

Project Report

Lampiran 3 Permodelan Struktur Apartemen

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height m	Master Story	Similar To	Splice Story	Splice Height m	Color
T1	A3	3	Yes	None	No		16744448
T1	A2	2.4	No	A3	No		16777088
T1	A1	3.5	Yes	None	No		8453888
T1	32	3.2	No	A1	No		8454016
T1	31	3.2	No	A1	No		8454016
T1	30	3.2	No	A1	No		8454016
T1	29	3.2	No	A1	No		8454016
T1	28	3.2	No	A1	No		8454016
T1	27	3.2	No	A1	No		8454016
T1	26	3.2	No	A1	No		8454016
T1	25	3.2	No	A1	No		8454016
T1	24	3.2	No	A1	No		8454016
T1	23	3.2	No	A1	No		8454016
T1	22	3.2	No	A1	No		8454016
T1	21	3.2	No	A1	No		8454016
T1	20	3.2	No	A1	No		8454016
T1	19	3.2	No	A1	No		8454016
T1	18	3.2	No	A1	No		8454016
T1	17	3.2	No	A1	No		8454016
T1	16	3.2	No	A1	No		8454016
T1	15	3.2	No	A1	No		8454016
T1	14	3.2	No	A1	No		8454016
T1	13	3.2	No	A1	No		8454016
T1	12	3.2	No	A1	No		8454016
T1	11	3.2	No	A1	No		8454016
T1	10	3.2	No	A1	No		8454016
T1	9	3.2	No	A1	No		8454016
T1	8	3.2	No	A1	No		8454016
T1	7	3.2	No	A1	No		8454016
T1	6	3.2	No	A1	No		8454016
T1	5	3.2	No	A1	No		8454016
T1	4	3.2	No	A1	No		8454016
T1	3	3.2	No	A1	No		8454016
T1	2	5.3	No	A1	No		8454016

1.2 Mass

Lampiran 4 Data Struktur Tabel 1.1 *Story Definitions*

Table 1.2 - Mass Source Definition

Name	Is Default	Include Lateral Mass?	Include Vertical Mass?	Lump Mass?	Source Self Mass?	Source Added Mass?	Source Load Patterns?	Move Mass Centroid?	Move Ratio X	Move Ratio Y	Load Pattern	Multiplier
MsSrc1	Yes	Yes	No	Yes	No	No	Yes	No			DL	1
MeSrc1											SDL	1
MsSrc1											LL	0.25

Table 1.3 - Centers Of Mass And Rigidity

Story	Diaphragm	Mass X kg	Mass Y kg	XCM m	YCM m	Cum Mass X kg	Cum Mass Y kg	XCCM m	YCCM m	XCR m	YCR m
32	D1	679894.71	679894.71	18.8839	6.2883	679894.71	679894.71	18.8839	6.2883	18.9005	5.3218
31	D1	665488.94	665488.94	18.8831	6.2873	1345383.65	1345383.65	18.8835	6.2878	18.9003	5.2416
30	D1	665488.94	665488.94	18.8831	6.2873	2010872.6	2010872.6	18.8834	6.2876	18.9001	5.1721
29	D1	665488.94	665488.94	18.8831	6.2873	2676361.54	2676361.54	18.8833	6.2875	18.9	5.1106
28	D1	665488.94	665488.94	18.8831	6.2873	3341850.48	3341850.48	18.8833	6.2875	18.8999	5.0543
27	D1	665488.94	665488.94	18.8831	6.2873	4007339.43	4007339.43	18.8833	6.2874	18.8997	5.0001
26	D1	665488.94	665488.94	18.8831	6.2873	4672828.37	4672828.37	18.8833	6.2874	18.8996	4.9463
25	D1	665488.94	665488.94	18.8831	6.2873	5338317.31	5338317.31	18.8832	6.2874	18.8995	4.8921
24	D1	672865.45	672865.45	18.8833	6.2960	6011162.76	6011162.76	18.8832	6.2887	18.8993	4.8402
23	D1	682092.08	682092.08	18.8836	6.3107	6693274.84	6693274.84	18.8833	6.2909	18.8992	4.7863
22	D1	682092.08	682092.08	18.8836	6.3107	7375366.92	7375366.92	18.8833	6.2927	18.8991	4.7216
21	D1	682092.08	682092.08	18.8836	6.3107	8057459.01	8057459.01	18.8833	6.2943	18.899	4.649
20	D1	682092.08	682092.08	18.8836	6.3107	8739551.09	8739551.09	18.8833	6.2956	18.8988	4.5894
19	D1	682092.08	682092.08	18.8836	6.3107	9421643.17	9421643.17	18.8834	6.2967	18.8987	4.4819
18	D1	682092.08	682092.08	18.8836	6.3107	10103735.25	10103735.25	18.8834	6.2976	18.8986	4.3854
17	D1	682092.08	682092.08	18.8836	6.3107	10785827.33	10785827.33	18.8834	6.2984	18.8985	4.2781
16	D1	682092.08	682092.08	18.8836	6.3107	11467919.41	11467919.41	18.8834	6.2992	18.8984	4.1563
15	D1	682092.08	682092.08	18.8836	6.3107	12150011.5	12150011.5	18.8834	6.2998	18.8983	4.0236
14	D1	682092.08	682092.08	18.8836	6.3107	12832103.58	12832103.58	18.8834	6.3004	18.8983	3.8714
13	D1	682092.08	682092.08	18.8836	6.3107	13514195.66	13514195.66	18.8834	6.3009	18.8982	3.6984
12	D1	682092.08	682092.08	18.8836	6.3107	14196287.74	14196287.74	18.8834	6.3014	18.8981	3.5008
11	D1	682092.08	682092.08	18.8836	6.3107	14878379.82	14878379.82	18.8834	6.3018	18.8981	3.2741
10	D1	682092.08	682092.08	18.8836	6.3107	15560471.9	15560471.9	18.8834	6.3022	18.898	3.013
9	D1	682092.08	682092.08	18.8836	6.3107	16242563.99	16242563.99	18.8834	6.3026	18.898	2.7115
8	D1	682092.08	682092.08	18.8836	6.3107	16924656.07	16924656.07	18.8834	6.3029	18.8981	2.3634
7	D1	682092.08	682092.08	18.8836	6.3107	17606748.15	17606748.15	18.8835	6.3032	18.8981	1.9624
6	D1	682092.08	682092.08	18.8836	6.3107	18288840.23	18288840.23	18.8835	6.3035	18.8982	1.5037
5	D1	682092.08	682092.08	18.8836	6.3107	18970932.31	18970932.31	18.8835	6.3037	18.8984	0.9883
4	D1	682092.08	682092.08	18.8836	6.3107	19653024.4	19653024.4	18.8835	6.304	18.8986	0.4246
3	D1	682092.08	682092.08	18.8836	6.3107	20335116.48	20335116.48	18.8835	6.3042	18.8989	-0.1007
2	D1	773352.06	773352.06	18.8855	6.3283	21108468.54	21108468.54	18.8835	6.3051	18.8993	0.1057
A1	D2	573670.06	573670.06	19.2398	6.4004	573670.06	573670.06	19.2398	6.4004	18.9008	5.4024
A2	D3	85267.89	85267.89	18.5027	4.6521	85267.89	85267.89	18.5027	4.6521	18.8975	5.3953
A3	D4	53491.56	53491.56	18.9532	5.4803	53491.56	53491.56	18.9532	5.4803	18.8996	5.6055

