$P = -10,000 \times 2,929 = -29,288 \text{ kg}$$

$$\approx -30,000 \text{ kg}$$

$$Px = -18,750 \text{ kg}$$

$$Py = -28,992 \text{ kg}$$

P2 (tengah):

$\sim \text{Luas atap} =$

$$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2}(\frac{1}{4} \times 1,953) \times (\frac{1}{4} \times 1,953) = \quad \mathbf{4,274 \text{ m}^2}$$

$$P = -10,000 \times 4,274 = -42,741 \text{ kg}$$
$$\approx \mathbf{-43,000 \text{ kg}}$$

$$P_x = -6,063 \text{ kg}$$

$$P_y = -42,309 \text{ kg}$$

P3 (sudut):

~ Luas atap =

$$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2}(\frac{1}{2} \times 1,953) \times (\frac{1}{2} \times 1,953) = \quad \mathbf{3,917 \text{ m}^2}$$

$$P = -10,000 \times 3,917 = -39,167 \text{ kg}$$
$$\approx \mathbf{-40,000 \text{ kg}}$$

$$P_x = -5,556 \text{ kg}$$

$$P_y = -38,771 \text{ kg}$$

## Perhitungan Beban Kuda-kuda KK15

### Data Teknis

Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Berat jurai, <b>Wj</b>	=	3,000 kg/m
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Panjang jurai antar kuda-kuda, <b>lj</b>	=	4,924 m
Berat gording, <b>Wgording</b>	=	2,728 kg/m
Bentang kuda-kuda, <b>L</b>	=	15,000 m
Berat Eternit + Plafon, <b>Wp</b>	=	18,000 kg/m <sup>2</sup>
Taksiran berat Kuda-kuda, <b>Wk</b>	=	45,000 kg/m
	$= \left(10 + \frac{L-12}{3} \times 5\right) \times l_k$	$= \left(10 + \frac{15-12}{3,000} \times 5\right) \times 3,000$
	=	45,000 kg/m
	=	45,000 kg/m
Kemiringan plafond, <b>α1</b> =	0,261 rad =	14,931 °
Panjang batang bawah 1 (datar)	=	1,500 m
Panjang batang bawah 2 (miring)	=	1,552 m

### Beban masing - masing join

#### Pembebanan atas:

P1 (tepi) =		
~ Luas atap =	$\frac{1}{2} \times 1,953 \times 3,000 =$	<b>2,929 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	178,512 kg
	<b>P =</b>	<b>179,000 kg</b>

P2 (tengah) =		
~ Luas atap =	$(1,953 \times \frac{3}{4} \times 3,000) - \frac{1}{2} \times (\frac{1}{4} \times 1,953) \times (\frac{1}{4} \times 1,953) =$	<b>4,274 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{4} \times 4,924) =$	1,847 kg
- Berat atap =	$50,000 \times 4,274 =$	213,706 kg
- Beban hidup =	$8,156 \times 4,274 =$	34,858 kg +
	=	258,595 kg
	<b>P =</b>	<b>259,000 kg</b>

P3 (sudut) =		
~ Luas atap =	$1,953 \times (\frac{3}{4} \times 3,000) =$	<b>4,393 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{3}{4} \times 3,000) =$	6,138 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg
- Berat atap =	$50,000 \times 4,393 =$	219,663 kg
- Beban hidup =	$8,156 \times 4,393 =$	35,829 kg +
	=	265,324 kg
	<b>P =</b>	<b>266,000 kg</b>

#### Pembebanan bawah:

P' 1 (tepi) =		
~ Luas plafond =	$\frac{1}{2} \times 1,552 \times 3,000 =$	<b>2,329 m<sup>2</sup></b>
- Berat Eternit + Plafon =	$18,000 \times 2,329 =$	41,915 kg
- Berat taksiran Kuda-kuda =	$45,000 \times \frac{1}{2} \times 1,500 =$	33,750 kg +

$$= 75,665 \text{ kg}$$

$$P = 76,000 \text{ kg}$$

P' 2 (sisi miring)=

~ Luas plafond =

$$(1,552 \times 3,000) - \frac{1}{2} \times (\frac{1}{2} \times 1,552) \times (\frac{1}{4} \times 3,000) = 4,366 \text{ m}^2$$

- Berat Eternit + Plafon =  $18,000 \times 4,366 = 78,591 \text{ kg}$

- Berat taksiran Kuda-kuda =  $45,000 \times 1,500 = 67,500 \text{ kg}$  +

$$= 146,091 \text{ kg}$$

$$P = 147,000 \text{ kg}$$

P' 3 (pertemuan sisi miring & datar) =

~ Luas plafond =

$$(\frac{1}{2} \times 1,552 \times \frac{5}{8} \times 3,000) + (\frac{1}{2} \times 1,500 \times \frac{1}{8} \times 3,000) = 4,579 \text{ m}^2$$

- Berat Eternit + Plafon =  $18,000 \times 4,579 = 82,415 \text{ kg}$

- Berat taksiran Kuda-kuda =  $45,000 \times 1,500 = 67,500 \text{ kg}$  +

$$= 149,915 \text{ kg}$$

$$P = 150,000 \text{ kg}$$

## Perhitungan Beban Kuda-kuda KK14

Data Teknis

Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Berat jurai, <b>Wj</b>	=	3,000 kg/m
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Panjang jurai antar kuda-kuda, <b>lj</b>	=	4,924 m
Berat gording, <b>Wgording</b>	=	2,728 kg/m
Bentang kuda-kuda, <b>L</b>	=	15,000 m
Berat Eternit + Plafon, <b>Wp</b>	=	18,000 kg/m <sup>2</sup>
Taksiran berat Kuda-kuda, <b>Wk</b>	=	45,000 kg/m
$= \left( 10 + \frac{L-12}{3} \times 5 \right) \times l_k$	=	$\left( 10 + \frac{15-12}{3,000} \times 5 \right) \times 3,000$
=		45,000 kg/m
=		<b>45,000 kg/m</b>
Kemiringan plafond, <b>α1</b> =	0,261 rad	= 14,931 °
Panjang batang bawah 1 (datar)	=	1,500 m
Panjang batang bawah 2 (miring)	=	1,552 m

Beban masing - masing join

Pembebanan atas:

P1 (tepi) =

~ Luas atap =	$\frac{1}{2} \times 1,953 \times 3,000 =$	<b>2,929 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	178,512 kg
	<b>P =</b>	<b>179,000 kg</b>

P2 (tengah) =

~ Luas atap =	$1,953 \times 3,000 =$	<b>5,858 m<sup>2</sup></b>
- Berat gording =	$2,728 \times 3,000 =$	8,184 kg
- Berat atap =	$50,000 \times 5,858 =$	292,884 kg
- Beban hidup =	$8,156 \times 5,858 =$	47,773 kg +
	=	348,841 kg
	<b>P =</b>	<b>349,000 kg</b>

P3 (tengah) = sama dengan P5 kk13

~ Luas atap =	$1,953 \times \frac{1}{2} \times ((\frac{1}{2} \times 3,000) + (\frac{1}{4} \times 3,000)) =$	<b>3,661 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{1}{2} \times 3,000) =$	4,092 kg
- Berat jurai =	$(\frac{1}{2} \times 3,000) \times (\frac{1}{2} \times 4,924) =$	3,693 kg
- Berat atap =	$50,000 \times 3,661 =$	183,053 kg
- Beban hidup =	$8,156 \times 3,661 =$	29,858 kg +
	=	220,696 kg
	<b>P =</b>	<b>221,000 kg</b>

P4 (tengah) =

~ Luas atap =	$1,953 \times (\frac{1}{2} \times 3,000) =$	<b>2,929 m<sup>2</sup></b>
- Berat gording =	$2,728 \times (\frac{1}{2} \times 3,000) =$	4,092 kg
- Berat atap =	$50,000 \times 2,929 =$	146,442 kg
- Beban hidup =	$8,156 \times 2,929 =$	23,886 kg +
	=	174,420 kg

# LAMPIRAN XVI



Perhitungan gaya batang kuda-kuda

LOAD COMBINATION MULTIPLIERS

COMBO	COMBO TYPE	CASE	FACTOR	LOAD TYPE
TETAP	ADD	ATAS	1	STATIC(DEAD)
TETAP	ADD	BAWAH	1	STATIC(DEAD)

FRAME ELEMENT FORCES (kg)

FRAME	LOC (m)	Tetap	Angin Kiri	Angin Kanan	P	P Design
JURAI1	4,924429	-1,248574	2,14E-03	-4,21E-02	-1,248574	-316,8628
JURAI10	2,462214	-302,1228	-13,46282	1,261348	-302,1228	
JURAI11	4,924429	-316,8628	-16,00364	9,25215	-316,8628	
JURAI12	4,924429	-287,1537	-16,46889	7,733764	-287,1537	
JURAI2	4,924429	-193,1316	-4,775852	-3,093718	-193,1316	
JURAI3	2,462214	-233,144	-10,08609	-1,362059	-233,144	
JURAI4	2,462214	-302,1228	-13,46282	1,261348	-302,1228	
JURAI5	4,924429	-316,8628	-16,00364	9,25215	-316,8628	
JURAI6	4,924429	-287,1537	-16,46889	7,733764	-287,1537	
JURAI7	4,924429	-1,248574	2,14E-03	-4,21E-02	-1,248574	
JURAI8	4,924429	-193,1316	-4,775852	-3,093718	-193,1316	
JURAI9	2,462214	-233,144	-10,08609	-1,362059	-233,144	
KK10A1	1,952562	-4588,443	95,95645	-357,9888	-4588,443	-4588,443
KK10A10	1,952562	-2312,201	-125,4249	-23,78905	-2312,201	
KK10A2	1,952562	-4523,08	-444,406	182,3933	-4523,08	
KK10A3	1,952562	-4334,616	103,13	-355,4999	-4334,616	
KK10A4	1,952562	-4270,54	-434,5946	182,2368	-4270,54	
KK10A5	1,952562	-3916,264	44,77415	-274,4825	-3916,264	
KK10A6	1,952562	-3850,687	-357,2735	127,5825	-3850,687	
KK10A7	1,952562	-2980,852	-6,531885	-173,6698	-2980,852	
KK10A8	1,952562	-2911,721	-216,5298	36,20476	-2911,721	
KK10A9	1,952562	-2382,827	-50,67789	-98,35638	-2382,827	
KK10B1	1,552418	3593,814	-56,14227	251,6086	3593,814	3611,782
KK10B10	1,5	2310,354	282,2904	-166,0274	2310,354	
KK10B2	1,552418	3611,782	505,2137	-310,6096	3611,782	
KK10B3	1,552418	3127,988	0,4597407	164,754	3127,988	
KK10B4	1,552418	3145,418	417,5557	-253,2054	3145,418	
KK10B5	1,5	2296,233	48,11604	68,87354	2296,233	
KK10B6	1,5	1837,494	89,96688	-1,018165	1837,494	
KK10B7	1,5	1457,444	130,2859	-65,10213	1457,444	
KK10B8	1,5	1469,725	129,6904	-65,16685	1469,725	
KK10B9	1,5	1850,441	200,2308	-111,9655	1850,441	
KK10D1	2,580698	480,5617	-91,50311	124,288	604,8497	1566,003
KK10D2	2,580698	482,603	116,7841	-83,98911	482,603	
KK10D3	3,309456	1560,034	-105,4108	196,91	1560,034	
KK10D4	3,309456	1566,003	263,8376	-172,5768	1566,003	
KK10D5	4,459821	1349,592	-125,2912	207,7747	1349,592	
KK10D6	4,459821	1352,935	243,5152	-161,1608	1352,935	
KK10D7	5,652654	1428,982	-152,7999	242,1532	1428,982	
KK10D8	5,652654	1431,341	266,3792	-177,1146	1431,341	
KK10V1	0,85	-161,9202	61,71814	-83,09295	-245,01315	

FRAME	LOC (m)	Tetap	Angin Kiri	Angin Kanan	P	P Design
KK11D12	4,459821	-141,889	-168,2183	171,8989	-310,1073	
KK11D13	4,459821	-145,7392	173,3752	-171,8523	-317,5915	
KK11D14	4,459821	1431,905	318,8419	-212,5306	1431,905	
KK11D15	3,309456	1693,111	260,9409	-173,4615	1693,111	
KK11D16	2,580698	453,2018	116,2322	-81,98862	569,434	
KK11D2	3,309456	1710,582	-119,7734	208,3646	1710,582	
KK11D3	4,459821	1441,321	-183,7763	290,6832	1441,321	
KK11D4	4,459821	-141,889	-168,2183	171,8989	-310,1073	
KK11D5	4,459821	-145,7392	173,3752	-171,8523	-317,5915	
KK11D6	4,459821	1431,905	318,8419	-212,5306	1431,905	
KK11D7	3,309456	1693,111	260,9409	-173,4615	1693,111	
KK11D8	2,580698	453,2018	116,2322	-81,98862	569,434	
KK11D9	2,580698	451,0871	-87,93044	122,1596	573,2467	
KK11V1	0,85	-147,269	59,52935	-82,12568	-229,39468	
KK11V10	0,85	-147,269	59,52935	-82,12568	-229,39468	-1508,6274
KK11V11	1,7	-443,1902	93,17545	-134,2727	-577,4629	409,4866
KK11V12	2,95	-1215,353	174,3708	-275,5864	-1215,353	
KK11V13	4,2	244,6555	156,8371	-161,3823	401,4926	
KK11V14	4,2	78,64052	-2,312081	9,14E-02	78,64052	
KK11V15	4,2	248,4773	-163,5096	161,0093	409,4866	
KK11V16	2,95	-1206,395	-302,2324	201,5855	-1508,6274	
KK11V17	1,7	-444,1891	-130,7847	89,66725	-574,9738	
KK11V18	0,85	-148,4113	-77,97643	55,3651	-226,38773	
KK11V2	1,7	-443,1902	93,17545	-134,2727	-577,4629	
KK11V3	2,95	-1215,353	174,3708	-275,5864	-1215,353	
KK11V4	4,2	244,6555	156,8371	-161,3823	401,4926	
KK11V5	4,2	78,64052	-2,312081	9,14E-02	78,64052	
KK11V6	4,2	248,4773	-163,5096	161,0093	409,4866	
KK11V7	2,95	-1206,395	-302,2324	201,5855	-1508,6274	
KK11V8	1,7	-444,1891	-130,7847	89,66725	-574,9738	
KK11V9	0,85	-148,4113	-77,97643	55,3651	-226,38773	
KK12A1	1,952562	63,86417	2,247163	0,3252079	63,86417	
KK12A2	1,5	-315,4402	-14,65373	0,2643582	-315,4402	-315,4402
KK12A3	1,5	-315,4402	-14,65373	0,2643582	-315,4402	63,86417
KK12A4	1,952562	63,86417	2,247163	0,3252079	63,86417	
KK12B1	1,5	128,4119	4,707621	3,649561	128,4119	
KK12B2	1,5	128,3853	4,706464	3,649359	128,3853	128,4119
KK12B3	1,5	128,3853	4,706464	3,649359	128,3853	
KK12B4	1,5	128,4119	4,707621	3,649561	128,4119	
KK12V1	5,45	75,17305	5,317669	-8,42E-02	75,17305	
KK12V2	5,45	75,17305	5,317669	-8,42E-02	75,17305	75,17305
KK13A1	1,952562	-2691,255	106,497	-201,0617	-2691,255	
KK13A10	1,952562	-2615,498	-218,7654	128,2038	-2615,498	-2691,255
KK13A11	1,952562	-2691,255	106,497	-201,0617	-2691,255	
KK13A12	1,952562	-2552,096	112,3457	-205,9236	-2552,096	
KK13A13	1,5	-1543,823	57,71194	-109,1332	-1543,823	
KK13A14	1,5	-1788,472	36,61797	-94,21269	-1788,472	
KK13A15	1,5	-1730,083	16,50167	-80,00204	-1730,083	
KK13A16	1,5	-1744,247	-78,03955	12,69569	-1744,247	
KK13A17	1,5	-1806,226	-99,96804	40,56781	-1806,226	

