BAB VI

KESIMPULAN DAN SARAN

6.1 Kesimpulan

Setelah dilakukan analisis dan perancangan pada struktur Gedung *Condotel Mataram City* Yogyakarta, dapat diambil beberapa kesimpulan seperti yang tercantum di bawah ini.

1. Pada proses perancangan struktur terjadi perubahan desain sebanyak empat kali dikarenakan pengecekan syarat waktu getar alami fundamental gedung (T_1) disusul dengan pengecekan desain struktur betonnya. Pengecekan struktur beton berupa pemeriksaan rasio baja tulangan, gaya geser yang terjadi, dan gaya geser pada hubungan balok kolom (join).
    1) Desain pertama menggunakan dimensi sesuai estimasi awal dan didapatkan bahwa desain tidak memenuhi syarat waktu getar alami, timbul gaya geser yang melebihi gaya geser maksimum yang diijinkan pada balok, dan rasio penulangan yang melebihi rasio maksimumnnya pada balok serta kolom.
    2) Pada desain kedua ditambahkan dinding geser dengan tujuan mengurangi waktu getar alami. Hasil desain kedua masih belum memenuhi syarat T_1 dan pemeriksaan betonnya.
    3) Dilakukan pembesaran dimensi kolom pada desain ketiga, penambahan dimensi kolom dapat menambah kekakuan struktur sehingga waktu getar alami dapat berkurang. Sebagian balok yang

digunakan sudah aman, tetapi timbul gaya geser pada join yang melebihi batas nominal gesernya.

4) Dilakukan pembesaran dimensi balok induk panjang 6 meter dari 400 x 700 mm^2 menjadi 500 x 800 mm^2. Waktu getar alami (T_1) yang diperoleh sudah memenuhi syarat waktu getar alami (< 2,08 s). Hasil pemeriksaan beton pada semua balok sudah aman, tetapi untuk kolom masih tidak aman karena masih ada gaya geser pada join yang melebihi batas nominal gesernya.
5) Pada desain kelima, dimensi kolom lantai 1 s/d 3 diperbesar dari 900 x 900 mm^2 menjadi 950 x 950 mm^2 dengan tujuan menambah luas efektif pada join sehingga gaya geser nominal menjadi lebih besar. Semua balok dan kolom sudah masuk syarat, sehingga desain ditetapkan sebagai desain untuk perancangan struktur.

2. Elemen – elemen struktur yang dirancang berupa pelat, balok, kolom, dan tangga sesuai dengan batasan masalah serta dinding geser sebagai elemen struktur tambahan. Berikut kesimpulan dari dimensi dan tulangan yang digunakan:
   1) Digunakan pelat lantai satu arah tebal 120 mm dengan tulangan pokok P10-250 untuk daerah tumpuan dan lapangan, serta P8-200 untuk tulangan susut.
   2) Digunakan pelat atap satu arah tebal 100 mm dengan tulangan pokok P10-250 untuk daerah tumpuan dan lapangan, serta P8-200 untuk tulangan susut.

3) Digunakan tangga tipe 1 dengan tinggi 5 meter pada lantai 2 dan 3 dengan tulangan pelat pada tumpuan D13-100 dan lapangan D13-150, serta tulangan susut P10-250.
4) Digunakan tangga tipe 2 dengan tinggi 5 meter pada lantai 1, lantai 4 hingga lantai teratas dengan tulangan pelat pada tumpuan D13-250 dan lapangan D13-250, serta tulangan susut P10-250.
5) Balok bordes yang digunakan berdimensi 200 x 400 mm^2. Digunakan tulangan longitudinal 2D16 untuk tumpuan atas, tumpuan bawah, dan lapangan. Digunakan tulangan geser 2P10-150 pada tumpuan dan lapangan.
6) Balok anak yang digunakan berdimensi 250 x 500 mm^2 dengan panjang 8 meter. Digunakan tulangan longitudinal 2D25 untuk tumpuan atas, tumpuan bawah, dan lapangan. Digunakan tulangan geser 2P10-100 pada tumpuan dan 2P10-200 pada lapangan.
7) Balok induk pertama yang digunakan berdimensi 300 x 500 mm^2 dengan panjang 8 meter. Digunakan tulangan longitudinal 2D25 untuk tumpuan atas, tumpuan bawah, dan lapangan. Digunakan tulangan geser 2P12-100 pada tumpuan dan 2P10-200 pada lapangan.
8) Balok induk kedua yang digunakan berdimensi 500 x 800 mm^2 dengan panjang 6 meter. Digunakan tulangan longitudinal 6D25 untuk tumpuan atas, 4D25 untuk tumpuan bawah, dan 3D25 untuk lapangan. Digunakan tulangan geser 4P12-100 pada tumpuan dan 3P12-100 pada lapangan.

9) Kolom yang ditinjau pada kolom lantai 2, berdimensi 950 x 950 mm^2 dengan tinggi 5 meter. Digunakan tulangan longitudinal 20D25, tulangan transversal 4D13-100 sepanjang *lo* dan 4D13-150 diluar *lo*.
10) Digunakan dinding geser dengan tebal 350 mm dan dipasang menerus dari bagian bawah struktur hingga pada ketinggian 40 meter. Digunakan tulangan dua lapis D16-300 untuk tulangan horizontal dan vertikal. Pada elemen batas digunakan sengkang 4D13-100 serta digunakan 2D13-100 pada badan penampang.

6.2 Saran

Berikut saran yang dapat diberikan penulis dari hasil penyusunan tugas akhir Perancangan Struktur Atas Gedung *Condotel Mataram City* Yogyakarta:

1. Estimasi dimensi perlu dilakukan pertama kali dalam merencang ukuran elemen struktur dan dapat dijadikan pedoman awal untuk menentukan perubahan dimensi bila diperlukan.
2. Dalam melakukan analisis struktur dapat digunakan program bantu untuk mempercepat proses penyusunan, tetapi juga tidak boleh lupa prinsip – prinsip dasar hitungan dan tidak bergantung sepenuhnya pada program tersebut.
3. Aturan dan tata cara perancangan seperti SNI 03-1726-2002 dan SNI 03-2847-2002 digunakan sebagai acuan dan pedoman dalam perancangan struktur bangunan.

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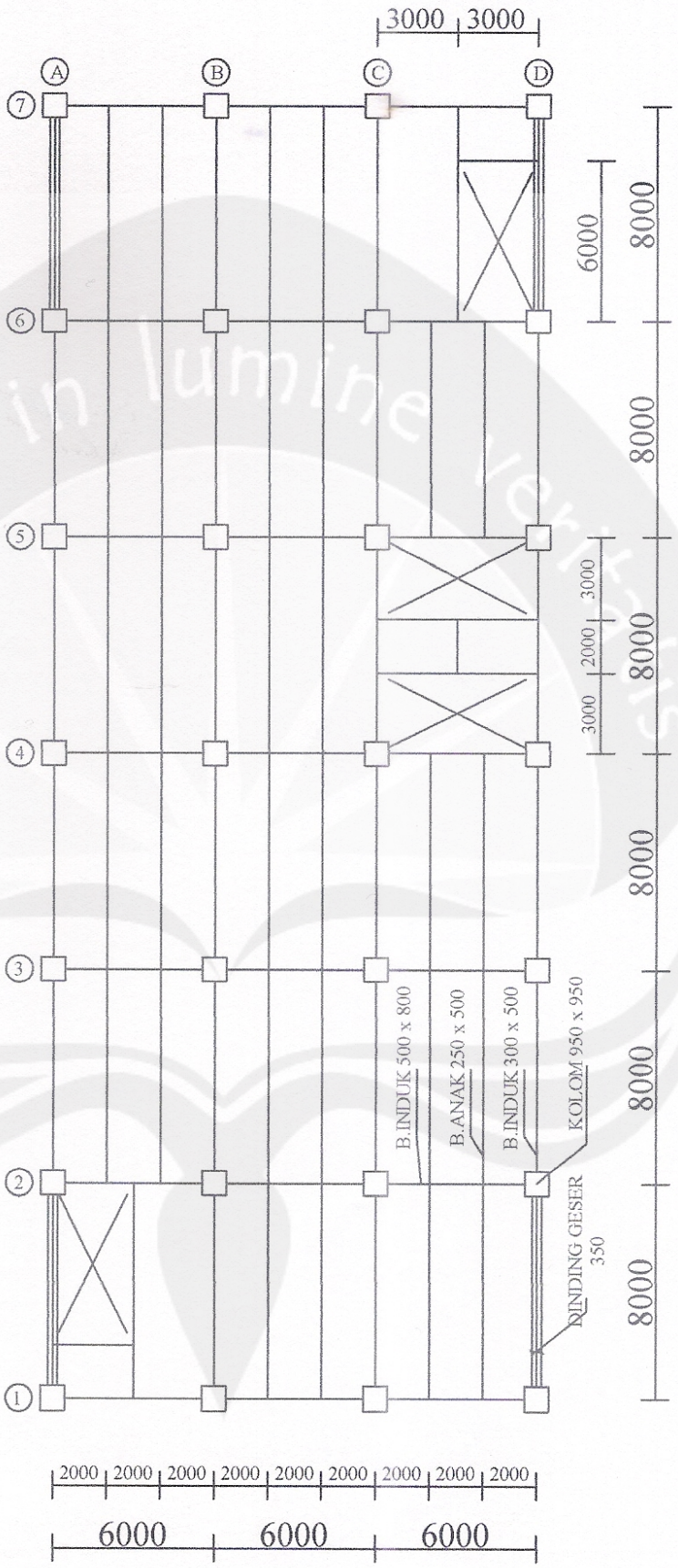
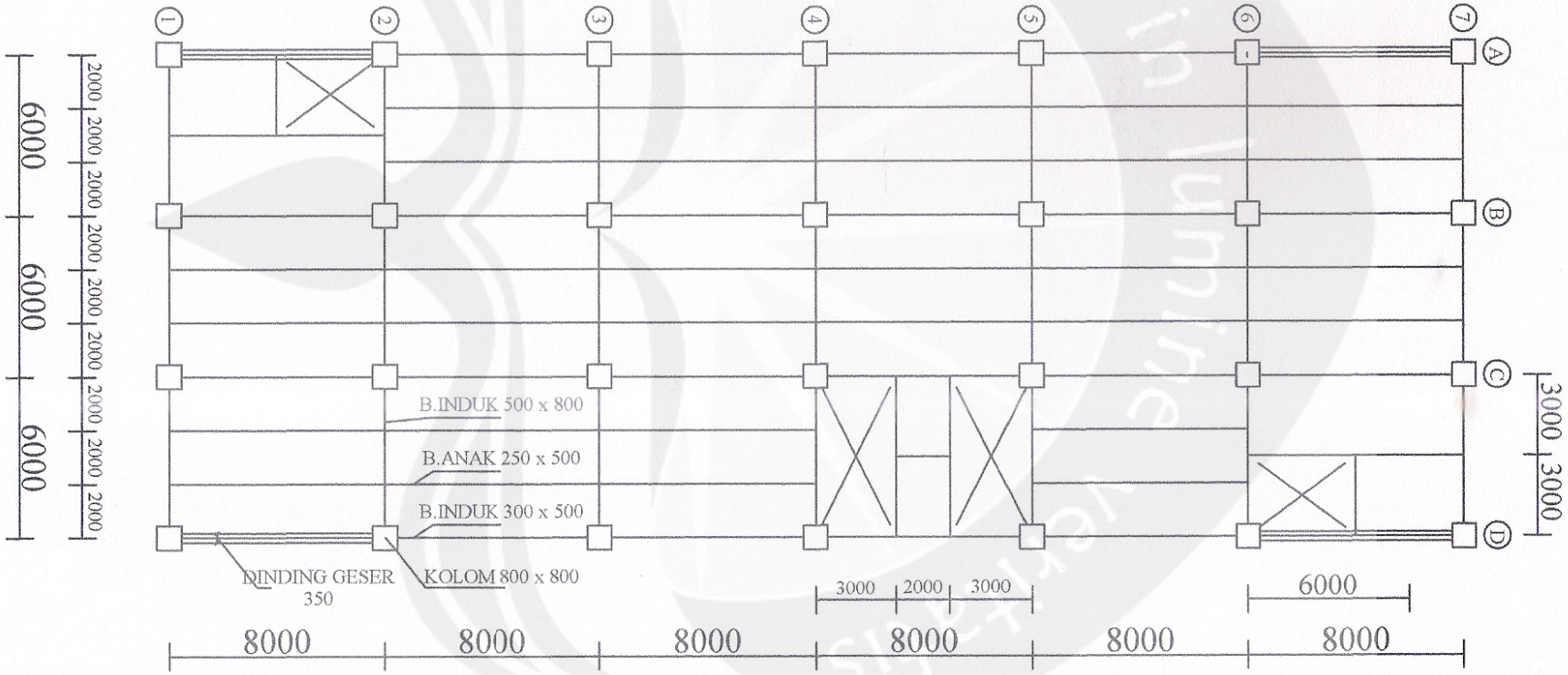
LAMPIRAN A

A.1. Gambar Denah Lantai 1 s/d Lantai 3
A.2. Gambar Denah Lantai 4 s/d Lantai 6
A.3. Gambar Denah Lantai 7 s/d Lantai 9
A.4. Gambar Denah Lantai 10 s/d Lantai 12
A.5. Gambar Denah Lantai 13 / Atap
A.6. Gambar Denah Portal 5
A.7. Gambar Denah Portal C
A.8. Gambar Penulangan Pelat Lantai
A.9. Gambar Penulangan Pelat Atap
A.10. Gambar Penulangan Balok Anak Delapan Meter
A.11. Gambar Penulangan Balok Induk Delapan Meter
A.12. Gambar Penulangan Balok Induk Enam Meter
A.13. Gambar Penulangan Kolom Lt.2
A.14. Gambar Penulangan Tangga
A.15. Gambar Penulangan Dinding Geser