Lampiran 5 Data Struktur Tabel 1.2 *Mass Source Definition* & Tael 1.3 *Center Of Mass And Rigidity*

Table 1.4 - Mass Summary by Diaphragm

Story	Diaphragm	Mass X kg	Mass Y kg	Mass Moment of Inertia ton-m ²	X Mass Center m	Y Mass Center m
A3	D4	53491.56	53491.56	1080.4908	18.9532	5.4003
A2	D3	85267.89	85267.89	10442.2726	18.5027	4.6521
A1	D2	573670.06	573670.06	78008.406	19.2308	6.4004
32	D1	679894.71	679894.71	99065.5871	18.8839	6.2883
31	D1	665488.94	665488.94	96551.722	18.8831	6.2873
30	D1	665488.94	665488.94	96551.722	18.8831	6.2873
29	D1	665488.94	665488.94	96551.6945	18.8831	6.2873
28	D1	665488.94	665488.94	96551.6945	18.8831	6.2873
27	D1	665488.94	665488.94	96551.6945	18.8831	6.2873
26	D1	665488.94	665488.94	96551.6945	18.8831	6.2873
25	D1	665488.94	665488.94	96551.6945	18.8831	6.2873
24	D1	672865.45	672865.45	98050.4807	18.8833	6.2986
23	D1	682092.08	682092.08	99911.5096	18.8836	6.3107
22	D1	682092.08	682092.08	99911.5096	18.8836	6.3107
21	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
20	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
19	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
18	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
17	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
16	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
15	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
14	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
13	D1	682092.08	682092.08	99911.5096	18.8836	6.3107
12	D1	682092.08	682092.08	99911.5096	18.8836	6.3107
11	D1	682092.08	682092.08	99911.5096	18.8836	6.3107
10	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
9	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
8	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
7	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
6	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
5	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
4	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
3	D1	682092.08	682092.08	99911.4821	18.8836	6.3107
2	D1	773352.06	773352.06	118411.3581	18.8865	6.3283

Table 1.5 - Mass Summary by Story

Story	UX kg	UY kg	UZ kg
A3	53491.56	53491.56	0
A2	120592.1	120592.1	0
A1	598021.08	598021.08	0
32	711259.85	711259.85	0
31	696821.34	696821.34	0

Lampiran 6 Data Struktur Tabel 1.4 *Mass Summary by Diaphragm* & Tael 1.5 *Mass Summary by Story*

Table 1.5 - Mass Summary by Story (continued)

Story	UX kg	UY kg	UZ kg
30	696821.34	696821.34	0
29	696821.34	696821.34	0
28	696821.34	696821.34	0
27	696821.34	696821.34	0
26	696821.34	696821.34	0
25	696821.34	696821.34	0
24	704140.18	704140.18	0
23	713366.81	713366.81	0
22	713366.81	713366.81	0
21	713366.81	713366.81	0
20	713366.81	713366.81	0
19	713366.81	713366.81	0
18	713366.81	713366.81	0
17	713366.81	713366.81	0
16	713366.81	713366.81	0
15	713366.81	713366.81	0
14	713366.81	713366.81	0
13	713366.81	713366.81	0
12	713366.81	713366.81	0
11	713366.81	713366.81	0
10	713366.81	713366.81	0
9	713366.81	713366.81	0
8	713366.81	713366.81	0
7	713366.81	713366.81	0
6	713366.81	713366.81	0
5	713366.81	713366.81	0
4	713366.81	713366.81	0
3	713366.81	713366.81	0
2	829140.78	829140.78	0
Base	182069.57	182069.57	0

Table 1.6 - Mass Summary by Group

Group	Self Mass kg	Self Weight kN	Mass X kg	Mass Y kg	Mass Z kg
All	0	150613.4871	23057167.54	23057167.54	0

Lampiran 7 Data Struktur Tabel 1.5 *Mass Summary by Story (continued)*
& Tabel 1.6 *Mass Summary by Group*

2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

2.1 Materials

Table 2.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
400Psi	Concrete	Isotropic	Unknown	Gray&Dark	
A416Gr270	Tendon	Uniaxial	Unknown	Green	
A615Gr60	Rebar	Uniaxial	Unknown	Blue	
A992Fy50	Steel	Isotropic	Unknown	Yellow	
BjTS42	Rebar	Uniaxial	Unknown	Red	
fc30	Concrete	Isotropic	Unknown	16777088	
fc35	Concrete	Isotropic	Unknown	8453888	
fc40	Concrete	Isotropic	Unknown	8454016	
fc45	Concrete	Isotropic	Unknown	8454143	
fc50	Concrete	Isotropic	Unknown	8421631	

2.2 Frame Sections

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 4)

Name	Material	Shape	Color	Area cm ²	J cm ⁴	I33 cm ⁴	I22 cm ⁴	I23 cm ⁴	IMajor cm ⁴	IMinor cm ⁴
B20.35.a	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B20.35.b	fc30	Concrete Rectangular	Blue	700	60031.0	71458.3	23333.3			
B20.35.c	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B20.35.d	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B20.35.e	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B20.35.f	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B20.35.g	fc30	Concrete Rectangular	8454016	700	60031.9	71458.3	23333.3			
B25.40.a	fc30	Concrete Rectangular	8454016	1000	127345.2	133333.3	52083.3			
B25.40.b	fc30	Concrete Rectangular	8454016	1000	127345.2	133333.3	52083.3			
B30.45.a	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.b	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.c	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.d	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.e	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.f	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.g	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.h	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.i	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.j	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.k	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.l	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
B30.45.m	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
BK30.45.a	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
BK30.45.b	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
BK40.60	fc30	Concrete Rectangular	8454016	2400	751249.4	720000	320000			

Lampiran 8 Data Properti Tabel 2.1 *Material Properties General* & Tabel 2.2 *Frame Section Property Definitions Summary*

Table 2.2 - Frame Section Property Definitions - Summary (Part 1 of 4, continued)

