CHAPTER V

CONCLUSIONS AND SUGGESTIONS

5.1. Conclusions

After analyzing and designing "Cibubur Apartment" building based on Indonesian Concrete Code SNI 03 - 2847 – 2002 and Indonesian Earthquake Code SNI 03 - 1726 - 2002, some conclusions can be taken:

- The entire slab has the thickness 120 mm and using reinforcement bar 10 mm, most of them are designed as two-way slab and the other are designed as one-way slab,
- Slab reinforcement of roof slab which are designed as two-way slab, most of them use P10-200 of tension and compression reinforcement in x and y direction. Roof slab type 10,12,and 14 use P10-200 of tension and compression reinforcement in x direction, whereas tension and compression reinforcement in y direction use P10-200. Roof slab type 5 and 11 use P10-200 of tension and compression reinforcement in x direction, whereas tension and compression reinforcement in y direction use P10-200. Slab reinforcement for roof slab which is designed as one-way slab use P10-200 of tension and compression reinforcement in x direction and y direction.

- Slab reinforcement of floor slab which are designed as two-way slab, most of them use P10-200 of tension and compression reinforcement in x and y direction. Floor slab type 21 use P10-200 of tension and compression reinforcement in x and y direction. Floor slab type 1,17, and 20 use P10-200 of tension and compression reinforcement in x and y direction. Floor slab type 19 use P10-200 of tension and compression reinforcement in x and y direction. Slab reinforcement for floor slab which is designed as one-way slab use P10-200 of tension and compression reinforcement in x direction,
- Thickness of Stair and landing is 150 mm, both of them use P10-150 of tension and compression reinforcement and P10-150 of shrinkage reinforcement,
- Dimension of beam (B1966) at story 14 is 350 mm in width and for thickness is 600 mm, longitudinal reinforcement for support (negative moment) is 6D20 as top reinforcement, for support area (positive moment) is 4D20 as bottom reinforcement, longitudinal reinforcement for midspan (positive moment) 4D20 as top reinforcement and bottom reinforcement,
- Dimension of column (C170) at story 14 is 600 mm in width and 600 mm in height, longitudinal reinforcement has 20D20, and P10–100 of transversal reinforcement.

5.2. Suggestions

- Before designing a structure that is very important if we have understand about the codes in SNI 03 - 2847 - 2002, SNI 03 - 1729 - 2002 and SNI 03 - 1726 – 2002,
- Input data in ETABS carefully so the output that will be used for design will be correct,
- Structural design for building which has similarity form with T-shape, U-shape, or L-shape, it is better considering about dilatation system as connection between two main building to avoid serious damage of structural component if it is shaken by earthquake. By using dilatation, damage will occur at the connection part as the effect of collision between two buildings and structural failure can be prevented, so the building is more safe and reparation cost is cheaper.
- Other alternative in structural design for building which has similarity form as mentioned above, by reducing the strength of structural element on connection area, in other words the strength of structural component on the connection area are more weaker than structural component on two main buildings, so if the building is shaken by earthquake, structural failure is expected will be occured on the connection area, therefore structural failure on the two main building can be prevented. The disadvantage of this method is reparation cost is more expensive.