FRAME	LOC (m)	Tetap	Angin Kiri	Angin Kanan	P	P Design	
KK13A18	1,5	-1585,239	-123,5241	69,12994	-1585,239		
KK13A19	1,952562	-2476,401	-221,2088	131,6472	-2476,401		
KK13A2	1,952562	-2552,096	112,3457	-205,9236	-2552,096		
KK13A20	1,952562	-2615,498	-218,7654	128,2038	-2615,498		
KK13A3	1,5	-1543,823	57,71194	-109,1332	-1543,823		
KK13A4	1,5	-1788,472	36,61797	-94,21269	-1788,472		
KK13A5	1,5	-1730,083	16,50167	-80,00204	-1730,083		
KK13A6	1,5	-1744,247	-78,03955	12,69569	-1744,247		
KK13A7	1,5	-1806,226	-99,96804	40,56781	-1806,226		
KK13A8	1,5	-1585,239	-123,5241	69,12994	-1585,239		
KK13A9	1,952562	-2476,401	-221,2088	131,6472	-2476,401		
KK13B1	1,552418	2109,584	-64,72124	129,1733	2109,584	2226,455	
KK13B10	1,552418	2226,455	230,8584	-158,8952	2226,455		
KK13B11	1,552418	2109,584	-64,72124	129,1733	2109,584		
KK13B12	1,552418	1740,585	-24,56561	67,75801	1740,585		
KK13B13	1,5	1916,065	-2,810731	50,38283	1916,065		
KK13B14	1,5	1867,948	18,1465	35,92977	1867,948		
KK13B15	1,5	2018,622	67,21183	-11,16253	2018,622		
KK13B16	1,5	2018,584	66,74884	-10,70373	2018,584		
KK13B17	1,5	1932,93	116,6012	-57,63094	1932,93		
KK13B18	1,5	2004,322	139,3645	-85,75966	2004,322		
KK13B19	1,552418	1856,62	169,0296	-118,3722	1856,62		
KK13B2	1,552418	1740,585	-24,56561	67,75801	1740,585		
KK13B20	1,552418	2226,455	230,8584	-158,8952	2226,455		
KK13B3	1,5	1916,065	-2,810731	50,38283	1916,065		
KK13B4	1,5	1867,948	18,1465	35,92977	1867,948		
KK13B5	1,5	2018,622	67,21183	-11,16253	2018,622		
KK13B6	1,5	2018,584	66,74884	-10,70373	2018,584		
KK13B7	1,5	1932,93	116,6012	-57,63094	1932,93		
KK13B8	1,5	2004,322	139,3645	-85,75966	2004,322		
KK13B9	1,552418	1856,62	169,0296	-118,3722	1856,62		
KK13D1	2,580698	456,4855	-66,23611	96,1984	456,4855	-387,8487 457,432	
KK13D10	2,267157	-387,8487	-32,96943	23,0773	-387,8487		
KK13D11	2,267157	57,39068	-32,78868	22,46593	79,85661		
KK13D12	2,267157	-204,0467	-71,86008	70,71652	-275,90678		
KK13D13	2,267157	-182,5179	72,42009	-70,7638	-253,2817		
KK13D14	2,267157	92,55418	34,68611	-43,2863	127,24029		
KK13D15	2,267157	-352,1709	35,72671	-43,85825	-352,1709		
KK13D16	2,580698	457,432	93,88253	-63,88697	457,432		
KK13D2	2,267157	-387,8487	-32,96943	23,0773	-387,8487		
KK13D3	2,267157	57,39068	-32,78868	22,46593	79,85661		
KK13D4	2,267157	-204,0467	-71,86008	70,71652	-275,90678		
KK13D5	2,267157	-182,5179	72,42009	-70,7638	-253,2817		
KK13D6	2,267157	92,55418	34,68611	-43,2863	127,24029		
KK13D7	2,267157	-352,1709	35,72671	-43,85825	-352,1709		
KK13D8	2,580698	457,432	93,88253	-63,88697	457,432		
KK13D9	2,580698	456,4855	-66,23611	96,1984	456,4855		
KK13V1	0,85	-154,7958	45,2473	-65,17973	-219,97553		-330,3668 903,5708
KK13V10	0,85	-154,7958	45,2473	-65,17973	-219,97553		
KK13V11	1,7	903,5708	19,01736	0,137794	903,5708		
KK13V12	1,7	81,24845	24,85676	-17,16858	106,10521		

FRAME	LOC (m)	Tetap	Angin Kiri	Angin Kanan	P	P Design
KK13V13	1,7	-278,6316	28,91919	-13,32709	-278,6316	
KK13V14	1,7	122,0569	-0,1754142	2,88E-02	122,0569	
KK13V15	1,7	-330,3668	-18,93191	31,28244	-330,3668	
KK13V16	1,7	54,68816	-26,39579	32,77755	87,46571	
KK13V17	1,7	891,0432	16,08434	2,728744	891,0432	
KK13V18	0,85	-154,9908	-63,44354	43,51295	-218,43434	
KK13V2	1,7	903,5708	19,01736	0,137794	903,5708	
KK13V3	1,7	81,24845	24,85676	-17,16858	106,10521	
KK13V4	1,7	-278,6316	28,91919	-13,32709	-278,6316	
KK13V5	1,7	122,0569	-0,1754142	2,88E-02	122,0569	
KK13V6	1,7	-330,3668	-18,93191	31,28244	-330,3668	
KK13V7	1,7	54,68816	-26,39579	32,77755	87,46571	
KK13V8	1,7	891,0432	16,08434	2,728744	891,0432	
KK13V9	0,85	-154,9908	-63,44354	43,51295	-218,43434	
KK14A1	1,952562	-1843,612	-36,18386	28,6652	-1843,612	
KK14A10	1,952562	-1508,116	24,13021	-22,77	-1508,116	-1843,612
KK14A11	1,952562	-957,9268	26,47296	-24,18624	-957,9268	
KK14A12	1,952562	-406,283	1,943904	-7,086136	-406,283	
KK14A13	1,952562	-406,283	1,943904	-7,086136	-406,283	
KK14A14	1,952562	-957,9268	26,47296	-24,18624	-957,9268	
KK14A15	1,952562	-1508,116	24,13021	-22,77	-1508,116	
KK14A16	1,952562	-1837,211	12,76627	-21,30385	-1837,211	
KK14A2	1,952562	-1515,427	-31,05114	33,34632	-1515,427	
KK14A3	1,952562	-924,4525	-29,73994	36,16266	-924,4525	
KK14A4	1,952562	-395,1185	-8,355532	6,488661	-395,1185	
KK14A5	1,952562	-395,1185	-8,355532	6,488661	-395,1185	
KK14A6	1,952562	-924,4525	-29,73994	36,16266	-924,4525	
KK14A7	1,952562	-1515,427	-31,05114	33,34632	-1515,427	
KK14A8	1,952562	-1843,612	-36,18386	28,6652	-1843,612	
KK14A9	1,952562	-1837,211	12,76627	-21,30385	-1837,211	
KK14B1	1,552418	1431,284	28,19674	-23,09984	1431,284	
KK14B10	1,552418	867,701	-17,0085	18,1939	867,701	1431,284
KK14B11	1,5	361,585	-1,935856	5,81822	361,585	
KK14B12	1,5	88,33189	5,692501	0,3594927	88,33189	
KK14B13	1,5	88,33189	5,692501	0,3594927	88,33189	
KK14B14	1,5	361,585	-1,935856	5,81822	361,585	
KK14B15	1,552418	867,701	-17,0085	18,1939	867,701	
KK14B16	1,552418	1426,138	-11,09617	16,99235	1426,138	
KK14B2	1,552418	873,3615	26,50797	-26,11193	873,3615	
KK14B3	1,5	386,9262	9,33982	-4,635505	386,9262	
KK14B4	1,5	120,6401	2,469575	4,672496	120,6401	
KK14B5	1,5	120,6401	2,469575	4,672496	120,6401	
KK14B6	1,5	386,9262	9,33982	-4,635505	386,9262	
KK14B7	1,552418	873,3615	26,50797	-26,11193	873,3615	
KK14B8	1,552418	1431,284	28,19674	-23,09984	1431,284	
KK14B9	1,552418	1426,138	-11,09617	16,99235	1426,138	
KK14D1	2,580698	502,8974	-3,894311	-1,950488	502,8974	
KK14D10	4,459821	764,3537	-26,06684	17,06911	764,3537	890,7073
KK14D11	3,309456	890,7073	-44,29905	29,57763	890,7073	
KK14D12	2,580698	502,4207	-6,267144	0,3377984	502,4207	
KK14D2	3,309456	852,7936	35,6102	-51,80538	852,7936	

# LAMPIRAN xvii

## Perencanaan Gording

### Data Teknis

Jarak antar kuda-kuda, <b>lk</b>	=	3,000 m
Jarak antar gording (pj. sisi atas), <b>lg</b>	=	1,953 m
Kemiringan atap, <b><math>\alpha</math></b>	= 0,695 rad	= 39,806 °
Berat penutup atap (genteng), <b>Wa</b>	=	50,000 kg/m <sup>2</sup>
Beban hidup (air hujan), <b>Wh</b>	=	8,156 kg/m <sup>2</sup>
air hujan = <b>(40 - 0,8 <math>\alpha</math>)</b> kg/m <sup>2</sup>		
= 40 - 0,8 x 39,806		
= 8,156 kg/m <sup>2</sup>		
air hujan max. = 20,000 kg/m <sup>2</sup>		
Jumlah sagrod	=	1
Mutu baja, <b>Fy</b>	= 36,000 ksi	= 2531,050 kg/m <sup>2</sup>
Modulus elastis, <b>Es</b>	= 29000,000 ksi	
	=	2038901,781 kg/m <sup>2</sup>

### Beban Gording

#### Beban mati, **qD**

Penutup atap	<b>Wa x lg</b> =	50,000 x 1,953 =	97,628 kg/m
Berat sendiri gording (taksiran)			= 5,000 kg/m +
		<b>qD</b> =	102,628 kg/m

$$\text{Beban hidup, } qL = Wh \times lg = 8,156 \times 1,953 = 15,924 \text{ kg/m}$$

#### Beban Angin (terbesar), **qW**

$$= 29,288$$

Digunakan beban angin rencana sebesar, **W** = 25,000 kg/m<sup>2</sup>

#### Angin tekan wt

$$C1 = (0,02 \alpha - 0,4)$$

$$= (0,02 \times 39,806 - 0,4)$$

$$= 0,600$$

$$Wt = C1 \times W \times lg$$

$$= 0,600 \times 25,000 \times 1,953 = 29,288 \text{ kg/m}$$

#### Angin hisap wh

$$C2 = -0,400$$

$$Wh = C2 \times W \times lg$$

$$= -0,400 \times 25,000 \times 1,953 = -19,526 \text{ kg/m}$$

$$q_{\perp} = (qD + qL) \times \cos \alpha$$

$$= (102,628 + 15,924) \times \cos 39,806$$

$$= 91,074 \text{ kg/m}$$

$$q_{//} = (qD + qL) \times \sin \alpha$$

$$= (102,628 + 15,924) \times \sin 39,806$$

$$= 75,895 \text{ kg/m}$$

### Perhitungan Momen

#### Akibat beban tetap

$$M = (1/8) \times 91,074 \times 3,000^2$$

$$= 102,459 \text{ kg.m}$$

#### asumsi ada 1 sagrod:

$$M = (1/32) \times 75,895 \times 3,000^2$$

$$= 21,346 \text{ kg.m}$$

*Akibat beban angin*

$$M = (1/8) \times 29,288 \times 3,000^2$$

$$= 32,949 \text{ kg.m}$$

#### Dimensi Gording

Pilih profil rencana berdasarkan S perlu  
 asumsi tegangan yang terjadi = 0,6 fy

$$S_x \text{ perlu} = \frac{M_{max} \perp}{0,6 F_y} = \frac{102,459 \times 100}{1518,630}$$

$$= 6,747 \text{ cm}^3$$

tegangan ijin sumbu y = 0,75 fy

$$S_y \text{ perlu} = \frac{M_{max} //}{0,75 F_y} = \frac{21,346 \times 100}{1898,288}$$

$$= 1,124 \text{ cm}^3$$

di pakai profil: C 100x50x20x2,3

$I_x = 80,700 \text{ cm}^4$	$I_y = 19,000 \text{ cm}^4$
$S_x = 16,100 \text{ cm}^3$	$S_y = 6,060 \text{ cm}^3$
$E = 2100000 \text{ kg/cm}^2$	
$W = 2,728 \text{ kg/m}$	
$bf = 50,000 \text{ mm}$	$= 1,969 \text{ in}$
$d = 100,000 \text{ mm}$	$= 3,937 \text{ in}$
$t = 2,300 \text{ mm}$	$= 0,091 \text{ in}$
$A_f = 1000,000 \text{ mm}^2$	$= 1,550 \text{ in}^2$

#### Kontrol tegangan

Tegangan ijin lentur:

$$L_b = lk / 2 = 1,500 \text{ m} \quad (1 \text{ sagrod})$$

$$= 150,000 \text{ cm}$$

$$\frac{76 \times 1,969}{36,000} \quad \frac{149,606}{6,000}$$

$$= 24,934 \text{ in}$$

$$= 63,333 \text{ cm}$$

$$\frac{20000}{(3,937/1,550) \times 36}$$

$$= \frac{20000}{91,440}$$

$$= 218,723 \text{ in}$$

$$= 555,556 \text{ cm}$$

$$L_c = 63,333 \text{ cm}$$

$$L_u = 555,556 \text{ cm}$$

maka:  $L_c < L_b \leq L_u$

$\frac{1,969}{2 \times 0,091}$	$>$	$=$	$\frac{65,000}{36,000}$
$= 10,870$			$= 10,833$
$\frac{3,937}{0,091}$			$= \frac{640,000}{36,000}$

$$= 43,478 \leq = 106,667$$

maka tampang adalah non compact

$$Fbx = 0,660 Fy$$

$$= 0,660 \times 2531,050$$

$$= 1670,493 \text{ kg/cm}^2$$

Kondisis pembebanan tetap:

Tegangan yang terjadi:

$$fbx = \frac{M_{max \perp}}{Sx} = \frac{102,459 \times 100}{16,100}$$

$$= 636,390 \text{ kg/cm}^2$$

$$fbx = \frac{M_{max //}}{Sy} = \frac{21,346 \times 100}{6,060}$$

$$= 352,237 \text{ kg/cm}^2$$

Syarat:

$$\frac{fbx}{0,660 fy} + \frac{fby}{0,75 fy} \leq 1$$

$$\frac{636,390}{1670,493} + \frac{352,237}{1898,288} \leq 1$$

$$0,567 \leq 1 \text{ OK!}$$

Kondisis pembebanan sementara:

Tegangan yang terjadi:

$$fbx = \frac{M_{max \perp} + Ma}{Sx} = \frac{(102,459 + 32,949) \times 100}{16,100}$$

$$= 841,045 \text{ kg/cm}^2$$

$$fbx = \frac{M_{max //}}{Sy} = \frac{21,346 \times 100}{6,060}$$

$$= 352,237 \text{ kg/cm}^2$$

Syarat:

$$\frac{fbx}{0,660 fy} + \frac{fby}{0,75 fy} \leq 1$$

$$\frac{841,045}{1670,493} + \frac{352,237}{1898,288} \leq 1$$

$$0,689 \leq 1 \text{ OK!}$$

Kontrol lendutan

$$\text{Lendutan max.} = L / 360 = 0,833 \text{ cm}$$

Kondisis pembebanan tetap:

$$d_{\perp} = \frac{5 q_{\perp} l k^4}{384 E I_x} = \frac{5 \times 91,074 / 100 \times 300,000^4}{384 \times 2038901,781 \times 80,700}$$

$$= 0,584 \text{ cm} \leq 0,833 \text{ cm OK}$$

$$d_{//} = \frac{5 q_{//} (l k / (1 + j \cdot \text{sagrod}))^4}{384 E I_y}$$

$$= \frac{5 \times 75,895 \times (300,000 / (1 + 1))^4}{384 \times 2038901,781 \times 80,700}$$



# LAMPIRAN xviii

## Perencanaan Sagrod dan Tierod

Data Teknis

Kemiringan atap, $\alpha$	=	0,695 rad	=	39,806 °
Berat penutup atap (genteng), $W_a$	=		=	50,000 kg/m <sup>2</sup>
Jumlah gording / sisi, $n_G$	=		=	1
Mutu baja, $F_y$	=	36,000 ksi	=	2531,050 kg/m <sup>2</sup>
Mutu baja, $F_u$	=	58,000 ksi	=	4077,804 kg/m <sup>2</sup>
Modulus elastis, $E_s$	=	29000,000 ksi	=	

Beban Sagrod

Berat penutup atap (genteng):

$$W_a \times \left\{ \frac{1}{2} \cdot (L / \cos \alpha) \right\} = 50,000 \times \left\{ \frac{1}{2} \times (1,953 / \cos 39,806) \right\} = 97,628 \text{ kg/m}$$

Beban Hidup:

$$W_h \times \left\{ \frac{1}{2} \cdot (L / \cos \alpha) \right\} = 8,156 \times \left\{ \frac{1}{2} \times (3,000 / \cos 39,806) \right\} = 15,924 \text{ kg/m}$$

Jumlah Gording satu sisi x berat gording:

$$n_G \times W_{\text{gording}} = 1,000 \times 2,728 = 2,728 \text{ kg/m}$$

$$\text{Jumlah Beban Sagrod (P)} = \frac{2,728 \text{ kg/m} + 116,280 \text{ kg/m}}$$

$P // = P (\sin \alpha) \frac{1}{2} l_k$

$$= 116,280 \times \sin 39,806 \times \frac{1}{2} \times 3,000 = 111,661 \text{ kg}$$

Dimensi Sagrod

$$= \frac{111,661}{0,33 \times 4077,804} = 0,083 \text{ cm}^2$$

$$= \frac{4 \times 0,083}{\pi} = 0,325 \text{ cm}$$

$$\text{Dsagrod yg dipakai} = \text{Dsagrod} + 0,3 \text{ cm} = 0,625 \text{ cm} \approx 10,000 \text{ mm}$$

Dimensi Tierod

$$= \frac{111,661 \times \cos 39,806}{0,33 \times 4077,804} = 0,064 \text{ cm}^2$$

$$= \frac{4 \times 0,064}{\pi} = 0,285 \text{ cm}$$

$$\text{Dsagrod yg dipakai} = \text{Dsagrod} + 0,3 \text{ cm} = 0,585 \text{ cm} \approx 10,000 \text{ mm}$$

# LAMPIRAN XIX

Perencanaan Sambungan.

