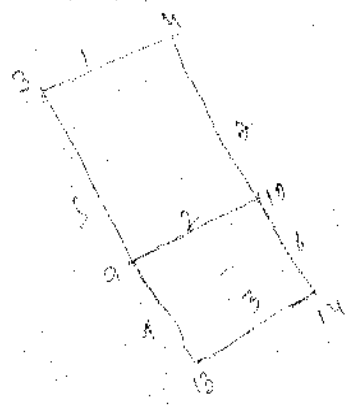


TYPICAL FLOOR PLAN (1ST TO 4RD)



G. Mitra Colony  
N-14

STAAD SPACE

-- PAGE NO. 12

## SUPPORT REACTIONS -UNIT KN METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	5	0.75	490.65	1.10	1.23	0.20	1.86
2	5	-1.04	983.28	-0.81	0.17	0.02	-3.98
3	5	-1.31	1034.04	-2.05	-0.56	-0.06	4.92
4	5	-3.40	972.56	0.00	1.11	-0.19	5.81
5	5	-0.60	681.67	0.90	1.77	0.34	3.50
6	5	5.12	769.85	1.95	1.56	0.12	-4.28
7	5	0.64	1207.30	2.77	2.54	0.18	7.29
8	5	-1.61	1271.59	0.53	0.57	0.15	6.42
9	5	-2.15	1427.78	0.95	0.45	-0.54	9.30
10	5	-3.02	1317.03	2.02	1.86	0.08	10.13
11	5	2.90	660.06	0.65	0.74	-0.19	-1.45
12	5	0.70	934.75	-0.26	0.08	-0.02	1.81
13	5	1.25	1298.16	-2.07	-1.08	0.49	5.59
14	5	0.61	1243.75	0.43	1.04	-0.79	5.26
15	5	2.32	1416.00	0.67	1.50	0.00	3.48
16	5	3.03	628.08	0.38	0.55	-0.15	-1.44
17	5	4.38	816.65	-0.13	0.10	0.35	-1.99
18	5	-1.45	419.79	0.03	0.34	-0.11	4.05
19	5	-1.03	591.13	-0.65	-0.78	-0.01	4.14
20	5	-2.15	768.34	-2.66	-2.73	0.42	4.69
21	5	-3.12	1129.28	-2.57	-3.52	-0.37	6.38
22	5	-0.83	1054.60	-1.19	-1.42	-0.55	6.66

\*\*\*\*\* END OF LATEST ANALYSIS RESULT \*\*\*\*\*

332. LOAD LIST 5 TO 19

333. PRINT MEMBER FORCES ALL





=====

C O L U M N   N O .   1 0 9   D E S I G N   R E S U L T S

M25                      Fe415 (Main)                      Fe415 (Sec.)

LENGTH: 3300.0 mm    CROSS SECTION: 250.0 mm X 600.0 mm    COVER: 40.0 mm

\*\* SECTION IS NOT ADEQUATE  
Reinforcement % exceeds maximum limit

\*\* GUIDING LOAD CASE:    13 BRACED LONG COLUMN

=====

=====

C O L U M N   N O .   2 0 9   D E S I G N   R E S U L T S

M25                      Fe415 (Main)                      Fe415 (Sec.)

LENGTH: 3000.0 mm    CROSS SECTION: 250.0 mm X 600.0 mm    COVER: 40.0 mm

\*\* SECTION IS NOT ADEQUATE  
Reinforcement % exceeds maximum limit

\*\* GUIDING LOAD CASE:    13 END JOINT:    209 SHORT COLUMN

=====

\*\*\*\*\*END OF COLUMN DESIGN RESULTS\*\*\*\*\*

374. DESIGN COLUMN 10 110 210

=====

BEAM NO. 4017 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1425.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

Section fails while designing section: 0.0 mm  
 Nominal shear force exceeds tau\_c\_max limit

=====

DESIGN LOAD SUMMARY (KN MET)