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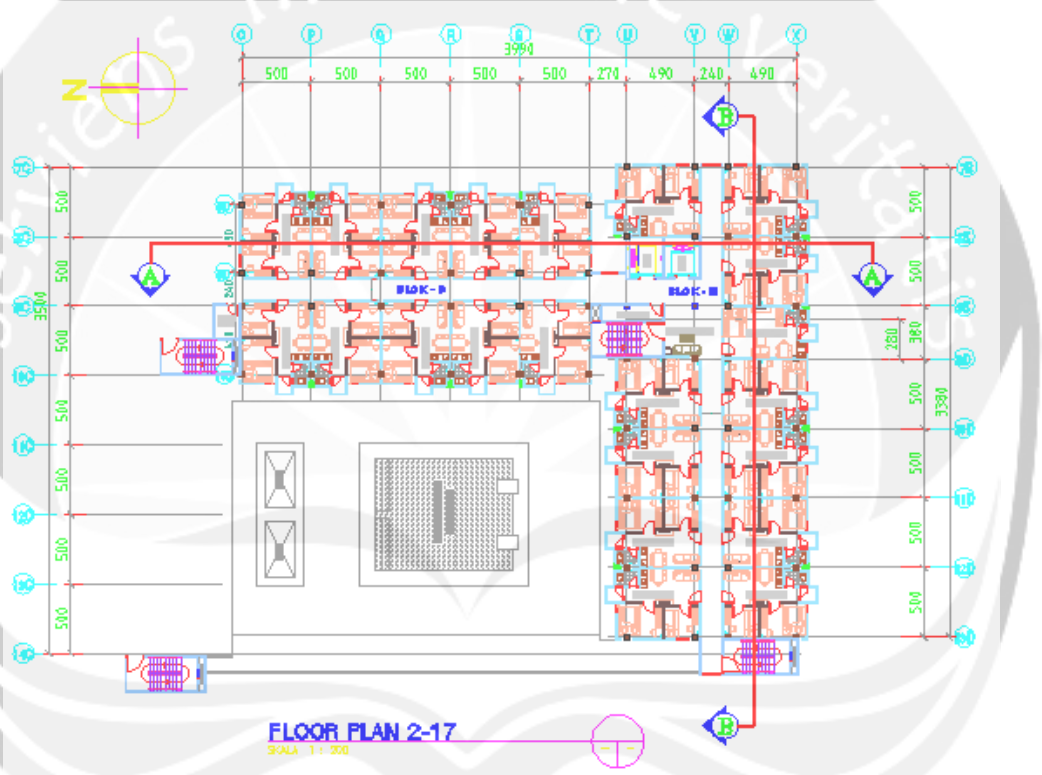
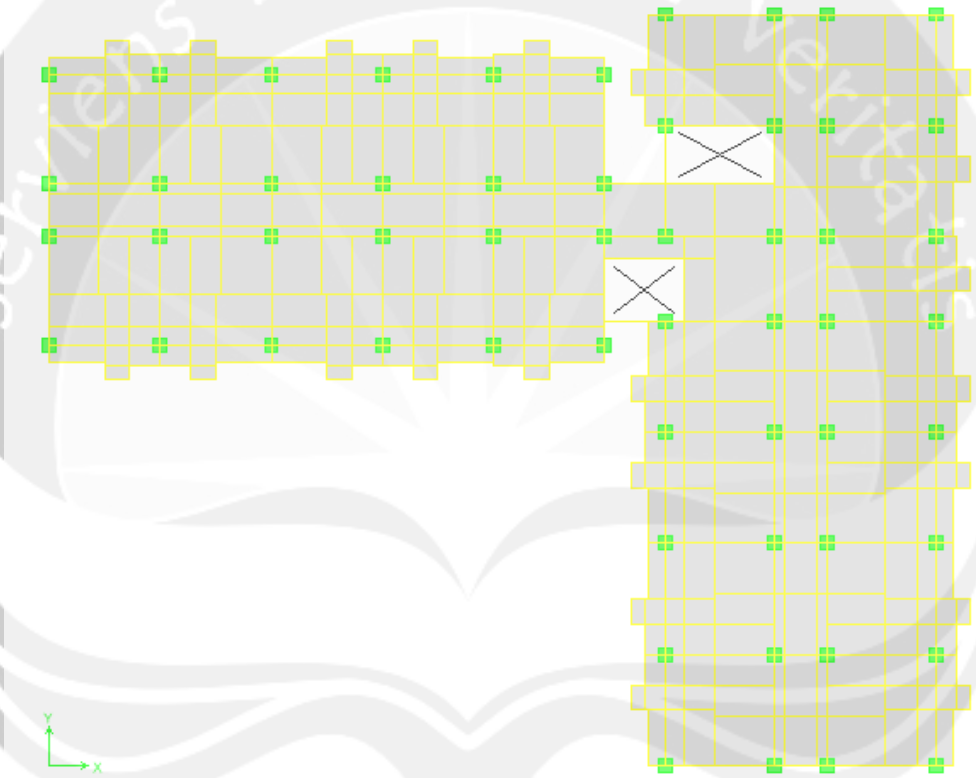
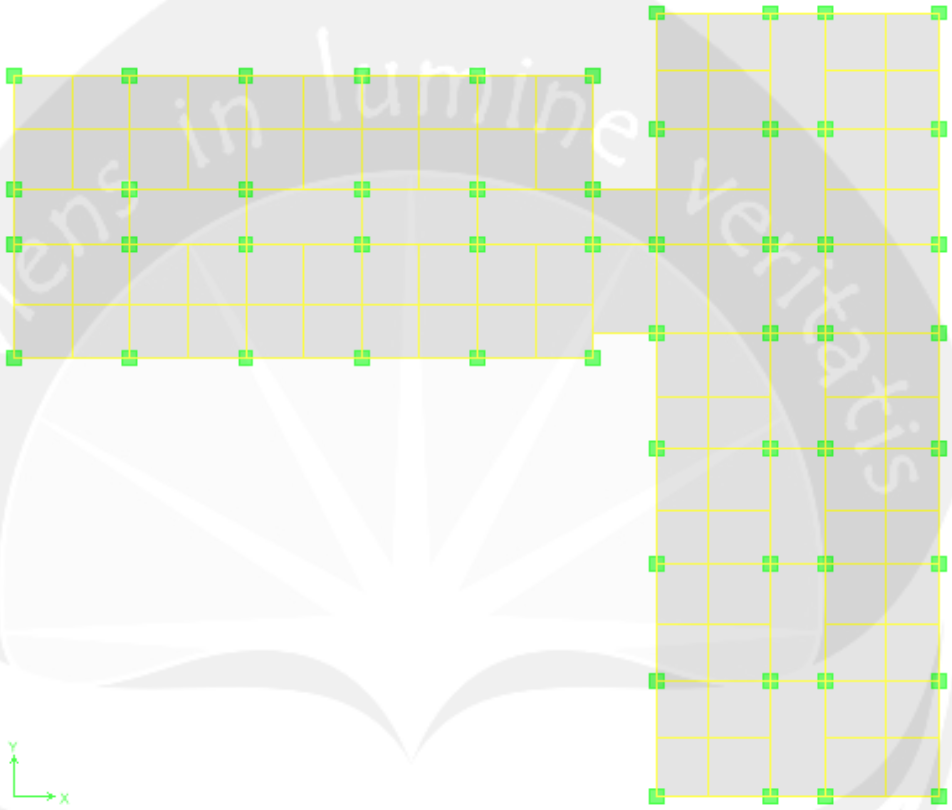
SNI – 2847 – 2002*, "Standar Perencanaan Perhitungan Struktur Beton untuk Bangunan Gedung"*, Departemen Permukiman dan Prasarana Wilayah, Badan Standarisasi Nasional.