Dipakai baut non full drat:

$$\begin{aligned}\text{Ø baut} &= 4/8 \text{ in} \\ &= 1,27 \text{ cm}\end{aligned}$$

$$\begin{aligned}F_u &= 58,000 \text{ ksi} \\ &= 4077,804 \text{ kg/cm}^2\end{aligned}$$

$$\begin{aligned}F_v &= 30,000 \text{ ksi} \quad (\text{AISC 5-73}) \\ &= 2109,209 \text{ kg/cm}^2\end{aligned}$$

$$\begin{aligned}F \text{ tumpuan} &= 1,22 F_u = 4974,920 \text{ kg} \\ t_p &= 2 \times 0,3 = 0,600 \text{ cm}\end{aligned}$$

$$P \text{ tumpuan} = t_p \times D \text{ baut} \times F \text{ tumpuan} \times n = 3107,286 \text{ kg}$$

$$P \text{ geser} = A \text{ geser} \times F_v \times 2n = 5343,759 \text{ kg}$$

$$\text{Dipakai } P \text{ terkecil} = 3107,286 \text{ kg}$$

Batang	Gaya axial	jml baut	
		perlu	pakai
JURAI1	-1,248574	0,000	2
JURAI10	-302,1228	0,097	2
JURAI11	-316,8628	0,102	2
JURAI12	-287,1537	0,092	2
JURAI2	-193,1316	0,062	2
JURAI3	-233,144	0,075	2
JURAI4	-302,1228	0,097	2
JURAI5	-316,8628	0,102	2
JURAI6	-287,1537	0,092	2
JURAI7	-1,248574	0,000	2
JURAI8	-193,1316	0,062	2
JURAI9	-233,144	0,075	2
KK10A1	-4588,443	1,477	2
KK10A10	-2312,201	0,744	2
KK10A2	-4523,08	1,456	2
KK10A3	-4334,616	1,395	2
KK10A4	-4270,54	1,374	2
KK10A5	-3916,264	1,260	2
KK10A6	-3850,687	1,239	2
KK10A7	-2980,852	0,959	2
KK10A8	-2911,721	0,937	2
KK10A9	-2382,827	0,767	2
KK10B1	3593,814	1,157	2
KK10B10	2310,354	0,744	2
KK10B2	3611,782	1,162	2
KK10B3	3127,988	1,007	2
KK10B4	3145,418	1,012	2

Batang	Gaya axial	jml baut	
		perlu	pakai
KK10B5	2296,233	0,739	2
KK10B6	1837,494	0,591	2
KK10B7	1457,444	0,469	2
KK10B8	1469,725	0,473	2
KK10B9	1850,441	0,596	2
KK10D1	604,8497	0,195	2
KK10D2	482,603	0,155	2
KK10D3	1560,034	0,502	2
KK10D4	1566,003	0,504	2
KK10D5	1349,592	0,434	2
KK10D6	1352,935	0,435	2
KK10D7	1428,982	0,460	2
KK10D8	1431,341	0,461	2
KK10V1	-245,0132	0,079	2
KK10V2	-240,7502	0,077	2
KK10V3	-590,5508	0,190	2
KK10V4	-586,8264	0,189	2
KK10V5	-1133,887	0,365	2
KK10V6	-1136,954	0,366	2
KK10V7	-1232,182	0,397	2
KK10V8	-1234,391	0,397	2
KK10V9	104,7737	0,034	2
KK11A1	-5319,182	1,712	2
KK11A10	-5277,557	1,698	2
KK11A11	-5319,182	1,712	2
KK11A12	-5048,046	1,625	2
KK11A13	-4650,656	1,497	2
KK11A14	-3627,321	1,167	2
KK11A15	-2293,081	0,738	2
KK11A16	-2284,719	0,735	2
KK11A17	-3595,992	1,157	2
KK11A18	-4609,053	1,483	2
KK11A19	-5007,827	1,612	2
KK11A2	-5048,046	1,625	2
KK11A20	-5277,557	1,698	2
KK11A3	-4650,656	1,497	2
KK11A4	-3627,321	1,167	2
KK11A5	-2293,081	0,738	2
KK11A6	-2284,719	0,735	2
KK11A7	-3595,992	1,157	2
KK11A8	-4609,053	1,483	2
KK11A9	-5007,827	1,612	2
KK11B1	4169,78	1,342	2
KK11B10	4104,531	1,321	2
KK11B11	4169,78	1,342	2
KK11B12	3712,864	1,195	2
KK11B13	2794,206	0,899	2

Batang	Gaya axial	jml baut	
		perlu	pakai
KK11V8	-574,9738	0,185	2
KK11V9	-226,3877	0,073	2
KK12A1	63,86417	0,021	2
KK12A2	-315,4402	0,102	2
KK12A3	-315,4402	0,102	2
KK12A4	63,86417	0,021	2
KK12B1	128,4119	0,041	2
KK12B2	128,3853	0,041	2
KK12B3	128,3853	0,041	2
KK12B4	128,4119	0,041	2
KK12V1	75,17305	0,024	2
KK12V2	75,17305	0,024	2
KK13A1	-2691,255	0,866	2
KK13A10	-2615,498	0,842	2
KK13A11	-2691,255	0,866	2
KK13A12	-2552,096	0,821	2
KK13A13	-1543,823	0,497	2
KK13A14	-1788,472	0,576	2
KK13A15	-1730,083	0,557	2
KK13A16	-1744,247	0,561	2
KK13A17	-1806,226	0,581	2
KK13A18	-1585,239	0,510	2
KK13A19	-2476,401	0,797	2
KK13A2	-2552,096	0,821	2
KK13A20	-2615,498	0,842	2
KK13A3	-1543,823	0,497	2
KK13A4	-1788,472	0,576	2
KK13A5	-1730,083	0,557	2
KK13A6	-1744,247	0,561	2
KK13A7	-1806,226	0,581	2
KK13A8	-1585,239	0,510	2
KK13A9	-2476,401	0,797	2
KK13B1	2109,584	0,679	2
KK13B10	2226,455	0,717	2
KK13B11	2109,584	0,679	2
KK13B12	1740,585	0,560	2
KK13B13	1916,065	0,617	2
KK13B14	1867,948	0,601	2
KK13B15	2018,622	0,650	2
KK13B16	2018,584	0,650	2
KK13B17	1932,93	0,622	2
KK13B18	2004,322	0,645	2
KK13B19	1856,62	0,598	2
KK13B2	1740,585	0,560	2
KK13B20	2226,455	0,717	2
KK13B3	1916,065	0,617	2

Batang	Gaya axial	jml baut	
		perlu	pakai
KK13B4	1867,948	0,601	2
KK13B5	2018,622	0,650	2
KK13B6	2018,584	0,650	2
KK13B7	1932,93	0,622	2
KK13B8	2004,322	0,645	2
KK13B9	1856,62	0,598	2
KK13D1	456,4855	0,147	2
KK13D10	-387,8487	0,125	2
KK13D11	79,85661	0,026	2
KK13D12	-275,9068	0,089	2
KK13D13	-253,2817	0,082	2
KK13D14	127,2403	0,041	2
KK13D15	-352,1709	0,113	2
KK13D16	457,432	0,147	2
KK13D2	-387,8487	0,125	2
KK13D3	79,85661	0,026	2
KK13D4	-275,9068	0,089	2
KK13D5	-253,2817	0,082	2
KK13D6	127,2403	0,041	2
KK13D7	-352,1709	0,113	2
KK13D8	457,432	0,147	2
KK13D9	456,4855	0,147	2
KK13V1	-219,9755	0,071	2
KK13V10	-219,9755	0,071	2
KK13V11	903,5708	0,291	2
KK13V12	106,1052	0,034	2
KK13V13	-278,6316	0,090	2
KK13V14	122,0569	0,039	2
KK13V15	-330,3668	0,106	2
KK13V16	87,46571	0,028	2
KK13V17	891,0432	0,287	2
KK13V18	-218,4343	0,070	2
KK13V2	903,5708	0,291	2
KK13V3	106,1052	0,034	2
KK13V4	-278,6316	0,090	2
KK13V5	122,0569	0,039	2
KK13V6	-330,3668	0,106	2
KK13V7	87,46571	0,028	2
KK13V8	891,0432	0,287	2
KK13V9	-218,4343	0,070	2
KK14A1	-1843,612	0,593	2
KK14A10	-1508,116	0,485	2
KK14A11	-957,9268	0,308	2
KK14A12	-406,283	0,131	2
KK14A13	-406,283	0,131	2
KK14A14	-957,9268	0,308	2
KK14A15	-1508,116	0,485	2

Batang	Gaya axial	jml baut	
		perlu	pakai
KK14A16	-1837,211	0,591	2
KK14A2	-1515,427	0,488	2
KK14A3	-924,4525	0,298	2
KK14A4	-395,1185	0,127	2
KK14A5	-395,1185	0,127	2
KK14A6	-924,4525	0,298	2
KK14A7	-1515,427	0,488	2
KK14A8	-1843,612	0,593	2
KK14A9	-1837,211	0,591	2
KK14B1	1431,284	0,461	2
KK14B10	867,701	0,279	2
KK14B11	361,585	0,116	2
KK14B12	88,33189	0,028	2
KK14B13	88,33189	0,028	2
KK14B14	361,585	0,116	2
KK14B15	867,701	0,279	2
KK14B16	1426,138	0,459	2
KK14B2	873,3615	0,281	2
KK14B3	386,9262	0,125	2
KK14B4	120,6401	0,039	2
KK14B5	120,6401	0,039	2
KK14B6	386,9262	0,125	2
KK14B7	873,3615	0,281	2
KK14B8	1431,284	0,461	2
KK14B9	1426,138	0,459	2
KK14D1	502,8974	0,162	2
KK14D10	764,3537	0,246	2
KK14D11	890,7073	0,287	2
KK14D12	502,4207	0,162	2
KK14D2	852,7936	0,274	2
KK14D3	743,5531	0,239	2
KK14D4	743,5531	0,239	2
KK14D5	852,7936	0,274	2
KK14D6	502,8974	0,162	2
KK14D7	502,4207	0,162	2
KK14D8	890,7073	0,287	2
KK14D9	764,3537	0,246	2
KK14V1	-128,4758	0,041	2
KK14V2	-591,9188	0,190	2
KK14V3	-591,9188	0,190	2
KK14V4	-128,4758	0,041	2
KK14V5	-127,9305	0,041	2
KK14V6	-611,4576	0,197	2
KK14V7	-611,4576	0,197	2
KK14V8	-127,9305	0,041	2
KK15A1	-797,3245	0,257	2
KK15A2	-550,814	0,177	2



# LAMPIRAN XX

### Perhitungan Pusat Kekakuan Lt 1

E = 210000 kg/cm<sup>2</sup>

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
			m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>			
K1	G1	I1	0	3	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,002133
K2	G2	I2	9	3	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,002133
K3	G3	I3	12	3	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,000675
K6	G6	I6	12	9	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,002025
K5	G5	I5	9	9	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,0064
K4	G4	I4	0	9	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,0064
K7	G7	I7	0	15	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,010667
K8	G8	I10	9	15	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,010667
K9	G9	I11	12	15	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,003375
K17	G17	I27	9	21	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,014933
K16	G16	I25	0	21	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,014933
K25	G25	I39	0	27	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,0192
K26	G26	I41	9	27	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,0192
K27	G27	I42	12	27	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,006075
K36	G36	I53	12	33	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,007425
K35	G35	I52	9	33	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,023467
K34	G34	I50	0	33	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,023467
K45	G45	I76	0	39	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0	0,027733
K46	G46	I81	9	39	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,0064	0,027733
K47	G47	I82	12	39	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0027	0,008775
K39	G39	I66	17	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,0081
K37	G37	I54	17	33	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,007425
K30	G30	I45	17	30	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,00675

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Kx x Xc
			m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>	
K28	G28	I43	17	27	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,006075
K21	G21	I34	17	24	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,0054
K19	G19	I29	17	21	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,004725
K10	G10	I19	17	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,003825	0,00405
K11	G11	I20	20	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0045	0,00405
K12	G12	I21	23	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,005175	0,00405
K13	G13	I22	26	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,00585	0,00405
K14	G14	I23	29	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,006525	0,00405
K15	G15	I24	32	18	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,00405
K20	G20	I31	32	21	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,004725
K24	G24	I38	32	24	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,0054
K29	G29	I44	32	27	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,006075
K33	G33	I49	32	30	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,00675
K38	G38	I56	32	33	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,007425
K44	G44	I71	32	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0072	0,0081
K43	G43	I70	29	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,006525	0,0081
K42	G42	I69	26	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,00585	0,0081
K41	G41	I68	23	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,005175	0,0081
K40	G40	I67	20	36	3	KLMA	0,3	0,3	0,000675	0,000675	0,000225	0,000225	0,0045	0,0081
K31	G31	I47	23	30	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,016356	0,021333
K32	G32	I48	29	30	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,020622	0,021333
K23	G23	I37	29	24	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,020622	0,017067

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
K22	G22	I36	23	24	3	KLMB	0,4	0,4	0,002133	0,002133	0,000711	0,000711	0,016356	0,017067
total, Σ:										0,0191	0,0191	0,25623056	0,44786667	

$$I_x = \frac{1}{12} b \cdot h^3 \quad K_x = \frac{I_x}{L}$$

$$I_y = \frac{1}{12} b^3 \cdot h \quad K_y = \frac{I_y}{L}$$

Pusat Kekakuan

$$X_r = \frac{\sum(K_y \times X_c)}{\sum K_y} = \frac{0,25623}{0,0191} = 13,4152$$

$$Y_r = \frac{\sum(K_x \times Y_c)}{\sum K_x} = \frac{0,447867}{0,0191} = 23,44852 \text{ m}$$

## Perhitungan Pusat Kekakuan Lt 2

E = 210000 kg/cm<sup>2</sup>

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang			Momen Inertia		Kekakuan		Titik Pusat Kekakuan	
			Xc	Yc		L	Section I	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
		m	m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>			
K48	II1	II3	0	3	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0016
K49	II2	II4	9	3	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0016
K50	II3	II5	12	3	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,000506
K53	II6	II10	12	9	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,001519
K52	II5	II9	9	9	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0048
K51	II4	II8	0	9	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0048
K54	II7	II13	0	15	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,008
K55	II0	II14	9	15	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,008
K56	II1	II15	12	15	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,002531
K65	II8	II26	12	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,003544
K64	II7	II25	9	21	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0112
K63	II5	II24	0	21	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0112
K72	II3	II40	0	27	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0144
K73	II4	II41	9	27	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0144
K74	II2	II42	12	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,004556
K81	II3	II63	12	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,005569
K80	II2	II62	9	33	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0176
K79	II0	II60	0	33	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0176
K90	II6	II79	0	39	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0208
K91	II8	II84	9	39	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0208
K92	II8	II85	12	39	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,006581

