BAB V

KESIMPULAN DAN SARAN

5.1. Kesimpulan

Setelah melakukan analisis dan perancangan pada struktur gedung Apartemen salemba *Residence* Tower A yang disesuaikan dengan Tata Cara Perhitungan Struktur Beton Untuk Gedung SNI 03-2847-2002 dan Tata Cara Perencanaan Ketahanan Gempa Untuk Bangunan Gedung SNI 03-1726-2002 serta Tata cara Perencanaan Struktur Baja Untuk Bangunan Gedung SNI 03-1729-2002, dapat diambil kesimpulan sebagai berikut:

1. Dalam perencanaan atap baja, gording digunakan *Lipped Channel* 125x50x20x3.2 dan rangka kuda - kuda digunakan *Double Equal Angel* 2Lx50x50x5 dan 2Lx40x40x5 dimana data perencanaan diperoleh dari *Produc Catalogue* P.T Gunung Garuda *Steel*
2. Dalam perancangan gedung ini digunakan pelat dua arah dan pelat satu arah. Tebal pelat bagian atap 120 mm dan pelat lantai 150 mm, dan memenuhi syarat lendutan maksimum yang diijinkan.
3. Dalam perencanaan balok, digunakan beberapa dimensi balok induk diantaranya sebesar 400 mm x 650 mm, 350mm x 650 mm. Dalam perencanaan Balok – balok tersebut dihasilkan jumlah tulangan lentur dan geser yang berbeda – beda.

Dinding geser menggunakan tebal dinding 450 mm dan 600 mm dinding geser yang dirancang perlu di tinjau apakah perlu dipasang *boundary element*. Karena *boundary element* sama fungsinya seperti kolom yang disediakan pada bagian ujung *shearwall* yang menyatu dengan dinding.

5.2. Saran

1. Dalam perancangan pada setiap elemen struktur seperti penentuan tulangan pelat, balok dan dinding geser sebaiknya digunakan ukuran yang hampir seragam untuk mempermudah pelaksanaan pekerjaan di lapangan.
2. Dalam melakukan input data dengan bantuan Program Perangkat Lunak baik itu *SAP2000*, atau *ETABS* hendaknya dilakukan dengan teliti sesuai dengan asumsi–asumsi yang telah ditetapkan sebelumnya sehingga dapat dihasilkan analisis struktur yang mendekati keadaan sebenarnya.

   seperti *Shear Wall* pada perancangan ini yang digunakan adalah Program Perangkat Lunak *ETABS* ada beberapa hal yang perlu diperhatikan diantaranya:

   - Dinding struktur dalam hal ini *Shear Wall* harus dirancang sebagai *Pier*.
   - Penamaan pada *Shear Wall* harus sama pada *Shear Wall* yang di anggap menyatu dalam bentuk U atau L, supaya nantinya hasil output dari program perangkat lunak tidak kacau.
3. Sebelum melakukan suatu perencanaan & perancangan struktur alangkah lebih tepat apabila memahami lebih dahulu peraturan yang berlaku khususnya SNI 03-2847-2002 mengenai Tata Cara Perhitungan Struktur Beton Untuk Bangunan Gedung dan SNI 03-1726-2002 mengenai Tata Cara Perencanaan Ketahanan Gempa Untuk Bangunan Gedung.

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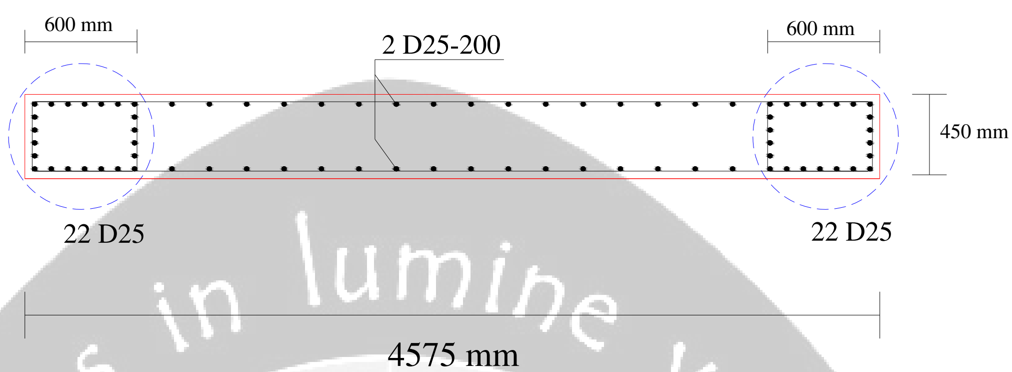
LAMPIRAN

Diagram Pn-Mn interaksi *Shear wall*

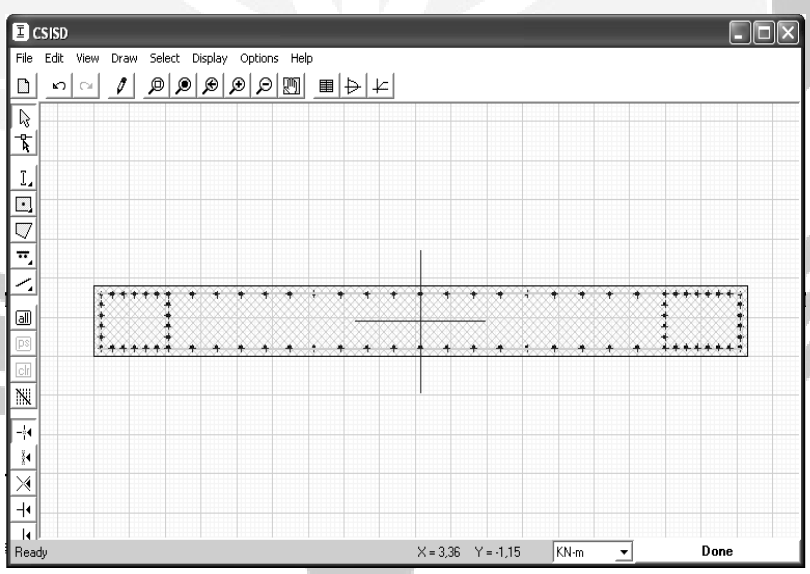
1. *Shear Wall type* I *Pier* 18 (4575 mm x 450 mm)



Gambar Penulangan longitudinal *shear wall pier* 18

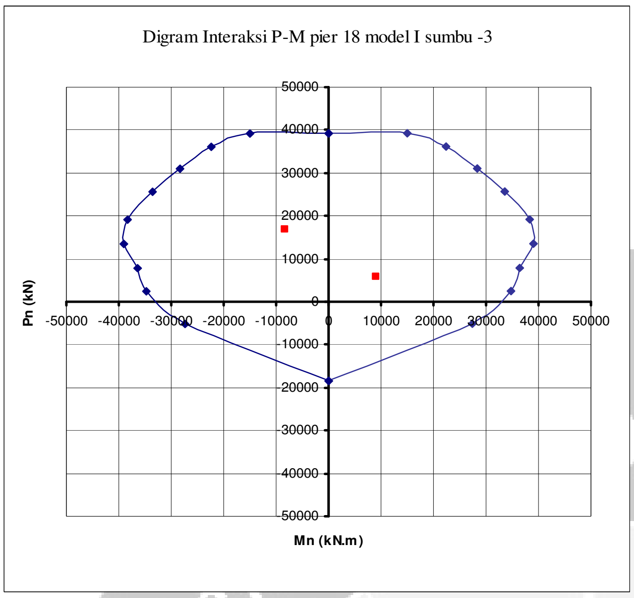
Design reinforcement shear wall pier 18 digunakan *Bar cover* = 0,04 m

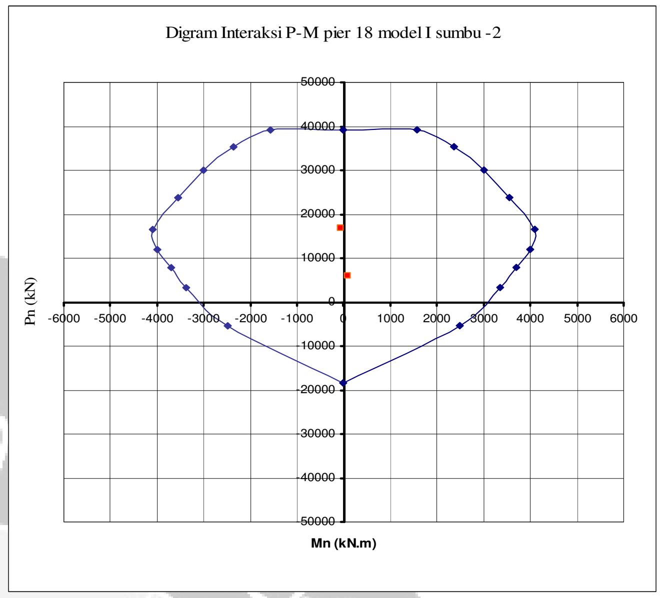
Diperoleh diagram interaksi Pn-Mn shear wall dengan menggunakan *CISD* sebagai berikut :



Gambar. *Design reinforcement shear wall pier* 18

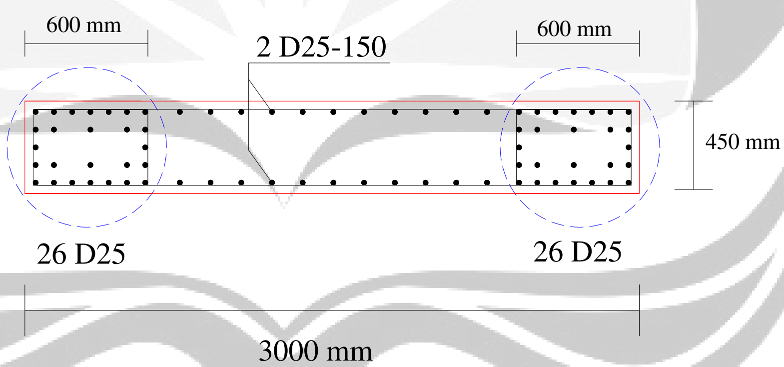
Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 18 sebagai berikut:





Gambar. Diagram interak Pn-Mn *pier* 18

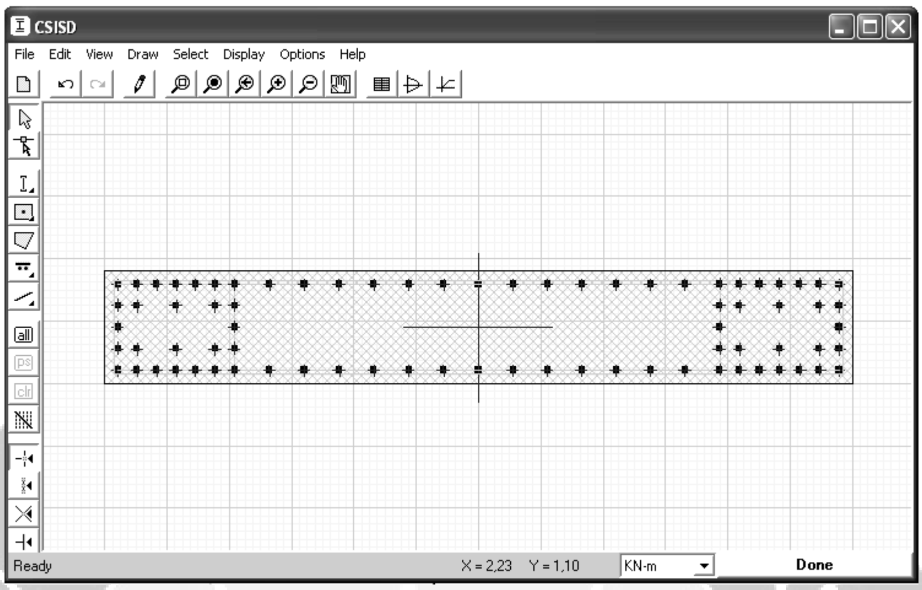
2. *Shear Wall* I *type Pier* 30 (3000 mm x 450 mm)