Name	Material	Shape	Color	Area cm ²	J cm ⁴	I33 cm ⁴	I22 cm ⁴	I23 cm ⁴	IMajor cm ⁴	IMinor cm ⁴
G30.45.a	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.b	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.c	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.d	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.e	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.f	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.g	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.h	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.i	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.j	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.k	fc30	Concrete Rectangular	Green	1350	237700	227812.5	101250			
G30.45.l	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G30.45.m	fc30	Concrete Rectangular	8454016	1350	237700	227812.5	101250			
G35.50.a	fc30	Concrete Rectangular	8454016	1750	405757.3	364583.3	178645.8			
G35.50.b	fc30	Concrete Rectangular	8454016	1750	405757.3	364583.3	178645.8			
G40.55.a	fc30	Concrete Rectangular	8454016	2200	648266.7	554583.3	293333.3			
G40.55.b	fc30	Concrete Rectangular	8454016	2200	648266.7	554583.3	293333.3			
G40.55.c	fc30	Concrete Rectangular	8454016	2200	648266.7	554583.3	293333.3			
G40.60.a	fc30	Concrete Rectangular	8454016	2400	751249.4	720000	320000			
G40.60.b	fc30	Concrete Rectangular	8454016	2400	751249.4	720000	320000			
G45.60.a	fc30	Concrete Rectangular	8454016	2700	984074.4	810000	455625			
G45.60.b	fc30	Concrete Rectangular	8454016	2700	984074.4	810000	455625			
G45.60.c	fc30	Concrete Rectangular	8454016	2700	984074.4	810000	455625			
G45.60.d	fc30	Concrete Rectangular	8454016	2700	984074.4	810000	455625			
G60.45	fc30	Concrete Rectangular	8454016	2700	984074.4	455625	810000			
GK40.60.a	fc30	Concrete Rectangular	8454016	2400	751249.4	720000	320000			
GK40.60.b	fc30	Concrete Rectangular	8454016	2400	751249.4	720000	320000			
K40.40	fc30	Concrete Rectangular	8421631	1600	380533.3	213333.3	213333.3			
K50.100.a	fc45	Concrete Rectangular	8421631	5000	2861002.6	4166666.7	1041666.7			
K50.100.b	fc40	Concrete Rectangular	8421631	5000	2861002.6	4166666.7	1041666.7			
K50.120.a	fc50	Concrete Rectangular	8421631	6000	3690796.7	7200000	1250000			
K50.120.b	fc50	Concrete Rectangular	8421631	6000	3690796.7	7200000	1250000			
K60.140	fc50	Concrete Rectangular	8421631	8400	7366051.3	13720000	2520000			
KA40.50	fc30	Concrete Rectangular	8421631	2000	547416.7	416666.7	266666.7			
KT30.30	fc30	Concrete Rectangular	8421631	900	114075	67500	67500			

Lampiran 9 Data Properti Tabel 2.2 *Frame Section Property Definitions Summary (continued)*

2.3 Shell Sections

Table 2.3 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness mm	Deck Material	Deck Depth mm
B12	Slab	Shell-Thin	fc30	120		
Deck1	Deck	Membrane	4000Psi	162.5	A992Fy50	75
S12.a	Slab	Shell-Thin	fc30	120		
S12.b	Slab	Shell-Thin	fc30	120		
S12.c	Slab	Shell-Thin	fc30	120		
S12.e	Slab	Shell-Thin	fc30	120		
S15	Slab	Shell-Thin	fc30	150		
ST12	Slab	Shell-Thin	fc30	120		
ST15	Slab	Shell-Thin	fc30	150		
SW40.a	Wall	Shell-Thick	fc30	400		
SW40.b	Wall	Shell-Thick	fc30	400		
SW40.c	Wall	Shell-Thick	fc30	400		
SW40.d	Wall	Shell-Thick	fc30	400		

2.4 Reinforcement Sizes

Table 2.4 - Reinforcing Bar Sizes

Name	Diameter mm	Area cm ²
6	6	0.3
8	8	0.5
10	10	0.8
12	12	1.1
14	14	1.5
16	16	2
18	18	2.5
20	20	3.1
22	22	3.8
25	25	4.9
26	26	5.3
28	28	6.2
32	32	8
36	36	10.2
40	40	12.6
50	50	19.6

Lampiran 10 Data Properti Tabel 2.3 *Shell Sections* & Tabel 2.4 *Reinforcement Sizes*

3 Loads

This chapter provides loading information as applied to the model.

3.1 Load Patterns

Table 3.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
-EQDxECC	Yes	Other	0	
-EQDyFECC	Yes	Other	0	
-LLRF	Yes	Other	0	
DL	No	Dead	1	
EQSx	No	Seismic	0	ASCE 7-10
EQSx(1/3)	Yes	Seismic	0	ASCE 7-10
EQSx(2/3)	Yes	Seismic	0	ASCE 7-10
EQSx(3/3)	Yes	Seismic	0	ASCE 7-10
EQSy	No	Seismic	0	ASCE 7-10
EQSy(1/3)	Yes	Seismic	0	ASCE 7-10
EQSy(2/3)	Yes	Seismic	0	ASCE 7-10
EQSy(3/3)	Yes	Seismic	0	ASCE 7-10
LL	No	Live	0	
SDL	No	Dead	0	
WL	No	Wind	0	ASCE 7-10
WL(1/12)	Yes	Wind	0	ASCE 7-10
WL(10/12)	Yes	Wind	0	ASCE 7-10
WL(11/12)	Yes	Wind	0	ASCE 7-10
WL(12/12)	Yes	Wind	0	ASCE 7-10
WL(2/12)	Yes	Wind	0	ASCE 7-10
WL(3/12)	Yes	Wind	0	ASCE 7-10
WL(4/12)	Yes	Wind	0	ASCE 7-10
WL(5/12)	Yes	Wind	0	ASCE 7-10
WL(6/12)	Yes	Wind	0	ASCE 7-10
WL(7/12)	Yes	Wind	0	ASCE 7-10
WL(8/12)	Yes	Wind	0	ASCE 7-10
WL(9/12)	Yes	Wind	0	ASCE 7-10

3.2 Functions

3.2.1 Response Spectrum Functions

Table 3.2 - Functions - Response Spectrum - ASCE7-10 (Part 1 of 2)

Name	Period sec	Value	Ss And S1 From	Site Latitude deg	Site Longitude deg	Zip Code	Ss	S1	TL sec	Site Class
Spektra Surabaya	0	0.242957	User Defined				0.666	0.253	8	E
Spektra Surabaya	0.166	0.607392								
Spektra Surabaya	0.63	0.607392								
Spektra Surabaya	1	0.503976								
Spektra Surabaya	1.2	0.41998								

Lampiran 11 Data Beban Tabel 3.1 *Load Pattern* & Tabel 3.2 *Functions Response Spectrum ASCE7-10*

Table 3.2 - Functions - Response Spectrum - ASCE7-10 (Part 2 of 2, continued)

Fa	Fv	SDS	SD1	Damping Ratio

3.3 Load Cases

Table 3.3 - Load Case Definitions - Summary

Name	Type	Notes
Modal	Modal - Eigen	
DL	Linear Static	
LL	Linear Static	
SDL	Linear Static	
WL	Linear Static	
EQSt	Linear Static	
EQSy	Linear Static	
EQDx	Response Spectrum	
EQDy	Response Spectrum	

3.4 Load Combinations

Table 3.4 - Load Combination Definitions

Name	Type	Is Auto	Load Name	Mode	SF	Notes
Comb Envelope	Envelope	No	Comb U1		1	
Comb Envelope			Comb U2		1	
Comb Envelope			Comb U3		1	
Comb Envelope			Comb U4		1	
Comb Envelope			Comb U5		1	
Comb Envelope			Comb U6		1	
Comb Envelope			Comb U7		1	
Comb Envelope			Comb U8		1	
Comb Envelope			Comb U9		1	
Comb Envelope			Comb U10		1	
Comb Envelope			Comb U11		1	
Comb Envelope			Comb U12		1	
Comb Envelope			Comb U13		1	
Comb Envelope			Comb U14		1	
Comb Envelope			Comb U15		1	
Comb Envelope			Comb U16		1	
Comb Envelope			Comb U17		1	
Comb Envelope			Comb U18		1	
Comb P-Delta	Linear Add	No	DL		1	
Comb P-Delta			SDL		1	
Comb P-Delta			LL		0.3	