A.1. DENAH LANTAI 1 s/d LANTAI 3 (Skala 1:250)

(PT. SARASWANTI INDOLAND DEVELOPMENT)



A.2. DENAH LANTAI 4 s/d LANTAI 6 (Skala 1:250)

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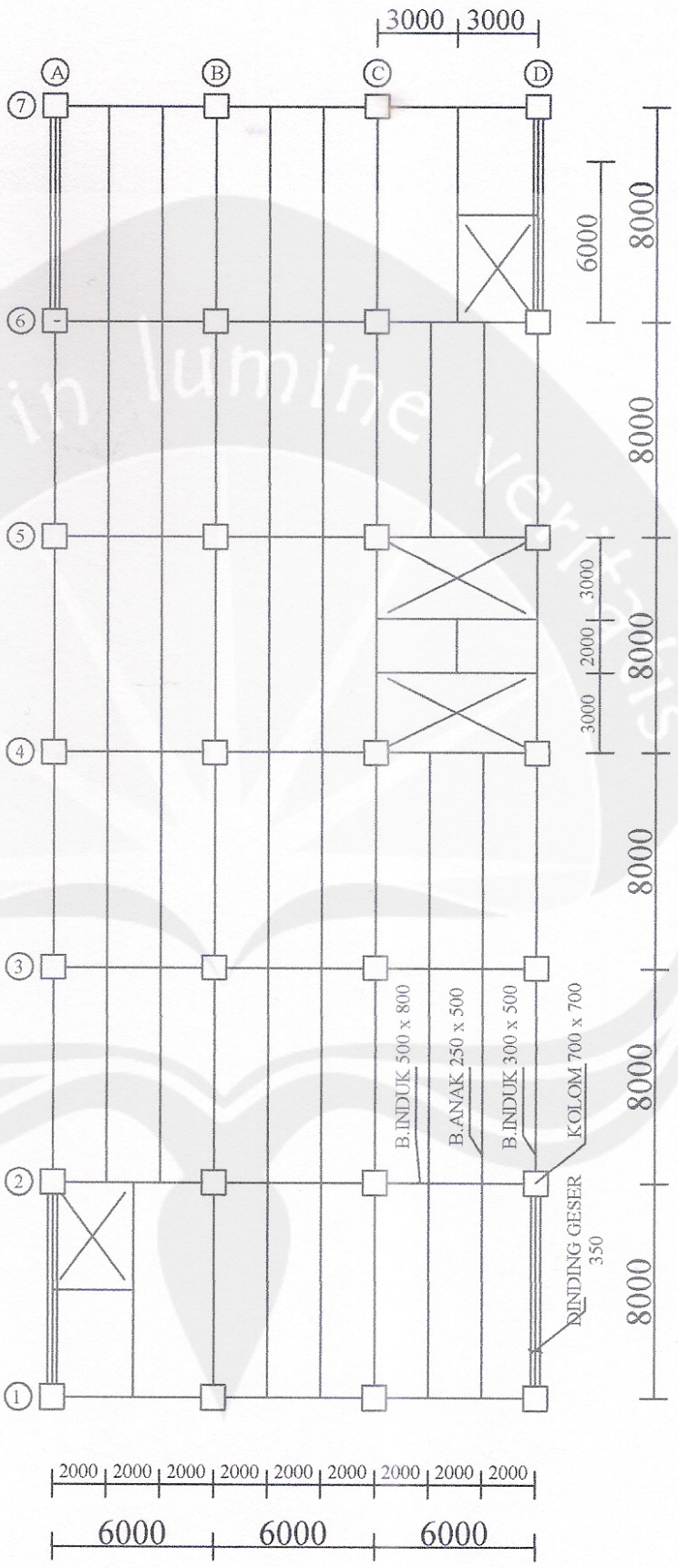
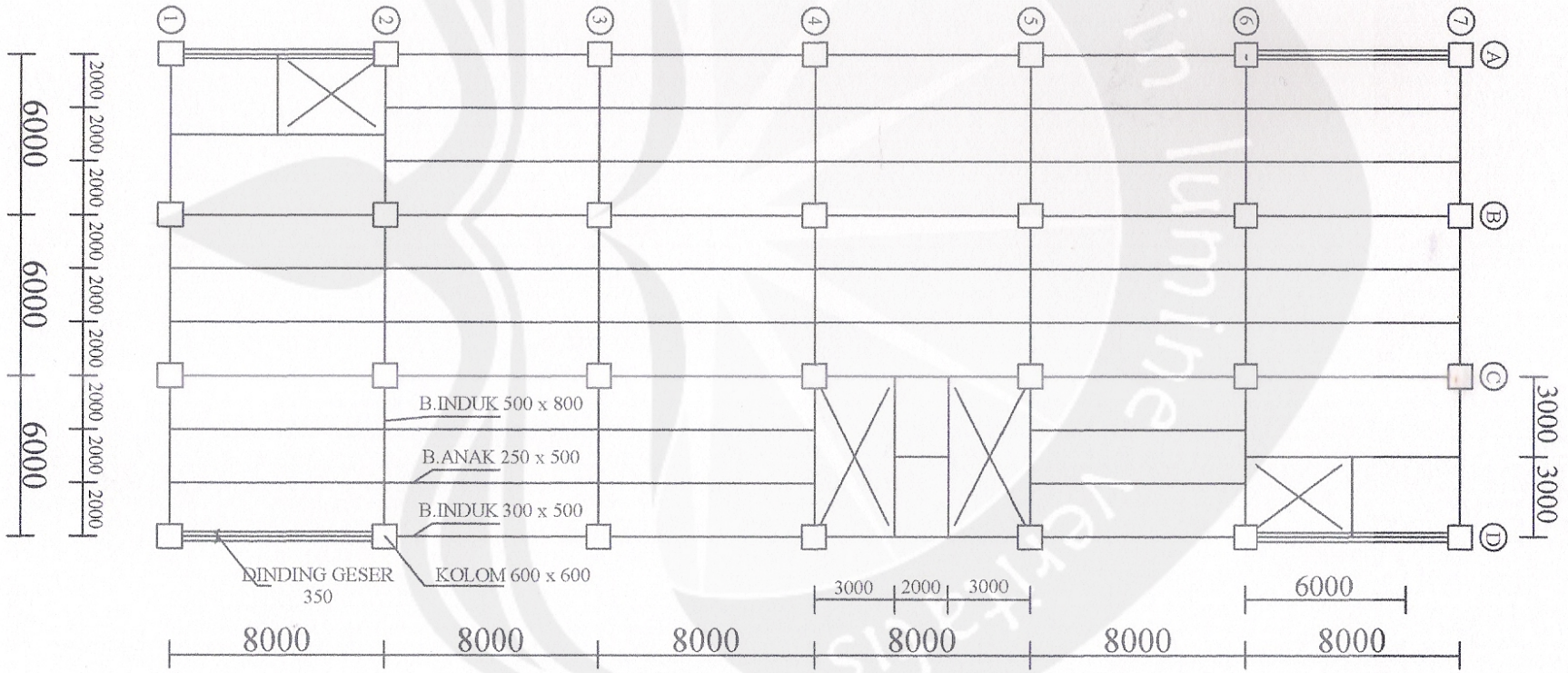


A.3. DENAH LANTAI 7 s/d LANTAI 9 (Skala 1:250)

(PT. SARASWANTI INDOLAND DEVELOPMENT)



A.4. DENAH LANTAI 10 s/d LANTAI 12 (Skala 1:250)

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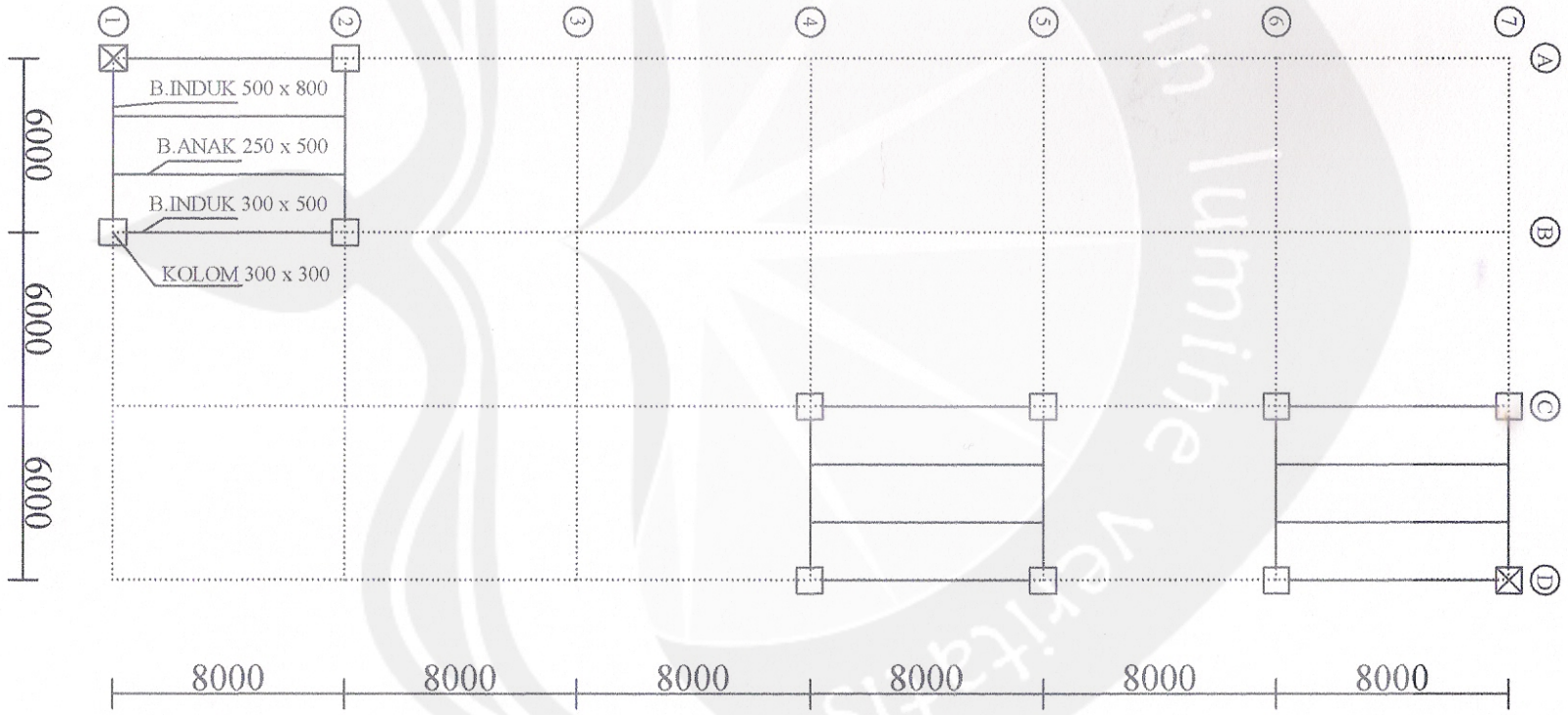
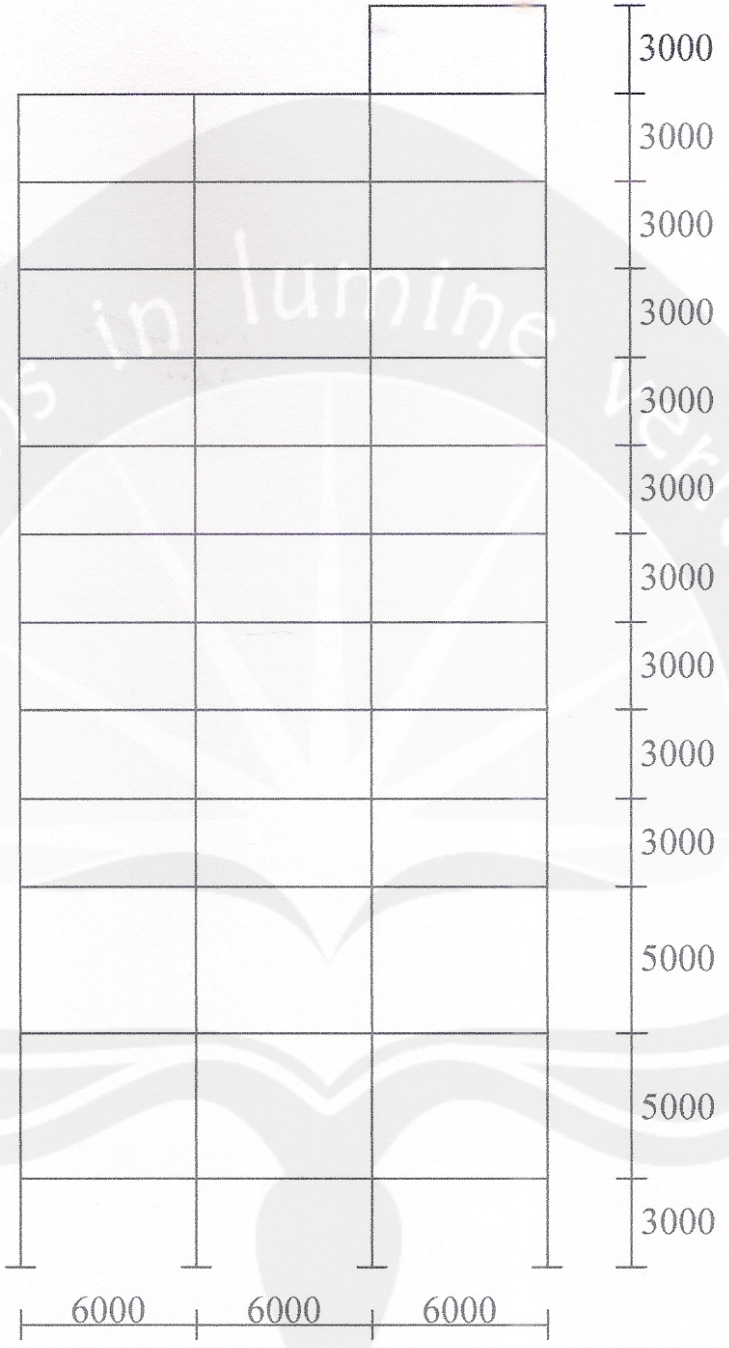
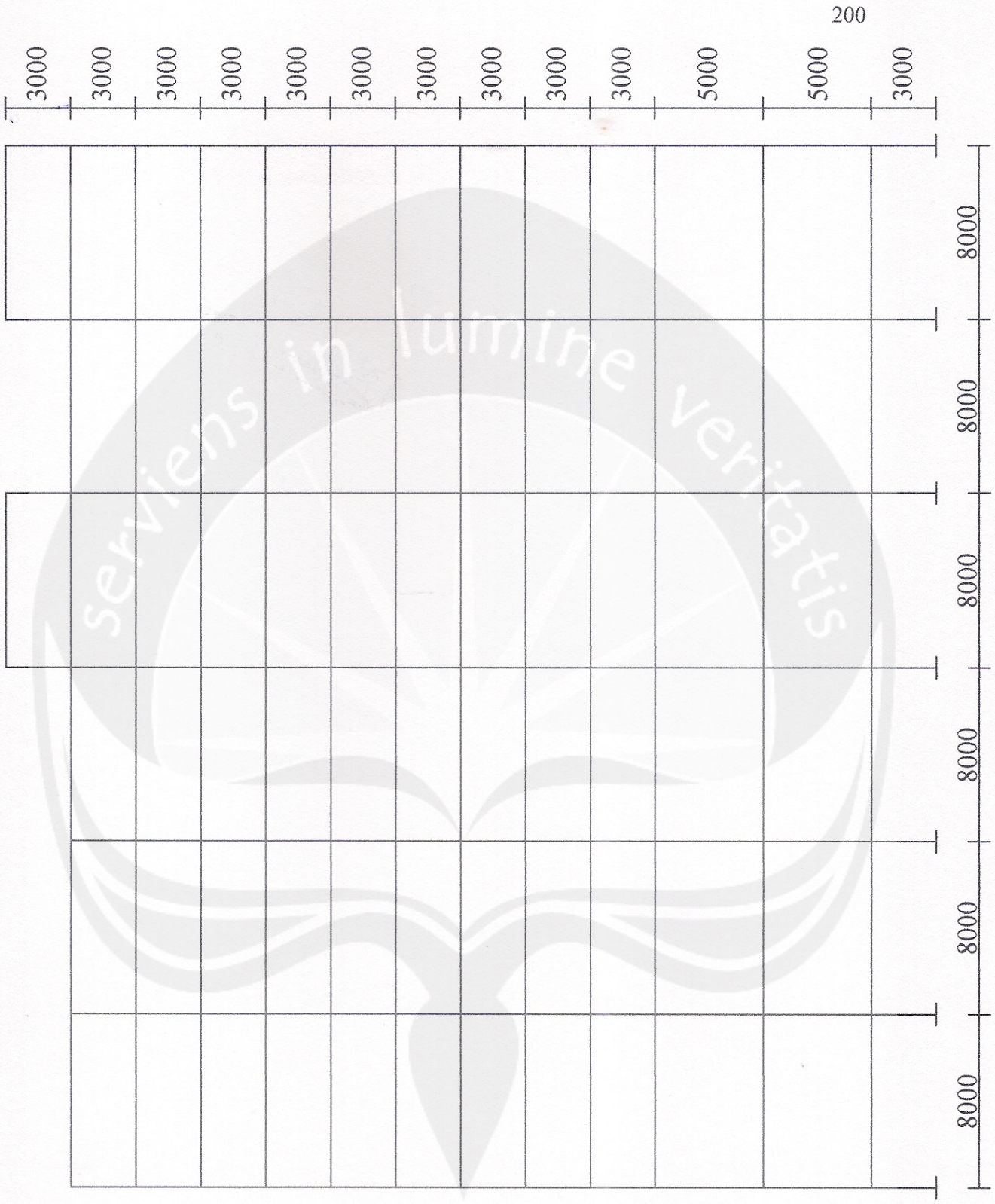