Gambar. Penulangan longitudinal *shear wall pier* 30

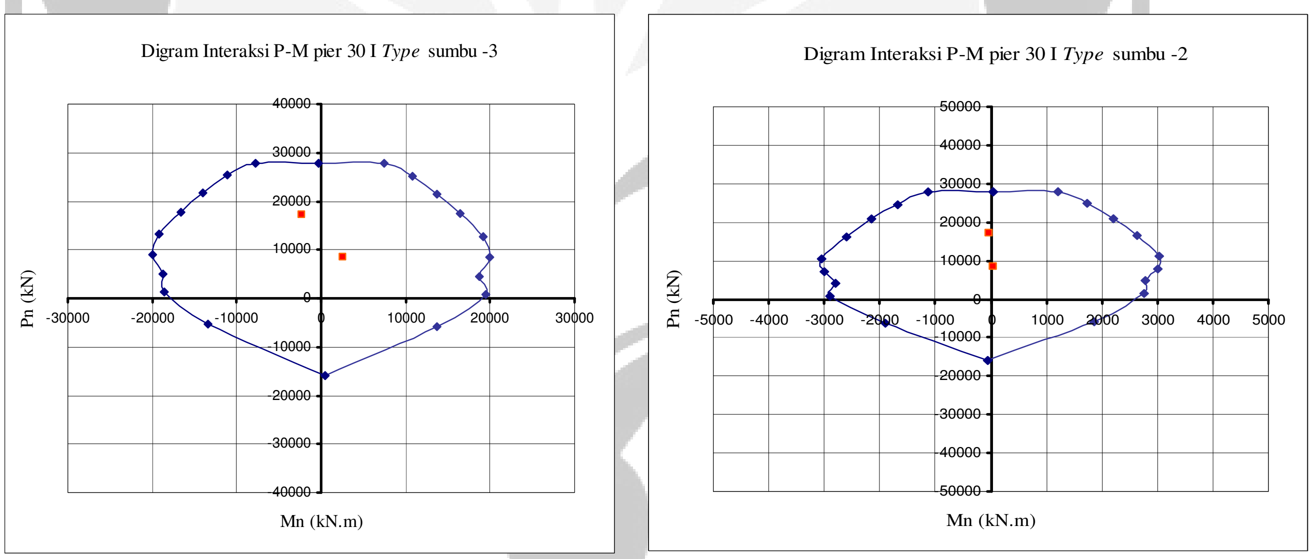
Design reinforcement shear wall pier 30 digunakan *Bar cover* = 0,04 m

Diperoleh diagram interaksi Pn-Mn shear wall dengan menggunakan *CISD* sebagai berikut :



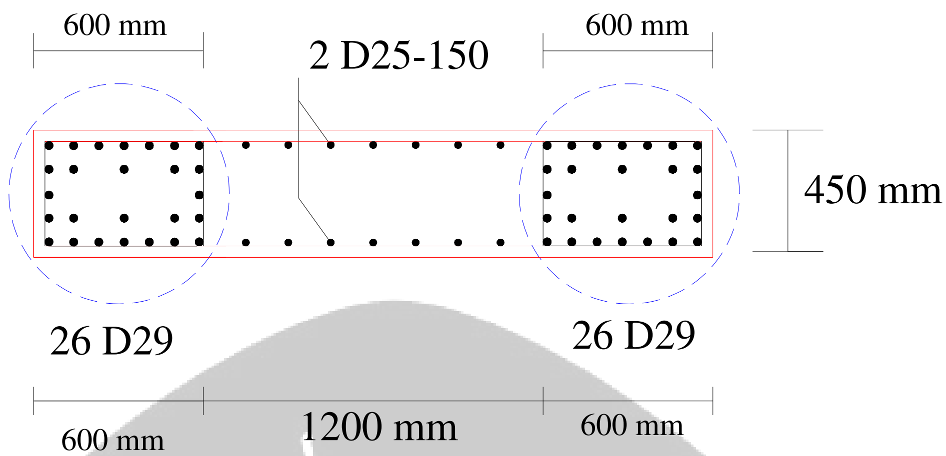
Gambar. *Design reinforcement shear wall pier* 30

Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 30 sebagai berikut:



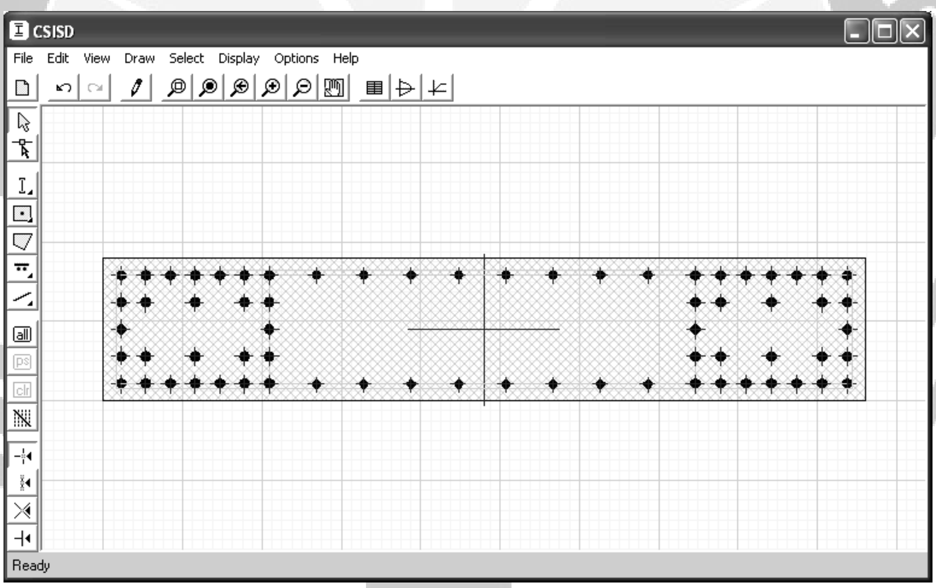
Gambar. Diagram interak Pn-Mn *pier* 30

3. *Shear Wall* I *type Pier* 31 (2400 mm x 450 mm)



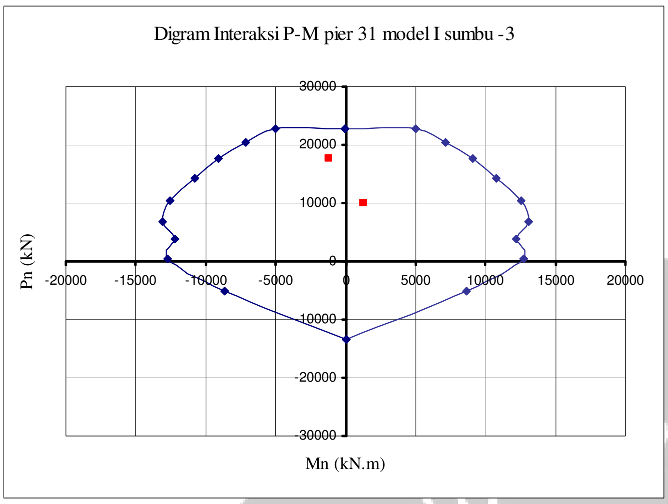
Gambar. Penulangan longitudinal *Shear wall pier* 31

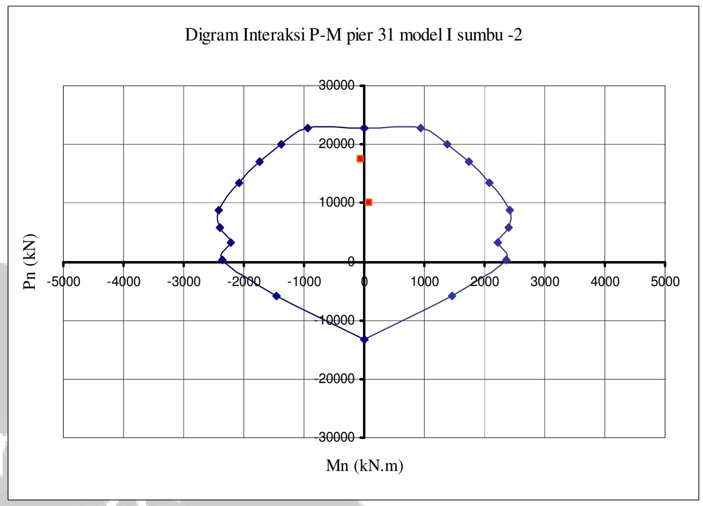
Design reinforcement shear wall pier 31 digunakan *Bar cover* = 0,04 m digambarkan dengan menggunakan *CISD* sebagai berikut :



Gambar. *Design reinforcement shear wall pier* 31

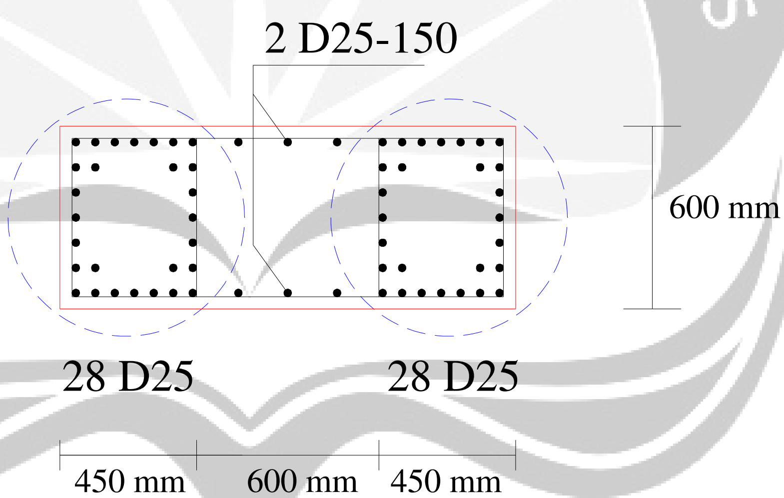
Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 31 sebagai berikut:





Gambar. Diagram interak Pn-Mn *pier* 31

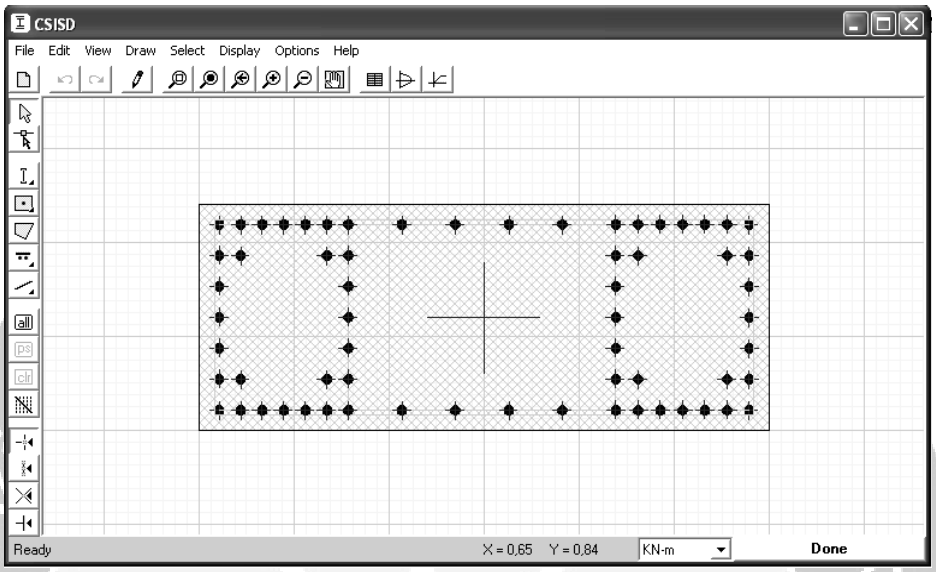
4. *Shear Wall* I *type pie*r 32



Gambar 4.55 Penulangan longitudinal *Shear wall pie*r 32

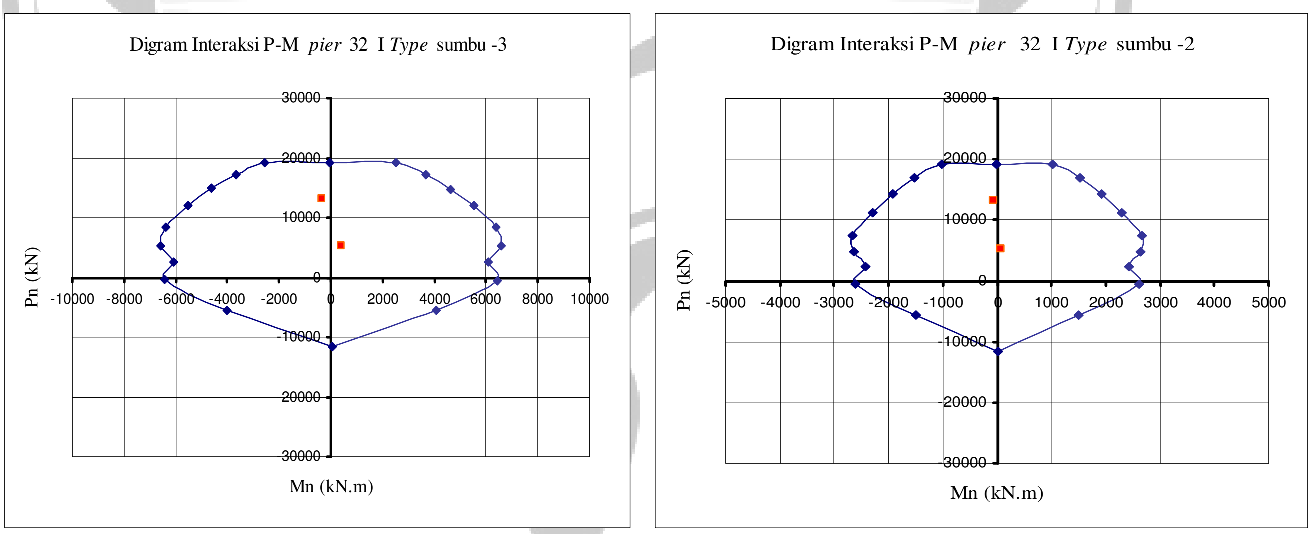
Design reinforcement shear wall pier 30 digunakan *Bar cover* = 0,04 m

Diperoleh diagram interaksi Pn-Mn shear wall dengan menggunakan *CISD* sebagai berikut :



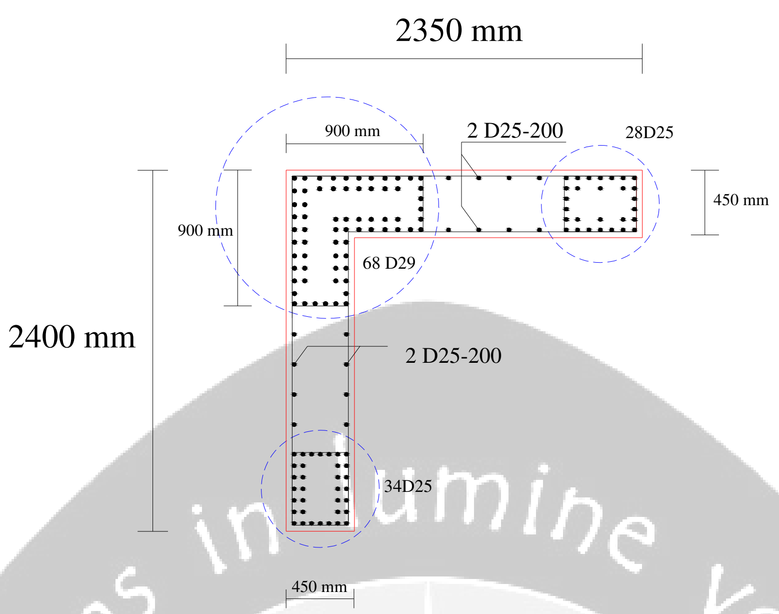
Gambar. *Design reinforcement shear wall pier* 32

Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 32 sebagai berikut:



Gambar. Diagram interak Pn-Mn *pier* 32

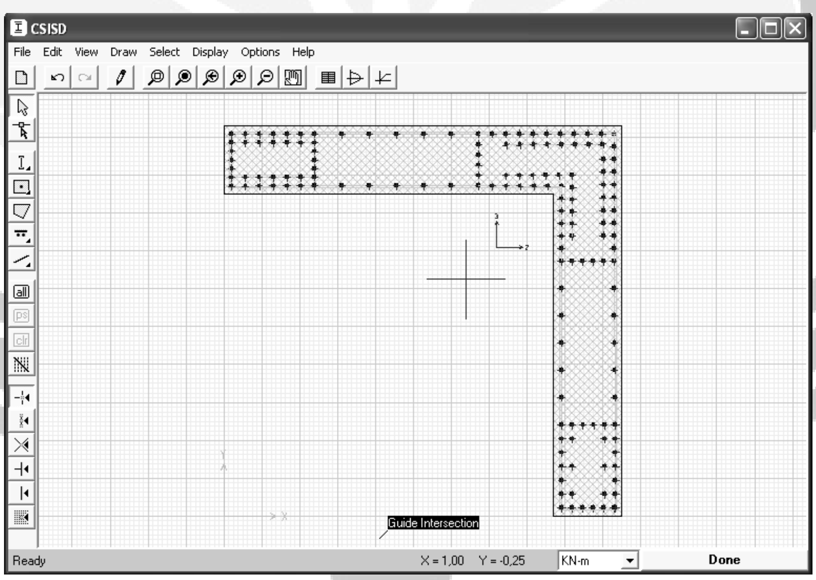
5. *Shear Wall* L *type Pier* 10



Gambar Penulangan longitudinal *shear wall pier* 10

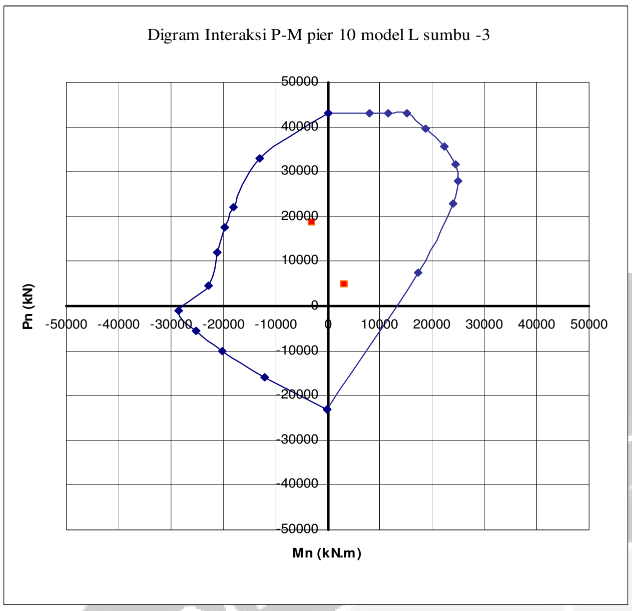
Design reinforcement shear wall pier 10 digunakan *Bar cover* = 0,04 m

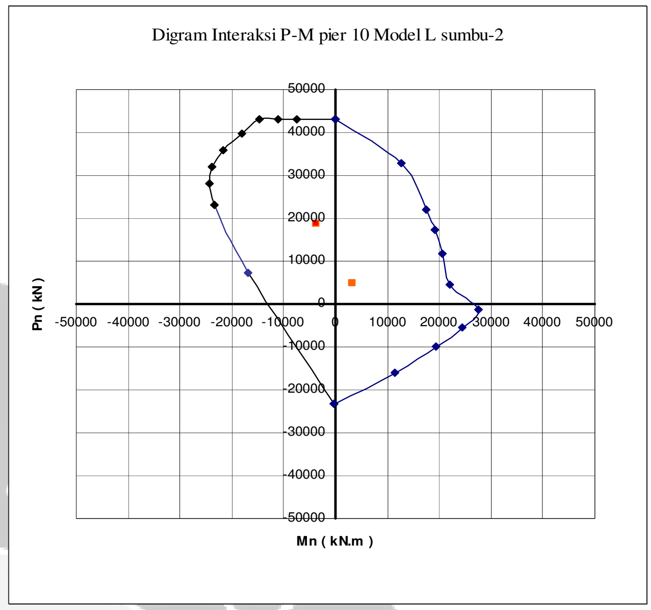
Diperoleh diagram interaksi Pn-Mn shear wall dengan menggunakan *CISD* sebagai berikut :