Lampiran 13 Data Beban Tabel 3.3 *Load Case Definitions Summary* & Tabel 3.4 *Load Combination Definitions*

Table 3.4 - Load Combination Definitions (continued)

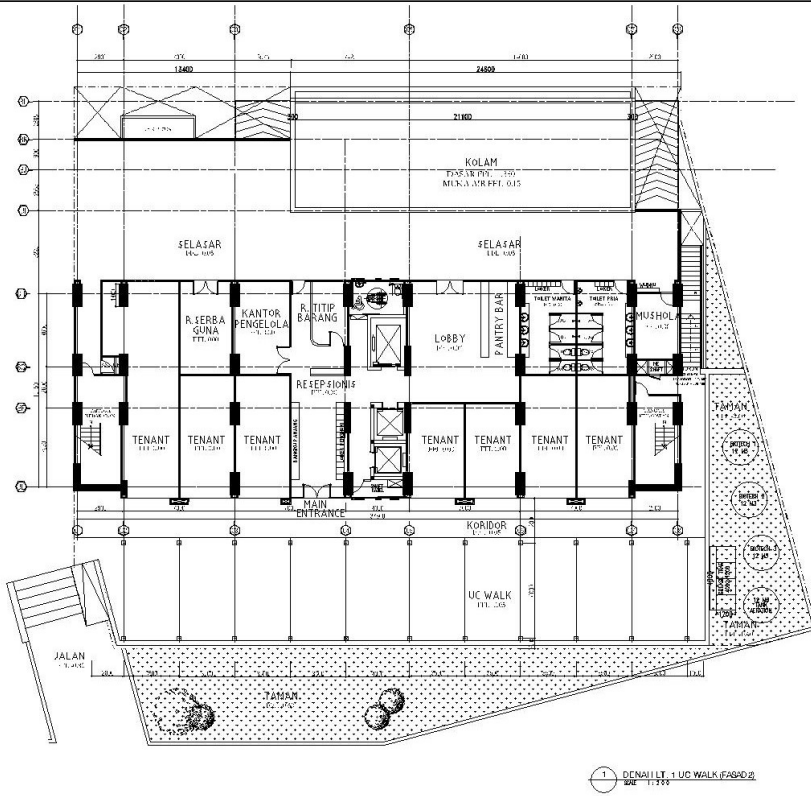
Name	Type	Is Auto	Load Name	Mode	SF	Notes
Comb U1	Linear Add	No	DL		1.4	
Comb U1			SDL		1.4	
Comb U2	Linear Add	No	DL		1.2	
Comb U2			SDL		1.2	
Comb U2			LL		1.6	
Comb U3	Linear Add	No	DL		1.2	
Comb U3			SDL		1.2	
Comb U3			LL		1	
Comb U3			WL		1	
Comb U4	Linear Add	No	DL		1.3214	
Comb U4			SDL		1.3214	
Comb U4			LL		1	
Comb U4			EQDx		1.3	
Comb U4			EQDy		0.39	
Comb U5	Linear Add	No	DL		1.3214	
Comb U5			SDL		1.3214	
Comb U5			LL		1	
Comb U5			EQDx		1.3	
Comb U5			EQDy		-0.39	
Comb U6	Linear Add	No	DL		1.3214	
Comb U6			SDL		1.3214	
Comb U6			LL		1	
Comb U6			FQDx		-1.3	
Comb U6			EQDy		0.39	
Comb U7	Linear Add	No	DL		1.3214	
Comb U7			SDL		1.3214	
Comb U7			LL		1	
Comb U7			EQDx		-1.3	
Comb U7			FQDy		-0.39	
Comb U8	Linear Add	No	DL		1.3214	
Comb U8			SDL		1.3214	
Comb U8			LL		1	
Comb U8			EQDx		0.39	
Comb U8			EQDy		1.3	
Comb U9	Linear Add	No	DL		1.3214	
Comb U9			SDL		1.3214	
Comb U9			LL		1	
Comb U9			EQDx		0.39	
Comb U9			EQDy		-1.3	
Comb U10	Linear Add	No	DL		1.3214	
Comb U10			SDL		1.3214	
Comb U10			LL		1	
Comb U10			FQDx		-0.39	
Comb U10			EQDy		1.3	
Comb U11	Linear Add	No	DL		1.3214	

Lampiran 14 Data Beban Tabel 3.4 *Load Combination Definitions*
(continued)

Table 3.4 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
Comb U11			SDL		1.3214	
Comb U11			LL		1	
Comb U11			EQDx		-0.39	
Comb U11			EQDy		-1.3	
Comb U12	Linear Add	No	DL		1.0214	
Comb U12			SDL		1.0214	
Comb U12			EQDx		1.3	
Comb U12			EQDy		0.39	
Comb U13	Linear Add	No	DL		1.0214	
Comb U13			SDL		1.0214	
Comb U13			EQDx		1.3	
Comb U13			EQDy		-0.39	
Comb U14	Linear Add	No	DL		1.0214	
Comb U14			SDL		1.0214	
Comb U14			EQDx		-1.3	
Comb U14			EQDy		0.39	
Comb U15	Linear Add	No	DL		1.0214	
Comb U15			SDL		1.0214	
Comb U15			EQDx		-1.3	
Comb U15			EQDy		-0.39	
Comb U16	Linear Add	No	DL		1.0214	
Comb U16			SDL		1.0214	
Comb U16			EQDx		0.39	
Comb U16			EQDy		1.3	
Comb U17	Linear Add	No	DL		1.0214	
Comb U17			SDL		1.0214	
Comb U17			EQDx		0.39	
Comb U17			EQDy		-1.3	
Comb U18	Linear Add	No	DL		1.0214	
Comb U18			SDL		1.0214	
Comb U18			EQDx		-0.39	
Comb U18			EQDy		1.3	
Comb U19	Linear Add	No	DL		1.0214	
Comb U19			SDL		1.0214	
Comb U19			EQDx		-0.39	
Comb U19			EQDy		-1.3	
Comb WU	Linear Add	No	DL		1.2	
Comb WU			SDL		1.2	
Comb WU			LL		1	

Lampiran 15 Data Beban Tabel 3.4 *Load Combination Definitions (continued)*



NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI STRUKTUR ATAS BANGUNAN APARTEMEN 32 LANTAI DENGAN SISTEM GANDA DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI 1 UC WALK (FASAD 2)