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang L	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		Section I	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Kx x Xc	Ky x Yc
			m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>			
K84	I66	II73	17	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,006075
K82	I54	II64	17	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,005569
K77	I45	II53	17	30	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,005063
K75	I43	II43	17	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,004556
K68	I34	II34	17	24	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,00405
K66	I29	II27	17	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,003544
K57	II9	II18	17	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,003038
K58	I20	II19	20	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003375	0,003038
K59	I21	II20	23	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003881	0,003038
K60	I22	II21	26	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004388	0,003038
K61	I23	II22	29	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004894	0,003038
K62	I24	II23	32	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,003038
K67	I31	II28	32	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,003544
K71	I38	II39	32	24	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,00405
K76	I44	II48	32	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,004556
K78	I49	II58	32	30	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,005063
K83	I56	II65	32	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,005569
K89	I71	II78	32	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,006075
K88	I70	II77	29	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004894	0,006075
K87	I69	II76	26	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004388	0,006075
K86	I68	II75	23	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003881	0,006075
K85	I67	II74	20	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003375	0,006075
K70	I37	II38	29	24	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,015467	0,0128

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section I	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
K69	I36	II36	23	24	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,012267	0,0128
									total, Σ:		0,01342708	0,01342708	0,16646458	0,30744375

$$I_x = \frac{1}{12} b \cdot h^3 \quad K_x = \frac{I_x}{L}$$

$$I_y = \frac{1}{12} b^3 \cdot h \quad K_y = \frac{I_y}{L}$$

Pusat Kekakuan

$$X_r = \frac{\sum (K_y \cdot X \cdot Y_c)}{\sum K_y} = \frac{0,16646}{0,01343} = 12,3977$$

$$Y_r = \frac{\sum (K_x \cdot X \cdot Y_c)}{\sum K_x} = \frac{0,307444}{0,013427} = 22,89728 \text{ m}$$

### Perhitungan Pusat Kekakuan Lt 3

E = 210000 kg/cm<sup>2</sup>

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
		m	m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>			
K93	III3	III3	0	3	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0016
K94	III4	III4	9	3	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0016
K95	III5	III5	12	3	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,000506
K98	III10	III10	12	9	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,001519
K97	III9	III9	9	9	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0048
K96	III8	III8	0	9	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0048
K99	III13	III13	0	15	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,008
K100	III14	III14	9	15	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,008
K101	III15	III15	12	15	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,002531
K110	III26	III26	12	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,003544
K109	III25	III25	9	21	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0112
K108	III24	III24	0	21	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0112
K117	III40	III40	0	27	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0144
K118	III41	III41	9	27	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0144
K119	III42	III42	12	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,004556
K126	III63	III63	12	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,005569
K125	III62	III62	9	33	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0176
K124	III60	III60	0	33	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0176
K135	III79	III79	0	39	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0	0,0208
K136	III84	III84	9	39	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,0048	0,0208
K137	III85	III85	12	39	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002025	0,006581



Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky <sub>x</sub> Xc
			m	m	m	m	m	m <sup>4</sup>	m <sup>4</sup>	m <sup>3</sup>	m <sup>3</sup>			
K129	II73	III73	17	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,006075
K127	II64	III64	17	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,005569
K122	II53	III53	17	30	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,005063
K120	II43	III43	17	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,004556
K113	II34	III34	17	24	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,00405
K111	II27	III27	17	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,003544
K102	II18	III18	17	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,002869	0,003038
K103	II19	III19	20	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003375	0,003038
K104	II20	III20	23	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003881	0,003038
K105	II21	III21	26	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004388	0,003038
K106	II22	III22	29	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004894	0,003038
K107	II23	III23	32	18	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,003038
K112	II28	III28	32	21	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,003544
K116	II39	III39	32	24	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,00405
K121	II48	III48	32	27	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,004556
K123	II58	III58	32	30	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,005063
K128	II65	III65	32	33	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,005569
K134	II78	III78	32	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,0054	0,006075
K133	II77	III77	29	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004894	0,006075
K132	II76	III76	26	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,004388	0,006075
K131	II75	III75	23	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003881	0,006075
K130	II74	III74	20	36	4	KLMA	0,3	0,3	0,000675	0,000675	0,000169	0,000169	0,003375	0,006075
K115	II38	III38	29	24	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,015467	0,0128

Frame ID	joint 1	joint 2	Koordinat Letak		Panjang	Ukuran Penampang		Momen Inertia		Kekakuan		Titik Pusat Kekakuan		
			Xc	Yc		L	Section ID	lebar, b	tinggi, h	Ix	Iy	Kx	Ky	Ky x Xc
K114	II36	III36	23	24	4	KLMB	0,4	0,4	0,002133	0,002133	0,000533	0,000533	0,012267	0,0128
total, Σ:									0,01342708	0,01342708	0,16646458	0,30744375		

$$I_x = \frac{1}{12} b \cdot h^3 \quad K_x = \frac{I_x}{L}$$

$$I_y = \frac{1}{12} b^3 \cdot h \quad K_y = \frac{I_y}{L}$$

Pusat Kekakuan

$$X_r = \frac{\sum (K_y \times X)}{\sum K_y} = \frac{0,16646}{0,01343} = 12,3977$$

$$Y_r = \frac{\sum (K_x \times Y_c)}{\sum K_x} = \frac{0,307444}{0,013427} = 22,89728 \text{ m}$$

## Perhitungan Pusat Massa Lt 1

gravitasi,  $g = 10 \text{ m/s}^2$

Berat jenis beton,  $\rho = 2400 \text{ kg/m}^3$

Massa jenis,  $\rho_m = 240 \text{ (kg/m}^3\text{)/(m/s}^2\text{)}$

Frame ID	Koordinat Letak		Panjang	Ukuran Penampang		Volume	Berat	Massa	Titik Pusat Massa	
	Xc	Yc	L	lebar, b	tinggi, h	V	W	M	M x Xc	M x Yc
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)		
K1	0	3	3	0,4	0,4	0,48	1152	115,2	0	345,6
K2	9	3	3	0,4	0,4	0,48	1152	115,2	1036,8	345,6
K3	12	3	3	0,3	0,3	0,27	648	64,8	777,6	194,4
K6	12	9	3	0,3	0,3	0,27	648	64,8	777,6	583,2
K5	9	9	3	0,4	0,4	0,48	1152	115,2	1036,8	1036,8
K4	0	9	3	0,4	0,4	0,48	1152	115,2	0	1036,8
K7	0	15	3	0,4	0,4	0,48	1152	115,2	0	1728
K8	9	15	3	0,4	0,4	0,48	1152	115,2	1036,8	1728
K9	12	15	3	0,3	0,3	0,27	648	64,8	777,6	972
K17	9	21	3	0,4	0,4	0,48	1152	115,2	1036,8	2419,2
K16	0	21	3	0,4	0,4	0,48	1152	115,2	0	2419,2
K25	0	27	3	0,4	0,4	0,48	1152	115,2	0	3110,4
K26	9	27	3	0,4	0,4	0,48	1152	115,2	1036,8	3110,4
K27	12	27	3	0,3	0,3	0,27	648	64,8	777,6	1749,6
K36	12	33	3	0,3	0,3	0,27	648	64,8	777,6	2138,4
K35	9	33	3	0,4	0,4	0,48	1152	115,2	1036,8	3801,6
K34	0	33	3	0,4	0,4	0,48	1152	115,2	0	3801,6
K45	0	39	3	0,4	0,4	0,48	1152	115,2	0	4492,8
K46	9	39	3	0,4	0,4	0,48	1152	115,2	1036,8	4492,8
K47	12	39	3	0,3	0,3	0,27	648	64,8	777,6	2527,2
K39	17	36	3	0,3	0,3	0,27	648	64,8	1101,6	2332,8
K37	17	33	3	0,3	0,3	0,27	648	64,8	1101,6	2138,4
K30	17	30	3	0,3	0,3	0,27	648	64,8	1101,6	1944
K28	17	27	3	0,3	0,3	0,27	648	64,8	1101,6	1749,6
K21	17	24	3	0,3	0,3	0,27	648	64,8	1101,6	1555,2
K19	17	21	3	0,3	0,3	0,27	648	64,8	1101,6	1360,8
K10	17	18	3	0,3	0,3	0,27	648	64,8	1101,6	1166,4
K11	20	18	3	0,3	0,3	0,27	648	64,8	1296	1166,4
K12	23	18	3	0,3	0,3	0,27	648	64,8	1490,4	1166,4
K13	26	18	3	0,3	0,3	0,27	648	64,8	1684,8	1166,4
K14	29	18	3	0,3	0,3	0,27	648	64,8	1879,2	1166,4
K15	32	18	3	0,3	0,3	0,27	648	64,8	2073,6	1166,4
K20	32	21	3	0,3	0,3	0,27	648	64,8	2073,6	1360,8
K24	32	24	3	0,3	0,3	0,27	648	64,8	2073,6	1555,2
K29	32	27	3	0,3	0,3	0,27	648	64,8	2073,6	1749,6
K33	32	30	3	0,3	0,3	0,27	648	64,8	2073,6	1944
K38	32	33	3	0,3	0,3	0,27	648	64,8	2073,6	2138,4
K44	32	36	3	0,3	0,3	0,27	648	64,8	2073,6	2332,8
K43	29	36	3	0,3	0,3	0,27	648	64,8	1879,2	2332,8
K42	26	36	3	0,3	0,3	0,27	648	64,8	1684,8	2332,8
K41	23	36	3	0,3	0,3	0,27	648	64,8	1490,4	2332,8
K40	20	36	3	0,3	0,3	0,27	648	64,8	1296	2332,8
K31	23	30	3	0,4	0,4	0,48	1152	115,2	2649,6	3456
K32	29	30	3	0,4	0,4	0,48	1152	115,2	3340,8	3456
K23	29	24	3	0,4	0,4	0,48	1152	115,2	3340,8	2764,8

K22	23	24	3	0,4	0,4	0,48	1152	115,2	2649,6	2764,8
SLOF43	30,5	21	3	0,2	0,15	0,09	216	21,6	658,8	453,6
SLOF94	30,5	34,5	3	0,2	0,15	0,09	216	21,6	658,8	745,2
SLOF93	21,5	34,5	3	0,2	0,15	0,09	216	21,6	464,4	745,2
SLOF118	7,75	38,1	1,8	0,2	0,15	0,054	129,6	12,96	100,44	493,776
SLOF117	6	38,1	1,8	0,2	0,15	0,054	129,6	12,96	77,76	493,776
SLOF116	4	38,1	1,8	0,2	0,15	0,054	129,6	12,96	51,84	493,776
SLOF90	1	34,25	2	0,2	0,15	0,06	144	14,4	14,4	493,2
SLOF49	2,25	24	4,5	0,2	0,15	0,135	324	32,4	72,9	777,6
SLOF51	12	24	6	0,3	0,2	0,36	864	86,4	1036,8	2073,6
SLOF27	12	18	6	0,3	0,2	0,36	864	86,4	1036,8	1555,2
SLOF10	12	12	6	0,3	0,2	0,36	864	86,4	1036,8	1036,8
SLOF5	12	6	6	0,3	0,2	0,36	864	86,4	1036,8	518,4
SLOF1	4,5	3	9	0,4	0,2	0,72	1728	172,8	777,6	518,4
SLOF2	10,5	3	3	0,4	0,2	0,24	576	57,6	604,8	172,8
SLOF6	4,5	9	9	0,4	0,2	0,72	1728	172,8	777,6	1555,2
SLOF7	10,5	9	3	0,4	0,2	0,24	576	57,6	604,8	518,4
SLOF35	17	19,5	3	0,3	0,2	0,18	432	43,2	734,4	842,4
SLOF46	17	22,5	3	0,3	0,2	0,18	432	43,2	734,4	972
SLOF58	17	25,5	3	0,3	0,2	0,18	432	43,2	734,4	1101,6
SLOF67	17	28,5	3	0,3	0,2	0,18	432	43,2	734,4	1231,2
SLOF76	17	31,5	3	0,3	0,2	0,18	432	43,2	734,4	1360,8
SLOF92	17	34,5	3	0,3	0,2	0,18	432	43,2	734,4	1490,4
SLOF104	18,5	36	3	0,3	0,2	0,18	432	43,2	799,2	1555,2
SLOF105	21,5	36	3	0,3	0,2	0,18	432	43,2	928,8	1555,2
SLOF106	24,5	36	3	0,3	0,2	0,18	432	43,2	1058,4	1555,2
SLOF107	27,5	36	3	0,3	0,2	0,18	432	43,2	1188	1555,2
SLOF108	30,5	36	3	0,3	0,2	0,18	432	43,2	1317,6	1555,2
SLOF28	18,5	18	3	0,3	0,2	0,18	432	43,2	799,2	777,6
SLOF29	21,5	18	3	0,3	0,2	0,18	432	43,2	928,8	777,6
SLOF30	24,5	18	3	0,3	0,2	0,18	432	43,2	1058,4	777,6
SLOF31	27,5	18	3	0,3	0,2	0,18	432	43,2	1188	777,6
SLOF32	30,5	18	3	0,3	0,2	0,18	432	43,2	1317,6	777,6
SLOF86	0	33,625	1,25	0,35	0,2	0,0875	210	21	0	706,125
SLOF95	0	35,125	1,75	0,35	0,2	0,1225	294	29,4	0	1032,675
SLOF113	0	37,5	3	0,35	0,2	0,21	504	50,4	0	1890
SLOF103	12	36	6	0,3	0,2	0,36	864	86,4	1036,8	3110,4
SLOF71	12	30	6	0,3	0,2	0,36	864	86,4	1036,8	2592
SLOF52	18,5	24	3	0,35	0,2	0,21	504	50,4	932,4	1209,6
SLOF53	21,5	24	3	0,35	0,2	0,21	504	50,4	1083,6	1209,6
SLOF54	26	24	6	0,35	0,2	0,42	1008	100,8	2620,8	2419,2
SLOF55	30,5	24	3	0,35	0,2	0,21	504	50,4	1537,2	1209,6
SLOF72	18,5	30	3	0,35	0,2	0,21	504	50,4	932,4	1512
SLOF73	21,5	30	3	0,35	0,2	0,21	504	50,4	1083,6	1512
SLOF74	26	30	6	0,35	0,2	0,42	1008	100,8	2620,8	3024
SLOF75	30,5	30	3	0,35	0,2	0,21	504	50,4	1537,2	1512
SLOF119	1	39	2	0,4	0,2	0,16	384	38,4	38,4	1497,6
SLOF120	3	39	2	0,4	0,2	0,16	384	38,4	115,2	1497,6
SLOF121	5	39	2	0,4	0,2	0,16	384	38,4	192	1497,6
SLOF122	6,875	39	1,75	0,4	0,2	0,14	336	33,6	231	1310,4
SLOF123	8,375	39	1,25	0,4	0,2	0,1	240	24	201	936
SLOF124	10,5	39	3	0,4	0,2	0,24	576	57,6	604,8	2246,4
SLOF101	1	36	2	0,2	0,15	0,06	144	14,4	14,4	518,4