A.5. DENAH LANTAI 13 / ATAP (Skala 1:250)

(PT. SARASWANTI INDOLAND DEVELOPMENT)

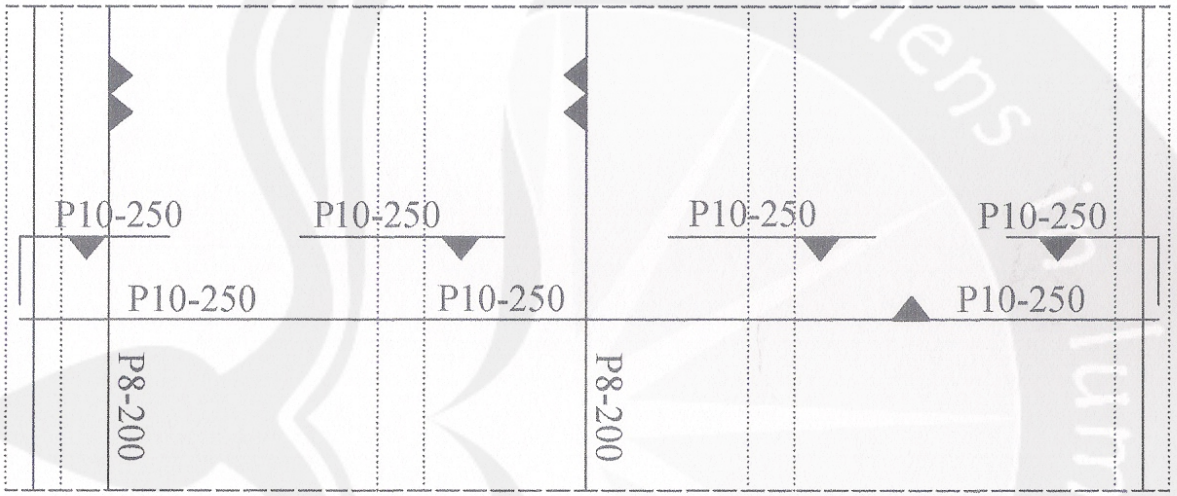


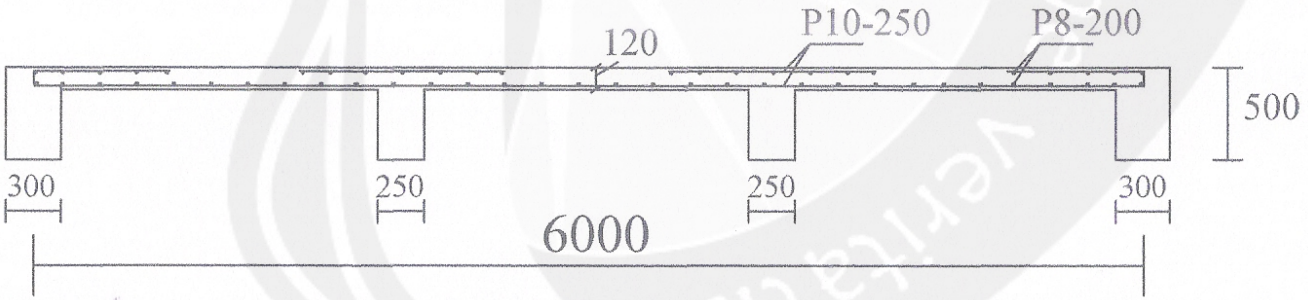
A.6. DENAH PORTAL 5 (Skala 1:250)
(PT. SARASWANTI INDOLAND DEVELOPMENT)



A.7. DENAH PORTAL C (Skala 1:250)

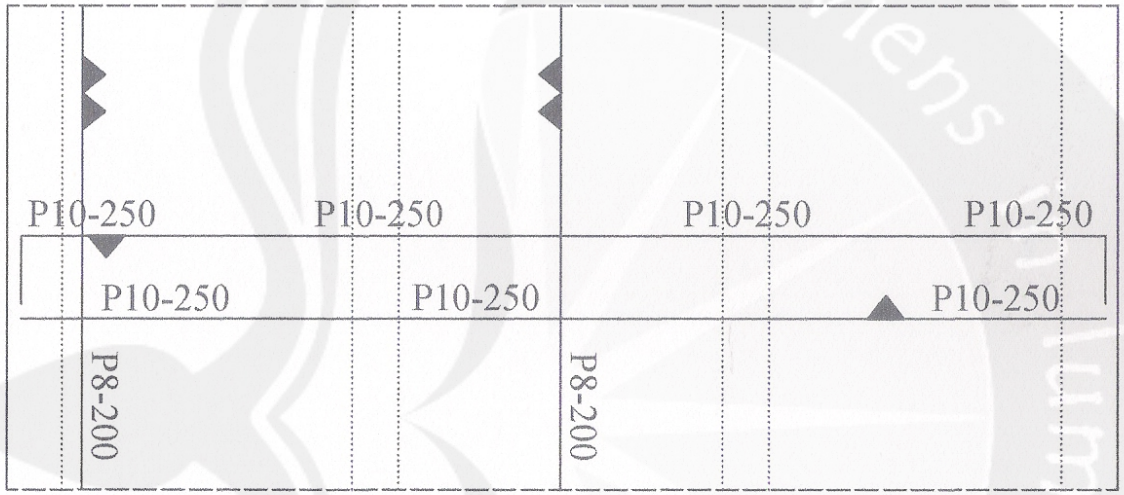
(PT. SARASWANTI INDOLAND DEVELOPMENT)

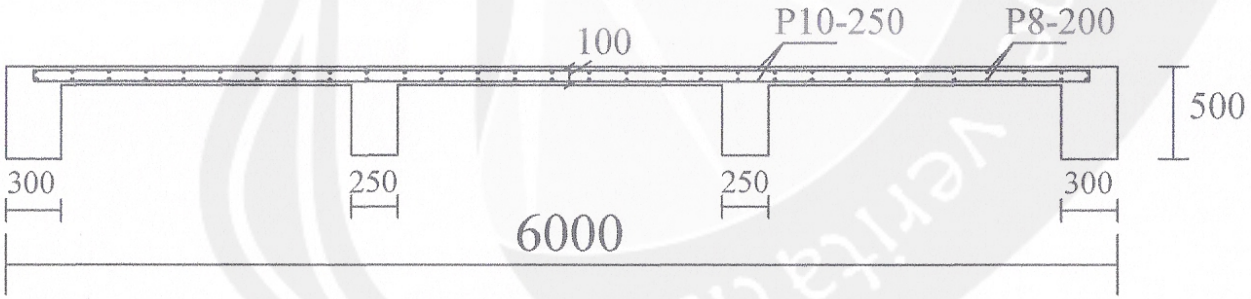




A.8. PENULANGAN PELAT LANTAI (Skala 1:40)

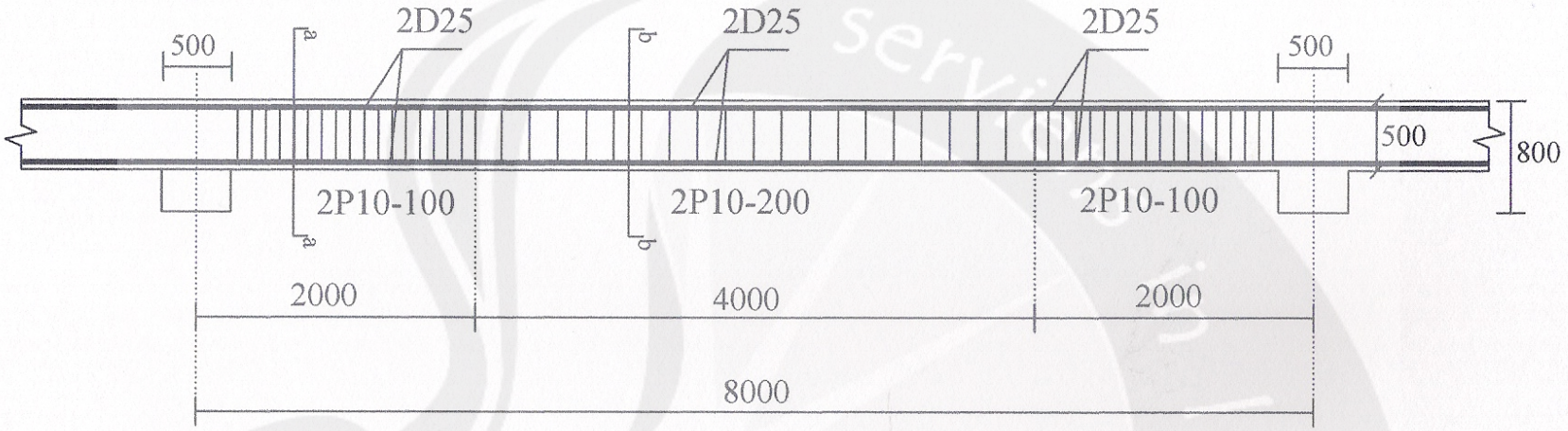
(PT. SARASWANTI INDOLAND DEVELOPMENT)





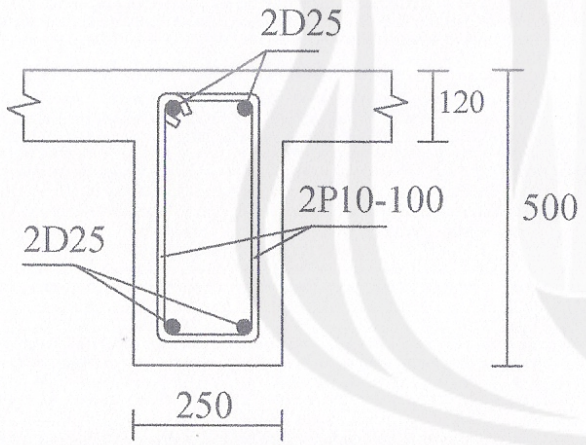
A.9. PENULANGAN PELAT ATAP (Skala 1:40)