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

II. BAMBANG KISWONO, M.T. MAKSUM, S.T., M.T.

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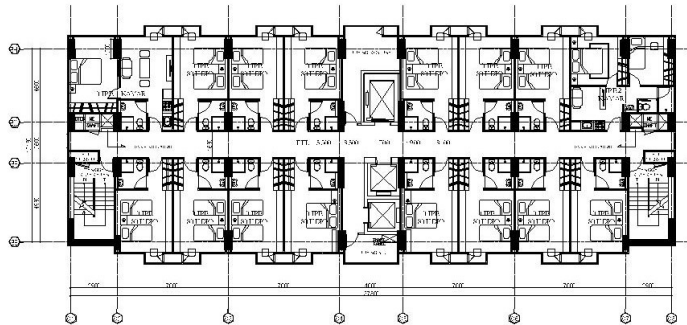
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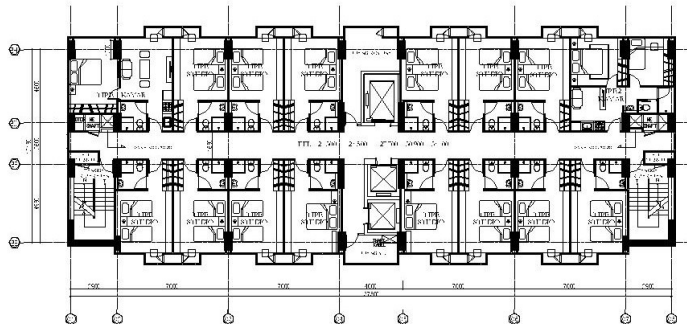
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14

1 DENAH LANTAI 1 UC WALK (FASAD 2) 1:200



2 DENAH LANTAI TIPIKAL (FASAD A)
LANTAI 2 - 6
KAL - 11.1.1.1



3 DENAH LANTAI TIPIKAL (FASAD B)
LANTAI 7 - 11
KAL - 11.1.1.2

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 02 LANTAI
DENGAN SRTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI TIKAL
LANTAI 2-6 (FASAD A)
LANTAI 7-11 (FASAD B)

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

Ir. BAMBANG KISWONO, M.T.
MAKSUM, S.T., M.T.

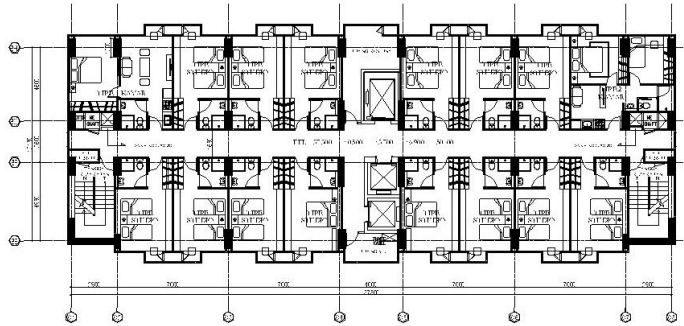
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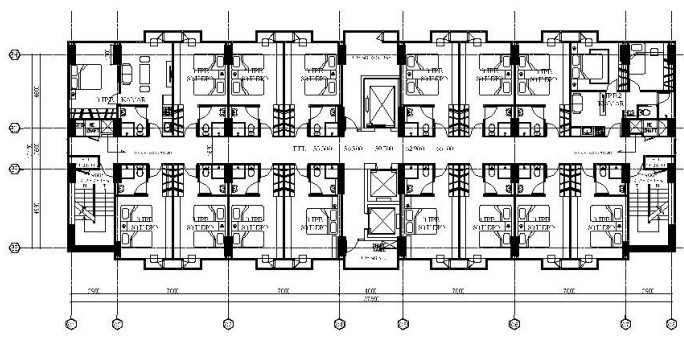
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02

14



4 DENAH LANTAI TIPIKAL (FASAD C)
LANTAI 12 - 16
SKALA 1 : 200



5 DENAH LANTAI TIPIKAL (FASAD D)
LANTAI 17 - 21
SKALA 1 : 200

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

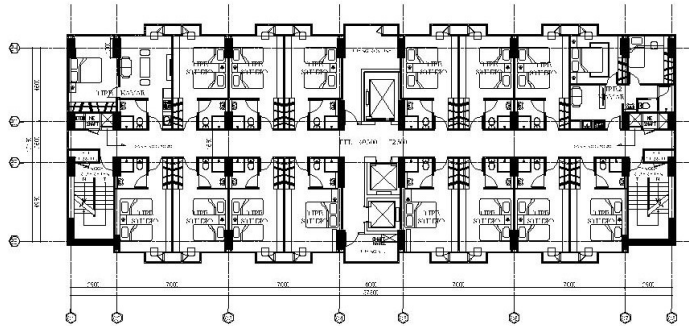
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LANTAI 12-16 (FASAD C)
LANTAI 17-21 (FASAD D)

DIGAMBAR
LUKMAN HAKIM

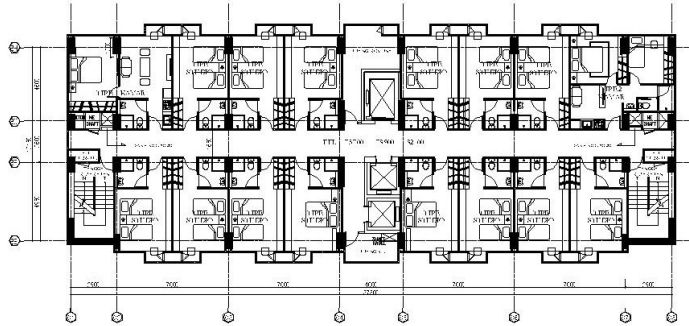
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Ir. BAMBANG KISWONO, M.T.
MAKSUMA, S.T., M.T.

SKALA
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NO. GAMBAR	JUMLAH
03	14



6 DENAH LANTAI TINGKAL (FASAD AA)
LANTAI 22 - 23
SKALA 1:100



7 DENAH LANTAI TINGKAL (FASAD D)
LANTAI 24 - 26
SKALA 1:100

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI TINGKAL
LANTAI 22-23 (FASAD AA)
LANTAI 24-26 (FASAD D)

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

Ir. BAMBANG KISWONO, M.T.
MAKSUMA, S.T., A.T.

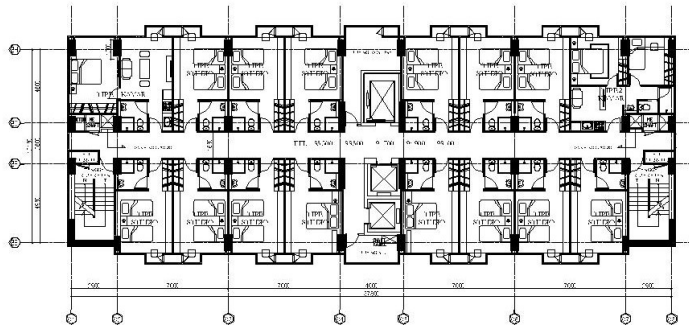
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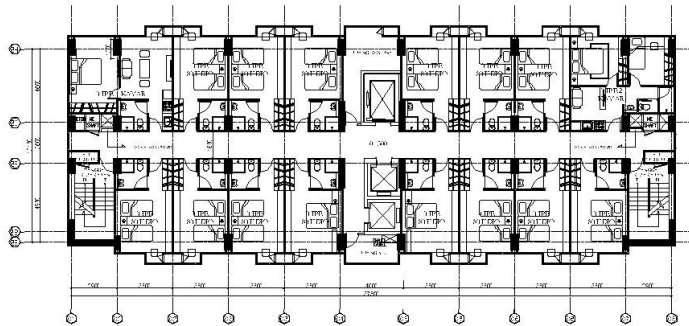
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04

14



DENAH LANTAI TIPIKAL (FASAD BB)
 LANTAI 27 - 31
 SKALA 1:100



DENAH LANTAI TIPIKAL (FASAD D)
 LANTAI 32
 SKALA 1:100

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
 STRUKTUR ATAS BANGUNAN
 APARTEMEN 32 LANTAI
 DENGAN SISTEM GANDA,
 DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI TIPIKAL
 LANTAI 27-31 (FASAD BB)
 LANTAI 32 (FASAD D)

DIGAMBAR

LURMAN HAKIM

DIPERIKSA

IR. BAMBANG KUSWONO, N.T.
 MAKSUM, S.T., M.T.