APPENDIX

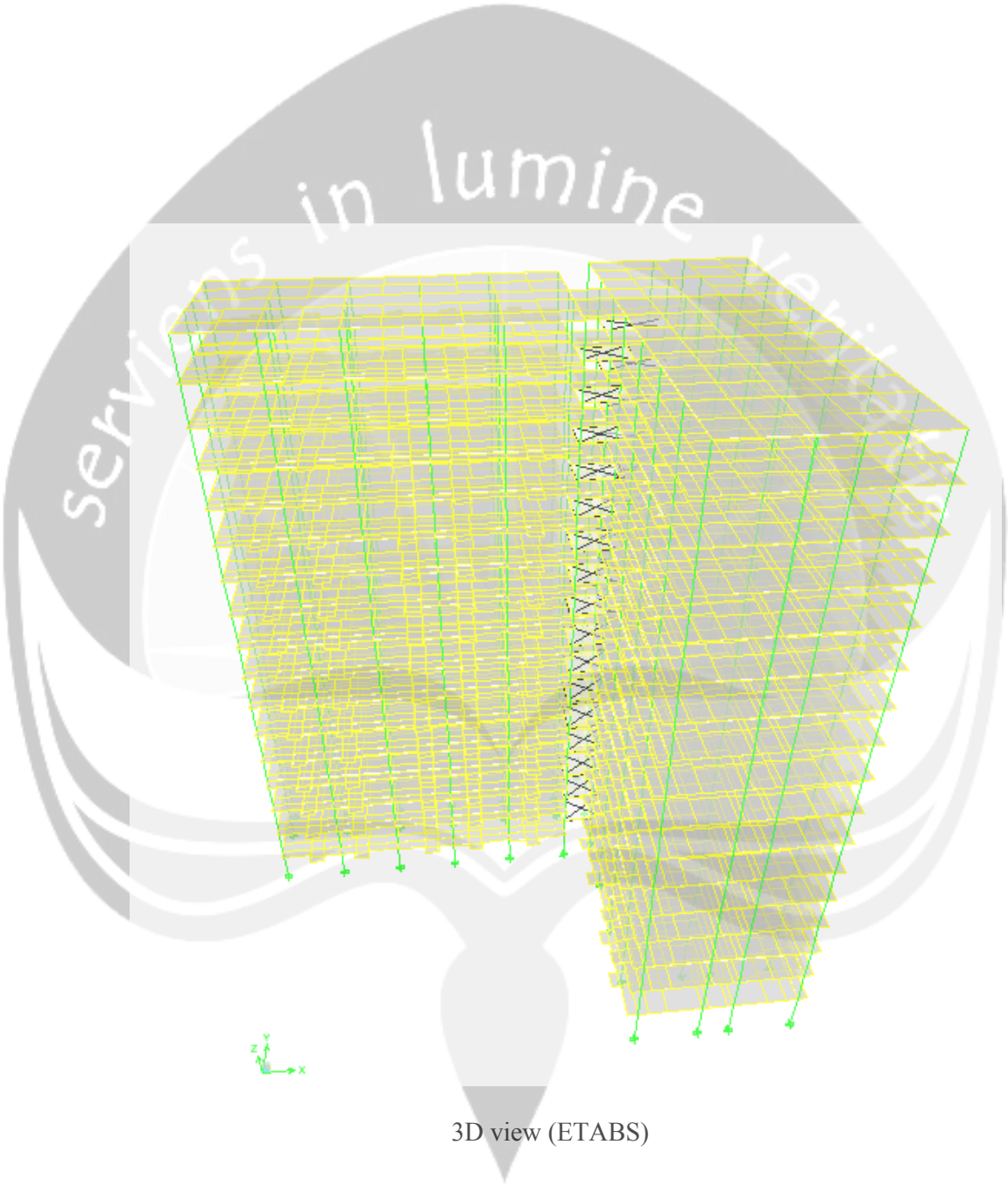

N
BLOK-B
BLOK-A
FLOOR PLAN 2-17
SKALA 1 : 200



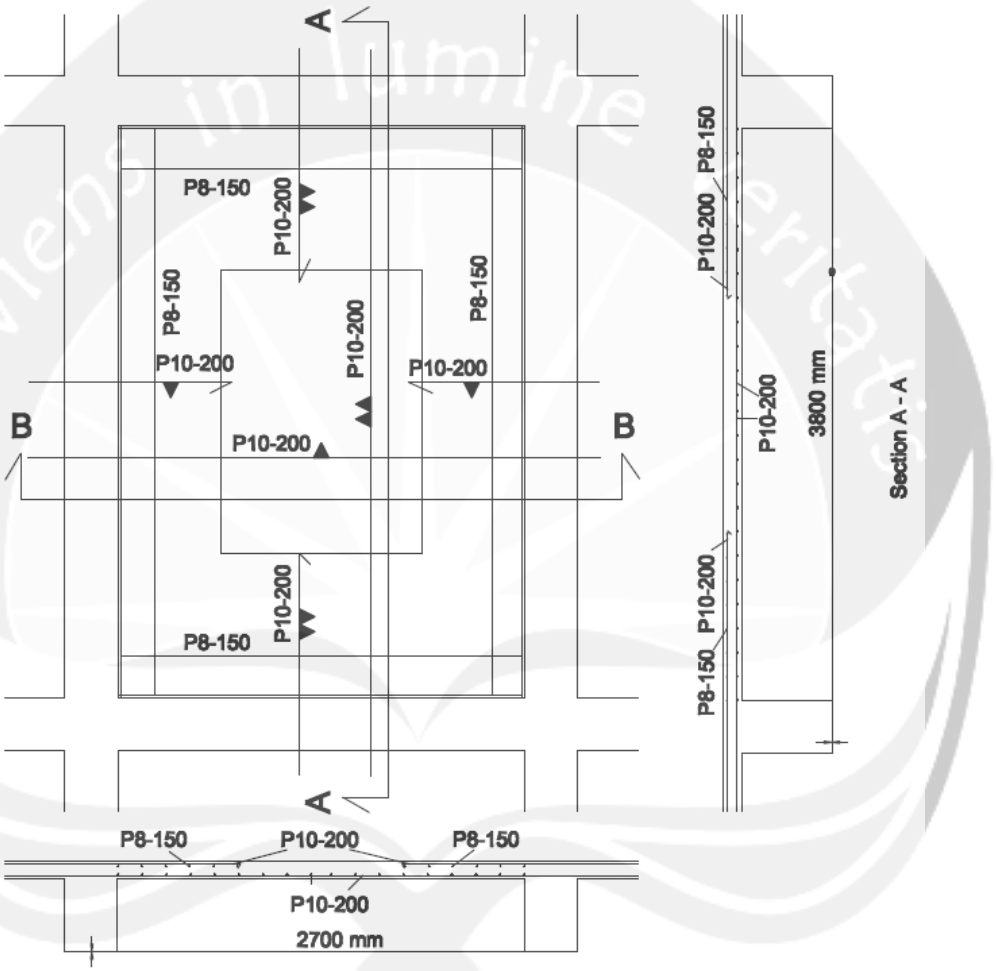
Floor plan typical (ETABS)



Floor plan for roof floor (ETABS)