(PT. SARASWANTI INDOLAND DEVELOPMENT)

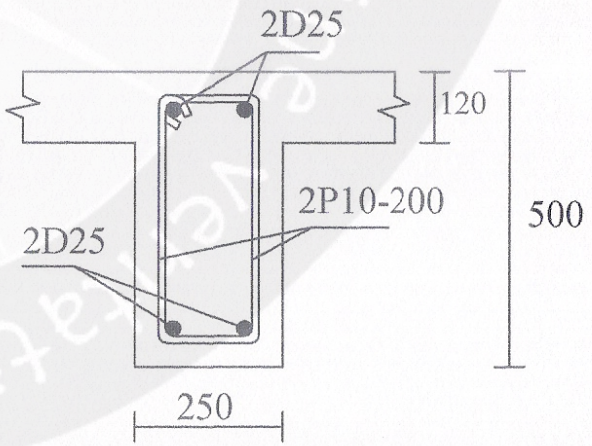


A.10. PENULANGAN BALOK ANAK DELAPAN METER (Skala 1:50)

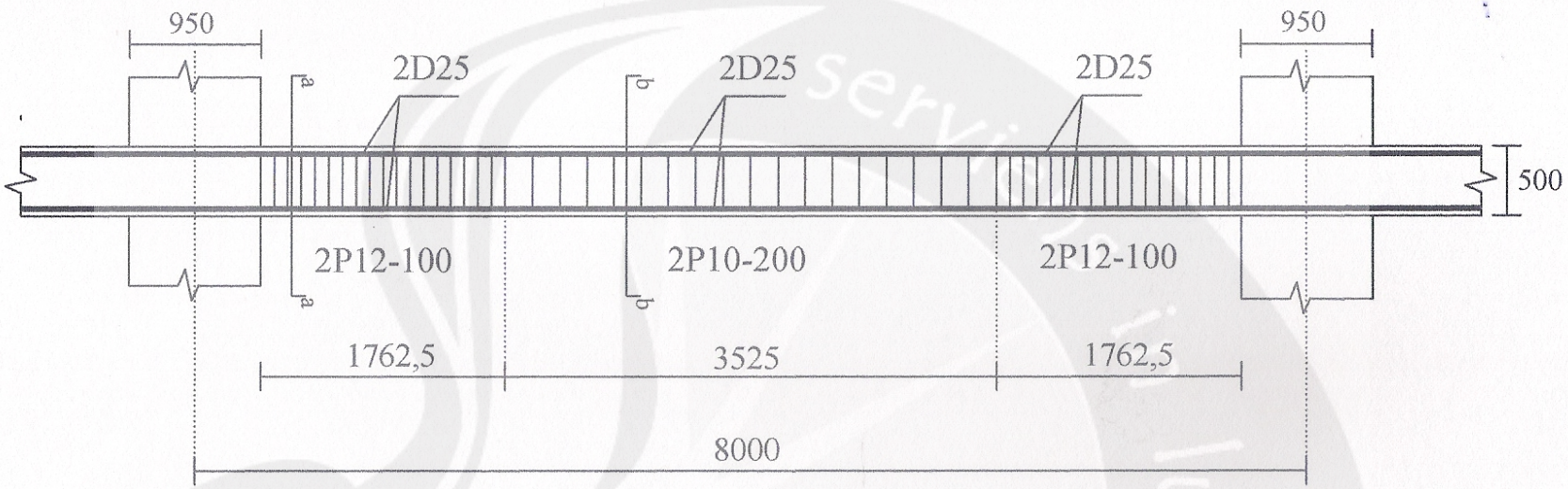
(PT. SARASWANTI INDOLAND DEVELOPMENT)



POTONGAN a-a
(Skala 1:12,5)

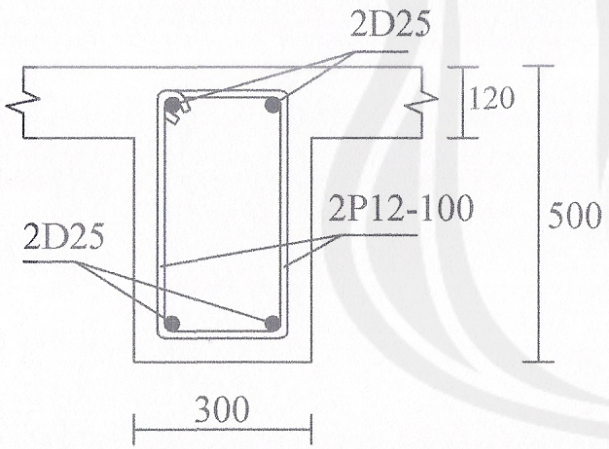


POTONGAN b-b
(Skala 1:12,5)

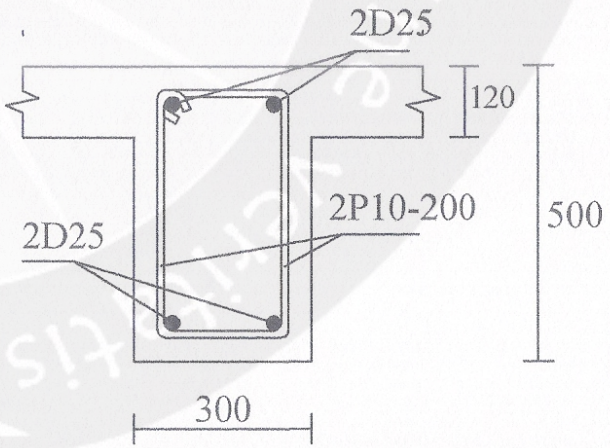


A.11. PENULANGAN BALOK INDUK DELAPAN METER (Skala 1:50)

(PT. SARASWANTI INDOLAND DEVELOPMENT)



POTONGAN a-a
(Skala 1:12,5)



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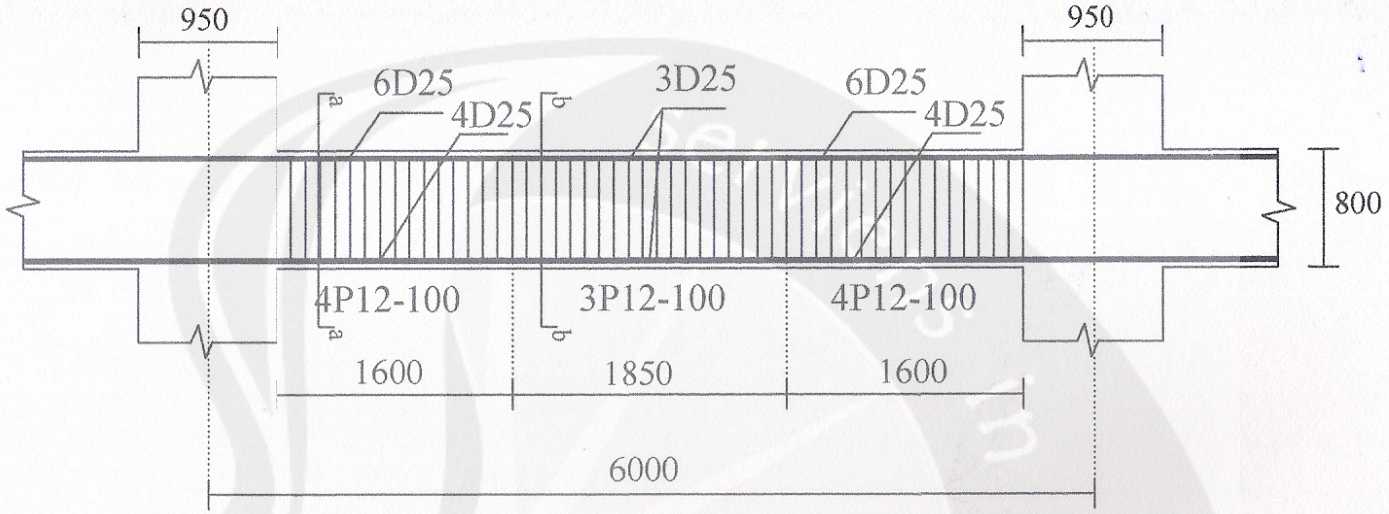
(Skala 1:12,5)



A.12. PENULANGAN BALOK INDUK ENAM METER (Skala 1:50)

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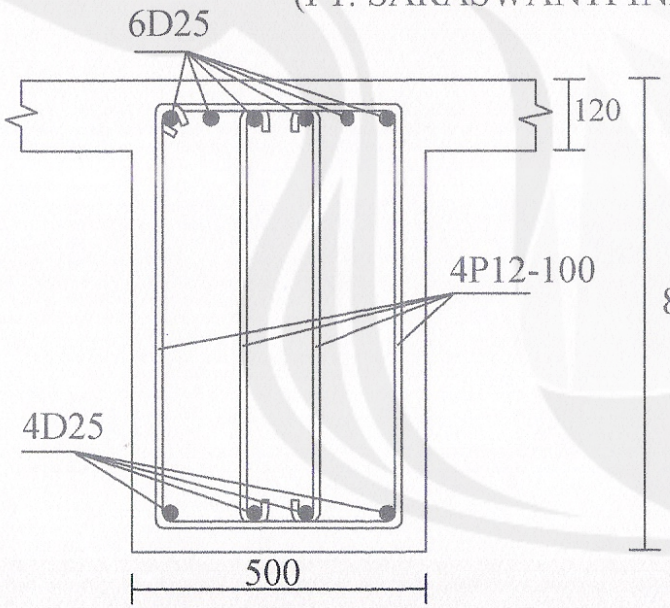

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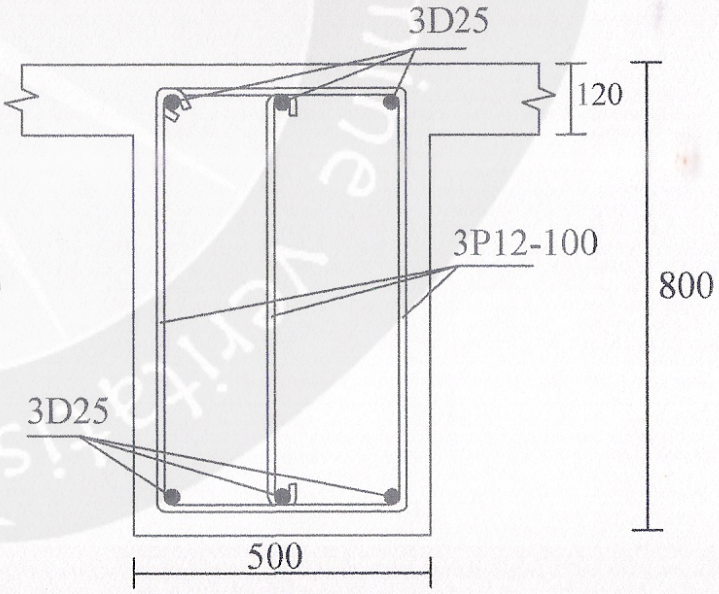

POTONGAN b-b
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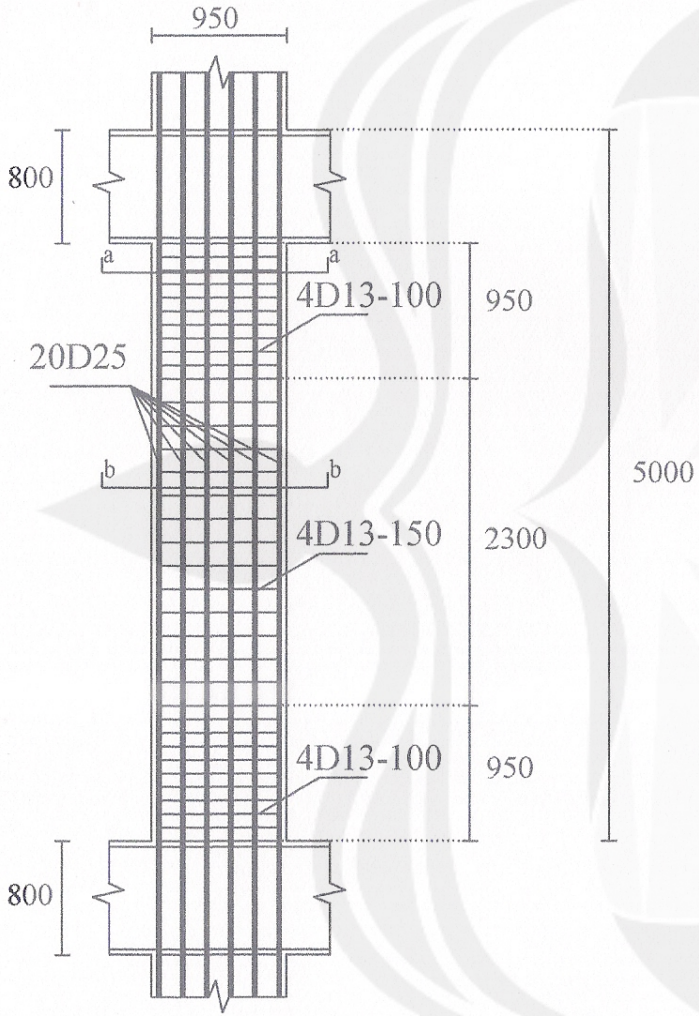
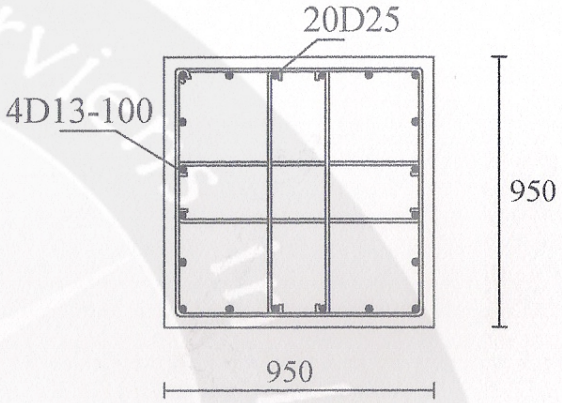