SLOF102	5,5	36	7	0,2	0,15	0,21	504	50,4	277,2	1814,4
SLOF4	9	6	6	0,35	0,2	0,42	1008	100,8	907,2	604,8
SLOF9	9	12	6	0,35	0,2	0,42	1008	100,8	907,2	1209,6
SLOF26	9	18	6	0,35	0,2	0,42	1008	100,8	907,2	1814,4
SLOF50	9	24	6	0,35	0,2	0,42	1008	100,8	907,2	2419,2
SLOF70	9	30	6	0,35	0,2	0,42	1008	100,8	907,2	3024
SLOF91	9	34,5	3	0,35	0,2	0,21	504	50,4	453,6	1738,8
SLOF114	9	37,5	3	0,35	0,2	0,21	504	50,4	453,6	1890
SLOF110	3	37,2	2	0,2	0,15	0,06	144	14,4	43,2	535,68
SLOF111	5	37,2	2	0,2	0,15	0,06	144	14,4	72	535,68
SLOF112	6,875	37,2	1,75	0,2	0,15	0,0525	126	12,6	86,625	468,72
SLOF38	2,25	21	4,5	0,3	0,2	0,27	648	64,8	145,8	1360,8
SLOF39	6,75	21	4,5	0,3	0,2	0,27	648	64,8	437,4	1360,8
SLOF40	10,5	21	3	0,3	0,2	0,18	432	43,2	453,6	907,2
SLOF60	2,25	27	4,5	0,4	0,2	0,36	864	86,4	194,4	2332,8
SLOF61	6,75	27	4,5	0,4	0,2	0,36	864	86,4	583,2	2332,8
SLOF62	10,5	27	3	0,4	0,2	0,24	576	57,6	604,8	1555,2
SLOF63	14,5	27	5	0,4	0,2	0,4	960	96	1392	2592
SLOF57	4,5	25,5	3	0,2	0,15	0,09	216	21,6	97,2	550,8
SLOF45	4,5	22,5	3	0,2	0,15	0,09	216	21,6	97,2	486
SLOF34	4,5	19,5	3	0,2	0,15	0,09	216	21,6	97,2	421,2
SLOF11	1	15	2	0,4	0,2	0,16	384	38,4	38,4	576
SLOF12	3	15	2	0,4	0,2	0,16	384	38,4	115,2	576
SLOF13	6,5	15	5	0,4	0,2	0,4	960	96	624	1440
SLOF14	10,5	15	3	0,4	0,2	0,24	576	57,6	604,8	864
SLOF37	32	19,5	3	0,3	0,2	0,18	432	43,2	1382,4	842,4
SLOF48	32	22,5	3	0,3	0,2	0,18	432	43,2	1382,4	972
SLOF59	32	25,5	3	0,3	0,2	0,18	432	43,2	1382,4	1101,6
SLOF68	32	28,5	3	0,3	0,2	0,18	432	43,2	1382,4	1231,2
SLOF78	32	31,5	3	0,3	0,2	0,18	432	43,2	1382,4	1360,8
SLOF89	32	33,75	1,5	0,3	0,2	0,09	216	21,6	691,2	729
SLOF100	32	35,25	1,5	0,3	0,2	0,09	216	21,6	691,2	761,4
SLOF36	29	19,5	3	0,35	0,2	0,21	504	50,4	1461,6	982,8
SLOF47	29	22,5	3	0,35	0,2	0,21	504	50,4	1461,6	1134
SLOF66	29	27	6	0,35	0,2	0,42	1008	100,8	2923,2	2721,6
SLOF80	29	32,25	4,5	0,35	0,2	0,315	756	75,6	2192,4	2438,1
SLOF99	29	35,25	1,5	0,35	0,2	0,105	252	25,2	730,8	888,3
SLOF42	23	21	6	0,35	0,2	0,42	1008	100,8	2318,4	2116,8
SLOF65	23	27	6	0,35	0,2	0,42	1008	100,8	2318,4	2721,6
SLOF79	23	32,25	4,5	0,35	0,2	0,315	756	75,6	1738,8	2438,1
SLOF98	23	35,25	1,5	0,35	0,2	0,105	252	25,2	579,6	888,3
SLOF81	1	33	2	0,2	0,15	0,06	144	14,4	14,4	475,2
SLOF82	5,5	33	7	0,2	0,15	0,21	504	50,4	277,2	1663,2
SLOF83	10,5	33	3	0,2	0,15	0,09	216	21,6	226,8	712,8
SLOF84	14,5	33	5	0,2	0,15	0,15	360	36	522	1188
SLOF85	18,5	33	3	0,2	0,15	0,09	216	21,6	399,6	712,8
SLOF3	0	6	6	0,35	0,2	0,42	1008	100,8	0	604,8
SLOF8	0	12	6	0,35	0,2	0,42	1008	100,8	0	1209,6
SLOF15	0	15,75	1,5	0,35	0,2	0,105	252	25,2	0	396,9
SLOF20	0	17,25	1,5	0,35	0,2	0,105	252	25,2	0	434,7
SLOF33	0	19,5	3	0,35	0,2	0,21	504	50,4	0	982,8
SLOF44	0	22,5	3	0,35	0,2	0,21	504	50,4	0	1134
SLOF56	0	25,5	3	0,35	0,2	0,21	504	50,4	0	1285,2

SLOF69	0	30	6	0,35	0,2	0,42	1008	100,8	0	3024	
SLOF41	20	21	6	0,35	0,2	0,42	1008	100,8	2016	2116,8	
SLOF64	20	27	6	0,35	0,2	0,42	1008	100,8	2016	2721,6	
SLOF77	20	31,5	3	0,35	0,2	0,21	504	50,4	1008	1587,6	
SLOF88	20	33,75	1,5	0,35	0,2	0,105	252	25,2	504	850,5	
SLOF97	20	35,25	1,5	0,35	0,2	0,105	252	25,2	504	888,3	
SLOF115	2	38,1	1,8	0,2	0,15	0,054	129,6	12,96	25,92	493,776	
SLOF109	2	36,6	1,2	0,2	0,15	0,036	86,4	8,64	17,28	316,224	
SLOF96	2	35,125	1,75	0,2	0,15	0,0525	126	12,6	25,2	442,575	
SLOF87	2	33,625	1,25	0,2	0,15	0,0375	90	9	18	302,625	
SLOF23	1	18	2	0,2	0,15	0,06	144	14,4	14,4	259,2	
SLOF24	3	18	2	0,2	0,15	0,06	144	14,4	43,2	259,2	
SLOF25	4,25	18	0,5	0,2	0,15	0,015	36	3,6	15,3	64,8	
SLOF22	4	17,25	1,5	0,2	0,15	0,045	108	10,8	43,2	186,3	
SLOF17	4	15,75	1,5	0,2	0,15	0,045	108	10,8	43,2	170,1	
SLOF18	1	16,5	2	0,2	0,15	0,06	144	14,4	14,4	237,6	
SLOF19	3	16,5	2	0,2	0,15	0,06	144	14,4	43,2	237,6	
SLOF21	2	17,25	1,5	0,2	0,15	0,045	108	10,8	21,6	186,3	
SLOF16	2	15,75	1,5	0,2	0,15	0,045	108	10,8	21,6	170,1	
Beban hidup plat	Koordinat Letak		n Reduksi φ	Ukuran Pelat		Luas	Beban	Massa M	Titik Pusat Massa		
	Xc m	Yc m		panjang,l m	lebar,b m	A m <sup>2</sup>	q kg/m <sup>2</sup>	φ.A.q/g	M x Xc	M x Yc	
satu arah	4,5	18	0,5	9	30	270	250	3375	15187,5	60750	
II,III	10,5	21	0,5	3	36	108	300	1620	17010	34020	
XIV	6,75	34,5	0,5	4,5	3	13,5	300	202,5	1366,875	6986,25	
XI-XIII	4,5	37,5	0,5	9	3	27	250	337,5	1518,75	12656,25	
IV,V	14,5	28,5	0,5	5	9	45	300	675	9787,5	19237,5	
B,C	24,5	33	0,5	15	6	90	400	1800	44100	59400	
A	24,5	28,5	0,5	15	3	45	500	1125	27562,5	32062,5	
VIII,IX	24,5	25,5	0,5	15	3	45	400	900	22050	22950	
VI	24,5	21	0,5	15	6	90	250	1125	27562,5	23625	
VII	24,5	21	0,5	15	6	90	300	1350	33075	28350	
total Σ:								22521	341133,1	538808,5	

$$V = b \times h \times L \quad bm = bj / g$$

$$W = V \times bj \quad M = V \times bm$$

$$\text{Total Massa Lt} \quad 22521 \text{ kg/(m}^2\text{)}$$

Pusat Massa

$$X_r = \frac{M \times X_c}{\sum M}$$

$$= \frac{341133}{22521}$$

$$= 15,147 \text{ m}$$

$$Y_r = \frac{\sum M \times Y_c}{\sum M}$$

$$= \frac{538808,5}{22521,48}$$

$$= 23,92421 \text{ m}$$

## Perhitungan Pusat Massa Lt 2

gravitasi,  $g = 10 \text{ m/s}^2$

Berat jenis beton,  $\rho = 2400 \text{ kg/m}^3$

Massa jenis,  $\rho_m = 240 \text{ (kg/m}^3\text{)/(m/s}^2\text{)}$

Frame ID	Koordinat Letak		Panjang	Ukuran Penampang		Volume	Berat	Massa	Titik Pusat Massa	
	Xc	Yc	L	lebar, b	tinggi, h	V	W	M	M x Xc	M x Yc
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)		
K48	0	3	4	0,4	0,4	0,64	1536	153,6	0	460,8
K49	9	3	4	0,4	0,4	0,64	1536	153,6	1382,4	460,8
K50	12	3	4	0,3	0,3	0,36	864	86,4	1036,8	259,2
K53	12	9	4	0,3	0,3	0,36	864	86,4	1036,8	777,6
K52	9	9	4	0,4	0,4	0,64	1536	153,6	1382,4	1382,4
K51	0	9	4	0,4	0,4	0,64	1536	153,6	0	1382,4
K54	0	15	4	0,4	0,4	0,64	1536	153,6	0	2304
K55	9	15	4	0,4	0,4	0,64	1536	153,6	1382,4	2304
K56	12	15	4	0,3	0,3	0,36	864	86,4	1036,8	1296
K65	12	21	4	0,3	0,3	0,36	864	86,4	1036,8	1814,4
K64	9	21	4	0,4	0,4	0,64	1536	153,6	1382,4	3225,6
K63	0	21	4	0,4	0,4	0,64	1536	153,6	0	3225,6
K72	0	27	4	0,4	0,4	0,64	1536	153,6	0	4147,2
K73	9	27	4	0,4	0,4	0,64	1536	153,6	1382,4	4147,2
K74	12	27	4	0,3	0,3	0,36	864	86,4	1036,8	2332,8
K81	12	33	4	0,3	0,3	0,36	864	86,4	1036,8	2851,2
K80	9	33	4	0,4	0,4	0,64	1536	153,6	1382,4	5068,8
K79	0	33	4	0,4	0,4	0,64	1536	153,6	0	5068,8
K90	0	39	4	0,4	0,4	0,64	1536	153,6	0	5990,4
K91	9	39	4	0,4	0,4	0,64	1536	153,6	1382,4	5990,4
K92	12	39	4	0,3	0,3	0,36	864	86,4	1036,8	3369,6
K84	17	36	4	0,3	0,3	0,36	864	86,4	1468,8	3110,4
K82	17	33	4	0,3	0,3	0,36	864	86,4	1468,8	2851,2
K77	17	30	4	0,3	0,3	0,36	864	86,4	1468,8	2592
K75	17	27	4	0,3	0,3	0,36	864	86,4	1468,8	2332,8
K68	17	24	4	0,3	0,3	0,36	864	86,4	1468,8	2073,6
K66	17	21	4	0,3	0,3	0,36	864	86,4	1468,8	1814,4
K57	17	18	4	0,3	0,3	0,36	864	86,4	1468,8	1555,2
K58	20	18	4	0,3	0,3	0,36	864	86,4	1728	1555,2
K59	23	18	4	0,3	0,3	0,36	864	86,4	1987,2	1555,2
K60	26	18	4	0,3	0,3	0,36	864	86,4	2246,4	1555,2
K61	29	18	4	0,3	0,3	0,36	864	86,4	2505,6	1555,2
K62	32	18	4	0,3	0,3	0,36	864	86,4	2764,8	1555,2
K67	32	21	4	0,3	0,3	0,36	864	86,4	2764,8	1814,4
K71	32	24	4	0,3	0,3	0,36	864	86,4	2764,8	2073,6
K76	32	27	4	0,3	0,3	0,36	864	86,4	2764,8	2332,8
K78	32	30	4	0,3	0,3	0,36	864	86,4	2764,8	2592
K83	32	33	4	0,3	0,3	0,36	864	86,4	2764,8	2851,2
K89	32	36	4	0,3	0,3	0,36	864	86,4	2764,8	3110,4
K88	29	36	4	0,3	0,3	0,36	864	86,4	2505,6	3110,4
K87	26	36	4	0,3	0,3	0,36	864	86,4	2246,4	3110,4
K86	23	36	4	0,3	0,3	0,36	864	86,4	1987,2	3110,4
K85	20	36	4	0,3	0,3	0,36	864	86,4	1728	3110,4
K70	29	24	4	0,4	0,4	0,64	1536	153,6	4454,4	3686,4
K69	23	24	4	0,4	0,4	0,64	1536	153,6	3532,8	3686,4

INDK1	10,5	0	3	0,6	0,3	0,54	1296	129,6	1360,8	0
INDK66	34,5	28,5	3	0,6	0,3	0,54	1296	129,6	4471,2	3693,6
INDK8	12	6	6	0,6	0,3	1,08	2592	259,2	3110,4	1555,2
INDK54	4,5	27	9	0,6	0,3	1,62	3888	388,8	1749,6	10497,6
INDK86	17	34,5	3	0,6	0,3	0,54	1296	129,6	2203,2	4471,2
INDK77	32	31,5	3	0,6	0,3	0,54	1296	129,6	4147,2	4082,4
INDK83	29	33	6	0,6	0,3	1,08	2592	259,2	7516,8	8553,6
INDK80	10,5	33	3	0,6	0,3	0,54	1296	129,6	1360,8	4276,8
ANAK6	26	21	6	0,45	0,3	0,81	1944	194,4	5054,4	4082,4
INDK20	0	16,5	3	0,6	0,3	0,54	1296	129,6	0	2138,4
INDK61	12	28,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3693,6
INDK48	9	25,5	3	0,6	0,3	0,54	1296	129,6	1166,4	3304,8
INDK72	33,25	30	2,5	0,6	0,3	0,45	1080	108	3591	3240
ANAK31	5,25	36	1,5	0,7	0,3	0,315	756	75,6	396,9	2721,6
ANAK2	4,5	6	9	0,7	0,3	1,89	4536	453,6	2041,2	2721,6
ANAK27	4,5	34,5	3	0,3	0,25	0,225	540	54	243	1863
INDK3	12	1,5	3	0,6	0,3	0,54	1296	129,6	1555,2	194,4
INDK56	10,5	27	3	0,6	0,3	0,54	1296	129,6	1360,8	3499,2
INDK89	18,5	36	3	0,6	0,3	0,54	1296	129,6	2397,6	4665,6
INDK87	32	34,5	3	0,6	0,3	0,54	1296	129,6	4147,2	4471,2
INDK34	23	21	6	0,6	0,3	1,08	2592	259,2	5961,6	5443,2
INDK81	14,5	33	5	0,6	0,3	0,9	2160	216	3132	7128
ANAK5	20	20,25	4,5	0,45	0,3	0,6075	1458	145,8	2916	2952,45
INDK28	0	19,5	3	0,6	0,3	0,54	1296	129,6	0	2527,2
INDK49	12	25,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3304,8
INDK60	9	28,5	3	0,6	0,3	0,54	1296	129,6	1166,4	3693,6
INDK96	1	39	2	0,6	0,3	0,36	864	86,4	86,4	3369,6
ANAK32	6,875	36	1,75	0,7	0,3	0,3675	882	88,2	606,375	3175,2
ANAK3	4,5	12	9	0,7	0,3	1,89	4536	453,6	2041,2	5443,2
ANAK7	18,5	22,5	3	0,3	0,25	0,225	540	54	999	1215
INDK4	4,5	3	9	0,6	0,3	1,62	3888	388,8	1749,6	1166,4
INDK57	14,5	27	5	0,6	0,3	0,9	2160	216	3132	5832
INDK90	21,5	36	3	0,6	0,3	0,54	1296	129,6	2786,4	4665,6
INDK23	18,5	18	3	0,6	0,3	0,54	1296	129,6	2397,6	2332,8
INDK51	23	25,5	3	0,6	0,3	0,54	1296	129,6	2980,8	3304,8
ANAK14	21,5	27	3	0,4	0,3	0,36	864	86,4	1857,6	2332,8
ANAK8	20	23,25	1,5	0,45	0,3	0,2025	486	48,6	972	1129,95
INDK37	0	22,5	3	0,6	0,3	0,54	1296	129,6	0	2916
INDK2	9	1,5	3	0,6	0,3	0,54	1296	129,6	1166,4	194,4
INDK43	21,5	24	3	0,6	0,3	0,54	1296	129,6	2786,4	3110,4
INDK97	3	39	2	0,6	0,3	0,36	864	86,4	259,2	3369,6
ANAK33	8,375	36	1,25	0,7	0,3	0,2625	630	63	527,625	2268
ANAK4	4,5	18	9	0,7	0,3	1,89	4536	453,6	2041,2	8164,8
ANAK23	14,5	30	5	0,45	0,3	0,675	1620	162	2349	4860
INDK5	10,5	3	3	0,6	0,3	0,54	1296	129,6	1360,8	388,8
INDK55	18,5	27	3	0,4	0,3	0,36	864	86,4	1598,4	2332,8
INDK91	24,5	36	3	0,6	0,3	0,54	1296	129,6	3175,2	4665,6
INDK24	21,5	18	3	0,6	0,3	0,54	1296	129,6	2786,4	2332,8
INDK63	23	28,5	3	0,6	0,3	0,54	1296	129,6	2980,8	3693,6
ANAK15	24,5	27	3	0,4	0,3	0,36	864	86,4	2116,8	2332,8
ANAK12	20	25,5	3	0,45	0,3	0,405	972	97,2	1944	2478,6
INDK47	0	25,5	3	0,6	0,3	0,54	1296	129,6	0	3304,8
INDK7	9	4,5	3	0,6	0,3	0,54	1296	129,6	1166,4	583,2