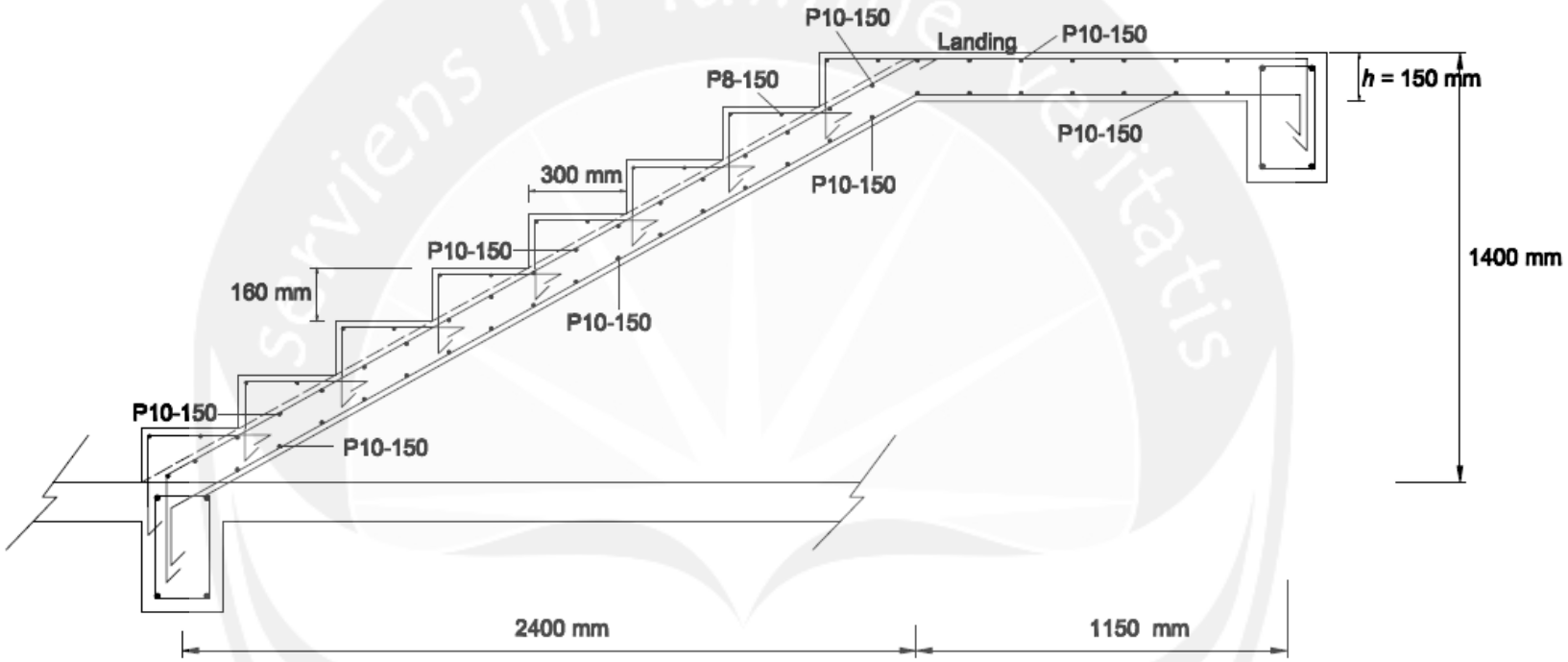


3D view (ETABS)