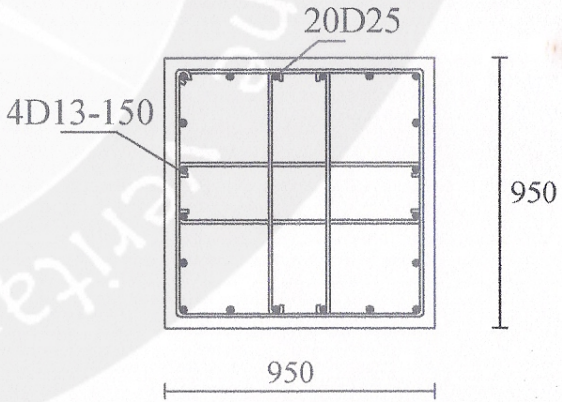
A.13. PENULANGAN KOLOM LT. 2 (Skala 1:50)

(PT. SARASWANTI INDOLAND DEVELOPMENT)



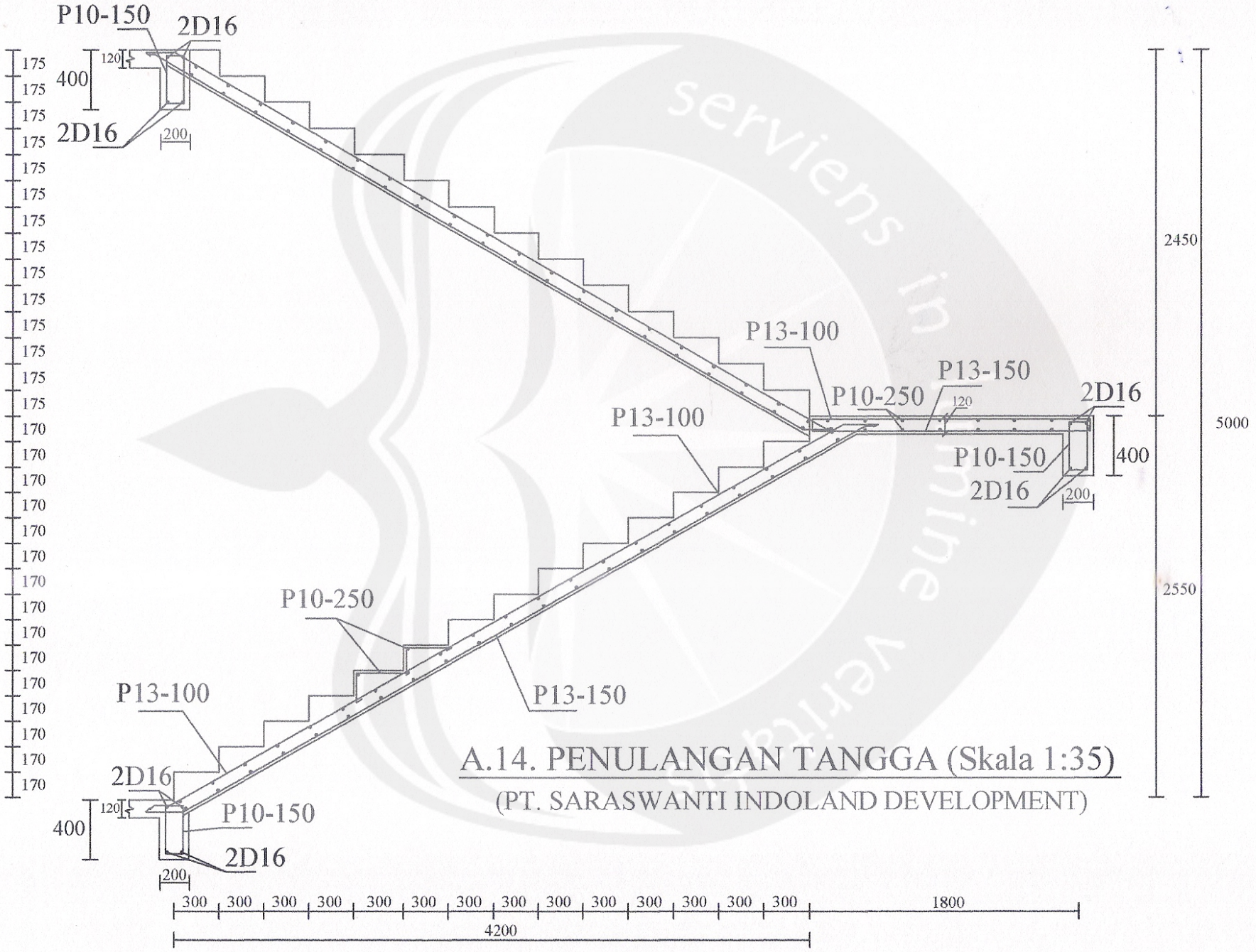
POTONGAN a-a

(Skala 1:25)



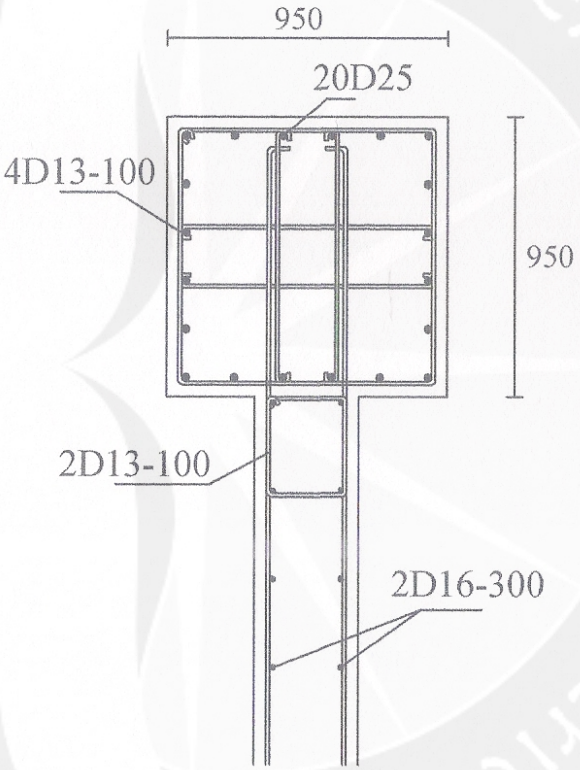
POTONGAN b-b

(Skala 1:25)



A.14. PENULANGAN TANGGA (Skala 1:35)

(PT. SARASWANTI INDOLAND DEVELOPMENT)



A.15. PENULANGAN DINDING GESER(Skala 1:25)

(PT. SARASWANTI INDOLAND DEVELOPMENT)

LAMPIRAN B

B.1. *Input ETABS 9.0*
B.2. *Output ETABS 9.0*
B.3. *Concrete Design / Check of Structure*
B.4. Nomogram Komponen Struktur Bergoyang

B.1. *Input ETABS 9.0*

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

L O A D I N G C O M B I N A T I O N S

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
COMB1	ADD	DEAD	Static	1.4000
COMB2	ADD	DEAD	Static	1.2000
		LIVE	Static	1.6000
COMB3	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	1.0000
		EY	Static	0.3000
COMB4	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	1.0000
		EY	Static	-0.3000
COMB5	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	-1.0000
		EY	Static	0.3000
COMB6	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	-1.0000
		EY	Static	-0.3000
COMB7	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	0.3000
		EY	Static	1.0000
COMB8	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	0.3000
		EY	Static	-1.0000
COMB9	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	-0.3000
		EY	Static	1.0000
COMB10	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		EX	Static	-0.3000
		EY	Static	-1.0000
COMB11	ADD	DEAD	Static	0.9000
		EX	Static	1.0000
		EY	Static	0.3000
COMB12	ADD	DEAD	Static	0.9000
		EX	Static	1.0000
		EY	Static	-0.3000
COMB13	ADD	DEAD	Static	0.9000
		EX	Static	-1.0000
		EY	Static	0.3000
COMB14	ADD	DEAD	Static	0.9000
		EX	Static	-1.0000
		EY	Static	-0.3000
COMB15	ADD	DEAD	Static	0.9000
		EX	Static	0.3000
		EY	Static	1.0000
COMB16	ADD	DEAD	Static	0.9000
		EX	Static	0.3000
		EY	Static	-1.0000

COMB17	ADD	DEAD	Static	0.9000
		EX	Static	-0.3000
		EY	Static	1.0000
COMB18	ADD	DEAD	Static	0.9000
		EX	Static	-0.3000
		EY	Static	-1.0000
COMB19	ENVE	COMB18	Combo	1.0000
		COMB17	Combo	1.0000
		COMB16	Combo	1.0000
		COMB15	Combo	1.0000
		COMB14	Combo	1.0000
		COMB13	Combo	1.0000
		COMB12	Combo	1.0000
		COMB11	Combo	1.0000
		COMB10	Combo	1.0000
		COMB9	Combo	1.0000
		COMB8	Combo	1.0000
		COMB7	Combo	1.0000
		COMB6	Combo	1.0000
		COMB5	Combo	1.0000
		COMB4	Combo	1.0000
		COMB3	Combo	1.0000
		COMB2	Combo	1.0000
		COMB1	Combo	1.0000
XKIRI	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB3	Combo	1.0000
		COMB4	Combo	1.0000
		COMB11	Combo	1.0000
		COMB12	Combo	1.0000
XKANAN	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB5	Combo	1.0000
		COMB6	Combo	1.0000
		COMB13	Combo	1.0000
		COMB14	Combo	1.0000
YKIRI	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB7	Combo	1.0000
		COMB9	Combo	1.0000
		COMB15	Combo	1.0000
		COMB17	Combo	1.0000
YKANAN	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB8	Combo	1.0000
		COMB10	Combo	1.0000
		COMB16	Combo	1.0000
		COMB18	Combo	1.0000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

S T O R Y D A T A

STORY	HEIGHT	ELEVATION
STORY13	3.000	43.000
STORY12	3.000	40.000
STORY11	3.000	37.000
STORY10	3.000	34.000
STORY9	3.000	31.000
STORY8	3.000	28.000
STORY7	3.000	25.000
STORY6	3.000	22.000
STORY5	3.000	19.000
STORY4	3.000	16.000
STORY3	5.000	13.000
STORY2	5.000	8.000
STORY1	3.000	3.000
BASE		0.000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

S T A T I C L O A D C A S E S

STATIC CASE	CASE TYPE	AUTO LAT LOAD	SELF WT MULTIPLIER
DEAD	DEAD	N/A	1.0000
LIVE	LIVE	N/A	0.0000
EX	QUAKE	USER_COEFF	0.0000
EY	QUAKE	USER_COEFF	0.0000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

R E S P O N S E S P E C T R U M C A S E S

RESP SPEC CASE: SNI2002

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
CQC	SRSS	0.0500	0.0000	0.0000

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	WG5LUNAK	1.1500
U2	WG5LUNAK	1.1500
UZ	WG5LUNAK	1.1500

M A S S S O U R C E D A T A

MASS FROM	LATERAL MASS ONLY	LUMP MASS AT STORIES
Masses & LoaYes		Yes

M A S S S O U R C E L O A D S

LOAD	MULTIPLIER
LIVE	0.3000
DEAD	1.0000

B.2. *Output ETABS 9.0*

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

C E N T E R S O F C U M U L A T I V E M A S S & C E N T E R S O F R I G I D I T Y

STORY LEVEL	DIAPHRAGM NAME	MASS	CENTER OF MASS ORDINATE-X	CENTER OF MASS ORDINATE-Y	CENTER OF RIGIDITY ORDINATE-X	CENTER OF RIGIDITY ORDINATE-Y
STORY13	D13	76.5399	15.000	44.000	15.143	40.833
STORY13	D13B	76.5399	15.000	28.000	14.004	27.411
STORY13	D13C	76.5399	3.000	4.000	2.854	7.168
STORY12	D12	1410.3589	8.954	23.969	8.990	24.005
STORY11	D11	1512.5419	8.882	23.922	8.990	24.003
STORY10	D10	1512.5419	8.882	23.922	8.990	24.003
STORY9	D9	1533.3895	8.884	23.923	8.991	24.003
STORY8	D8	1560.1098	8.886	23.924	8.992	24.004
STORY7	D7	1560.1098	8.886	23.924	8.993	24.004
STORY6	D6	1585.0683	8.888	23.925	8.994	24.004
STORY5	D5	1615.8993	8.890	23.927	8.995	24.004
STORY4	D4	1615.8993	8.890	23.927	8.997	24.004
STORY3	D3	1829.4651	8.903	23.935	8.997	24.003
STORY2	D2	2061.8970	8.914	23.942	8.999	24.003
STORY1	D1	1883.4194	8.905	23.937	8.999	24.001

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

M O D A L P E R I O D S A N D F R E Q U E N C I E S

MODE NUMBER	PERIOD (TIME)	FREQUENCY (CYCLES/TIME)	CIRCULAR FREQ (RADIANS/TIME)
Mode 1	1.73313	0.57699	3.62533
Mode 2	1.18419	0.84446	5.30589
Mode 3	1.01698	0.98331	6.17831
Mode 4	0.56535	1.76882	11.11380
Mode 5	0.33835	2.95551	18.57005
Mode 6	0.30853	3.24112	20.36459
Mode 7	0.23226	4.30553	27.05245
Mode 8	0.20705	4.82984	30.34676
Mode 9	0.16097	6.21242	39.03381
Mode 10	0.15656	6.38716	40.13172
Mode 11	0.14016	7.13481	44.82932
Mode 12	0.12428	8.04627	50.55620