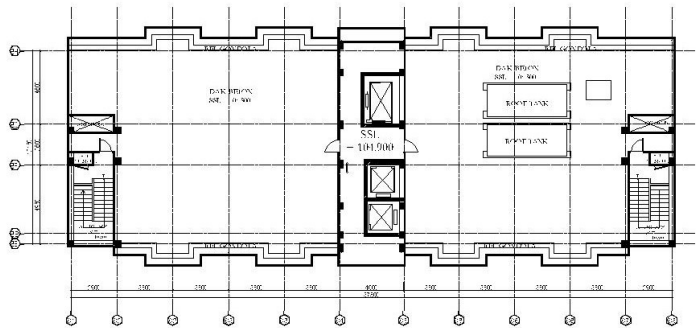
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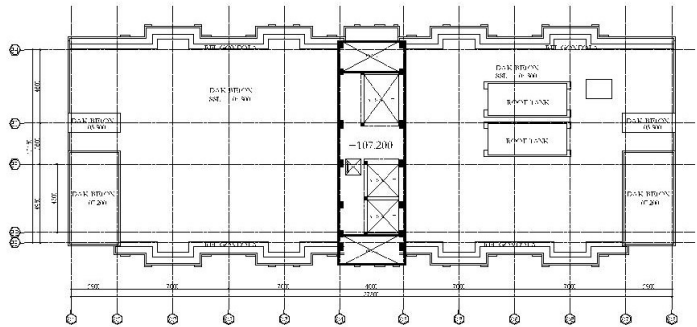
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05

14



10 DENAH LANTAI ATAP
SKALA 1:1000



11 DENAH LANTAI ATAP
SKALA 1:1000

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI ATAP
DENAH ATAP

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

II. BAMBANG KISWONO, M.T.
MAKSUM, S.T., M.T.

SKALA

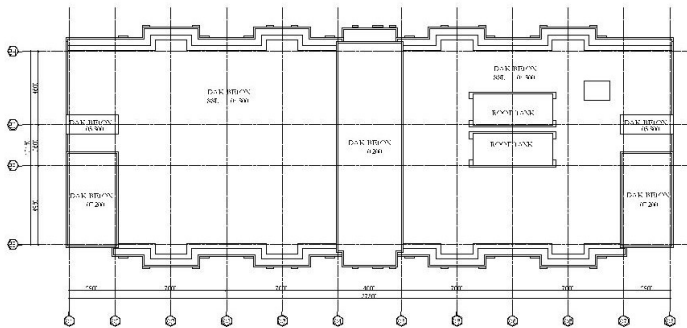
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NO. GAMBAR

JUMLAH

06

14



10
DENAH TAMPAK ATAP
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NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 02 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DENAH TAMPAK ATAP

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

Ir. BAMBANG KISWONO, M.T.
MAKSUM, S.T., M.T.

SKALA

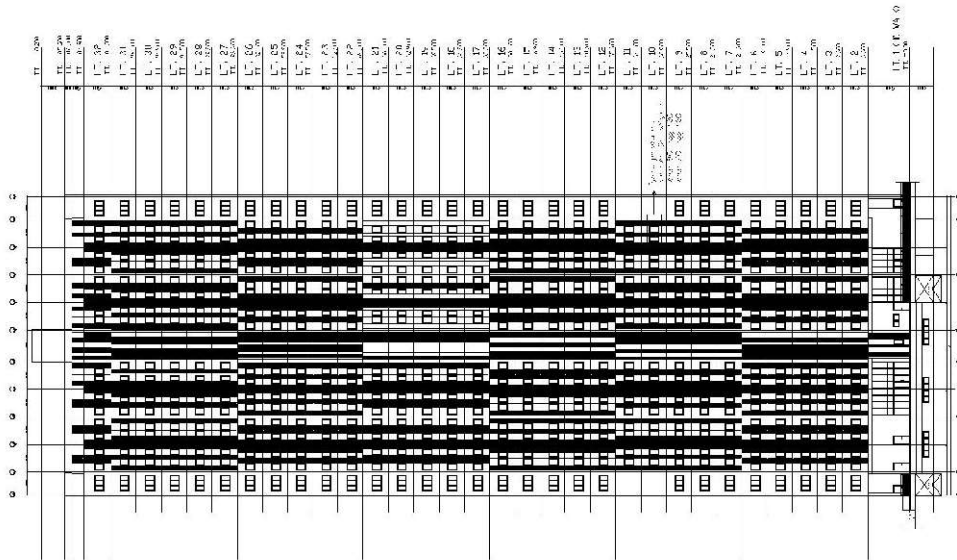
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07

14



TAMPAK BELAKANG (UTARA)

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MEMERIKSA
STRUKTUR ATAS BANGUNAN
APARTEMEN 55 ANTAI
DECCA, SISTEM CANDA
DI KOTA SURABAYA

JUDUL GAMBAR

TAMPAK BELAKANG (UTARA)

DIGAMBAR

LUKMAN HAKIM

DIPERIKSA

IR. BAMBANG KISWICHO, M.T.
NIA GUSMA, S.T., M.T.