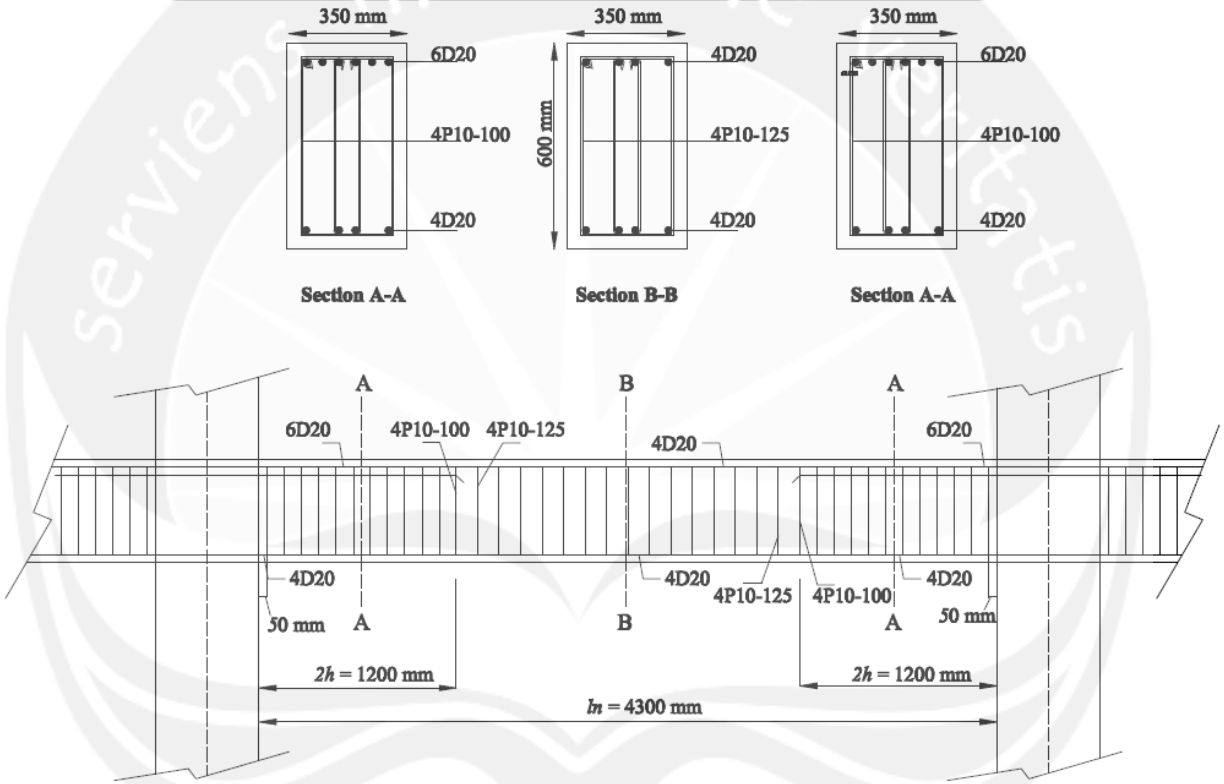


Section B - B

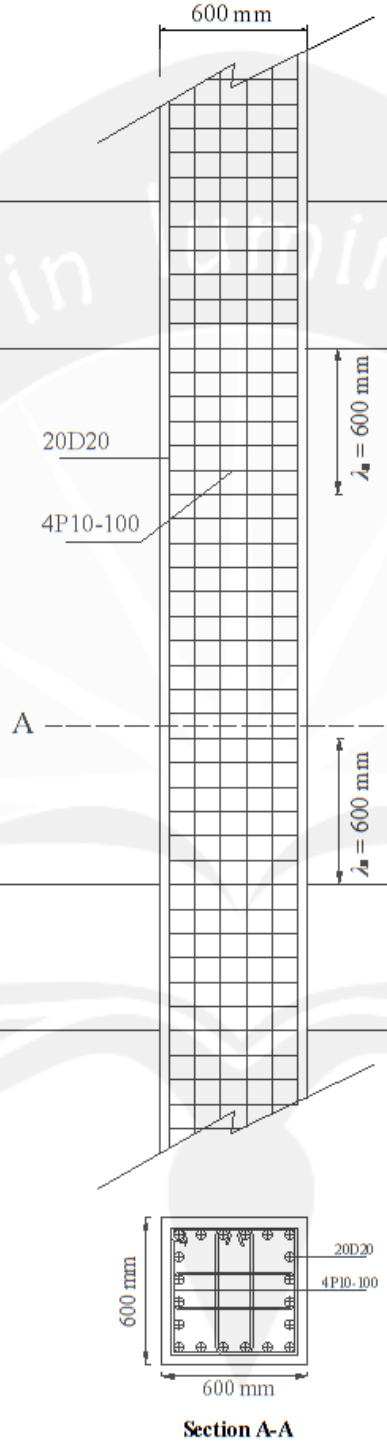
Roof Slab Type 5



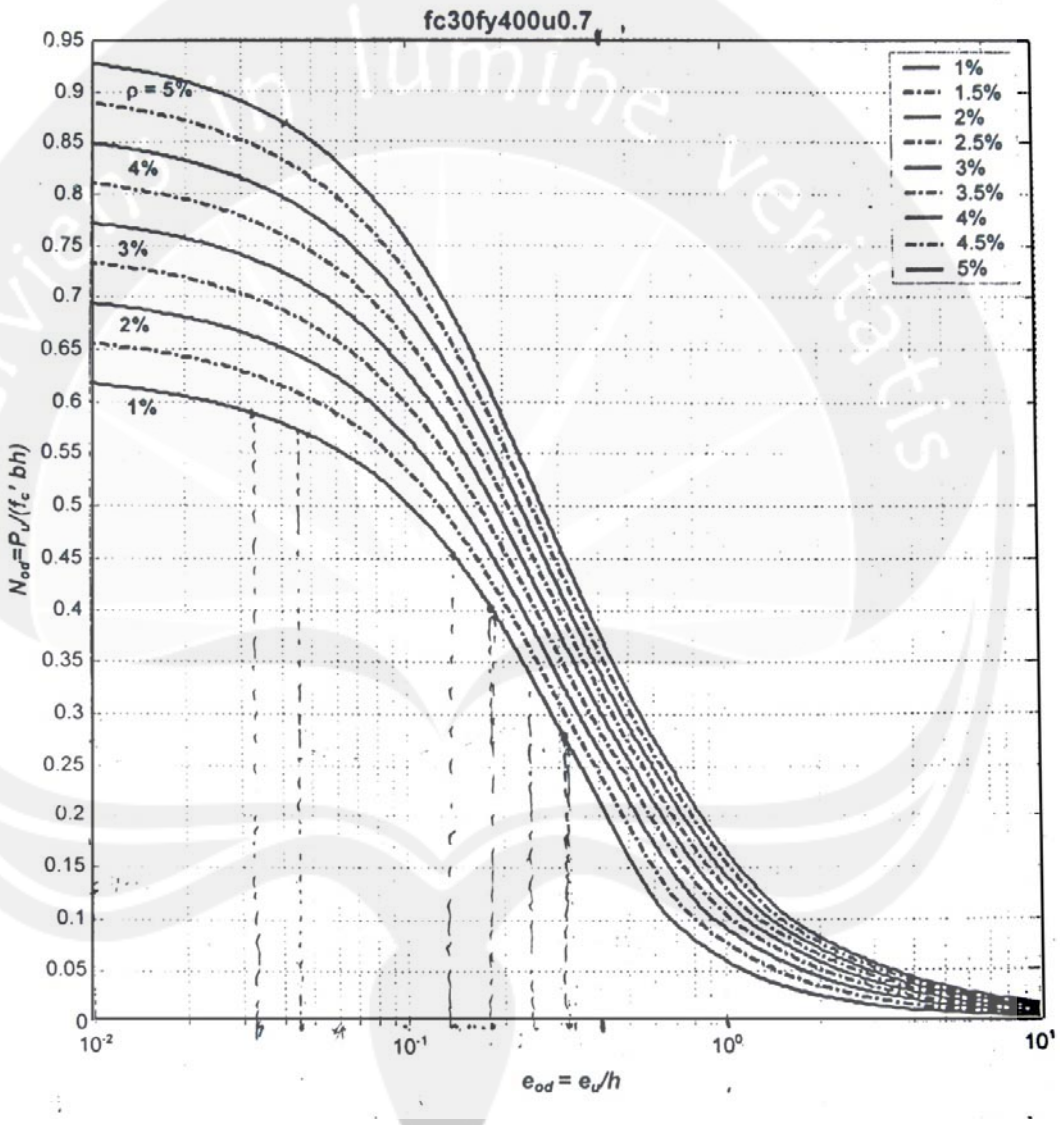
Stair Reinforcement



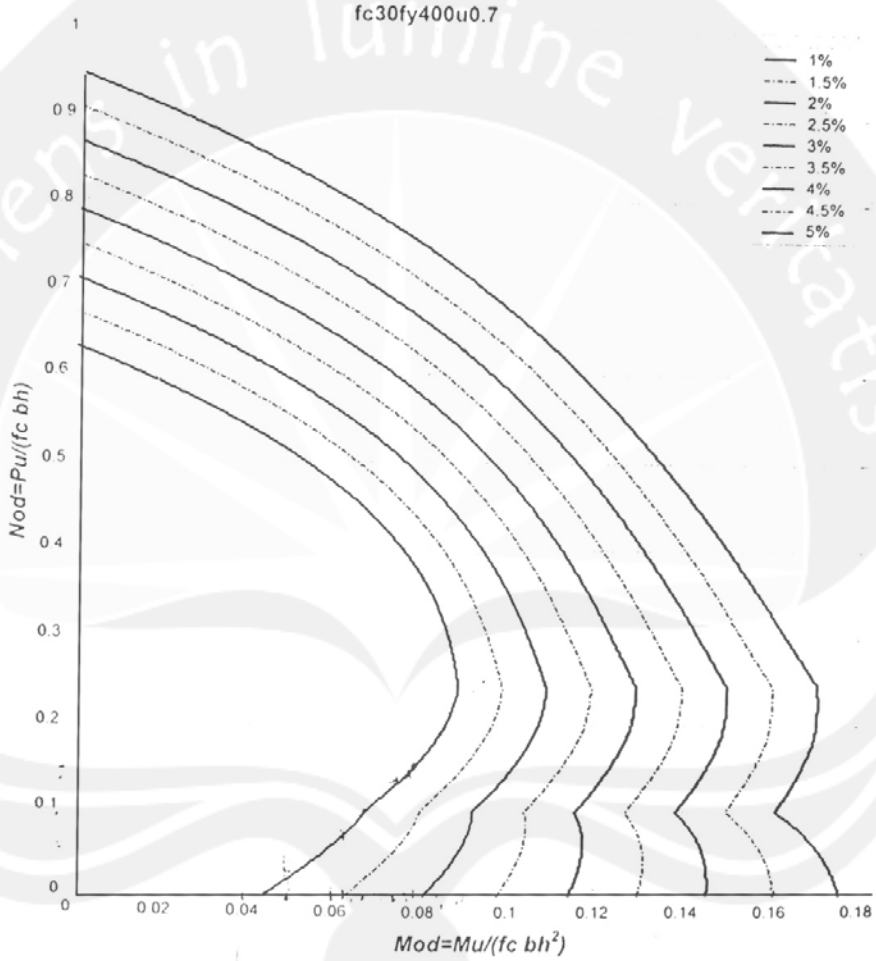
Beam Reinforcement of B298



Column reinforcement of C38



$N_{od} - e_{od}$ Curve



$N_{od} - M_{od}$ Curve

Tabel 13.3.1

Momen di dalam pelat persegi yang menumpu pada keempat tepinya akibat beban terbagi rata

				l_y/l_x	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3	2,4	2,5	>2,5
I		Mlx	=	+ 0,001 qlx^2 X	44	52	59	66	73	78	84	88	93	97	100	103	106	108	110	112	125
		Mly	=	+ 0,001 qlx^2 X	44	45	45	44	44	43	41	40	39	38	37	36	35	34	33	32	25
II		Mlx	=	+ 0,001 qlx^2 X	21	25	28	31	34	36	37	38	40	40	41	41	41	42	42	42	42
		Mly	=	+ 0,001 qlx^2 X	21	21	20	19	18	17	16	14	13	12	12	11	11	11	10	10	8
		Mtx	=	- 0,001 qlx^2 X	52	59	64	69	73	76	79	81	82	83	83	83	83	83	83	83	83
		Mty	=	- 0,001 qlx^2 X	52	54	56	57	57	57	57	57	57	57	57	57	57	57	57	57	57