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

M O D A L P A R T I C I P A T I N G M A S S R A T I O S

MODE	X-TRANS		Y-TRANS		Z-TRANS		RX-ROTN		RY-ROTN		RZ-ROTN	
NUMBER	%MASS	<SUM>	%MASS	<SUM>	%MASS	<SUM>	%MASS	<SUM>	%MASS	<SUM>	%MASS	<SUM>
Mode 1	81.31	< 81>	0.00	< 0>	0.00	< 0>	0.00	< 0>	99.18	< 99>	0.00	< 0>
Mode 2	0.00	< 81>	0.00	< 0>	0.00	< 0>	0.00	< 0>	0.00	< 99>	72.75	< 73>
Mode 3	0.00	< 81>	67.76	< 68>	0.00	< 0>	98.02	< 98>	0.00	< 99>	0.00	< 73>
Mode 4	7.09	< 88>	0.00	< 68>	0.00	< 0>	0.00	< 98>	0.64	<100>	0.00	< 73>
Mode 5	0.00	< 88>	0.00	< 68>	0.00	< 0>	0.00	< 98>	0.00	<100>	14.11	< 87>
Mode 6	2.36	< 91>	0.00	< 68>	0.00	< 0>	0.00	< 98>	0.10	<100>	0.00	< 87>
Mode 7	0.00	< 91>	18.48	< 86>	0.00	< 0>	1.72	<100>	0.00	<100>	0.00	< 87>
Mode 8	2.01	< 93>	0.00	< 86>	0.00	< 0>	0.00	<100>	0.00	<100>	0.00	< 87>
Mode 9	0.01	< 93>	0.01	< 86>	0.00	< 0>	0.00	<100>	0.00	<100>	4.51	< 91>
Mode 10	1.56	< 94>	0.00	< 86>	0.00	< 0>	0.00	<100>	0.04	<100>	0.02	< 91>
Mode 11	0.00	< 94>	0.36	< 87>	0.00	< 0>	0.03	<100>	0.00	<100>	0.10	< 91>
Mode 12	0.88	< 95>	0.00	< 87>	0.00	< 0>	0.00	<100>	0.00	<100>	0.00	< 91>

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M O D A L L O A D P A R T I C I P A T I O N R A T I O S
(STATIC AND DYNAMIC RATIOS ARE IN PERCENT)

TYPE	NAME	STATIC	DYNAMIC
Load	LIVE	0.0451	0.0000
Load	EX		

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

S T O R Y F O R C E S

STORY	LOAD	LOCATION	P	VX	VY	T	MX	MY
STORY13	SNI2002	Top	0.00	236.14	466.34	7891.959	0.000	0.000
		Bottom	0.00	236.14	466.34	7891.959	1399.020	708.413
STORY12	SNI2002	Top	0.00	1540.56	2752.24	45148.148	1399.020	708.413
		Bottom	0.00	1540.56	2752.24	45148.148	9630.056	5320.784
STORY11	SNI2002	Top	0.00	2762.80	4862.10	79803.382	9630.056	5320.784
		Bottom	0.00	2762.80	4862.10	79803.382	24186.859	13547.217
STORY10	SNI2002	Top	0.00	3856.05	6648.03	110316.262	24186.859	13547.217
		Bottom	0.00	3856.05	6648.03	110316.262	44062.556	24964.171
STORY9	SNI2002	Top	0.00	4846.62	8170.73	137526.807	44062.556	24964.171
		Bottom	0.00	4846.62	8170.73	137526.807	68420.794	39271.039
STORY8	SNI2002	Top	0.00	5762.17	9480.12	162234.721	68420.794	39271.039
		Bottom	0.00	5762.17	9480.12	162234.721	96558.050	56238.940
STORY7	SNI2002	Top	0.00	6589.64	10599.61	184281.904	96558.050	56238.940
		Bottom	0.00	6589.64	10599.61	184281.904	127842.405	75591.746
STORY6	SNI2002	Top	0.00	7352.89	11582.68	204399.693	127842.405	75591.746
		Bottom	0.00	7352.89	11582.68	204399.693	161813.241	97105.565
STORY5	SNI2002	Top	0.00	8067.85	12447.06	222999.990	161813.241	97105.565
		Bottom	0.00	8067.85	12447.06	222999.990	198099.510	120616.345
STORY4	SNI2002	Top	0.00	8713.21	13172.40	239557.908	198099.510	120616.345
		Bottom	0.00	8713.21	13172.40	239557.908	236331.877	145923.122
STORY3	SNI2002	Top	0.00	9344.79	13825.81	255541.092	236331.877	145923.122
		Bottom	0.00	9344.79	13825.81	255541.092	303196.236	191145.508
STORY2	SNI2002	Top	0.00	9761.69	14209.60	265903.218	303196.236	191145.508
		Bottom	0.00	9761.69	14209.60	265903.218	372262.907	238542.719
STORY1	SNI2002	Top	0.00	9849.44	14294.46	268101.476	372262.907	238542.719
		Bottom	0.00	9849.44	14294.46	268101.476	414195.733	267406.487

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

P O I N T D I S P L A C E M E N T S

STORY	POINT	LOAD	UX	UY	UZ	RX	RY	RZ
STORY13	11	EX	0.0573	-0.0001	-0.0002	0.00001	0.00032	0.00000
STORY12	11	EX	0.0563	-0.0001	-0.0002	0.00001	0.00029	0.00000
STORY11	11	EX	0.0548	-0.0001	-0.0002	0.00001	0.00037	0.00000
STORY10	11	EX	0.0525	-0.0001	-0.0001	0.00001	0.00050	0.00000
STORY9	11	EX	0.0494	0.0000	-0.0001	0.00000	0.00066	0.00000
STORY8	11	EX	0.0461	0.0000	-0.0001	0.00000	0.00079	0.00000
STORY7	11	EX	0.0422	0.0000	-0.0001	0.00000	0.00089	0.00000
STORY6	11	EX	0.0379	0.0000	-0.0001	0.00000	0.00102	0.00000
STORY5	11	EX	0.0335	0.0000	-0.0001	0.00000	0.00114	0.00000
STORY4	11	EX	0.0288	0.0000	-0.0001	0.00000	0.00126	0.00000
STORY3	11	EX	0.0232	0.0000	0.0000	0.00000	0.00159	0.00000
STORY2	11	EX	0.0122	0.0000	0.0000	0.00000	0.00173	0.00000
STORY1	11	EX	0.0023	0.0000	0.0000	0.00000	0.00112	0.00000
BASE	11	EX	0.0000	0.0000	0.0000	0.00000	0.00000	0.00000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

P O I N T D I S P L A C E M E N T S

STORY	POINT	LOAD	UX	UY	UZ	RX	RY	RZ
STORY13	3	EY	0.0006	0.0673	-0.0017	-0.00155	0.00035	-0.00019
STORY12	3	EY	-0.0001	0.0604	-0.0017	-0.00144	0.00023	0.00000
STORY11	3	EY	-0.0001	0.0546	-0.0017	-0.00119	0.00018	0.00000
STORY10	3	EY	0.0000	0.0488	-0.0016	-0.00125	0.00019	0.00000
STORY9	3	EY	0.0000	0.0430	-0.0015	-0.00127	0.00015	0.00000
STORY8	3	EY	0.0000	0.0370	-0.0014	-0.00127	0.00012	0.00000
STORY7	3	EY	0.0000	0.0312	-0.0013	-0.00124	0.00013	0.00000
STORY6	3	EY	0.0000	0.0258	-0.0011	-0.00120	0.00010	0.00000
STORY5	3	EY	0.0000	0.0205	-0.0010	-0.00114	0.00008	0.00000
STORY4	3	EY	0.0000	0.0155	-0.0008	-0.00104	0.00008	0.00000
STORY3	3	EY	0.0000	0.0110	-0.0006	-0.00090	0.00006	0.00000
STORY2	3	EY	0.0000	0.0050	-0.0004	-0.00068	0.00004	0.00000
STORY1	3	EY	0.0000	0.0012	-0.0001	-0.00038	0.00001	0.00000
BASE	3	EY	0.0000	0.0000	0.0000	0.00000	0.00000	0.00000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

L O A D I N G C O M B I N A T I O N S

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
COMB19	ENVE	COMB18	Combo	1.0000
		COMB17	Combo	1.0000
		COMB16	Combo	1.0000
		COMB15	Combo	1.0000
		COMB14	Combo	1.0000
		COMB13	Combo	1.0000
		COMB12	Combo	1.0000
		COMB11	Combo	1.0000
		COMB10	Combo	1.0000
		COMB9	Combo	1.0000
		COMB8	Combo	1.0000
		COMB7	Combo	1.0000
		COMB6	Combo	1.0000
		COMB5	Combo	1.0000
		COMB4	Combo	1.0000
		COMB3	Combo	1.0000
		COMB2	Combo	1.0000
		COMB1	Combo	1.0000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

B E A M F O R C E S

STORY	BEAM	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	B121	COMB19 MAX							
			0.0000	0.00	-37.23	0.00	0.042	0.000	-47.500
			0.5000	0.00	-34.84	0.00	0.042	0.000	-29.397
			1.0000	0.00	-30.39	0.00	0.042	0.000	-13.001
			1.5000	0.00	-24.91	0.00	0.042	0.000	0.825
			2.0000	0.00	-19.43	0.00	0.042	0.000	17.692
			2.5000	0.00	-13.95	0.00	0.042	0.000	34.700
			3.0000	0.00	-8.47	0.00	0.042	0.000	48.628
			3.5000	0.00	-2.99	0.00	0.042	0.000	56.903
			4.0000	0.00	2.65	0.00	0.042	0.000	59.523
			4.5000	0.00	12.46	0.00	0.042	0.000	56.490
			5.0000	0.00	23.03	0.00	0.042	0.000	47.802
			5.5000	0.00	34.34	0.00	0.042	0.000	33.460
			6.0000	0.00	45.65	0.00	0.042	0.000	16.272
			6.5000	0.00	56.95	0.00	0.042	0.000	-0.164
			7.0000	0.00	68.26	0.00	0.042	0.000	-14.191
			7.5000	0.00	77.19	0.00	0.042	0.000	-30.788
			8.0000	0.00	81.37	0.00	0.042	0.000	-49.091
STORY1	B121	COMB19 MIN							
			0.0000	0.00	-80.54	0.00	-0.020	0.000	-116.583
			0.5000	0.00	-76.37	0.00	-0.020	0.000	-77.157
			1.0000	0.00	-67.43	0.00	-0.020	0.000	-42.430
			1.5000	0.00	-56.13	0.00	-0.020	0.000	-14.492
			2.0000	0.00	-44.82	0.00	-0.020	0.000	2.763
			2.5000	0.00	-33.51	0.00	-0.020	0.000	13.399
			3.0000	0.00	-22.20	0.00	-0.020	0.000	21.296
			3.5000	0.00	-11.74	0.00	-0.020	0.000	26.452
			4.0000	0.00	-2.09	0.00	-0.020	0.000	28.852
			4.5000	0.00	3.39	0.00	-0.020	0.000	26.236
			5.0000	0.00	8.87	0.00	-0.020	0.000	20.880
			5.5000	0.00	14.35	0.00	-0.020	0.000	12.783
			6.0000	0.00	19.83	0.00	-0.020	0.000	1.945
			6.5000	0.00	25.31	0.00	-0.020	0.000	-16.299

		7.0000	0.00	30.80	0.00	-0.020	0.000	-44.596
		7.5000	0.00	35.24	0.00	-0.020	0.000	-80.050
		8.0000	0.00	37.63	0.00	-0.020	0.000	-119.888

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

B E A M F O R C E S

STORY	BEAM	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	B49	COMB19 MAX							
			0.4750	0.00	-42.90	0.00	2.755	0.000	-39.073
			0.8958	0.00	-40.34	0.00	2.755	0.000	-21.532
			1.3167	0.00	-37.26	0.00	2.755	0.000	-5.197
			1.7375	0.00	-34.16	0.00	2.755	0.000	9.832
			2.1583	0.00	-31.06	0.00	2.755	0.000	33.517
			2.5792	0.00	-27.96	0.00	2.755	0.000	56.478
			3.0000	0.00	-24.86	0.00	2.755	0.000	79.349
			3.0000	0.00	-4.47	0.00	0.083	0.000	71.789
			3.5000	0.00	-0.27	0.00	0.083	0.000	79.162
			4.0000	0.00	4.96	0.00	0.083	0.000	81.889
			4.5000	0.00	14.13	0.00	0.083	0.000	79.178
			5.0000	0.00	21.29	0.00	0.083	0.000	71.822
			5.0000	0.00	56.97	0.00	17.660	0.000	79.393
			5.4208	0.00	62.69	0.00	17.660	0.000	56.537
			5.8417	0.00	68.51	0.00	17.660	0.000	33.588
			6.2625	0.00	74.33	0.00	17.660	0.000	9.879
			6.6833	0.00	80.15	0.00	17.660	0.000	-5.145
			7.1042	0.00	85.92	0.00	17.660	0.000	-21.473
			7.5250	0.00	90.48	0.00	17.660	0.000	-39.009
STORY1	B49	COMB19 MIN							
			0.4750	0.00	-90.51	0.00	-17.656	0.000	-115.995
			0.8958	0.00	-85.95	0.00	-17.656	0.000	-80.194
			1.3167	0.00	-80.18	0.00	-17.656	0.000	-46.387
			1.7375	0.00	-74.36	0.00	-17.656	0.000	-14.762
			2.1583	0.00	-68.54	0.00	-17.656	0.000	4.720
			2.5792	0.00	-62.72	0.00	-17.656	0.000	21.436
			3.0000	0.00	-56.99	0.00	-17.656	0.000	36.847
			3.0000	0.00	-21.32	0.00	-0.087	0.000	33.056
			3.5000	0.00	-14.15	0.00	-0.087	0.000	38.838
			4.0000	0.00	-4.99	0.00	-0.087	0.000	40.936
			4.5000	0.00	0.26	0.00	-0.087	0.000	38.841
			5.0000	0.00	4.46	0.00	-0.087	0.000	33.060
			5.0000	0.00	24.84	0.00	-2.758	0.000	36.856
			5.4208	0.00	27.95	0.00	-2.758	0.000	21.450
			5.8417	0.00	31.05	0.00	-2.758	0.000	4.738
			6.2625	0.00	34.15	0.00	-2.758	0.000	-14.703
			6.6833	0.00	37.25	0.00	-2.758	0.000	-46.317
			7.1042	0.00	40.33	0.00	-2.758	0.000	-80.114
			7.5250	0.00	42.89	0.00	-2.758	0.000	-115.904