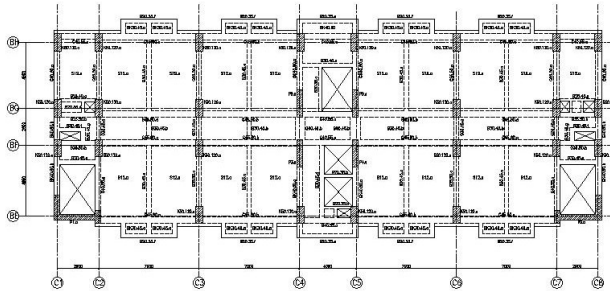
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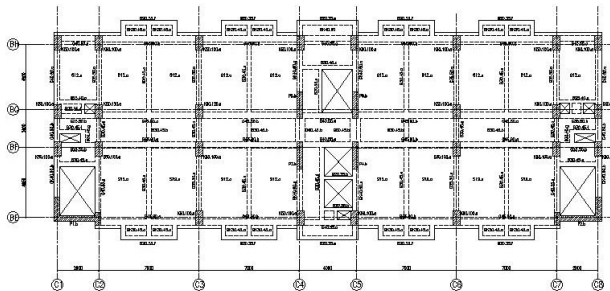
JUMLAH

38



DENAH LANTAI 2 ~ 23
SKALA 1:200

- UMI.LI.008P - 01/01
- UMI.LI.01 = +0.00
- UMI.LI.02 = +0.80
- UMI.LI.04 = +1.60
- UMI.LI.06 = +2.40
- UMI.LI.08 = +3.20
- UMI.LI.10 = +4.00
- UMI.LI.12 = +4.80
- UMI.LI.14 = +5.60
- UMI.LI.16 = +6.40
- UMI.LI.18 = +7.20
- UMI.LI.20 = +8.00
- UMI.LI.22 = +8.80
- UMI.LI.24 = +9.60
- UMI.LI.26 = +10.40
- UMI.LI.28 = +11.20
- UMI.LI.30 = +12.00
- UMI.LI.32 = +12.80
- UMI.LI.34 = +13.60
- UMI.LI.36 = +14.40
- UMI.LI.38 = +15.20
- UMI.LI.40 = +16.00
- UMI.LI.42 = +16.80
- UMI.LI.44 = +17.60
- UMI.LI.46 = +18.40
- UMI.LI.48 = +19.20
- UMI.LI.50 = +20.00
- UMI.LI.52 = +20.80
- UMI.LI.54 = +21.60
- UMI.LI.56 = +22.40
- UMI.LI.58 = +23.20
- UMI.LI.60 = +24.00
- UMI.LI.62 = +24.80
- UMI.LI.64 = +25.60
- UMI.LI.66 = +26.40
- UMI.LI.68 = +27.20
- UMI.LI.70 = +28.00
- UMI.LI.72 = +28.80
- UMI.LI.74 = +29.60
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- UMI.LI.78 = +31.20
- UMI.LI.80 = +32.00
- UMI.LI.82 = +32.80
- UMI.LI.84 = +33.60
- UMI.LI.86 = +34.40
- UMI.LI.88 = +35.20
- UMI.LI.90 = +36.00
- UMI.LI.92 = +36.80
- UMI.LI.94 = +37.60
- UMI.LI.96 = +38.40
- UMI.LI.98 = +39.20
- UMI.LI.100 = +40.00



DENAH LANTAI 24 ~ 32
SKALA 1:200

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DENAH LANTAI 2-32

DIGAMBAR

LUKMAN HARIM

DIPERIKSA

Ir. BAMBANG KISYONO, M.T.
MAKSUM, S.T., M.T.

SKALA

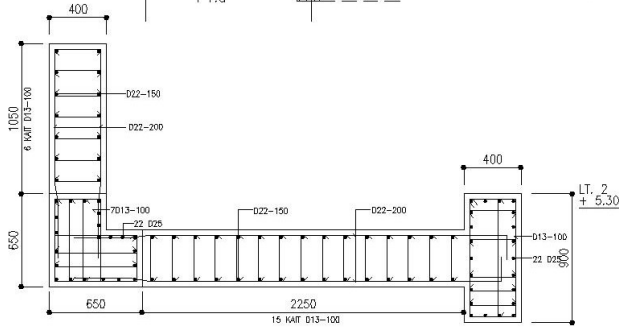
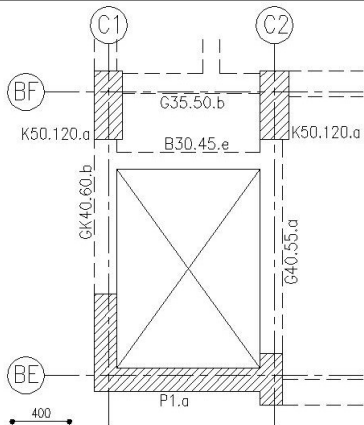
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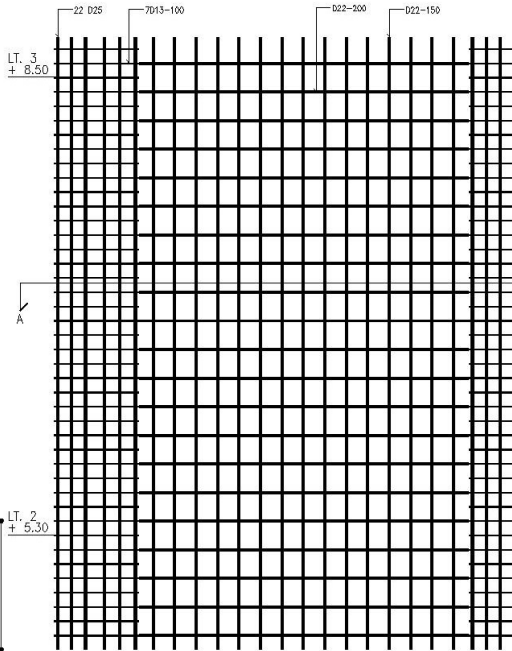
JUMLAH

14



POTONGAN A-A

SKALA 1 : 50



DETAIL DINDING GESER P1.a

SKALA 1 : 50

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DETAIL DINDING GESER P1.a

DIGAMBAR

LURMAN HAKIM

DIPERIKSA

Ir. BAMBANG KISYOHONO, M.T.
MAKSUM, S.T., M.T.

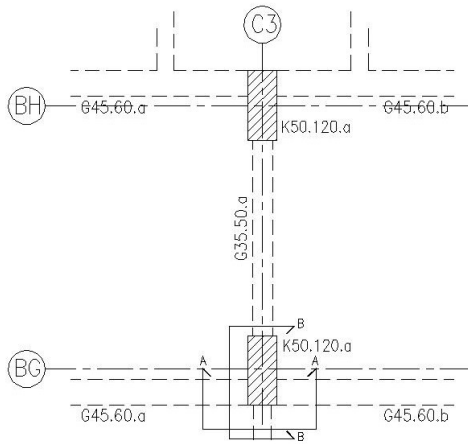
SKALA

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NO. GAMBAR JUMLAH

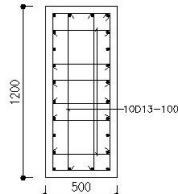
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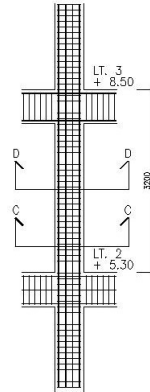
DETAIL KOLOM K50.120.a

SKALA 1 : 50



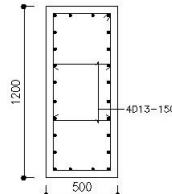
POTONGAN C-C

SKALA 1 : 50



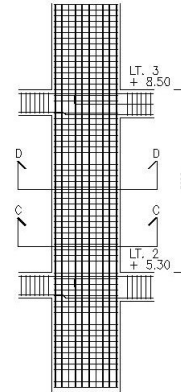
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SKALA 1 : 50



POTONGAN D-D

SKALA 1 : 50



POTONGAN B-B

SKALA 1 : 50

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
#PARTHEM 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DETAIL KOLOM K50.120.a

DIGAMBAR

LUKMAN HARIM

DIPERIKSA

Ir. BAMBANG KISYOHIO, M.T.
MAKSUM, S.T., M.T.