III		Mlx	=	+ 0,001 qlx^2 X	28	33	38	42	45	48	51	53	55	57	58	59	59	60	61	61	63
		Mly	=	+ 0,001 qlx^2 X	28	28	28	27	26	25	23	23	22	21	19	18	17	17	16	16	13
		Mtx	=	- 0,001 qlx^2 X	68	77	85	92	98	103	107	111	113	116	118	119	120	121	122	122	125
		Mty	=	- 0,001 qlx^2 X	68	72	74	76	77	77	78	78	78	78	79	79	79	79	79	79	79
IVA		Mlx	=	+ 0,001 qlx^2 X	22	28	34	42	49	55	62	68	74	80	85	89	93	97	100	103	125
		Mly	=	+ 0,001 qlx^2 X	32	35	37	39	40	41	41	41	41	40	39	38	37	36	35	35	25
		Mty	=	- 0,001 qlx^2 X	70	79	87	94	100	105	109	112	115	117	119	120	121	122	123	123	125
IVB		Mlx	=	+ 0,001 qlx^2 X	32	34	36	38	39	40	41	41	42	42	42	42	42	42	42	42	42
		Mly	=	+ 0,001 qlx^2 X	22	20	18	17	15	14	13	12	11	10	10	10	9	9	9	9	8
		Mtx	=	- 0,001 qlx^2 X	70	74	77	79	81	82	83	84	84	84	84	84	83	83	83	83	83
VA		Mtx	=	+ 0,001 qlx^2 X	31	38	45	53	60	66	72	78	83	88	92	96	99	102	105	108	125
		Mly	=	+ 0,001 qlx^2 X	37	39	41	41	42	42	41	41	40	39	38	37	36	35	34	33	25