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

B E A M F O R C E S

STORY	BEAM	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	B8	COMB19 MAX							
			0.4750	0.00	65.28	0.00	18.223	0.000	360.838
			0.8563	0.00	70.67	0.00	18.223	0.000	334.963
			1.2375	0.00	76.79	0.00	18.223	0.000	306.840
			1.6188	0.00	81.89	0.00	18.223	0.000	298.785
			2.0000	0.00	85.78	0.00	18.223	0.000	293.009
			2.0000	0.00	164.97	0.00	-0.233	0.000	293.023
			2.5000	0.00	170.33	0.00	-0.233	0.000	212.131

			3.0000	0.00	177.76	0.00	-0.233	0.000	142.951
			3.5000	0.00	189.53	0.00	-0.233	0.000	212.017
			4.0000	0.00	197.29	0.00	-0.233	0.000	293.086
			4.0000	0.00	337.79	0.00	17.330	0.000	293.115
			4.3813	0.00	343.34	0.00	17.330	0.000	298.988
			4.7625	0.00	351.23	0.00	17.330	0.000	307.193
			5.1438	0.00	361.11	0.00	17.330	0.000	335.431
			5.5250	0.00	369.56	0.00	17.330	0.000	361.422
STORY1	B8	COMB19 MIN							
			0.4750	0.00	-369.97	0.00	-17.758	0.000	-601.043
			0.8563	0.00	-361.52	0.00	-17.758	0.000	-461.529
			1.2375	0.00	-351.64	0.00	-17.758	0.000	-325.611
			1.6188	0.00	-343.75	0.00	-17.758	0.000	-215.358
			2.0000	0.00	-338.20	0.00	-17.758	0.000	-111.659
			2.0000	0.00	-197.65	0.00	-0.635	0.000	-111.621
			2.5000	0.00	-189.88	0.00	-0.635	0.000	-17.419
			3.0000	0.00	-178.14	0.00	-0.635	0.000	73.590
			3.5000	0.00	-170.72	0.00	-0.635	0.000	-16.932
			4.0000	0.00	-165.37	0.00	-0.635	0.000	-110.938
			4.0000	0.00	-86.08	0.00	-19.423	0.000	-110.955
			4.3813	0.00	-82.19	0.00	-19.423	0.000	-214.478
			4.7625	0.00	-77.09	0.00	-19.423	0.000	-324.609
			5.1438	0.00	-70.97	0.00	-19.423	0.000	-460.371
			5.5250	0.00	-65.58	0.00	-19.423	0.000	-599.728

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

L O A D I N G C O M B I N A T I O N S

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
COMB19	ENVE	COMB18	Combo	1.0000
		COMB17	Combo	1.0000
		COMB16	Combo	1.0000
		COMB15	Combo	1.0000
		COMB14	Combo	1.0000
		COMB13	Combo	1.0000
		COMB12	Combo	1.0000
		COMB11	Combo	1.0000
		COMB10	Combo	1.0000
		COMB9	Combo	1.0000
		COMB8	Combo	1.0000
		COMB7	Combo	1.0000
		COMB6	Combo	1.0000
		COMB5	Combo	1.0000
		COMB4	Combo	1.0000
		COMB3	Combo	1.0000
		COMB2	Combo	1.0000
		COMB1	Combo	1.0000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

C O L U M N F O R C E S

STORY	COLUMN	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	C11	COMB19 MAX							
			0.0000	-3347.96	398.09	15.71	0.494	131.227	1183.752
			2.1000	-3307.02	398.09	15.71	0.494	98.230	347.828
			4.2000	-3266.09	398.09	15.71	0.494	76.017	416.647
STORY2	C11	COMB19 MIN							
			0.0000	-6271.73	-360.79	-30.75	-0.060	-168.767	-1098.667
			2.1000	-6217.15	-360.79	-30.75	-0.060	-104.194	-341.075
			4.2000	-6162.56	-360.79	-30.75	-0.060	-50.405	-488.226

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

C O L U M N F O R C E S

STORY	COLUMN	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	C11	LIVE							
			0.0000	-1013.84	6.31	-3.96	0.099	-9.858	14.307
			2.1000	-1013.84	6.31	-3.96	0.099	-1.544	1.049
			4.2000	-1013.84	6.31	-3.96	0.099	6.769	-12.208
STORY2	C11	DEAD							
			0.0000	-3874.66	14.76	-5.28	0.160	-13.182	33.704
			2.1000	-3829.18	14.76	-5.28	0.160	-2.104	2.716
			4.2000	-3783.69	14.76	-5.28	0.160	8.973	-28.272

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

L O A D I N G C O M B I N A T I O N S

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
XKIRI	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB3	Combo	1.0000
		COMB4	Combo	1.0000
		COMB11	Combo	1.0000
		COMB12	Combo	1.0000
XKANAN	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB5	Combo	1.0000
		COMB6	Combo	1.0000
		COMB13	Combo	1.0000
		COMB14	Combo	1.0000
YKIRI	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB7	Combo	1.0000
		COMB9	Combo	1.0000
		COMB15	Combo	1.0000
		COMB17	Combo	1.0000
YKANAN	ENVE	COMB1	Combo	1.0000
		COMB2	Combo	1.0000
		COMB8	Combo	1.0000
		COMB10	Combo	1.0000
		COMB16	Combo	1.0000
		COMB18	Combo	1.0000

ETABS v9.0.0 File:TA FIX AMBIL TRIAL 5 Units:KN-m

C O L U M N F O R C E S

STORY	COLUMN	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	C11	XKIRI MAX							
			0.0000	-3517.35	398.09	0.07	0.428	27.916	1183.752
			2.1000	-3476.41	398.09	0.07	0.428	27.772	347.828
			4.2000	-3435.47	398.09	0.07	0.428	37.088	-39.580
STORY2	C11	XKIRI MIN							
			0.0000	-6271.73	20.66	-17.53	0.175	-71.231	47.186
			2.1000	-6217.15	20.66	-17.53	0.175	-34.417	3.803
			4.2000	-6162.56	20.66	-17.53	0.175	-7.064	-488.226
STORY2	C11	XKANAN MAX							
			0.0000	-3385.38	27.81	2.49	0.349	33.691	63.336
			2.1000	-3344.44	27.81	2.49	0.349	28.453	4.938
			4.2000	-3303.50	27.81	2.49	0.349	32.676	416.647
STORY2	C11	XKANAN MIN							
			0.0000	-6271.73	-360.79	-15.10	0.005	-65.456	-1098.667
			2.1000	-6217.15	-360.79	-15.10	0.005	-33.736	-341.075
			4.2000	-6162.56	-360.79	-15.10	0.005	-11.476	-53.460
STORY2	C11	YKIRI MAX							
			0.0000	-3347.96	137.46	15.71	0.349	131.227	395.919
			2.1000	-3307.02	137.46	15.71	0.349	98.230	107.246
			4.2000	-3266.09	137.46	15.71	0.349	76.017	103.992
STORY2	C11	YKIRI MIN							
			0.0000	-6271.73	-97.48	-12.66	-0.060	-31.590	-305.412
			2.1000	-6217.15	-97.48	-12.66	-0.060	-4.996	-100.710
			4.2000	-6162.56	-97.48	-12.66	-0.060	12.562	-181.426

STORY2	C11	YKANAN MAX						
			0.0000	-3586.84	134.78	-7.39	0.494	-18.455	390.498
			2.1000	-3545.90	134.78	-7.39	0.494	-2.946	107.463
			4.2000	-3504.97	134.78	-7.39	0.494	21.598	109.847
STORY2	C11	YKANAN MIN						
			0.0000	-6271.73	-100.16	-30.75	0.223	-168.767	-310.833
			2.1000	-6217.15	-100.16	-30.75	0.223	-104.194	-100.493
			4.2000	-6162.56	-100.16	-30.75	0.223	-50.405	-175.571
STORY1	C11	XKIRI MAX						
			0.0000	-3846.53	388.30	18.80	0.147	91.849	1162.496
			1.1000	-3825.09	388.30	18.80	0.147	72.899	738.520
			2.2000	-3803.65	388.30	18.80	0.147	59.548	323.690
STORY1	C11	XKIRI MIN						
			0.0000	-6875.99	20.00	-38.92	0.053	-108.998	16.326
			1.1000	-6847.39	20.00	-38.92	0.053	-67.915	-7.973
			2.2000	-6818.80	20.00	-38.92	0.053	-32.430	-37.736
STORY1	C11	XKANAN MAX						
			0.0000	-3729.83	27.06	20.77	0.096	93.745	21.790
			1.1000	-3708.38	27.06	20.77	0.096	72.623	-5.676
			2.2000	-3686.94	27.06	20.77	0.096	57.100	-27.679
STORY1	C11	XKANAN MIN						
			0.0000	-6875.99	-352.11	-36.95	-0.027	-107.102	-1133.134
			1.1000	-6847.39	-352.11	-36.95	-0.027	-68.191	-748.976
			2.2000	-6818.80	-352.11	-36.95	-0.027	-34.878	-373.965
STORY1	C11	YKIRI MAX						
			0.0000	-3684.79	133.91	79.65	0.096	320.871	363.147
			1.1000	-3663.35	133.91	79.65	0.096	235.069	219.009
			2.2000	-3641.91	133.91	79.65	0.096	155.435	83.241
STORY1	C11	YKIRI MIN						
			0.0000	-6875.99	-95.34	-15.25	-0.062	-12.820	-331.166
			1.1000	-6847.39	-95.34	-15.25	-0.062	2.318	-229.450
			2.2000	-6818.80	-95.34	-15.25	-0.062	12.145	-136.105
STORY1	C11	YKANAN MAX						
			0.0000	-3930.16	131.54	-8.93	0.182	-7.509	360.528
			1.1000	-3908.72	131.54	-8.93	0.182	3.957	218.993
			2.2000	-3887.28	131.54	-8.93	0.182	20.734	85.829
STORY1	C11	YKANAN MIN						
			0.0000	-6875.99	-97.71	-97.79	0.062	-336.124	-333.785
			1.1000	-6847.39	-97.71	-97.79	0.062	-230.361	-229.465
			2.2000	-6818.80	-97.71	-97.79	0.062	-130.765	-133.516

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY1	L=8.000		
Element	: B49	D=0.500	B=0.300	bf=0.300
Station Loc	: 7.650	ds=0.000	dct=0.050	dcb=0.050
Section ID	: BINDUK8M300X500	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

Positive Moment	Negative Moment	Special +Moment	Special -Moment
323.126	-494.812	323.126	-494.812

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	O/S #2	O/S #2	O/S #2	4.654E-04
Bottom (-2 Axis)	0.003	0.003	0.001	4.654E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
0.000	0.000	0.000	0.000	0.000

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
9.017E-04	6.732E-04	23.945	4.379	0.074	1.244

O/S #2 Reinforcing required exceeds maximum allowed

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY1	L=6.000		
Element	: B8	D=0.700	B=0.400	bf=0.400
Station Loc	: 5.650	ds=0.000	dct=0.045	dcb=0.045
Section ID	: BINDUK6M400X700	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

	Positive Moment	Negative Moment	Special +Moment	Special -Moment
	342.948	-603.175	342.948	-603.175

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	0.003	0.000	0.003	9.032E-04
Bottom (-2 Axis)	0.002	0.002	0.000	9.032E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
O/S #3	439.237	0.000	0.000	273.603

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.004	0.005	239.929	11.096	0.162	1.844

O/S #3 Shear stress exceeds maximum allowed

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=5.000	
Element	: C11	B=0.750 D=0.750	dc=0.046
Station Loc	: 0.000	E=23500000.00 fc=25000.000	Lt.Wt. Fac.=1.000
Section ID	: CL750X750	fy=400000.000 fys=240000.000	
Combo ID	: COMB19	RLLF=0.400	

Phi(Compression-Spiral):	0.700	Overstrength Factor:	1.25
Phi(Compression-Tied):	0.650		
Phi(Tension):	0.800		
Phi(Bending):	0.800		
Phi(Shear/Torsion):	0.750		

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

	Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
	O/S #2	5912.201	1937.242	1047.533	223.126	223.126

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.123	1.000	1.000	4.300
Minor Bending(M2)	1.000	1.123	1.000	1.000	4.300

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	0.001	424.842	579.677	136.571	424.842
Minor Shear(V3)	0.001	500.581	579.677	136.571	0.000

JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	N/A	N/A	N/A	N/A	N/A
Minor Shear(V3)	N/A	N/A	N/A	N/A	N/A

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
N/A	N/A

O/S #2 Reinforcing required exceeds maximum allowed

Notes:
N/A: Not Applicable
N/C: Not Calculated
N/N: Not Needed

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=8.000		
Element	: B55	D=0.500	B=0.300	bf=0.300
Station Loc	: 7.625	ds=0.000	dct=0.050	dcb=0.050
Section ID	: BINDUK8M300X500E=23500000.00		fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