Gambar. *Design reinforcement shear wall pier* 10

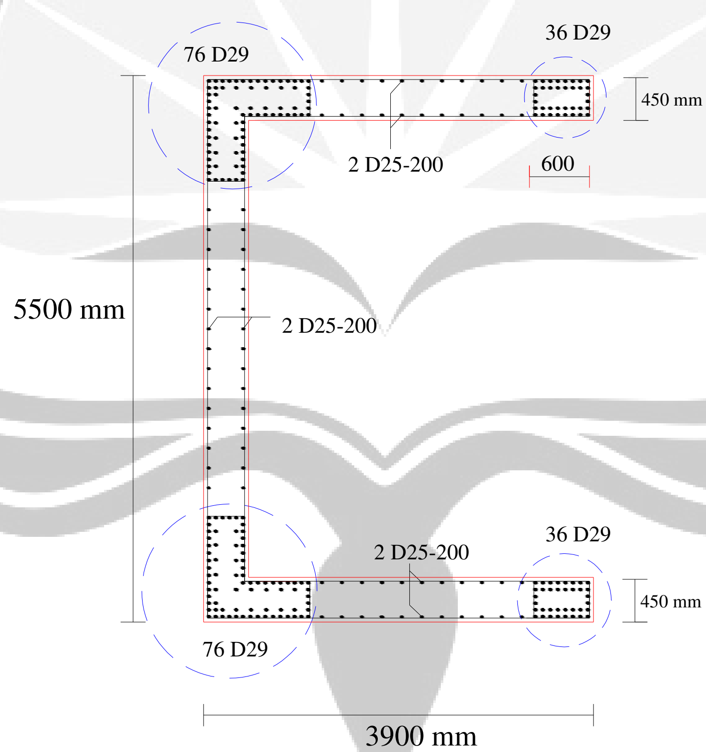
Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 10 sebagai berikut:





Gambar. Diagram interak Pn-Mn *pier* 10

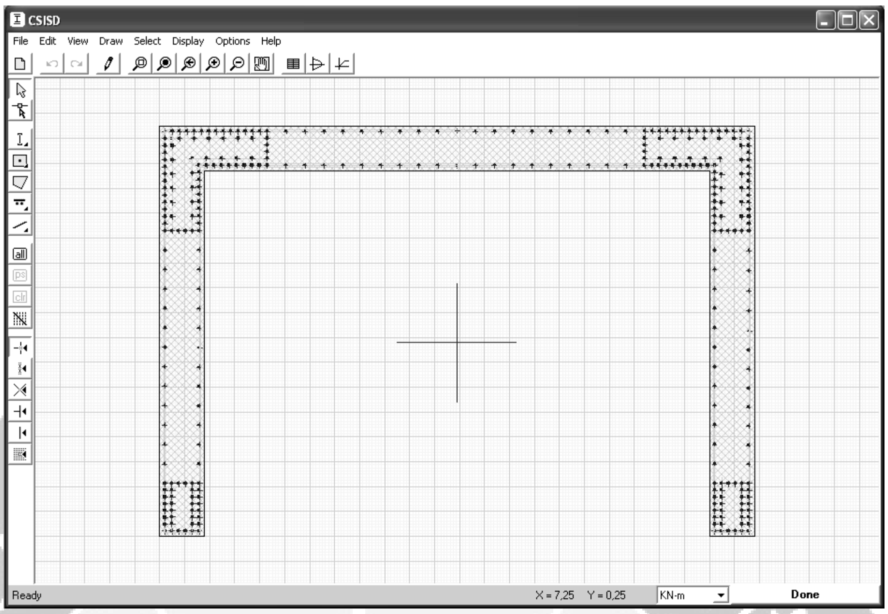
6. Shear *Wall* C *type* (5500 mm x 3900 mm x 450 mm)



Gambar Penulangan longitudinal *shear wall pier* 19

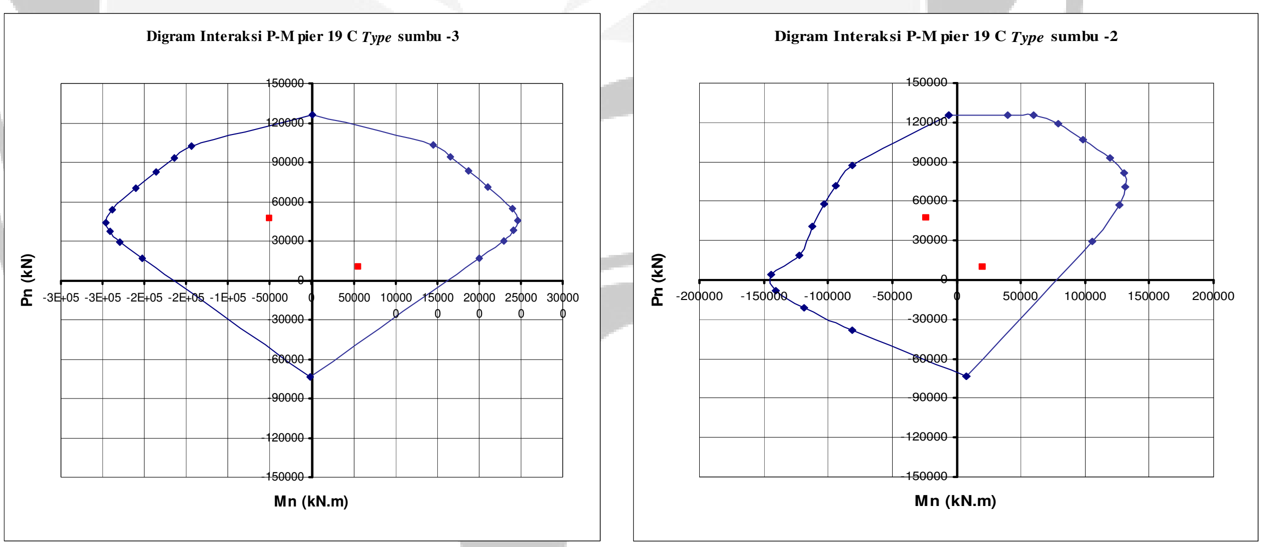
Design reinforcement shear wall pier 19 digunakan *Bar cover* = 0,04 m

digambarkan dengan menggunakan *CISD* sebagai berikut :



Gambar. *Design reinforcement shear wall pier* 19

Diperoleh diagram interaksi Pn-Mn shear wall untuk *pier* 19 sebagai berikut:



Gambar. Diagram interak Pn-Mn *pier* 19

Tabel Koefisien Momen Pelat 2 Arah *ISO/DIS/1996*

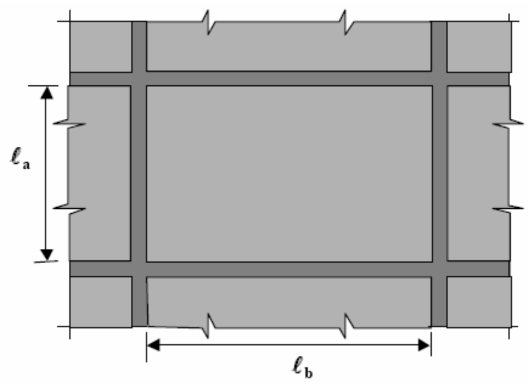


Fig. 7.14 - Central panel of two-way slabs supported on girders, beams or structural concrete walls

Table 7.4 - Central panel of two-way slabs supported on girders, beams or structural concrete walls

$\beta = \ell_b/\ell_a$	*Short direction* (ℓ_a)			*Long direction* (ℓ_b)		
Panel span ratio	Negative moment	Positive moment	Load fraction	Negative moment	Positive moment	Load fraction
1.0	$M_a^- = \frac{q_u \ell_a^2}{22}$	$M_a^+ = \frac{q_u \ell_a^2}{42}$	α_a = 0.50	$M_b^- = \frac{q_u \ell_b^2}{22}$	$M_b^+ = \frac{q_u \ell_b^2}{42}$	α_b = 0.50
1.1	$M_a^- = \frac{q_u \ell_a^2}{18}$	$M_a^+ = \frac{q_u \ell_a^2}{35}$	α_a = 0.60	$M_b^- = \frac{q_u \ell_b^2}{25}$	$M_b^+ = \frac{q_u \ell_b^2}{50}$	α_b = 0.40
1.2	$M_a^- = \frac{q_u \ell_a^2}{16}$	$M_a^+ = \frac{q_u \ell_a^2}{30}$	α_a = 0.67	$M_b^- = \frac{q_u \ell_b^2}{35}$	$M_b^+ = \frac{q_u \ell_b^2}{60}$	α_b = 0.33
1.3	$M_a^- = \frac{q_u \ell_a^2}{15}$	$M_a^+ = \frac{q_u \ell_a^2}{27}$	α_a = 0.74	$M_b^- = \frac{q_u \ell_b^2}{40}$	$M_b^+ = \frac{q_u \ell_b^2}{75}$	α_b = 0.26
1.4	$M_a^- = \frac{q_u \ell_a^2}{14}$	$M_a^+ = \frac{q_u \ell_a^2}{25}$	α_a = 0.80	$M_b^- = \frac{q_u \ell_b^2}{50}$	$M_b^+ = \frac{q_u \ell_b^2}{100}$	α_b = 0.20
1.5	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{23}$	α_a = 0.84	$M_b^- = \frac{q_u \ell_b^2}{65}$	$M_b^+ = \frac{q_u \ell_b^2}{120}$	α_b = 0.16
1.6	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{22}$	α_a = 0.87	$M_b^- = \frac{q_u \ell_b^2}{85}$	$M_b^+ = \frac{q_u \ell_b^2}{145}$	α_b = 0.13
1.7	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{21}$	α_a = 0.90	$M_b^- = \frac{q_u \ell_b^2}{110}$	$M_b^+ = \frac{q_u \ell_b^2}{180}$	α_b = 0.10
1.8	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	α_a = 0.92	$M_b^- = \frac{q_u \ell_b^2}{135}$	$M_b^+ = \frac{q_u \ell_b^2}{225}$	α_b = 0.08
1.9	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	α_a = 0.93	$M_b^- = \frac{q_u \ell_b^2}{160}$	$M_b^+ = \frac{q_u \ell_b^2}{275}$	α_b = 0.07
2.0	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{18}$	α_a = 0.94	$M_b^- = \frac{q_u \ell_b^2}{170}$	$M_b^+ = \frac{q_u \ell_b^2}{340}$	α_b = 0.06
> 2.0	$M_a^- = \frac{q_u \ell_a^2}{10}$	$M_a^+ = \frac{q_u \ell_a^2}{16}$	α_a = 1.00	Temperature and shrinkage reinforcement		α_b = 0.00

Tabel Koefisien Momen Pelat 2 Arah *ISO/DIS/1996*

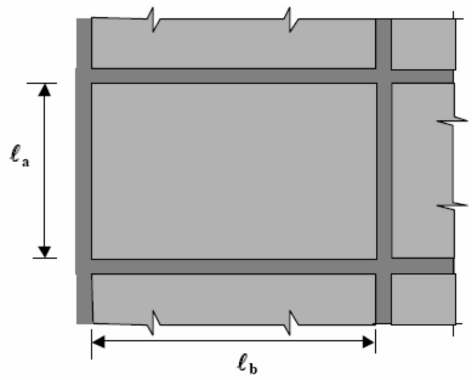


Fig. 7.15 - Edge panel with ℓ_a parallel to edge, of two-way slabs supported on girders, beams or walls

Table 7.5 - Edge panel with ℓ_a parallel to edge, of two-way slabs supported on girders, beams or walls