		mty	=	- 0,001 qlx^2 X	84	92	99	104	109	112	115	117	119	121	122	122	123	123	124	124	125
VB		Mlx	=	+ 0,001 qlx^2 X	37	41	45	48	51	53	55	56	58	59	60	60	60	61	61	62	63
		Mly	=	+ 0,001 qlx^2 X	31	30	28	27	25	24	22	21	20	19	18	17	17	16	16	15	13
		Mtx	=	- 0,001 qlx^2 X	84	92	98	103	108	111	114	117	119	120	121	122	122	123	123	124	125
VIA		Mlx	=	+ 0,001 qlx^2 X	21	26	31	36	40	43	46	49	51	53	55	56	57	58	59	60	63
		Mly	=	+ 0,001 qlx^2 X	26	27	28	28	27	26	25	23	22	21	21	20	20	19	19	18	18
		Mtx	=	- 0,001 qlx^2 X	55	65	74	82	89	94	99	103	106	110	114	116	117	118	119	120	123
		Mty	=	- 0,001 qlx^2 X	60	65	69	72	74	76	77	78	78	78	78	78	78	78	78	78	79
VIB		Mlx	=	+ 0,001 qlx^2 X	26	29	32	35	36	38	39	40	40	41	41	42	42	42	42	42	42
		Mly	=	+ 0,001 qlx^2 X	21	20	19	18	17	15	14	13	12	12	11	11	10	10	10	10	8
		Mtx	=	- 0,001 qlx^2 X	60	66	71	74	77	79	80	82	83	83	83	83	83	83	83	83	83
		Mty	=	- 0,001 qlx^2 X	55	57	57	57	58	57	57	57	57	57	57	57	57	57	57	57	57