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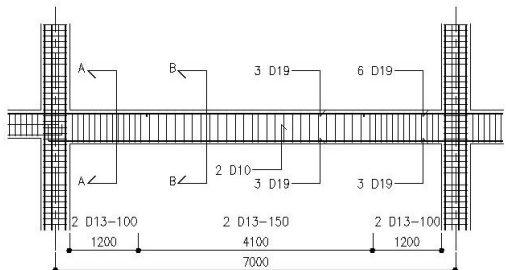
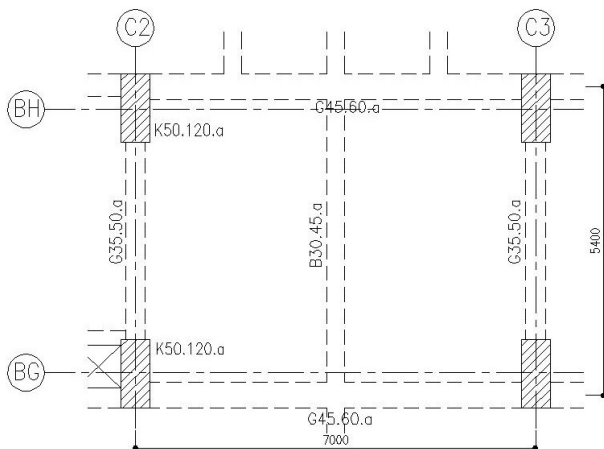
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NO. GAMBAR

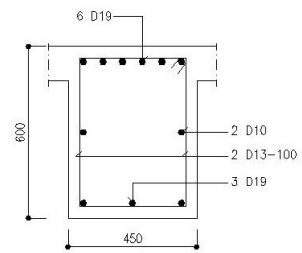
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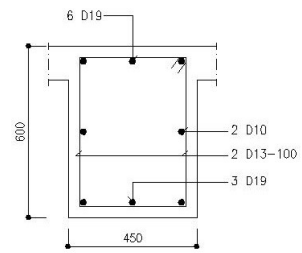
14



DETAIL BALOK G45.60.a
 SKALA 1 : 50



POTONGAN A-A
 SKALA 1 : 50



POTONGAN B-B
 SKALA 1 : 50

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
 STRUKTUR ATAS BANGUNAN
 APARTEMEN 12 LANTAI
 DENGAN SISTEM GANDA
 DI KOTA SURABAYA

JUDUL GAMBAR

DETAIL BALOK G45.60.a

DIGAMBAR

LUKMAN HARIM

DIPERIKSA

Ir. BAMBANG HSYMONO, M.T.
 MAKSUM, S.T., M.T.

SKALA

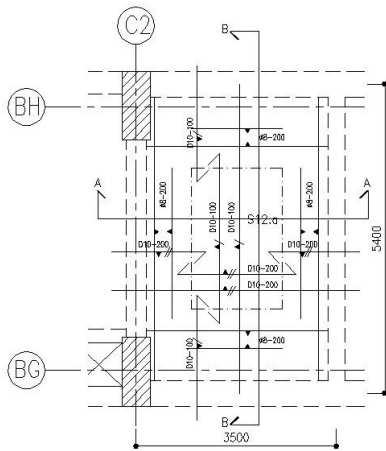
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NO. GAMBAR

JUMLAH

13

14



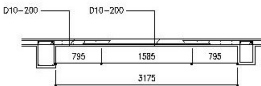
DETAIL PELAT S12.a

SKALA 1 : 50



POTONGAN B-B

SKALA 1 : 50



POTONGAN A-A

SKALA 1 : 50

NAMA KEGIATAN

SKRIPSI

JUDUL SKRIPSI

MODIFIKASI
STRUKTUR ATAS BANGUNAN
APARTEMEN 32 LANTAI
DENGAN SISTEM GANDA
DI KOTA SURABAYA

JUDUL GAMBAR

DETAIL PELAT S12.a

DIGAMBAR

LUKMAN HARIM

DIPERIKSA

Ir. BAMBANG KISWORO, N.T.
MAKSUM, S.T., M.T.

SKALA

1 : 50

NO. GAMBAR

14

JUMLAH

14

BIOGRAFI PENULIS



Lukman Hakim, lahir di Jombang, 03 April 1986 merupakan anak dari Bapak Safuwani (Almarhum) dan Ibu Siti Muchaiyah (Almarhumah). Penulis telah menempuh pendidikan formal di MI Islamiyah Banjarpoh Jombang lulus tahun 1998, MTs Bahrul Ulum Genukwatu Jombang lulus tahun 2001, dan MA Darul Falah Cukir Jombang lulus tahun 2006.

Pada tahun 2016, penulis melanjutkan studi Program Sarjana di Program Studi Teknik Sipil Universitas Muhammadiyah Surabaya.

Penulis memiliki pengalaman kerja sebagai **Drafter MEP** di PT. Pradiptaya tahun 2008 – 2013, **Quantity Surveyor MEP** di CV. Stima Graha Integra tahun 2014 – Sekarang.

Skripsi ini merupakan salah satu proposal hidup penulis dalam mengamalkan Hadits Rasulullah yang berbunyi “Sungguh (sebagian) mukmin kepada (sebagian) mukmin lainnya seperti bangunan, yang menguatkan sebagian dengan sebagian lainnya”.

Email : elha.samep@gmail.com



HASIL EVALUASI UJIAN SKRIPSI

Skripsi atas Mahasiswa :
Nama : LUKMAN HAKIM
NIM : 20161333013
Program Studi : Teknik Sipil
Judul Skripsi :

No	Uraian Perbaikan	Halaman
1.	Abstrak diperbaiki	
2.	Cek $\phi M_u > M_u$ $\phi V_u > V_u$	
3.	Perbaiki grafik simpangan dan stability ratio.	

Catatan: Lembar ini harus dibawa saat persetujuan revisi skripsi

Penguji

(.....PICHUS OCTAVIAN L.....)

HASIL EVALUASI UJIAN SKRIPSI

Skripsi atas Mahasiswa : *Lekman H*
 Nama : *Percaya Huda Agh Napun Apart 72114*
 NIM : *2016 177017*
 Program Studi : *Teknik Sipil*
 Judul Skripsi :
22/08/2022

No	Uraian Perbaikan	Halaman																
1.	<i>Abstrak + PR 13</i> <i>- Rujukan, ide, metode, kesimpulan (disesuaikan)</i> <i>06)</i>																	
2.	<i>Kesimpulan</i> <i>- Lembar detailkan detail wawancara</i> <i>wawancara</i>																	
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<i>13</i>	<i>13</i>	<i>20</i>	<i>20</i>															
<i>partisipasi</i>	<i>21</i>	<i>20</i>	<i>20</i>															
<i>partisipasi</i>	<i>21</i>	<i>20</i>	<i>20</i>															
<i>partisipasi</i>	<i>21</i>	<i>20</i>	<i>20</i>															

Catatan: Lembar ini harus dibawa saat persetujuan revisi skripsi

Penguji


 (.....)