INDK44	24,5	24	3	0,6	0,3	0,54	1296	129,6	3175,2	3110,4
INDK98	5	39	2	0,6	0,3	0,36	864	86,4	432	3369,6
ANAK9	4,5	24	9	0,7	0,3	1,89	4536	453,6	2041,2	10886,4
INDK67	18,5	30	3	0,6	0,3	0,54	1296	129,6	2397,6	3888
INDK11	4,5	9	9	0,6	0,3	1,62	3888	388,8	1749,6	3499,2
INDK30	17	19,5	3	0,6	0,3	0,54	1296	129,6	2203,2	2527,2
INDK92	27,5	36	3	0,6	0,3	0,54	1296	129,6	3564	4665,6
INDK25	24,5	18	3	0,6	0,3	0,54	1296	129,6	3175,2	2332,8
INDK82	23	33	6	0,6	0,3	1,08	2592	259,2	5961,6	8553,6
ANAK16	27,5	27	3	0,4	0,3	0,36	864	86,4	2376	2332,8
ANAK19	20	28,5	3	0,45	0,3	0,405	972	97,2	1944	2770,2
INDK59	0	28,5	3	0,6	0,3	0,54	1296	129,6	0	3693,6
INDK10	9	7,5	3	0,6	0,3	0,54	1296	129,6	1166,4	972
INDK45	27,5	24	3	0,6	0,3	0,54	1296	129,6	3564	3110,4
INDK99	6,875	39	1,75	0,6	0,3	0,315	756	75,6	519,75	2948,4
ANAK22	4,5	30	9	0,7	0,3	1,89	4536	453,6	2041,2	13608
ANAK10	14,5	24	5	0,45	0,3	0,675	1620	162	2349	3888
INDK12	10,5	9	3	0,6	0,3	0,54	1296	129,6	1360,8	1166,4
INDK36	17	21,75	1,5	0,6	0,3	0,27	648	64,8	1101,6	1409,4
INDK93	30,5	36	3	0,6	0,3	0,54	1296	129,6	3952,8	4665,6
INDK26	27,5	18	3	0,6	0,3	0,54	1296	129,6	3564	2332,8
INDK74	9	31,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4082,4
ANAK17	30,5	27	3	0,4	0,3	0,36	864	86,4	2635,2	2332,8
ANAK25	20	33	6	0,45	0,3	0,81	1944	194,4	3888	6415,2
INDK73	0	31,5	3	0,6	0,3	0,54	1296	129,6	0	4082,4
INDK14	9	10,5	3	0,6	0,3	0,54	1296	129,6	1166,4	1360,8
INDK46	30,5	24	3	0,6	0,3	0,54	1296	129,6	3952,8	3110,4
INDK100	8,375	39	1,25	0,6	0,3	0,225	540	54	452,25	2106
ANAK37	7,75	37,5	3	0,3	0,25	0,225	540	54	418,5	2025
INDK42	18,5	24	3	0,6	0,3	0,54	1296	129,6	2397,6	3110,4
INDK18	4,5	15	9	0,6	0,3	1,62	3888	388,8	1749,6	5832
INDK41	17	23,25	1,5	0,6	0,3	0,27	648	64,8	1101,6	1506,6
INDK31	32	19,5	3	0,6	0,3	0,54	1296	129,6	4147,2	2527,2
INDK27	30,5	18	3	0,6	0,3	0,54	1296	129,6	3952,8	2332,8
INDK85	9	34,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4471,2
INDK58	33,25	27	2,5	0,6	0,3	0,45	1080	108	3591	2916
INDK6	0	4,5	3	0,6	0,3	0,54	1296	129,6	0	583,2
INDK84	0	34,5	3	0,6	0,3	0,54	1296	129,6	0	4471,2
INDK17	9	13,5	3	0,6	0,3	0,54	1296	129,6	1166,4	1749,6
INDK68	21,5	30	3	0,6	0,3	0,54	1296	129,6	2786,4	3888
INDK101	10,5	39	3	0,6	0,3	0,54	1296	129,6	1360,8	5054,4
ANAK36	6	37,5	3	0,3	0,25	0,225	540	54	324	2025
INDK39	12	22,5	3	0,6	0,3	0,54	1296	129,6	1555,2	2916
INDK19	10,5	15	3	0,6	0,3	0,54	1296	129,6	1360,8	1944
INDK50	17	25,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3304,8
INDK40	32	22,5	3	0,6	0,3	0,54	1296	129,6	4147,2	2916
INDK35	29	21	6	0,6	0,3	1,08	2592	259,2	7516,8	5443,2
INDK95	9	37,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4860
ANAK26	26	33	6	0,45	0,3	0,81	1944	194,4	5054,4	6415,2
INDK9	0	7,5	3	0,6	0,3	0,54	1296	129,6	0	972
INDK94	0	37,5	3	0,6	0,3	0,54	1296	129,6	0	4860
INDK21	9	16,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2138,4
INDK69	24,5	30	3	0,6	0,3	0,54	1296	129,6	3175,2	3888

ANAK28	1	36	2	0,7	0,3	0,42	1008	100,8	100,8	3628,8
ANAK35	4	37,5	3	0,3	0,25	0,225	540	54	216	2025
INDK22	12	18	6	0,6	0,3	1,08	2592	259,2	3110,4	4665,6
INDK32	4,5	21	9	0,6	0,3	1,62	3888	388,8	1749,6	8164,8
INDK62	17	28,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3693,6
INDK53	32	25,5	3	0,6	0,3	0,54	1296	129,6	4147,2	3304,8
INDK52	29	25,5	3	0,6	0,3	0,54	1296	129,6	3758,4	3304,8
INDK78	2,25	33	4,5	0,6	0,3	0,81	1944	194,4	437,4	6415,2
ANAK20	26	28,5	3	0,45	0,3	0,405	972	97,2	2527,2	2770,2
INDK13	0	10,5	3	0,6	0,3	0,54	1296	129,6	0	1360,8
INDK88	12	36	6	0,6	0,3	1,08	2592	259,2	3110,4	9331,2
INDK29	9	19,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2527,2
INDK70	27,5	30	3	0,6	0,3	0,54	1296	129,6	3564	3888
ANAK29	3	36	2	0,7	0,3	0,42	1008	100,8	302,4	3628,8
ANAK34	2	37,5	3	0,3	0,25	0,225	540	54	108	2025
INDK15	12	12	6	0,6	0,3	1,08	2592	259,2	3110,4	3110,4
INDK33	10,5	21	3	0,6	0,3	0,54	1296	129,6	1360,8	2721,6
INDK76	17	31,5	3	0,6	0,3	0,54	1296	129,6	2203,2	4082,4
INDK65	32	28,5	3	0,6	0,3	0,54	1296	129,6	4147,2	3693,6
INDK64	29	28,5	3	0,6	0,3	0,54	1296	129,6	3758,4	3693,6
INDK79	6,75	33	4,5	0,6	0,3	0,81	1944	194,4	1312,2	6415,2
ANAK13	26	25,5	3	0,45	0,3	0,405	972	97,2	2527,2	2478,6
INDK16	0	13,5	3	0,6	0,3	0,54	1296	129,6	0	1749,6
INDK75	12	31,5	3	0,6	0,3	0,54	1296	129,6	1555,2	4082,4
INDK38	9	22,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2916
INDK71	30,5	30	3	0,6	0,3	0,54	1296	129,6	3952,8	3888
ANAK30	4,25	36	0,5	0,7	0,3	0,105	252	25,2	107,1	907,2
	Koordinat Letak		tebal	Ukuran Pelat		Volume	Berat	Massa	Titik Pusat Massa	
Plat ID	Xc	Yc	h	panjang,l	lebar,b	V	W	M	M x Xc	M x Yc
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)		
p1	6	21	0,12	12	36	51,84	124416	12442	74649,6	261273,6
p2	14,5	28,5	0,12	5	9	5,4	12960	1296	18792	36936
p3	24,5	27	0,12	15	18	32,4	77760	7776	190512	209952
p4	10,5	1,5	0,12	3	3	1,08	2592	259,2	2721,6	388,8
p5	33,25	28,5	0,12	2,5	3	0,9	2160	216	7182	6156
void 1	2,5	34,5	-0,12	5	3	-1,8	-4320	-432	-1080	-14904
void 2	18,5	20,5	-0,12	3	5	-1,8	-4320	-432	-7992	-8856
	Koordinat Letak		Koef.	Ukuran Pelat		Luas	Beban	Massa M	Titik Pusat Massa	
Beban hidup plat	Xc	Yc	Reduksi	panjang,l	lebar,b	A	q	φ.A.q/g	M x Xc	M x Yc
	m	m	φ	m	m	m <sup>2</sup>	kg/m <sup>2</sup>	kg/(m/s)		
I	10,5	1,5	0,5	3	3	9	300	135	1417,5	202,5
satu arah	4,5	18	0,5	9	30	270	250	3375	15187,5	60750
II,III	10,5	21	0,5	3	36	108	300	1620	17010	34020
XIV	6,75	34,5	0,5	4,5	3	13,5	300	202,5	1366,875	6986,25
XI-XIII	4,5	37,5	0,5	9	3	27	300	405	1822,5	15187,5
IV,V	14,5	28,5	0,5	5	9	45	300	675	9787,5	19237,5
B,C	24,5	33	0,5	15	6	90	250	1125	27562,5	37125
A	24,5	28,5	0,5	15	3	45	500	1125	27562,5	32062,5
VIII,IX	24,5	25,5	0,5	15	3	45	400	900	22050	22950
VI,VII	24,5	21	0,5	15	6	90	400	1800	44100	37800
X	33,25	28,5	0,5	2,5	3	7,5	500	187,5	6234,375	5343,75
void 1	2,5	34,5	0,5	5	3	15	-300	-225	-562,5	-7762,5

void 2	18,5	20,5	0,5	3	5	15	-300	-225	-4162,5	-4612,5
							total $\Sigma$ :	57319	800790,8	1338372

$$V = b \times h \times L \quad bm = bj / g$$

$$W = V \times bj \quad M = V \times bm$$

$$\text{Total Massa Lt} \quad 57319 \text{ kg/(m/s}^2\text{)}$$

Pusat Massa

$$\begin{aligned} X_r &= \frac{M \times X_c}{\Sigma M} \\ &= \frac{800791}{57319} \\ &= 13,971 \text{ m} \end{aligned}$$

$$\begin{aligned} Y_r &= \frac{\Sigma M \times Y_c}{\Sigma M} \\ &= \frac{1338372}{57319,2} \\ &= 23,34945 \text{ m} \end{aligned}$$

### Perhitungan Pusat Massa Lt 3

gravitasi,  $g = 10 \text{ m/s}^2$   
 Berat jenis beton,  $\rho_j = 2400 \text{ kg/m}^3$   
 Massa jenis,  $\rho_m = 240 \text{ (kg/m}^3\text{)/(m/s}^2\text{)}$

Frame ID	Koordinat Letak		Panjang	Ukuran Penampang		Volume	Berat	Massa	Titik Pusat Massa	
	Xc m	Yc m	L m	lebar, b m	tinggi, h m	V m <sup>3</sup>	W kg	M kg/(m/s)	M x Xc	M x Yc
K93	0	3	4	0,4	0,4	0,64	1536	153,6	0	460,8
K94	9	3	4	0,4	0,4	0,64	1536	153,6	1382,4	460,8
K95	12	3	4	0,3	0,3	0,36	864	86,4	1036,8	259,2
K98	12	9	4	0,3	0,3	0,36	864	86,4	1036,8	777,6
K97	9	9	4	0,4	0,4	0,64	1536	153,6	1382,4	1382,4
K96	0	9	4	0,4	0,4	0,64	1536	153,6	0	1382,4
K99	0	15	4	0,4	0,4	0,64	1536	153,6	0	2304
K100	9	15	4	0,4	0,4	0,64	1536	153,6	1382,4	2304
K101	12	15	4	0,3	0,3	0,36	864	86,4	1036,8	1296
K110	12	21	4	0,3	0,3	0,36	864	86,4	1036,8	1814,4
K109	9	21	4	0,4	0,4	0,64	1536	153,6	1382,4	3225,6
K108	0	21	4	0,4	0,4	0,64	1536	153,6	0	3225,6
K117	0	27	4	0,4	0,4	0,64	1536	153,6	0	4147,2
K118	9	27	4	0,4	0,4	0,64	1536	153,6	1382,4	4147,2
K119	12	27	4	0,3	0,3	0,36	864	86,4	1036,8	2332,8
K126	12	33	4	0,3	0,3	0,36	864	86,4	1036,8	2851,2
K125	9	33	4	0,4	0,4	0,64	1536	153,6	1382,4	5068,8
K124	0	33	4	0,4	0,4	0,64	1536	153,6	0	5068,8
K135	0	39	4	0,4	0,4	0,64	1536	153,6	0	5990,4
K136	9	39	4	0,4	0,4	0,64	1536	153,6	1382,4	5990,4
K137	12	39	4	0,3	0,3	0,36	864	86,4	1036,8	3369,6
K129	17	36	4	0,3	0,3	0,36	864	86,4	1468,8	3110,4
K127	17	33	4	0,3	0,3	0,36	864	86,4	1468,8	2851,2
K122	17	30	4	0,3	0,3	0,36	864	86,4	1468,8	2592
K120	17	27	4	0,3	0,3	0,36	864	86,4	1468,8	2332,8
K113	17	24	4	0,3	0,3	0,36	864	86,4	1468,8	2073,6
K111	17	21	4	0,3	0,3	0,36	864	86,4	1468,8	1814,4
K102	17	18	4	0,3	0,3	0,36	864	86,4	1468,8	1555,2
K103	20	18	4	0,3	0,3	0,36	864	86,4	1728	1555,2
K104	23	18	4	0,3	0,3	0,36	864	86,4	1987,2	1555,2
K105	26	18	4	0,3	0,3	0,36	864	86,4	2246,4	1555,2
K106	29	18	4	0,3	0,3	0,36	864	86,4	2505,6	1555,2
K107	32	18	4	0,3	0,3	0,36	864	86,4	2764,8	1555,2
K112	32	21	4	0,3	0,3	0,36	864	86,4	2764,8	1814,4
K116	32	24	4	0,3	0,3	0,36	864	86,4	2764,8	2073,6
K121	32	27	4	0,3	0,3	0,36	864	86,4	2764,8	2332,8
K123	32	30	4	0,3	0,3	0,36	864	86,4	2764,8	2592
K128	32	33	4	0,3	0,3	0,36	864	86,4	2764,8	2851,2
K134	32	36	4	0,3	0,3	0,36	864	86,4	2764,8	3110,4
K133	29	36	4	0,3	0,3	0,36	864	86,4	2505,6	3110,4
K132	26	36	4	0,3	0,3	0,36	864	86,4	2246,4	3110,4
K131	23	36	4	0,3	0,3	0,36	864	86,4	1987,2	3110,4
K130	20	36	4	0,3	0,3	0,36	864	86,4	1728	3110,4
K115	29	24	4	0,4	0,4	0,64	1536	153,6	4454,4	3686,4
K114	23	24	4	0,4	0,4	0,64	1536	153,6	3532,8	3686,4