$\beta = \ell_b/\ell_a$	*Short direction* (ℓ_a)			*Long direction* (ℓ_b)		
Panel span ratio	Negative moment	Positive moment	Load fraction	Negative moment	Positive moment	Load fraction
1.0	$M_a^- = \frac{q_u \ell_a^2}{16}$	$M_a^+ = \frac{q_u \ell_a^2}{35}$	α_a = 0.67	$M_b^- = \frac{q_u \ell_b^2}{33}$	$M_b^+ = \frac{q_u \ell_b^2}{40}$	α_b = 0.23
1.1	$M_a^- = \frac{q_u \ell_a^2}{15}$	$M_a^+ = \frac{q_u \ell_a^2}{31}$	α_a = 0.74	$M_b^- = \frac{q_u \ell_b^2}{35}$	$M_b^+ = \frac{q_u \ell_b^2}{50}$	α_b = 0.26
1.2	$M_a^- = \frac{q_u \ell_a^2}{14}$	$M_a^+ = \frac{q_u \ell_a^2}{28}$	α_a = 0.80	$M_b^- = \frac{q_u \ell_b^2}{50}$	$M_b^+ = \frac{q_u \ell_b^2}{65}$	α_b = 0.20
1.3	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{25}$	α_a = 0.85	$M_b^- = \frac{q_u \ell_b^2}{70}$	$M_b^+ = \frac{q_u \ell_b^2}{85}$	α_b = 0.15
1.4	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{23}$	α_a = 0.88	$M_b^- = \frac{q_u \ell_b^2}{90}$	$M_b^+ = \frac{q_u \ell_b^2}{110}$	α_b = 0.12
1.5	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{22}$	α_a = 0.91	$M_b^- = \frac{q_u \ell_b^2}{115}$	$M_b^+ = \frac{q_u \ell_b^2}{135}$	α_b = 0.09
1.6	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{21}$	α_a = 0.93	$M_b^- = \frac{q_u \ell_b^2}{135}$	$M_b^+ = \frac{q_u \ell_b^2}{160}$	α_b = 0.07
1.7	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	α_a = 0.94	$M_b^- = \frac{q_u \ell_b^2}{165}$	$M_b^+ = \frac{q_u \ell_b^2}{185}$	α_b = 0.06
1.8	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	α_a = 0.95	$M_b^- = \frac{q_u \ell_b^2}{200}$	$M_b^+ = \frac{q_u \ell_b^2}{220}$	α_b = 0.05
1.9	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{19}$	α_a = 0.96	$M_b^- = \frac{q_u \ell_b^2}{250}$	$M_b^+ = \frac{q_u \ell_b^2}{270}$	α_b = 0.04
2.0	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{18}$	α_a = 0.97	$M_b^- = \frac{q_u \ell_b^2}{330}$	$M_b^+ = \frac{q_u \ell_b^2}{340}$	α_b = 0.03
> 2.0	$M_a^- = \frac{q_u \ell_a^2}{10}$	$M_a^+ = \frac{q_u \ell_a^2}{16}$	α_a = 1.00	Temperature and shrinkage reinforcement		α_b = 0.00

Tabel Koefisien Momen Pelat 2 Arah *ISO/DIS/1996*

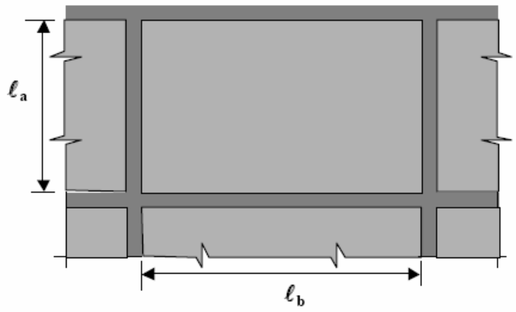


Fig. 7.16 - Edge panel with ℓ_b parallel to edge, of two-way slabs supported on girders, beams or walls

Table 7.6 - Edge panel with ℓ_b parallel to edge, of two-way slabs supported on girders, beams or walls

$\beta = \ell_b/\ell_a$	*Short direction* (ℓ_a)			*Long direction* (ℓ_b)		
Panel span ratio	Negative moment	Positive moment	Load fraction	Negative moment	Positive moment	Load fraction
1.0	$M_a^- = \frac{q_u \ell_a^2}{30}$	$M_a^+ = \frac{q_u \ell_a^2}{39}$	$\alpha_a = 0.33$	$M_b^- = \frac{q_u \ell_b^2}{16}$	$M_b^+ = \frac{q_u \ell_b^2}{35}$	$\alpha_b = 0.67$
1.1	$M_a^- = \frac{q_u \ell_a^2}{23}$	$M_a^+ = \frac{q_u \ell_a^2}{32}$	$\alpha_a = 0.42$	$M_b^- = \frac{q_u \ell_b^2}{19}$	$M_b^+ = \frac{q_u \ell_b^2}{40}$	$\alpha_b = 0.58$
1.2	$M_a^- = \frac{q_u \ell_a^2}{19}$	$M_a^+ = \frac{q_u \ell_a^2}{26}$	$\alpha_a = 0.51$	$M_b^- = \frac{q_u \ell_b^2}{22}$	$M_b^+ = \frac{q_u \ell_b^2}{50}$	$\alpha_b = 0.49$
1.3	$M_a^- = \frac{q_u \ell_a^2}{17}$	$M_a^+ = \frac{q_u \ell_a^2}{23}$	$\alpha_a = 0.59$	$M_b^- = \frac{q_u \ell_b^2}{27}$	$M_b^+ = \frac{q_u \ell_b^2}{60}$	$\alpha_b = 0.41$
1.4	$M_a^- = \frac{q_u \ell_a^2}{15}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	$\alpha_a = 0.66$	$M_b^- = \frac{q_u \ell_b^2}{32}$	$M_b^+ = \frac{q_u \ell_b^2}{70}$	$\alpha_b = 0.34$
1.5	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{19}$	$\alpha_a = 0.72$	$M_b^- = \frac{q_u \ell_b^2}{40}$	$M_b^+ = \frac{q_u \ell_b^2}{85}$	$\alpha_b = 0.28$
1.6	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{17}$	$\alpha_a = 0.77$	$M_b^- = \frac{q_u \ell_b^2}{50}$	$M_b^+ = \frac{q_u \ell_b^2}{100}$	$\alpha_b = 0.23$
1.7	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{16}$	$\alpha_a = 0.81$	$M_b^- = \frac{q_u \ell_b^2}{60}$	$M_b^+ = \frac{q_u \ell_b^2}{125}$	$\alpha_b = 0.19$
1.8	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{15}$	$\alpha_a = 0.85$	$M_b^- = \frac{q_u \ell_b^2}{70}$	$M_b^+ = \frac{q_u \ell_b^2}{150}$	$\alpha_b = 0.15$
1.9	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{15}$	$\alpha_a = 0.88$	$M_b^- = \frac{q_u \ell_b^2}{85}$	$M_b^+ = \frac{q_u \ell_b^2}{175}$	$\alpha_b = 0.12$
2.0	$M_a^- = \frac{q_u \ell_a^2}{10}$	$M_a^+ = \frac{q_u \ell_a^2}{14}$	$\alpha_a = 0.92$	$M_b^- = \frac{q_u \ell_b^2}{100}$	$M_b^+ = \frac{q_u \ell_b^2}{200}$	$\alpha_b = 0.08$
> 2.0	$M_a^- = \frac{q_u \ell_a^2}{9}$	$M_a^+ = \frac{q_u \ell_a^2}{11}$	$\alpha_a = 1.00$	Temperature and shrinkage reinforcement		$\alpha_b = 0.00$

Tabel Koefisien Momen Pelat 2 Arah *ISO/DIS/1996*

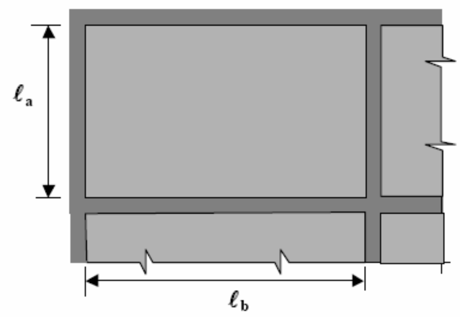


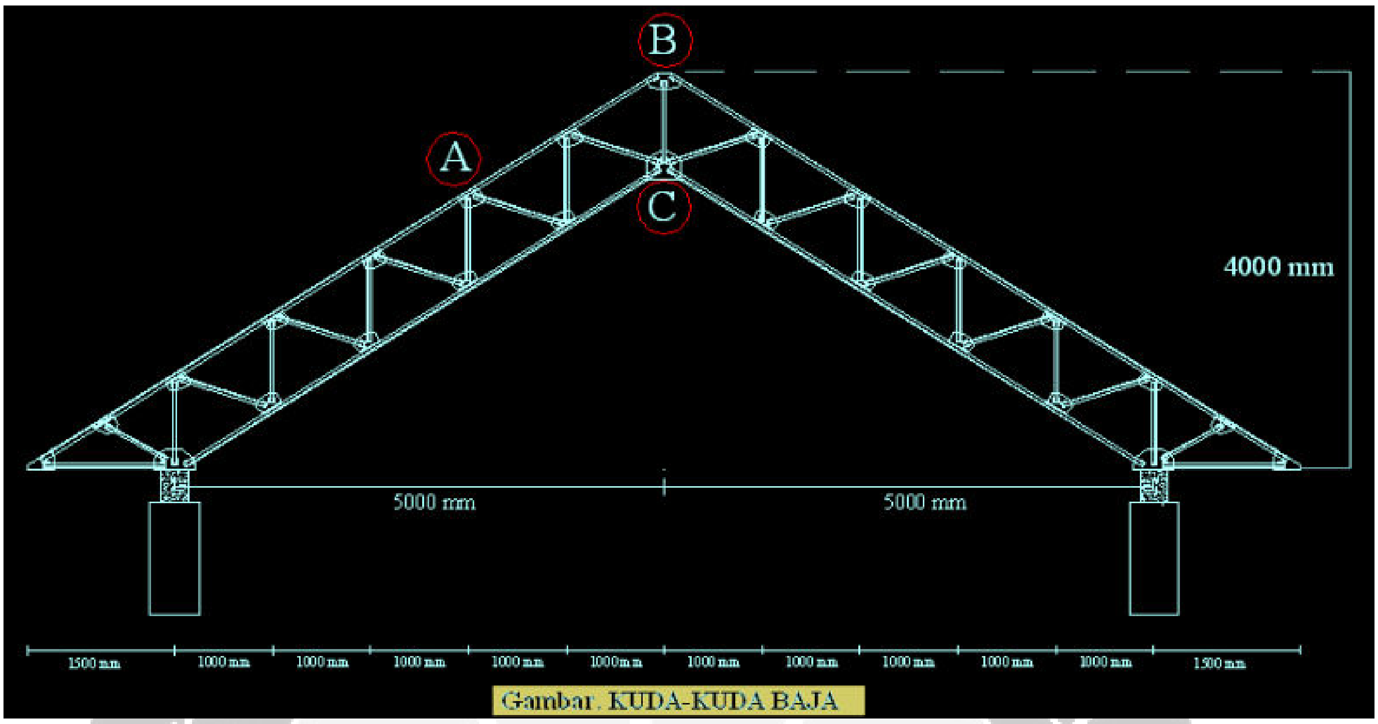
Fig. 7.17 - Corner panel of two-way slabs supported on girders, beams or structural concrete walls