	Positive Moment	Negative Moment	Special +Moment	Special -Moment
	58.765	-117.529	58.765	-117.529

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	8.688E-04	0.000	8.688E-04	4.654E-04
Bottom (-2 Axis)	4.654E-04	4.204E-04	0.000	4.654E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
O/S #3	94.674	84.073	10.602	38.932

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.001	0.001	38.046	4.379	0.074	1.244

O/S #3 Shear stress exceeds maximum allowed

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=6.000		
Element	: B9	D=0.700	B=0.400	bf=0.400
Station Loc	: 5.625	ds=0.000	dct=0.045	dcb=0.045
Section ID	: BINDUK6M400X700	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

Positive Moment	Negative Moment	Special +Moment	Special -Moment
629.652	-820.140	629.652	-820.140

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	0.005	0.000	0.005	9.032E-04
Bottom (-2 Axis)	0.003	0.003	0.000	9.032E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
O/S #3	531.273	0.000	531.273	427.646

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.002	0.002	92.038	11.096	0.162	1.844

O/S #3 Shear stress exceeds maximum allowed

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=5.000		
Element	: C12	B=0.750	D=0.750	dc=0.046
Station Loc	: 0.000	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Section ID	: CL750X750	fy=400000.000	fys=240000.000	
Combo ID	: COMB19	RLLF=0.400		

Phi(Compression-Spiral):	0.700	Overstrength Factor:	1.25
Phi(Compression-Tied):	0.650		
Phi(Tension):	0.800		
Phi(Bending):	0.800		
Phi(Shear/Torsion):	0.750		

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
0.007	466.420	77.672	726.182	17.603	17.603

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.009	1.000	1.000	4.300
Minor Bending(M2)	1.000	1.009	1.000	1.000	4.300

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	0.002	243.246	0.000	243.246	243.246
Minor Shear(V3)	0.001	55.895	0.000	136.571	55.895

JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	N/A	N/A	N/A	N/A	N/A
Minor Shear(V3)	N/A	N/A	N/A	N/A	N/A

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
N/A	N/A

Notes:
N/A: Not Applicable
N/C: Not Calculated
N/N: Not Needed

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY3	L=8.000		
Element	: B55	D=0.500	B=0.300	bf=0.300
Station Loc	: 7.550	ds=0.000	dct=0.050	dcb=0.050
Section ID	: BINDUK8M300X500	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

	Positive Moment	Negative Moment	Special +Moment	Special -Moment
	60.020	-120.040	60.020	-120.040

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	8.887E-04	0.000	8.887E-04	4.654E-04
Bottom (-2 Axis)	4.654E-04	4.297E-04	0.000	4.654E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
O/S #3	95.730	84.073	11.657	40.263

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.001	9.719E-04	34.567	4.379	0.074	1.244

O/S #3 Shear stress exceeds maximum allowed

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=6.000		
Element	: B9	D=0.700	B=0.400	bf=0.400
Station Loc	: 5.550	ds=0.000	dct=0.045	dcb=0.045
Section ID	: BINDUK6M400X700E=23500000.00		fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

Positive Moment	Negative Moment	Special +Moment	Special -Moment
573.239	-736.206	573.239	-736.206

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	0.004	0.000	0.004	9.032E-04
Bottom (-2 Axis)	0.003	0.003	0.000	9.032E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
O/S #3	499.703	0.000	499.703	400.079

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.002	0.002	90.251	11.096	0.162	1.844

O/S #3 Shear stress exceeds maximum allowed

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=5.000		
Element	: C11	B=0.900	D=0.900	dc=0.046
Station Loc	: 4.300	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Section ID	: C900X900	fy=400000.000	fys=240000.000	
Combo ID	: COMB19	RLLF=0.400		

Phi(Compression-Spiral):	7.000	Overstrength Factor:	1.25
Phi(Compression-Tied):	0.650		
Phi(Tension):	0.800		
Phi(Bending):	0.800		
Phi(Shear/Torsion):	0.750		

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
0.008	6006.571	268.178	350.738	253.718	253.718

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.057	1.000	1.000	4.300
Minor Bending(M2)	1.000	1.057	1.000	1.000	4.300

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	0.001	415.863	736.298	198.789	415.863
Minor Shear(V3)	0.000	61.405	736.298	0.000	61.405

JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	O/S #34	415.863	3282.469	3026.614	0.810
Minor Shear(V3)	0.223	61.405	674.438	3026.614	0.810

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
0.449	0.066

O/S #34 Joint shear ratio exceeds limit

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=5.000		
Element	: C11	B=0.900	D=0.900	dc=0.046
Station Loc	: 4.200	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Section ID	: C900X900	fy=400000.000	fys=240000.000	
Combo ID	: COMB19	RLLF=0.400		

Phi(Compression-Spiral):	0.700	Overstrength Factor:	1.25
Phi(Compression-Tied):	0.650		
Phi(Tension):	0.800		
Phi(Bending):	0.800		
Phi(Shear/Torsion):	0.750		

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
0.008	6127.209	273.244	482.280	258.813	258.813

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.056	1.000	1.000	4.200
Minor Bending(M2)	1.000	1.056	1.000	1.000	4.200

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	0.001	467.428	741.469	198.789	467.428
Minor Shear(V3)	0.000	61.181	741.469	0.000	61.181

JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	O/S #34	467.428	3234.962	3026.614	0.810
Minor Shear(V3)	0.222	61.181	671.641	3026.614	0.810

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
0.503	0.065

O/S #34 Joint shear ratio exceeds limit

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY1	L=8.000		
Element	: B49	D=0.500	B=0.300	bf=0.300
Station Loc	: 0.475	ds=0.000	dct=0.050	dcb=0.050
Section ID	: BINDUK8M300X500E=23500000.00		fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

Positive Moment	Negative Moment	Special +Moment	Special -Moment
57.997	-115.995	57.997	-115.995

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	8.567E-04	0.000	8.567E-04	4.654E-04
Bottom (-2 Axis)	4.654E-04	4.148E-04	0.000	4.654E-04

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
3.894E-04	115.613	84.073	31.541	39.551

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
6.649E-04	4.964E-04	17.656	4.379	0.074	1.244

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-mm (Summary)

Level	: STORY1	L=8000.000		
Element	: B49	D=500.000	B=300.000	bf=300.000
Station Loc	: 475.000	ds=0.000	dct=50.000	dcb=50.000
Section ID	: BINDUK8M300X500E	=23.500	fc=0.025	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=0.400	fys=0.240	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

	Positive Moment	Negative Moment	Special +Moment	Special -Moment
	57997.426	-115994.851	57997.426	-115994.851

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	856.686	0.000	856.686	465.396
Bottom (-2 Axis)	465.396	414.753	0.000	465.396

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
0.389	115.613	84.073	31.541	39.551

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.665	496.414	17655.892	4378.782	73765.729	1244.400

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY1	L=6.000		
Element	: B8	D=0.800	B=0.500	bf=0.500
Station Loc	: 0.475	ds=0.000	dct=0.080	dcb=0.080
Section ID	: BINDUK6M500X800E=23500000.00		fc=25000.000	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=400000.000	fys=240000.000	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

	Positive Moment	Negative Moment	Special +Moment	Special -Moment
	360.838	-601.043	360.838	-601.043

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	0.003	0.000	0.003	0.001
Bottom (-2 Axis)	0.002	0.002	0.000	0.001

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
0.004	468.142	0.000	468.142	292.846

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.000	0.000	17.758	19.162	0.248	2.244

ACI 318-99 BEAM SECTION DESIGN Type: Sway Special Units: KN-mm (Summary)

Level	: STORY1	L=6000.000		
Element	: B8	D=800.000	B=500.000	bf=500.000
Station Loc	: 475.000	ds=0.000	dct=80.000	dcb=80.000
Section ID	: BINDUK6M500X800E	=23.500	fc=0.025	Lt.Wt. Fac.=1.000
Combo ID	: COMB19	fy=0.400	fys=0.240	

Phi(Bending): 0.800
Phi(Shear): 0.750
Phi(Torsion): 0.750

Design Moments, M3

Positive Moment	Negative Moment	Special +Moment	Special -Moment
360838.192	-601043.287	360838.192	-601043.287

Flexural Reinforcement for Moment, M3

	Required Rebar	+Moment Rebar	-Moment Rebar	Minimum Rebar
Top (+2 Axis)	2816.013	0.000	2816.013	1241.056
Bottom (-2 Axis)	1636.122	1636.122	0.000	1241.056

Shear Reinforcement for Shear, V2

Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
3.612	468.142	0.000	468.142	292.846

Reinforcement for Torsion, T

Rebar At	Rebar Al	Torsion Tu	Critical Phi*Tcr	Area Ao	Perimeter Ph
0.000	0.000	17758.210	19161.849	248483.229	2244.400

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-m (Summary)

Level	: STORY2	L=5.000		
Element	: C11	B=0.950	D=0.950	dc=0.046
Station Loc	: 4.200	E=23500000.00	fc=25000.000	Lt.Wt. Fac.=1.000
Section ID	: C950X950	fy=400000.000	fys=240000.000	
Combo ID	: COMB19	RLLF=0.400		

Phi(Compression-Spiral):	0.700	Overstrength Factor:	1.25
Phi(Compression-Tied):	0.650		
Phi(Tension):	0.800		
Phi(Bending):	0.800		
Phi(Shear/Torsion):	0.750		

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

	Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
	0.009	6162.564	281.604	435.278	269.551	269.551

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.045	1.000	1.000	4.200
Minor Bending(M2)	1.000	1.045	1.000	1.000	4.200

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	0.001	457.247	799.928	222.119	457.247
Minor Shear(V3)	0.000	60.144	799.928	0.000	60.144

JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	0.935	457.247	3152.088	3372.246	0.903
Minor Shear(V3)	0.195	60.144	658.766	3372.246	0.903

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
0.428	0.056

ACI 318-99 COLUMN SECTION DESIGN Type: Sway Special Units: KN-mm (Summary)

Level	: STORY2	L=5000.000		
Element	: C11	B=950.000	D=950.000	dc=45.700
Station Loc	: 4200.000	E=23.500	fc=0.025	Lt.Wt. Fac.=1.000
Section ID	: C950X950	fy=0.400	fys=0.240	
Combo ID	: COMB19	RLLF=0.400		

Phi(Compression-Spiral):	0.700	Overstrength Factor: 1.25
Phi(Compression-Tied):	0.650	
Phi(Tension):	0.800	
Phi(Bending):	0.800	
Phi(Shear/Torsion):	0.750	

AXIAL FORCE & BIAXIAL MOMENT DESIGN FOR PU, M2, M3

Rebar Area	Design Pu	Design M2	Design M3	Minimum M2	Minimum M3
9025.000	6162.564	281603.941	435277.902	269550.540	269550.540

AXIAL FORCE & BIAXIAL MOMENT FACTORS

	Cm Factor	Delta_ns Factor	Delta_s Factor	K Factor	L Length
Major Bending(M3)	1.000	1.045	1.000	1.000	4200.000
Minor Bending(M2)	1.000	1.045	1.000	1.000	4200.000

SHEAR DESIGN FOR V2,V3

	Design Rebar	Shear Vu	Shear phi*Vc	Shear phi*Vs	Shear Vp
Major Shear(V2)	1.365	457.247	799.928	222.119	457.247
Minor Shear(V3)	0.000	60.144	799.928	0.000	60.144

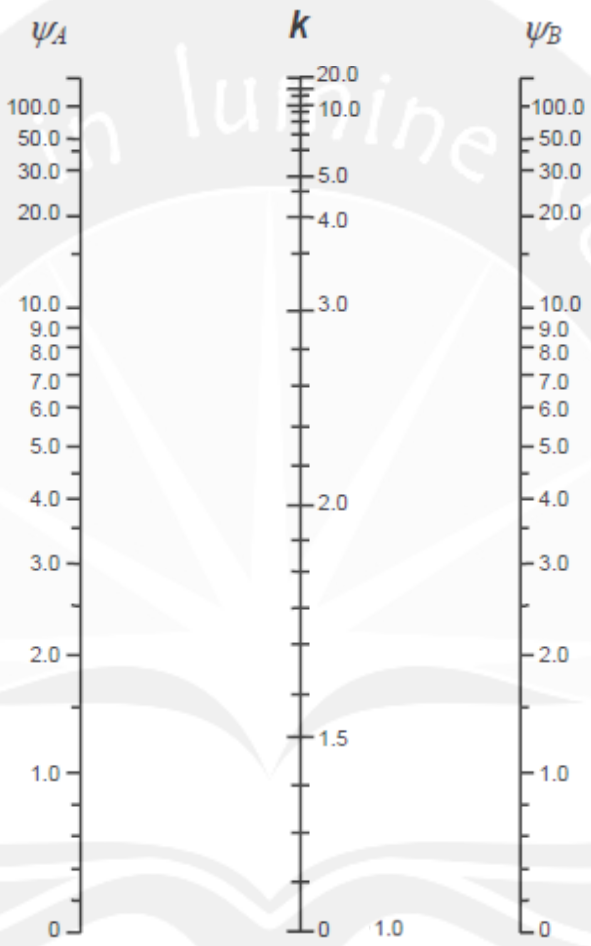
JOINT SHEAR DESIGN

	Joint Shear Ratio	Shear VuTop	Shear VuTot	Shear phi*Vc	Joint Area
Major Shear(V2)	0.935	457.247	3152.088	0.003	902500.000
Minor Shear(V3)	0.195	60.144	658.766	0.003	902500.000

(6/5) BEAM/COLUMN CAPACITY RATIOS

Major Ratio	Minor Ratio
0.428	0.056

B.4. Nomogram Komponen Struktur Bergoyang



Komponen struktur bergoyang
(b

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