INDK102	10,5	0	3	0,6	0,3	0,54	1296	129,6	1360,8	0
ANAK64	4,5	34,5	3	0,3	0,25	0,225	540	54	243	1863
INDK104	12	1,5	3	0,6	0,3	0,54	1296	129,6	1555,2	194,4
INDK157	10,5	27	3	0,6	0,3	0,54	1296	129,6	1360,8	3499,2
INDK190	18,5	36	3	0,6	0,3	0,54	1296	129,6	2397,6	4665,6
INDK188	32	34,5	3	0,6	0,3	0,54	1296	129,6	4147,2	4471,2
INDK135	23	21	6	0,6	0,3	1,08	2592	259,2	5961,6	5443,2
INDK182	14,5	33	5	0,6	0,3	0,9	2160	216	3132	7128
ANAK45	20	23,25	1,5	0,45	0,3	0,2025	486	48,6	972	1129,95
INDK138	0	22,5	3	0,6	0,3	0,54	1296	129,6	0	2916
INDK103	9	1,5	3	0,6	0,3	0,54	1296	129,6	1166,4	194,4
INDK144	21,5	24	3	0,6	0,3	0,54	1296	129,6	2786,4	3110,4
INDK209	3	39	2	0,6	0,3	0,36	864	86,4	259,2	3369,6
ANAK70	8,375	36	1,25	0,7	0,3	0,2625	630	63	527,625	2268
ANAK39	4,5	6	9	0,7	0,3	1,89	4536	453,6	2041,2	2721,6
ANAK44	18,5	22,5	3	0,3	0,25	0,225	540	54	999	1215
INDK105	4,5	3	9	0,6	0,3	1,62	3888	388,8	1749,6	1166,4
INDK158	14,5	27	5	0,6	0,3	0,9	2160	216	3132	5832
INDK191	21,5	36	3	0,6	0,3	0,54	1296	129,6	2786,4	4665,6
INDK124	18,5	18	3	0,6	0,3	0,54	1296	129,6	2397,6	2332,8
INDK153	23	25,5	3	0,6	0,3	0,54	1296	129,6	2980,8	3304,8
ANAK51	21,5	27	3	0,4	0,3	0,36	864	86,4	1857,6	2332,8
ANAK49	20	25,5	3	0,45	0,3	0,405	972	97,2	1944	2478,6
INDK148	0	25,5	3	0,6	0,3	0,54	1296	129,6	0	3304,8
INDK108	9	4,5	3	0,6	0,3	0,54	1296	129,6	1166,4	583,2
INDK145	24,5	24	3	0,6	0,3	0,54	1296	129,6	3175,2	3110,4
INDK210	5	39	2	0,6	0,3	0,36	864	86,4	432	3369,6
ANAK40	4,5	12	9	0,7	0,3	1,89	4536	453,6	2041,2	5443,2
ANAK60	14,5	30	5	0,45	0,3	0,675	1620	162	2349	4860
INDK106	10,5	3	3	0,6	0,3	0,54	1296	129,6	1360,8	388,8
INDK151	18,5	27	3	0,4	0,3	0,36	864	86,4	1598,4	2332,8
INDK192	24,5	36	3	0,6	0,3	0,54	1296	129,6	3175,2	4665,6
INDK125	21,5	18	3	0,6	0,3	0,54	1296	129,6	2786,4	2332,8
INDK164	23	28,5	3	0,6	0,3	0,54	1296	129,6	2980,8	3693,6
ANAK52	24,5	27	3	0,4	0,3	0,36	864	86,4	2116,8	2332,8
ANAK56	20	28,5	3	0,45	0,3	0,405	972	97,2	1944	2770,2
INDK160	0	28,5	3	0,6	0,3	0,54	1296	129,6	0	3693,6
INDK111	9	7,5	3	0,6	0,3	0,54	1296	129,6	1166,4	972
INDK146	27,5	24	3	0,6	0,3	0,54	1296	129,6	3564	3110,4
INDK211	6,875	39	1,75	0,6	0,3	0,315	756	75,6	519,75	2948,4
ANAK41	4,5	18	9	0,7	0,3	1,89	4536	453,6	2041,2	8164,8
INDK168	18,5	30	3	0,6	0,3	0,54	1296	129,6	2397,6	3888
INDK112	4,5	9	9	0,6	0,3	1,62	3888	388,8	1749,6	3499,2
INDK131	17	19,5	3	0,6	0,3	0,54	1296	129,6	2203,2	2527,2
INDK204	27,5	36	3	0,6	0,3	0,54	1296	129,6	3564	4665,6
INDK126	24,5	18	3	0,6	0,3	0,54	1296	129,6	3175,2	2332,8
INDK183	23	33	6	0,6	0,3	1,08	2592	259,2	5961,6	8553,6
ANAK53	27,5	27	3	0,4	0,3	0,36	864	86,4	2376	2332,8
ANAK62	20	33	6	0,45	0,3	0,81	1944	194,4	3888	6415,2
INDK174	0	31,5	3	0,6	0,3	0,54	1296	129,6	0	4082,4
INDK115	9	10,5	3	0,6	0,3	0,54	1296	129,6	1166,4	1360,8
INDK147	30,5	24	3	0,6	0,3	0,54	1296	129,6	3952,8	3110,4
INDK212	8,375	39	1,25	0,6	0,3	0,225	540	54	452,25	2106

INDK116	12	12	6	0,6	0,3	1,08	2592	259,2	3110,4	3110,4	
INDK134	10,5	21	3	0,6	0,3	0,54	1296	129,6	1360,8	2721,6	
INDK177	17	31,5	3	0,6	0,3	0,54	1296	129,6	2203,2	4082,4	
INDK166	32	28,5	3	0,6	0,3	0,54	1296	129,6	4147,2	3693,6	
INDK165	29	28,5	3	0,6	0,3	0,54	1296	129,6	3758,4	3693,6	
INDK180	6,75	33	4,5	0,6	0,3	0,81	1944	194,4	1312,2	6415,2	
ANAK43	26	21	6	0,45	0,3	0,81	1944	194,4	5054,4	4082,4	
INDK121	0	16,5	3	0,6	0,3	0,54	1296	129,6	0	2138,4	
INDK162	12	28,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3693,6	
INDK149	9	25,5	3	0,6	0,3	0,54	1296	129,6	1166,4	3304,8	
INDK173	33,25	30	2,5	0,6	0,3	0,45	1080	108	3591	3240	
ANAK68	5,25	36	1,5	0,7	0,3	0,315	756	75,6	396,9	2721,6	
ANAK71	2	37,5	3	0,3	0,25	0,225	540	54	108	2025	
INDK109	12	6	6	0,6	0,3	1,08	2592	259,2	3110,4	1555,2	
INDK156	4,5	27	9	0,6	0,3	1,62	3888	388,8	1749,6	10497,6	
INDK187	17	34,5	3	0,6	0,3	0,54	1296	129,6	2203,2	4471,2	
INDK178	32	31,5	3	0,6	0,3	0,54	1296	129,6	4147,2	4082,4	
INDK184	29	33	6	0,6	0,3	1,08	2592	259,2	7516,8	8553,6	
INDK181	10,5	33	3	0,6	0,3	0,54	1296	129,6	1360,8	4276,8	
ANAK42	20	20,25	4,5	0,45	0,3	0,6075	1458	145,8	2916	2952,45	
INDK129	0	19,5	3	0,6	0,3	0,54	1296	129,6	0	2527,2	
INDK150	12	25,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3304,8	
INDK161	9	28,5	3	0,6	0,3	0,54	1296	129,6	1166,4	3693,6	
INDK208	1	39	2	0,6	0,3	0,36	864	86,4	86,4	3369,6	
ANAK69	6,875	36	1,75	0,7	0,3	0,3675	882	88,2	606,375	3175,2	
Plat ID	Koordinat Letak		tebal	Ukuran Pelat		Volume	Berat	Massa	Titik Pusat Massa		
	Xc	Yc	h	panjang,l	lebar,b	V	W	M	M x Xc	M x Yc	
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)			
p1	6	21	0,12	12	36	51,84	124416	12442	74649,6	261273,6	
p2	14,5	28,5	0,12	5	9	5,4	12960	1296	18792	36936	
p3	24,5	27	0,12	15	18	32,4	77760	7776	190512	209952	
p4	10,5	1,5	0,12	3	3	1,08	2592	259,2	2721,6	388,8	
p5	33,25	28,5	0,12	2,5	3	0,9	2160	216	7182	6156	
void 1	2,5	34,5	-0,12	5	3	-1,8	-4320	-432	-1080	-14904	
void 2	18,5	20,5	-0,12	3	5	-1,8	-4320	-432	-7992	-8856	
Beban hidup plat	Koordinat Letak		Koefisien Reduksi $\phi$	Ukuran Pelat		Luas	Beban	Massa M	Titik Pusat Massa		
	Xc	Yc		panjang,l	lebar,b	A	q	$\phi \cdot A \cdot q/g$	M x Xc	M x Yc	
	m	m		m	m	m <sup>2</sup>	kg/m <sup>2</sup>	kg/(m/s)			
I	10,5	1,5	0,5	3	3	9	300	135	1417,5	202,5	
satu arah	4,5	18	0,5	9	30	270	250	3375	15187,5	60750	
II,III	10,5	21	0,5	3	36	108	300	1620	17010	34020	
XIV	6,75	34,5	0,5	4,5	3	13,5	300	202,5	1366,875	6986,25	
XI-XIII	4,5	37,5	0,5	9	3	27	300	405	1822,5	15187,5	
IV,V	14,5	28,5	0,5	5	9	45	300	675	9787,5	19237,5	
B,C	24,5	33	0,5	15	6	90	250	1125	27562,5	37125	
A	24,5	28,5	0,5	15	3	45	500	1125	27562,5	32062,5	
VIII,IX	24,5	25,5	0,5	15	3	45	400	900	22050	22950	
VI,VII	24,5	21	0,5	15	6	90	400	1800	44100	37800	
X	33,25	28,5	0,5	2,5	3	7,5	500	187,5	6234,375	5343,75	
void 1	2,5	34,5	0,5	5	3	15	-300	-225	-562,5	-7762,5	
void 2	18,5	20,5	0,5	3	5	15	-300	-225	-4162,5	-4612,5	
total $\Sigma$ :								57082	792728,6	1331762	

ANAK46	4,5	24	9	0,7	0,3	1,89	4536	453,6	2041,2	10886,4
ANAK47	14,5	24	5	0,45	0,3	0,675	1620	162	2349	3888
INDK113	10,5	9	3	0,6	0,3	0,54	1296	129,6	1360,8	1166,4
INDK137	17	21,75	1,5	0,6	0,3	0,27	648	64,8	1101,6	1409,4
INDK205	30,5	36	3	0,6	0,3	0,54	1296	129,6	3952,8	4665,6
INDK127	27,5	18	3	0,6	0,3	0,54	1296	129,6	3564	2332,8
INDK175	9	31,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4082,4
ANAK54	30,5	27	3	0,4	0,3	0,36	864	86,4	2635,2	2332,8
INDK107	0	4,5	3	0,6	0,3	0,54	1296	129,6	0	583,2
INDK185	0	34,5	3	0,6	0,3	0,54	1296	129,6	0	4471,2
INDK118	9	13,5	3	0,6	0,3	0,54	1296	129,6	1166,4	1749,6
INDK169	21,5	30	3	0,6	0,3	0,54	1296	129,6	2786,4	3888
INDK213	10,5	39	3	0,6	0,3	0,54	1296	129,6	1360,8	5054,4
ANAK59	4,5	30	9	0,7	0,3	1,89	4536	453,6	2041,2	13608
INDK143	18,5	24	3	0,6	0,3	0,54	1296	129,6	2397,6	3110,4
INDK119	4,5	15	9	0,6	0,3	1,62	3888	388,8	1749,6	5832
INDK142	17	23,25	1,5	0,6	0,3	0,27	648	64,8	1101,6	1506,6
INDK132	32	19,5	3	0,6	0,3	0,54	1296	129,6	4147,2	2527,2
INDK128	30,5	18	3	0,6	0,3	0,54	1296	129,6	3952,8	2332,8
INDK186	9	34,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4471,2
ANAK63	26	33	6	0,45	0,3	0,81	1944	194,4	5054,4	6415,2
INDK110	0	7,5	3	0,6	0,3	0,54	1296	129,6	0	972
INDK206	0	37,5	3	0,6	0,3	0,54	1296	129,6	0	4860
INDK122	9	16,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2138,4
INDK170	24,5	30	3	0,6	0,3	0,54	1296	129,6	3175,2	3888
ANAK65	1	36	2	0,7	0,3	0,42	1008	100,8	100,8	3628,8
ANAK74	7,75	37,5	3	0,3	0,25	0,225	540	54	418,5	2025
INDK140	12	22,5	3	0,6	0,3	0,54	1296	129,6	1555,2	2916
INDK120	10,5	15	3	0,6	0,3	0,54	1296	129,6	1360,8	1944
INDK152	17	25,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3304,8
INDK141	32	22,5	3	0,6	0,3	0,54	1296	129,6	4147,2	2916
INDK136	29	21	6	0,6	0,3	1,08	2592	259,2	7516,8	5443,2
INDK207	9	37,5	3	0,6	0,3	0,54	1296	129,6	1166,4	4860
ANAK57	26	28,5	3	0,45	0,3	0,405	972	97,2	2527,2	2770,2
INDK114	0	10,5	3	0,6	0,3	0,54	1296	129,6	0	1360,8
INDK189	12	36	6	0,6	0,3	1,08	2592	259,2	3110,4	9331,2
INDK130	9	19,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2527,2
INDK171	27,5	30	3	0,6	0,3	0,54	1296	129,6	3564	3888
ANAK66	3	36	2	0,7	0,3	0,42	1008	100,8	302,4	3628,8
ANAK73	6	37,5	3	0,3	0,25	0,225	540	54	324	2025
INDK123	12	18	6	0,6	0,3	1,08	2592	259,2	3110,4	4665,6
INDK133	4,5	21	9	0,6	0,3	1,62	3888	388,8	1749,6	8164,8
INDK163	17	28,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3693,6
INDK155	32	25,5	3	0,6	0,3	0,54	1296	129,6	4147,2	3304,8
INDK154	29	25,5	3	0,6	0,3	0,54	1296	129,6	3758,4	3304,8
INDK179	2,25	33	4,5	0,6	0,3	0,81	1944	194,4	437,4	6415,2
ANAK50	26	25,5	3	0,45	0,3	0,405	972	97,2	2527,2	2478,6
INDK117	0	13,5	3	0,6	0,3	0,54	1296	129,6	0	1749,6
INDK176	12	31,5	3	0,6	0,3	0,54	1296	129,6	1555,2	4082,4
INDK139	9	22,5	3	0,6	0,3	0,54	1296	129,6	1166,4	2916
INDK172	30,5	30	3	0,6	0,3	0,54	1296	129,6	3952,8	3888
ANAK67	4,25	36	0,5	0,7	0,3	0,105	252	25,2	107,1	907,2
ANAK72	4	37,5	3	0,3	0,25	0,225	540	54	216	2025

$$V = b \times h \times L \quad \text{bm} = \text{bj} / \text{g}$$

$$W = V \times \text{bj} \quad M = V \times \text{bm}$$

$$\text{Total Massa Lt} \quad 57082 \text{ kg}/(\text{m}/\text{s}^2)$$

Pusat Massa

$$\begin{aligned} X_r &= \frac{\sum M \times X_c}{\sum M} & Y_r &= \frac{\sum M \times Y_c}{\sum M} \\ &= \frac{792728,55}{57081,6} & &= \frac{1331762}{57081,6} \\ &= 13,888 \text{ m} & &= 23,33085 \text{ m} \end{aligned}$$



## Perhitungan Pusat Massa atap

gravitasi,  $g = 10 \text{ m/s}^2$

Berat jenis beton,  $\rho = 2400 \text{ kg/m}^3$

Massa jenis,  $\rho = 240 \text{ (kg/m}^3\text{)/(m/s}^2\text{)}$

Frame ID	Koordinat Letak		Panjang	Ukuran Penampang		Volume	Berat	Massa	Titik Pusat Massa	
	Xc	Yc	L	lebar, b	tinggi, h	V	W	M	M x Xc	M x Yc
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)		
K143	0	3	5,9	0,4	0,4	0,944	2265,6	226,56	0	679,68
K144	9	3	5,9	0,4	0,4	0,944	2265,6	226,56	2039,04	679,68
K145	12	3	5,9	0,3	0,3	0,531	1274,4	127,44	1529,28	382,32
K153	0	39	5,9	0,4	0,4	0,944	2265,6	226,56	0	8835,84
K154	9	39	5,9	0,4	0,4	0,944	2265,6	226,56	2039,04	8835,84
K155	12	39	5,9	0,3	0,3	0,531	1274,4	127,44	1529,28	4970,16
K146	0	9	5,9	0,4	0,4	0,944	2265,6	226,56	0	2039,04
K148	0	15	5,9	0,4	0,4	0,944	2265,6	226,56	0	3398,4
K150	0	21	5,9	0,4	0,4	0,944	2265,6	226,56	0	4757,76
K151	0	27	5,9	0,4	0,4	0,944	2265,6	226,56	0	6117,12
K152	0	33	5,9	0,4	0,4	0,944	2265,6	226,56	0	7476,48
K147	12	9	5,9	0,3	0,3	0,531	1274,4	127,44	1529,28	1146,96
K149	12	15	5,9	0,3	0,3	0,531	1274,4	127,44	1529,28	1911,6
K156	17	18	6,2	0,3	0,3	0,558	1339,2	133,92	2276,64	2410,56
K162	17	21	6,2	0,3	0,3	0,558	1339,2	133,92	2276,64	2812,32
K164	17	24	6,2	0,3	0,3	0,558	1339,2	133,92	2276,64	3214,08
K168	17	33	6,2	0,3	0,3	0,558	1339,2	133,92	2276,64	4419,36
K170	17	36	6,2	0,3	0,3	0,558	1339,2	133,92	2276,64	4821,12
K161	32	18	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	2410,56
K163	32	21	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	2812,32
K165	32	24	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	3214,08
K166	32	27	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	3615,84
K167	32	30	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	4017,6
K169	32	33	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	4419,36
K175	32	36	6,2	0,3	0,3	0,558	1339,2	133,92	4285,44	4821,12
K157	20	18	6,2	0,3	0,3	0,558	1339,2	133,92	2678,4	2410,56
K158	23	18	6,2	0,3	0,3	0,558	1339,2	133,92	3080,16	2410,56
K159	26	18	6,2	0,3	0,3	0,558	1339,2	133,92	3481,92	2410,56
K160	29	18	6,2	0,3	0,3	0,558	1339,2	133,92	3883,68	2410,56
K171	20	36	6,2	0,3	0,3	0,558	1339,2	133,92	2678,4	4821,12
K172	23	36	6,2	0,3	0,3	0,558	1339,2	133,92	3080,16	4821,12
K173	26	36	6,2	0,3	0,3	0,558	1339,2	133,92	3481,92	4821,12
K174	29	36	6,2	0,3	0,3	0,558	1339,2	133,92	3883,68	4821,12
K140	17	27	3,93	0,3	0,3	0,3537	848,88	84,888	1443,096	2291,976
K179	17	27	2,27	0,3	0,3	0,2043	490,32	49,032	833,544	1323,864
K141	17	30	3,93	0,3	0,3	0,3537	848,88	84,888	1443,096	2546,64
K180	17	30	2,27	0,3	0,3	0,2043	490,32	49,032	833,544	1470,96
K138	12	21	3,93	0,3	0,3	0,3537	848,88	84,888	1018,656	1782,648
K176	12	21	1,97	0,3	0,3	0,1773	425,52	42,552	510,624	893,592
K139	12	27	3,93	0,3	0,3	0,3537	848,88	84,888	1018,656	2291,976
K177	12	27	1,97	0,3	0,3	0,1773	425,52	42,552	510,624	1148,904
K142	12	33	3,93	0,3	0,3	0,3537	848,88	84,888	1018,656	2801,304
K178	12	33	1,97	0,3	0,3	0,1773	425,52	42,552	510,624	1404,216
INDK202	17	31,5	3	0,6	0,3	0,54	1296	129,6	2203,2	4082,4
INDK199	17	28,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3693,6