Table 7.7 - Corner panel of two-way slabs supported on girders, beams or structural concrete walls

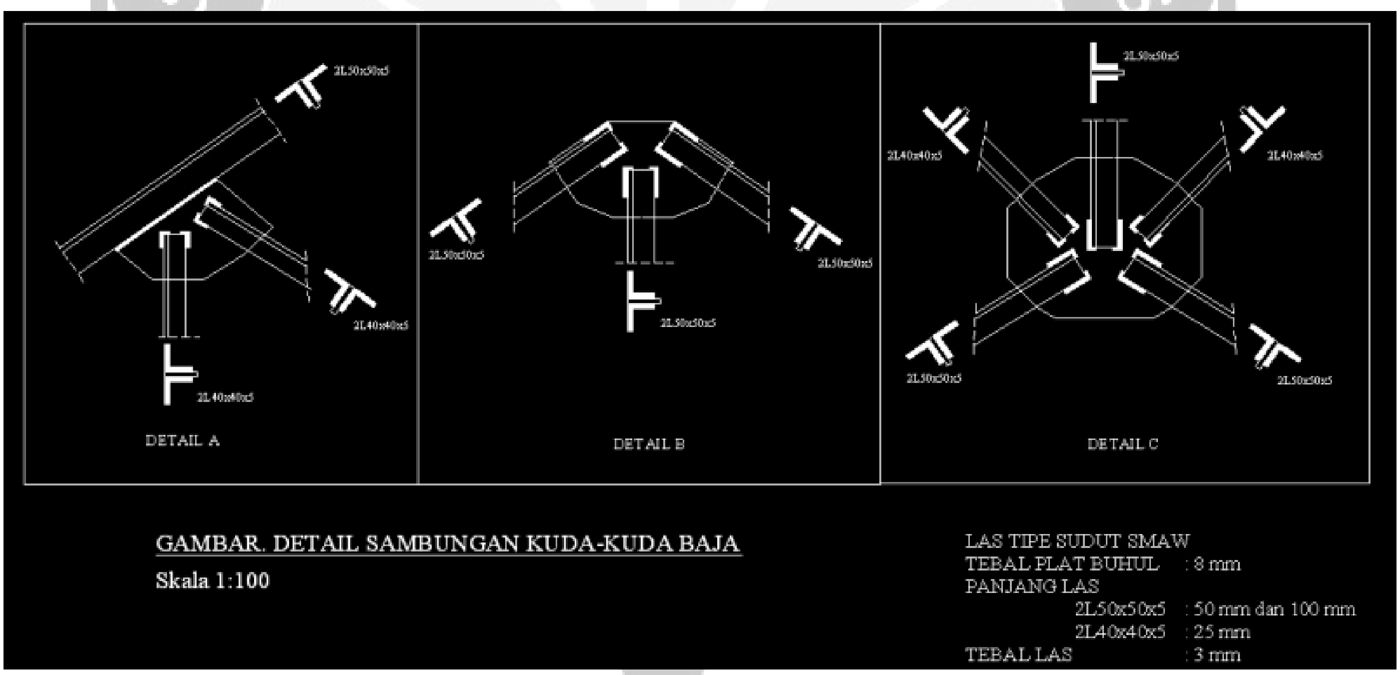
$\beta = \ell_b/\ell_a$	***Short direction*** (ℓ_a)			***Long direction*** (ℓ_b)		
Panel span ratio	Negative moment	Positive moment	Load fraction	Negative moment	Positive moment	Load fraction
1.0	$M_a^- = \frac{q_u \ell_a^2}{20}$	$M_a^+ = \frac{q_u \ell_a^2}{31}$	α_a = 0.50	$M_b^- = \frac{q_u \ell_b^2}{20}$	$M_b^+ = \frac{q_u \ell_b^2}{31}$	α_b = 0.50
1.1	$M_a^- = \frac{q_u \ell_a^2}{17}$	$M_a^+ = \frac{q_u \ell_a^2}{26}$	α_a = 0.59	$M_b^- = \frac{q_u \ell_b^2}{25}$	$M_b^+ = \frac{q_u \ell_b^2}{38}$	α_b = 0.41
1.2	$M_a^- = \frac{q_u \ell_a^2}{15}$	$M_a^+ = \frac{q_u \ell_a^2}{23}$	α_a = 0.67	$M_b^- = \frac{q_u \ell_b^2}{30}$	$M_b^+ = \frac{q_u \ell_b^2}{45}$	α_b = 0.33
1.3	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{20}$	α_a = 0.74	$M_b^- = \frac{q_u \ell_b^2}{40}$	$M_b^+ = \frac{q_u \ell_b^2}{55}$	α_b = 0.26
1.4	$M_a^- = \frac{q_u \ell_a^2}{13}$	$M_a^+ = \frac{q_u \ell_a^2}{19}$	α_a = 0.80	$M_b^- = \frac{q_u \ell_b^2}{50}$	$M_b^+ = \frac{q_u \ell_b^2}{70}$	α_b = 0.20
1.5	$M_a^- = \frac{q_u \ell_a^2}{12}$	$M_a^+ = \frac{q_u \ell_a^2}{17}$	α_a = 0.84	$M_b^- = \frac{q_u \ell_b^2}{60}$	$M_b^+ = \frac{q_u \ell_b^2}{85}$	α_b = 0.16
1.6	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{16}$	α_a = 0.87	$M_b^- = \frac{q_u \ell_b^2}{75}$	$M_b^+ = \frac{q_u \ell_b^2}{100}$	α_b = 0.13
1.7	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{16}$	α_a = 0.90	$M_b^- = \frac{q_u \ell_b^2}{100}$	$M_b^+ = \frac{q_u \ell_b^2}{125}$	α_b = 0.10
1.8	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{15}$	α_a = 0.92	$M_b^- = \frac{q_u \ell_b^2}{120}$	$M_b^+ = \frac{q_u \ell_b^2}{150}$	α_b = 0.08
1.9	$M_a^- = \frac{q_u \ell_a^2}{11}$	$M_a^+ = \frac{q_u \ell_a^2}{15}$	α_a = 0.94	$M_b^- = \frac{q_u \ell_b^2}{145}$	$M_b^+ = \frac{q_u \ell_b^2}{175}$	α_b = 0.06
2.0	$M_a^- = \frac{q_u \ell_a^2}{10}$	$M_a^+ = \frac{q_u \ell_a^2}{14}$	α_a = 0.96	$M_b^- = \frac{q_u \ell_b^2}{165}$	$M_b^+ = \frac{q_u \ell_b^2}{200}$	α_b = 0.04
> 2.0	$M_a^- = \frac{q_u \ell_a^2}{9}$	$M_a^+ = \frac{q_u \ell_a^2}{11}$	α_a = 1.00	Temperature and shrinkage reinforcement		α_b = 0.00

GAMBAR HASIL PERHITUNGAN

1. Atap



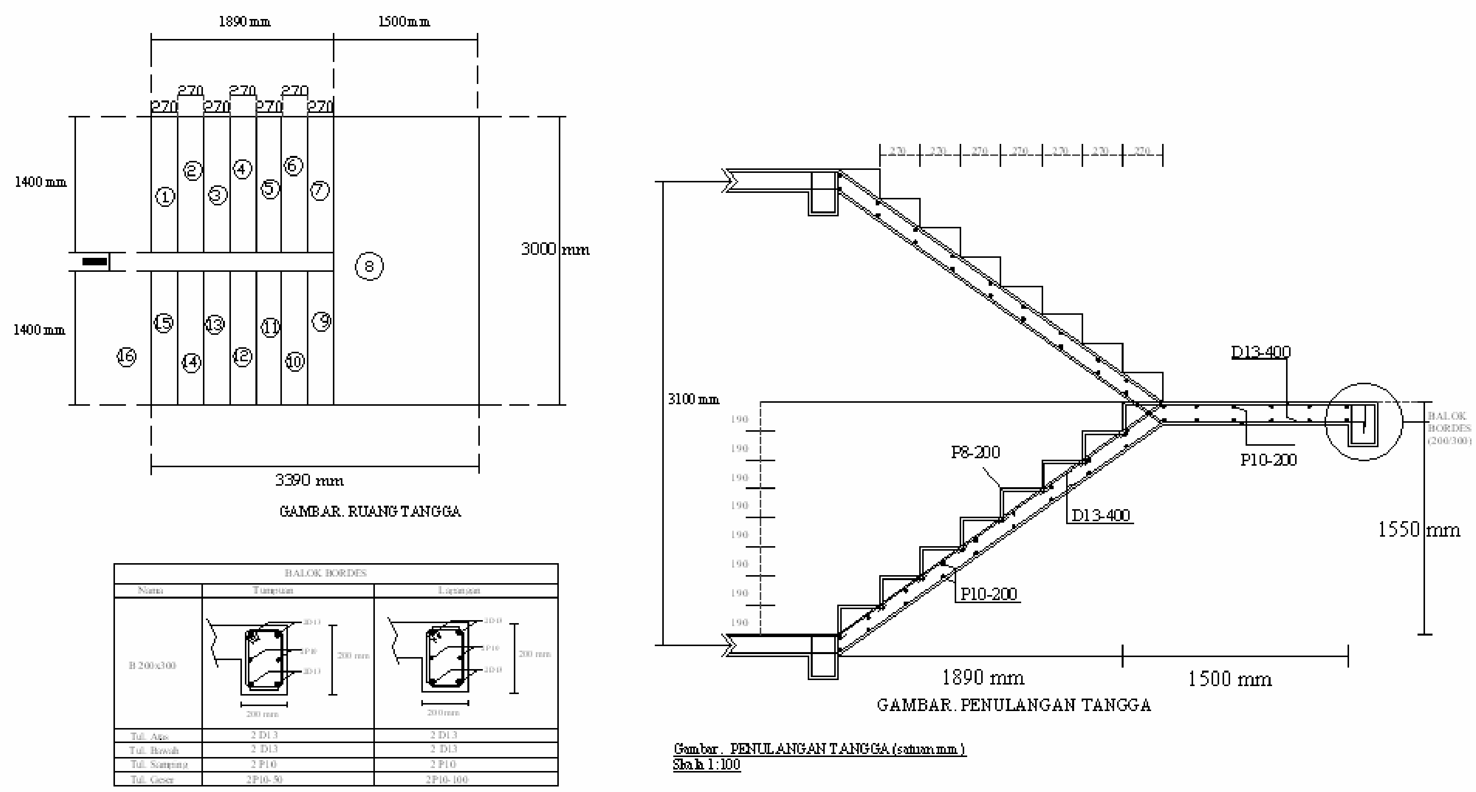
Gambar. KUDA-KUDA BAJA

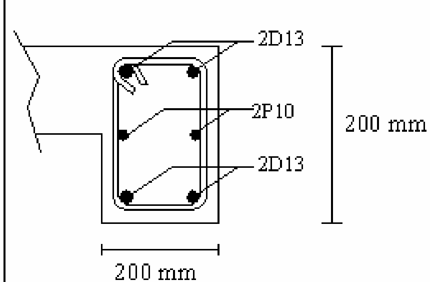
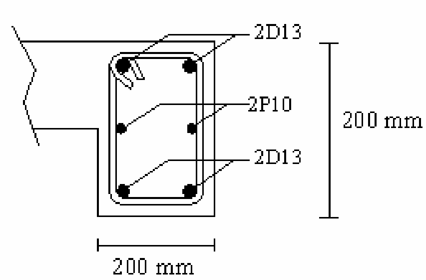