—— = Terletak bebas

= Terjepit penuh

Tabel 13.3.2

Momen di dalam pelat persegi yang menumpu pada keempat tepinya akibat beban terbagi rata

		ly/lx	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2,0	2,1	2,2	2,3	2,4	2,5	>2,5
I		(Mlx) = 0,001 qlx² X	44	52	59	66	73	78	84	88	93	97	100	103	106	108	110	112	125
		(Mly) = 0,001 qlx² X	44	45	45	44	44	43	41	40	39	38	37	36	35	34	32	32	25
II	(Mlx) =	(Mtx) = 0,001 qlx² X	36	42	46	50	53	56	58	59	60	61	62	62	62	63	63	63	63
		(Mly) = 0,001 qlx² X	36	37	38	38	38	37	36	36	35	35	35	34	34	34	34	34	38
		(Mty) = 0,001 qlx² X	36	37	38	38	38	37	36	36	35	35	35	34	34	34	34	34	38
III	(Mlx) =	(Mtx) = 0,001 qlx² X	48	55	61	67	71	76	79	82	84	86	88	89	90	91	92	92	94
		(Mly) = 0,001 qlx² X	48	50	51	51	51	51	51	50	50	49	49	49	48	48	47	47	19
		(Mty) = 0,001 qlx² X	48	50	51	51	51	51	51	50	50	49	49	49	48	48	47	47	56
IVA		(Mlx) = 0,001 qlx² X	22	28	33	41	48	55	62	68	74	80	85	89	93	97	100	103	125
		(Mly) = 0,001 qlx² X	51	57	62	67	70	73	75	77	78	79	79	79	79	79	79	79	25
		(Mty) = 0,001 qlx² X	51	57	62	67	70	73	75	77	78	79	79	79	79	79	79	79	75
IVB	(Mlx) =	(Mtx) = 0,001 qlx² X	51	54	57	59	60	61	62	62	63	63	63	63	63	63	63	63	63
		(Mly) = 0,001 qlx² X	22	20	18	17	15	14	13	12	11	10	10	10	9	9	9	9	13
VA		(Mlx) = 0,001 qlx² X	31	38	45	53	59	66	72	78	83	88	92	96	99	102	105	108	125
		(Mly) = 0,001 qlx² X	60	65	69	73	75	77	78	79	79	80	80	80	79	79	79	79	25
		(Mty) = 0,001 qlx² X	60	65	69	73	75	77	78	79	79	80	80	80	79	79	79	79	75
VB	(Mlx) =	(Mlx) = 0,001 qlx² X	60	66	71	75	79	82	85	87	88	89	90	91	91	92	92	93	94
		(Mly) = 0,001 qlx² X	31	30	28	27	25	24	22	21	20	19	18	17	17	16	16	15	12
VIA	(Mlx) =	(Mtx) = 0,001 qlx² X	38	46	53	59	65	69	73	77	80	83	85	86	87	88	89	90	56
		(Mly) = 0,001 qlx² X	43	46	48	50	51	51	51	51	50	50	50	49	49	48	48	48	19
		(Mty) = 0,001 qlx² X	43	46	48	50	51	51	51	51	50	50	50	49	49	48	48	48	56
VIB	(Mlx) =	(Mtx) = 0,001 qlx² X	43	48	53	55	57	58	60	61	62	62	62	63	63	63	63	63	63
		(Mly) = 0,001 qlx² X	36	39	38	38	37	36	36	35	35	34	34	34	33	33	33	33	13
		(Mty) = 0,001 qlx² X	38	39	38	38	37	36	36	35	35	34	34	34	33	33	33	33	38

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▪▪▪▪▪▪ = Menerus atau terjepit elastis

serviens in lumine veritatis