INDK196	17	25,5	3	0,6	0,3	0,54	1296	129,6	2203,2	3304,8	
INDK203	14,5	33	5	0,6	0,3	0,9	2160	216	3132	7128	
INDK200	14,5	30	5	0,6	0,3	0,9	2160	216	3132	6480	
INDK197	14,5	27	5	0,6	0,3	0,9	2160	216	3132	5832	
INDK194	14,5	24	5	0,6	0,3	0,9	2160	216	3132	5184	
INDK193	12	22,5	3	0,6	0,3	0,54	1296	129,6	1555,2	2916	
INDK195	12	25,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3304,8	
INDK198	12	28,5	3	0,6	0,3	0,54	1296	129,6	1555,2	3693,6	
INDK201	12	31,5	3	0,6	0,3	0,54	1296	129,6	1555,2	4082,4	
Plat ID	Koordinat Letak		tebal	Ukuran Pelat		Volume	Berat	Massa	Titik Pusat Massa		
	Xc	Yc	h	panjang,l	lebar,b	V	W	M	M x Xc	M x Yc	
	m	m	m	m	m	m <sup>3</sup>	kg	kg/(m/s)			
p2	14,5	28,5	0,12	5	9	5,4	12960	1296	18792	36936	
Beban hidup plat	Koordinat Letak		Koef. Reduksi φ	Ukuran Pelat		Luas	Beban	Massa M	Titik Pusat Massa		
	Xc	Yc		panjang,l	lebar,b	A	q	φ.A.q/g	M x Xc	M x Yc	
	m	m		m	m	m <sup>2</sup>	kg/m <sup>2</sup>	kg/(m/s)			
I	10,5	1,5	0,5	3	3	9	300	135	1417,5	202,5	
satu arah	4,5	18	0,5	9	30	270	250	3375	15187,5	60750	
II,III	10,5	21	0,5	3	36	108	300	1620	17010	34020	
XIV	6,75	34,5	0,5	4,5	3	13,5	300	202,5	1366,875	6986,25	
XI-XIII	4,5	37,5	0,5	9	3	27	300	405	1822,5	15187,5	
IV,V	14,5	28,5	0,5	5	9	45	300	675	9787,5	19237,5	
B,C	24,5	33	0,5	15	6	90	250	1125	27562,5	37125	
Λ	24,5	28,5	0,5	15	3	45	500	1125	27562,5	32062,5	
VIII,IX	24,5	25,5	0,5	15	3	45	400	900	22050	22950	
VI,VII	24,5	21	0,5	15	6	90	400	1800	44100	37800	
X	33,25	28,5	0,5	2,5	3	7,5	500	187,5	6234,375	5343,75	
void 1	2,5	34,5	0,5	5	3	15	-300	-225	-562,5	-7762,5	
void 2	18,5	20,5	0,5	3	5	15	-300	-225	-4162,5	-4612,5	
total Σ:								20045	300492,6	487029,6	

$$V = b \times h \times L \quad bm = bj / g$$

$$W = V \times bj \quad M = V \times bm$$

$$\text{Total Massa Lt} \quad 20045 \text{ kg/(m/s}^2\text{)}$$

Pusat Massa

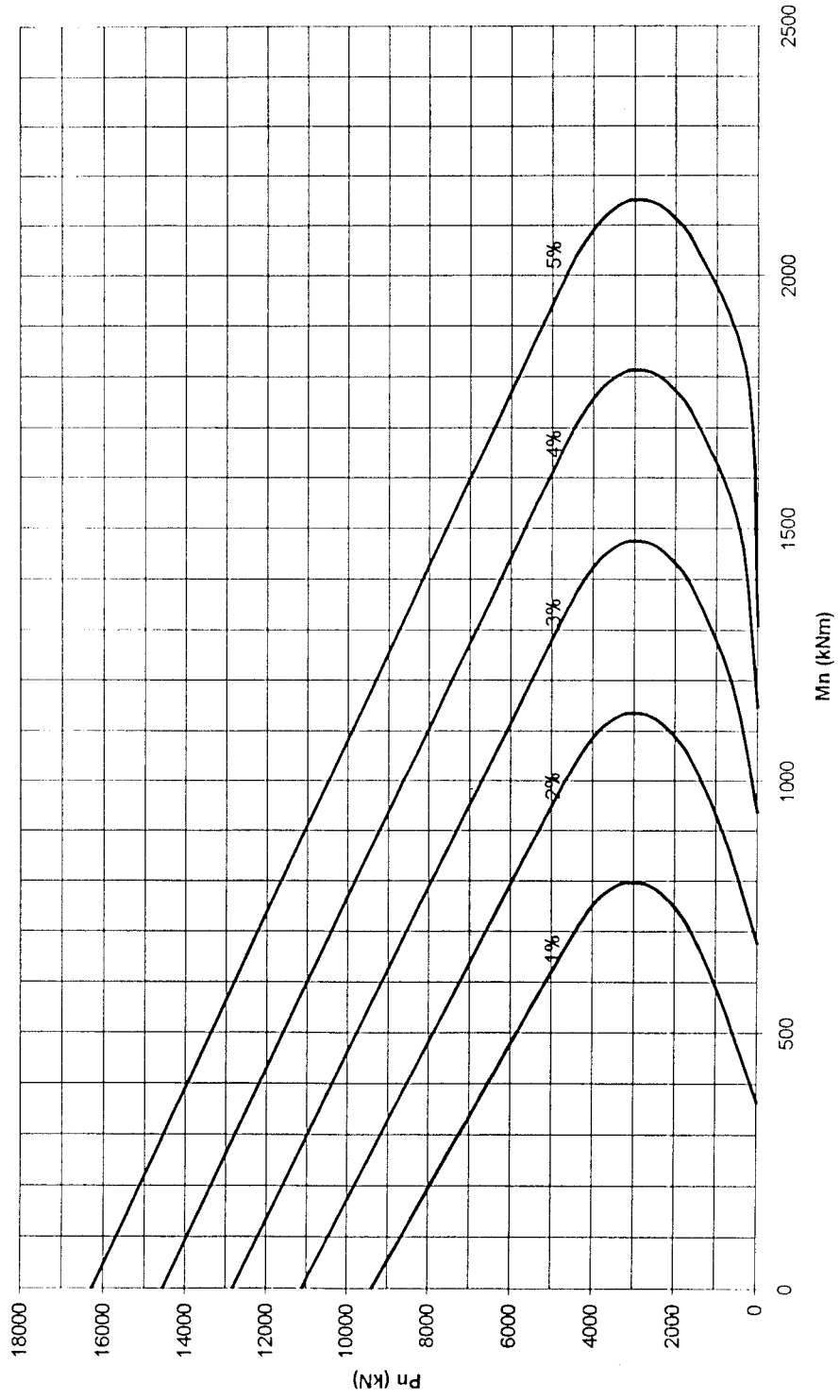
$$X_r = \frac{\sum M \times X_c}{\sum M} \quad Y_r = \frac{\sum M \times Y_c}{\sum M}$$

$$= \frac{300492,57}{20044,56} \quad = \frac{487029,6}{20044,56}$$

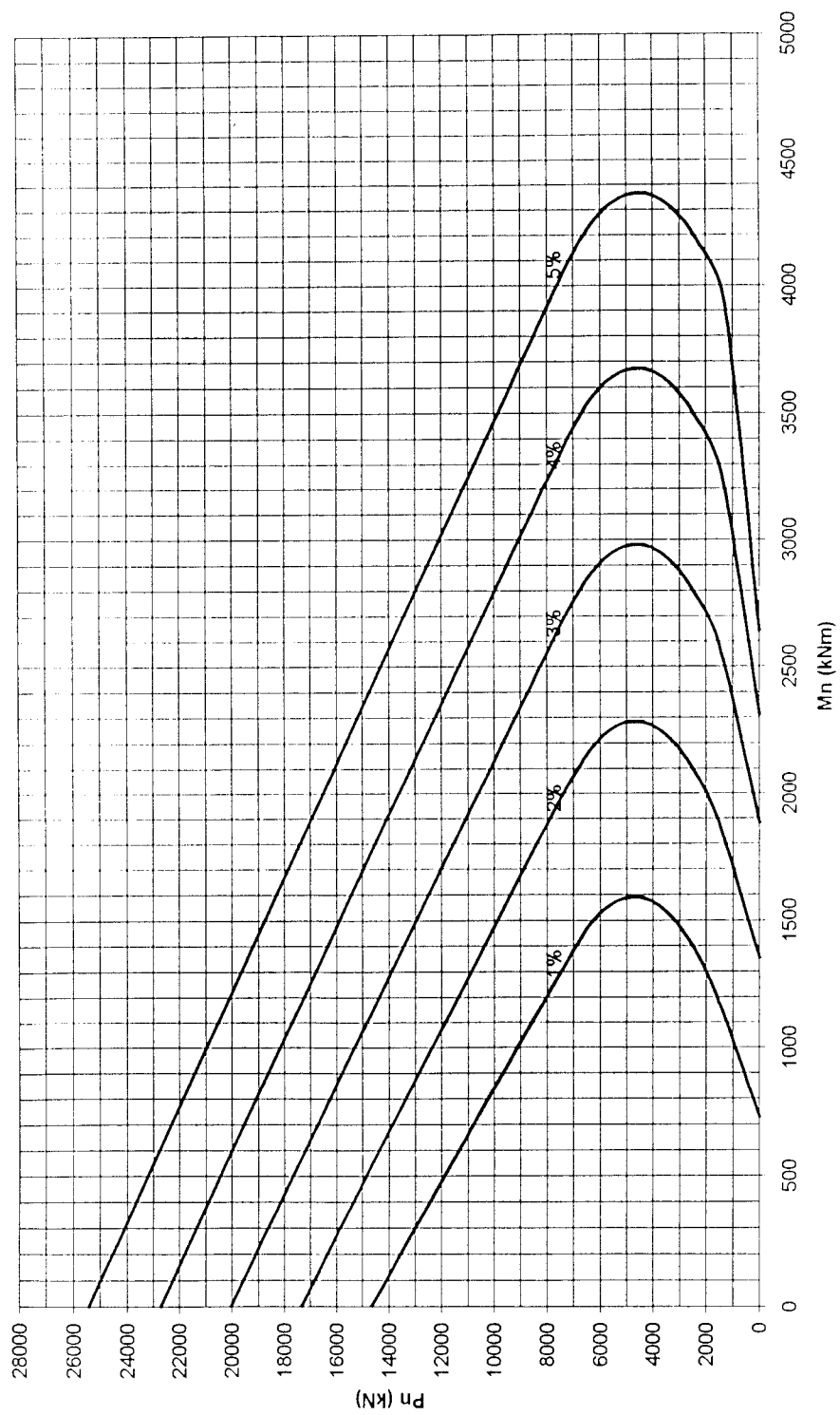
$$= 14,991 \text{ m} \quad = 24,29735 \text{ m}$$

# LAMPIRAN XXI

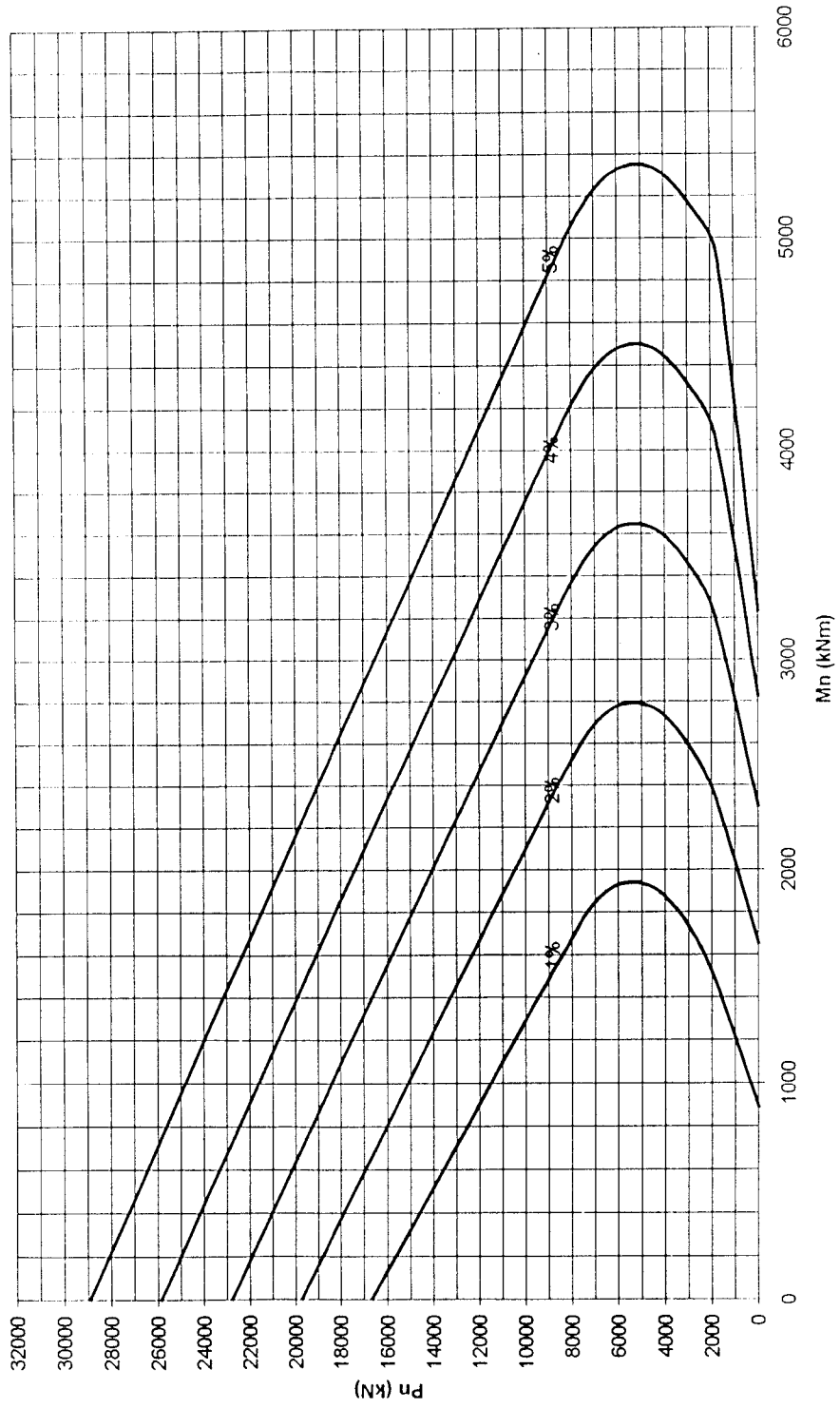
Grafik Mn, Pn (kolom 600/600)



Grafik Mn,Pn (kolom 750/750)



Grafik Mn,Pn (kolom 800/800)



Grafik Mn,Pn (kolom 1100/1100)