GAMBAR. DETAIL SAMBUNGAN KUDA-KUDA BAJA

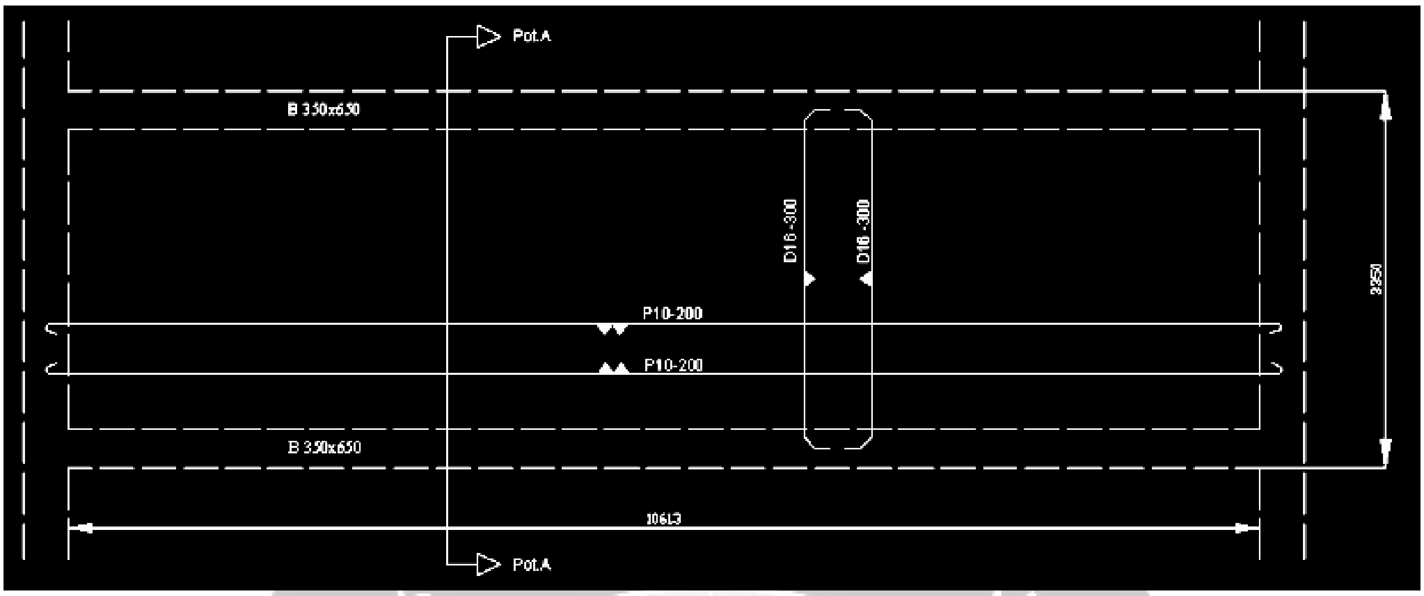
Skala 1:100

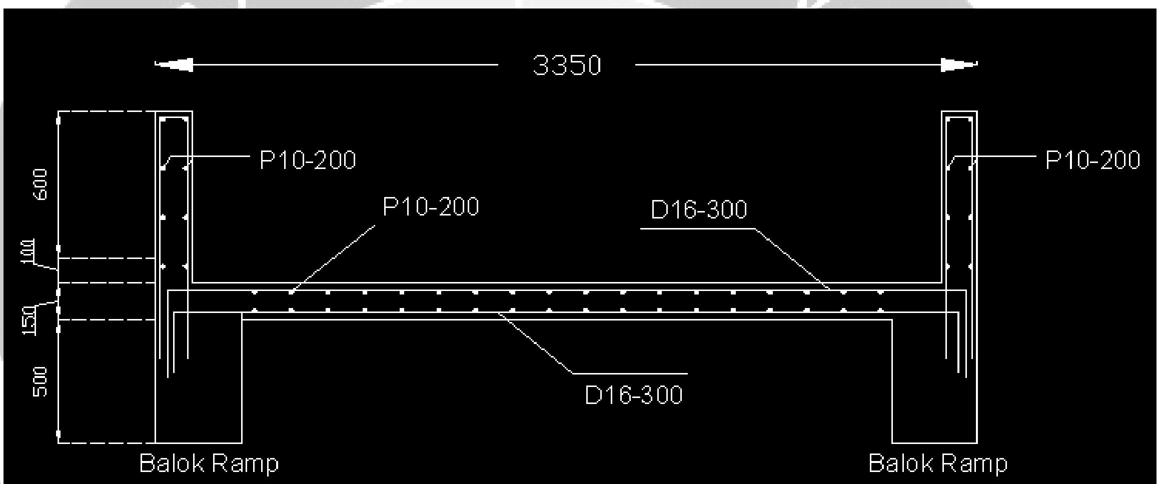
2. Tangga



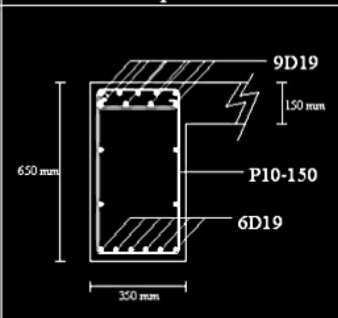
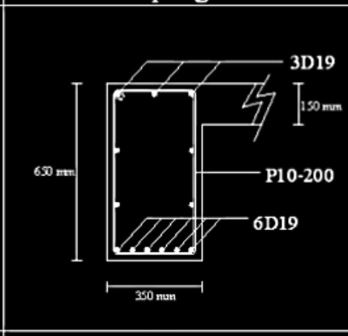
BALOK BORDES		
Nama	Tumpuan	Lapangan
B 200x300		
Tul. Atas	2 D13	2 D13
Tul. Bawah	2 D13	2 D13
Tul. Samping	2 P10	2 P10
Tul. Geser	2P10-50	2P10-100

3. *Ramp*

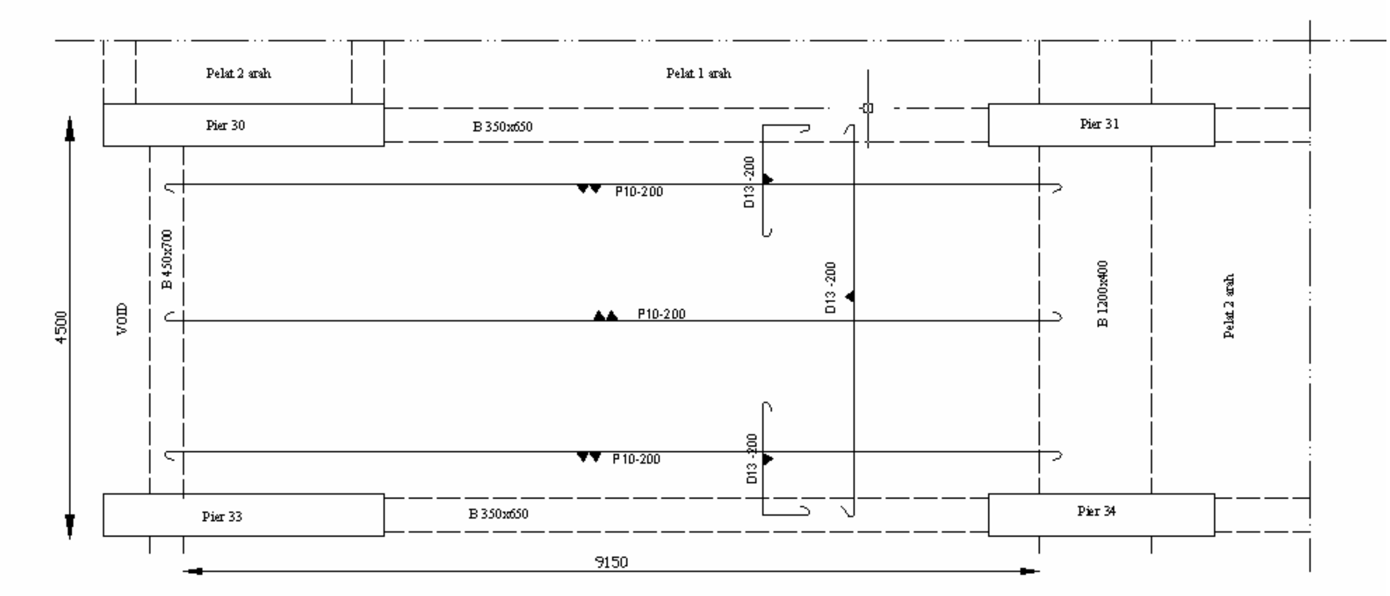




Gambar. Potongan A-A

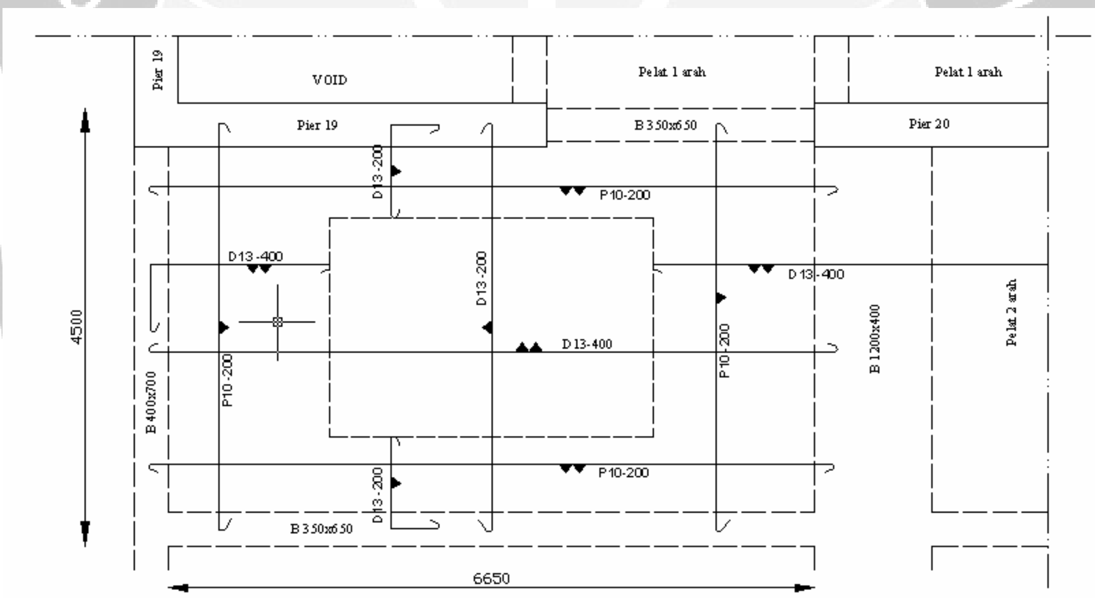
BALOK *RAMP*		
Nama	Tumpuan	Lapangan
B 350x650		
Tul. Atas	5+4 D19	3 D19
Tul. Bawah	6 D19	6 D19
Tul. Samping	2 P10	2 P10
Tul. Geser	2P10-150	2P10-200

4. Plat



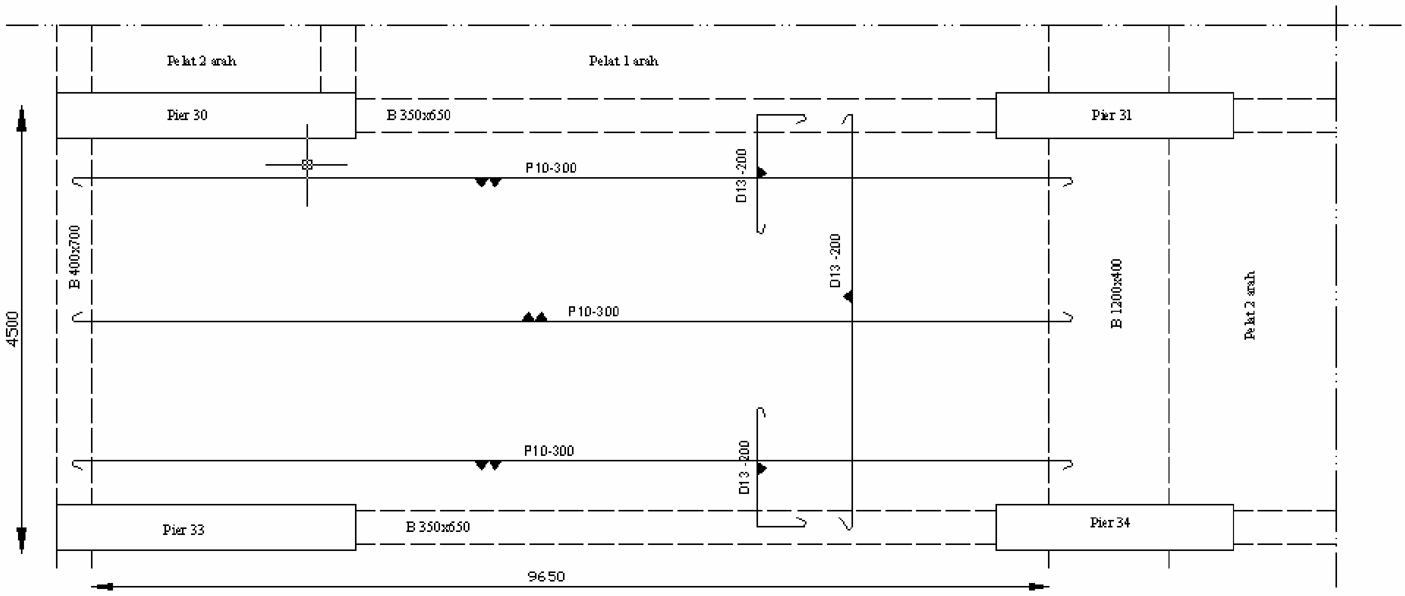
Gambar. Penulangan Pelat Satu arah tebal 150 mm
Skala 1:100

Rekap Penulangan satu Arah			
Keterangan	Tulangan	Diameter (mm)	spasi (mm)
Tebal (mm) = 150 mm Ukuran (mm) = 9150 mm x 4500 mm	Momen Tumpuan	13	200
	Susut Tumpuan	10	200
	Momen Lapangan	13	200
	Susut Lapangan	10	200



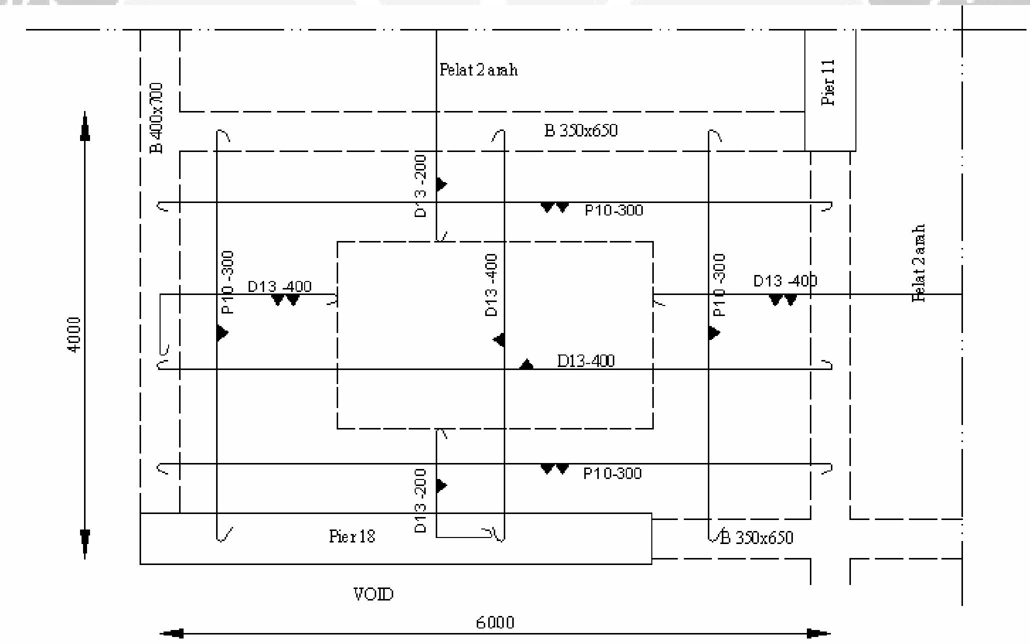
Gambar. Penulangan Pelat Dua arah tebal 150 mm
Skala 1:100

Rekap Penulangan Dua Arah			
Keterangan	Tulangan	Diameter (mm)	spasi (mm)
Tebal (mm) = 150 mm Ukuran (mm) = 6650 mm x 4500 mm	Momen Tumpuan arah x	13	200
	Susut Tumpuan Arah x	10	200
	Momen Lapangan arah x	13	200
	Momen Tumpuan arah Y	13	400
	Susut Tumpuan Arah Y	10	200
	Momen Lapangan arah Y	13	400



Gambar. Penulangan Pelat Satu arah tebal 120 mm
Skala 1:100

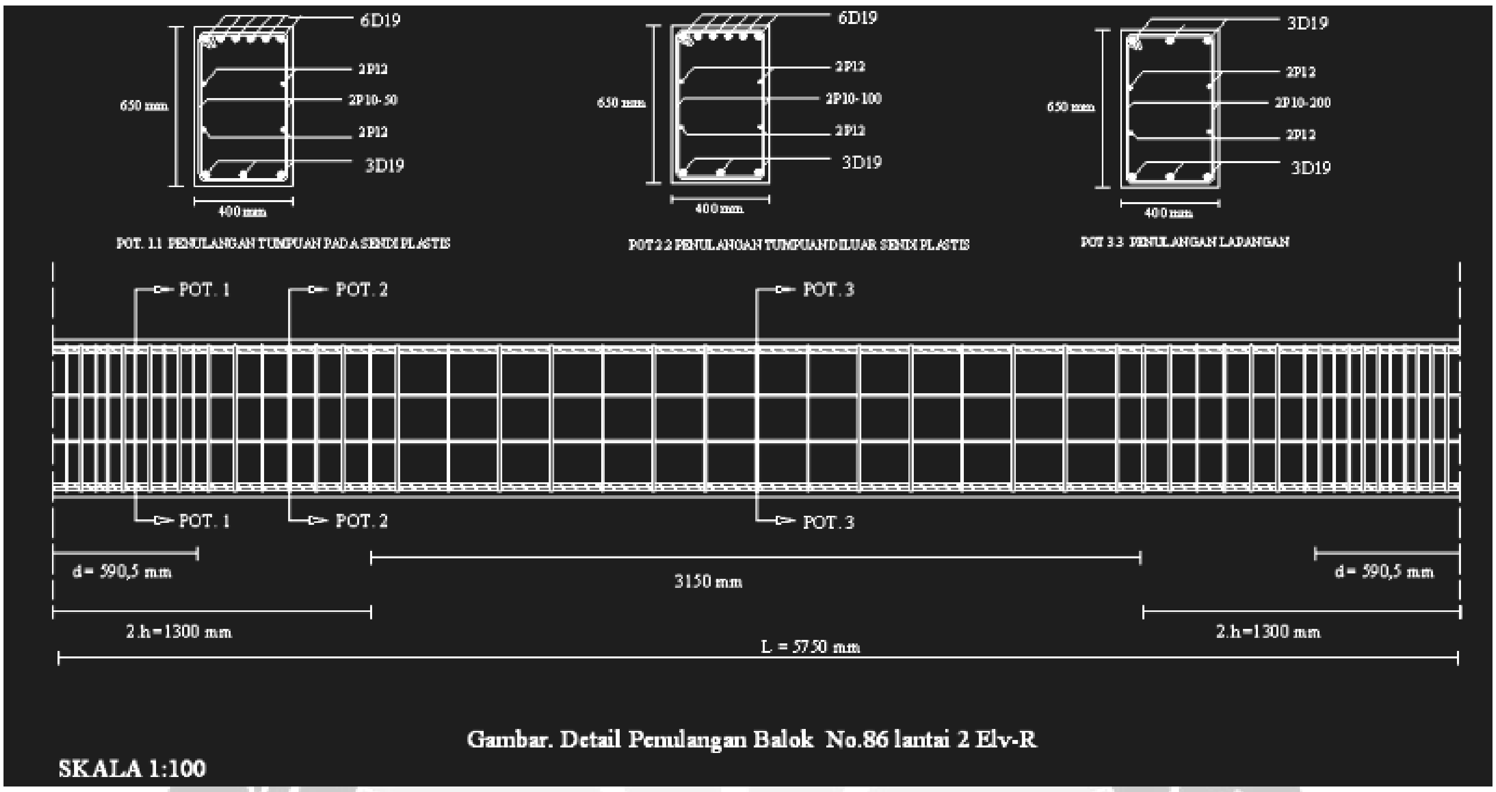
Rekap Penulangan satu Arah			
Keterangan	Tulangan	Diameter (mm)	spasi (mm)
Tebal (mm) = 120 mm Ukuran (mm) = 9650 mm x 4500 mm	Momen Tumpuan	13	200
	Susut Tumpuan	10	300
	Momen Lapangan	13	200
	Susut Lapangan	10	300



Gambar. Penulangan Pelat Dua arah tebal 120 mm
Skala 1:100

Rekap Penulangan Dua Arah			
Keterangan	Tulangan	Diameter (mm)	spasi (mm)
Tebal (mm) = 120mm Ukuran (mm) = 6000mm x 4000mm	Momen Tumpuan arah x	13	200
	Susut Tumpuan Arah x	10	300
	Momen Lapangan arah x	13	400
	Momen Tumpuan arah Y	13	400
	Susut Tumpuan Arah Y	10	300
	Momen Lapangan arah Y	13	400

5. Balok



Gambar. Detail Penulangan Balok No.86 lantai 2 Elv-R