SECTION (in. mm)	FLEXURE (Maxm. Sagging/Hogging moments)				SHEAR		
	P	MZ	MX	Load Case	VY	MX	Load Case
0.0	0.00	22.88	-9.73	16	69.53	-39.16	15
	0.00	-69.58	-16.00	14			
118.8	0.00	15.07	-16.16	12	65.91	-39.16	15
	0.00	-59.22	-16.00	14			
237.5	0.00	18.56	-16.16	12	63.80	-39.16	15
	0.00	-15.49	-39.16	15			
356.3	0.00	21.66	-16.16	12	60.22	-39.16	15
	0.00	-8.18	-39.16	15			
475.0	0.00	24.41	-16.16	12	56.67	-39.16	15
	0.00	-1.22	-39.16	15			
593.8	0.00	5.37	-39.16	15	54.01	-39.16	15
	0.00	-21.57	-16.00	14			
712.5	0.00	11.58	-39.16	15	51.04	-39.16	15
	0.00	-13.09	-16.00	14			
831.3	0.00	17.42	-39.16	15	47.57	-39.16	15
	0.00	-4.97	-16.00	14			
950.0	0.00	22.89	-39.16	15	44.60	-39.16	15
	0.00	-4.12	-9.57	18			
1068.8	0.00	28.00	-39.16	15	41.00	-39.16	15
	0.00	0.00	0.00	5			
1187.5	0.00	32.73	-39.16	15	38.60	-39.16	15
	0.00	0.00	0.00	5			
1306.3	0.00	37.07	-39.16	15	35.18	-39.16	15
	0.00	0.00	0.00	5			
1425.0	0.00	41.06	-39.16	15	32.06	-39.16	15
	0.00	0.00	0.00	5			

=====

=====

BEAM NO. 4018 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

Section fails while designing section: 1066.7 mm  
 Nominal shear force exceeds tau\_c\_max limit

=====

DESIGN LOAD SUMMARY (KN MET)

SECTION (in mm)	FLEXURE (Maxm. Sagging/Hogging moments)				SHEAR		
	P	MZ	MX	Load Case	VY	MX	Load Case
0.0	0.00	44.19	37.20	15	-56.08	37.20	15
	0.00	0.00	0.00	5			
133.3	0.00	36.48	37.20	15	-59.49	37.20	15
	0.00	0.00	0.00	5			
266.7	0.00	28.31	37.20	15	-63.01	37.20	15
	0.00	0.00	0.00	5			
400.0	0.00	19.67	37.20	15	-67.26	37.20	15
	0.00	0.00	0.00	5			
533.3	0.00	10.53	37.20	15	-70.23	37.20	15
	0.00	-1.69	14.21	12			
666.7	0.00	0.89	37.20	15	-73.61	37.20	15
	0.00	-0.05	31.70	19			
800.0	0.00	13.26	13.32	14	-77.68	37.20	15
	0.00	-9.24	37.20	15			
933.3	0.00	8.86	13.32	14	-81.83	37.20	15
	0.00	-19.83	37.20	15			
1066.7	0.00	12.73	7.81	18	-84.74	37.20	15
	0.00	-30.92	37.20	15			
1200.0	0.00	10.96	7.81	18	-88.82	37.20	15
	0.00	-42.50	37.20	15			
1333.3	0.00	8.92	7.81	18	-92.75	37.20	15
	0.00	-54.55	37.20	15			
1466.7	0.00	6.58	7.81	18	-95.36	37.20	15
	0.00	-67.10	37.20	15			
1600.0	0.00	3.93	7.81	18	-99.61	37.20	15
	0.00	-80.16	37.20	15			

BEAM NO. 4019 DESIGN RESULTS

M30

Fe415 (Main)

Fe415 (Sec.)

LENGTH: 1625.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	406.2 mm	812.5 mm	1218.8 mm	1625.0 mm
TOP REINF.	1051.36 (Sq. mm)	653.09 (Sq. mm)	690.67 (Sq. mm)	203.51 (Sq. mm)	188.95 (Sq. mm)
BOTTOM REINF.	213.73 (Sq. mm)	323.53 (Sq. mm)	491.85 (Sq. mm)	715.95 (Sq. mm)	926.36 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	406.2 mm	812.5 mm	1218.8 mm	1625.0 mm
TOP REINF.	10-12i 2 layer(s)	6-12i 1 layer(s)	7-12i 2 layer(s)	2-12i 1 layer(s)	2-12i 1 layer(s)
BOTTOM REINF.	2-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)	3-20i 1 layer(s)	3-20i 1 layer(s)

STAAD SPACE

-- PAGE NO. 437

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 665.0 mm AWAY FROM START SUPPORT

VY = 66.80 MX = -36.05 LD= 15

Provide 2 Legged 121 @ 120 mm c/c

=====

B E A M N O. 4020 D E S I G N R E S U L T S

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2200.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	550.0 mm	1100.0 mm	1650.0 mm	2200.0 mm
TOP REINF.	188.95 (Sq. mm)	188.95 (Sq. mm)	403.80 (Sq. mm)	719.44 (Sq. mm)	1267.59 (Sq. mm)
BOTTOM REINF.	861.01 (Sq. mm)	654.84 (Sq. mm)	855.44 (Sq. mm)	189.46 (Sq. mm)	0.00 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	550.0 mm	1100.0 mm	1650.0 mm	2200.0 mm
TOP REINF.	2-121 1 layer(s)	2-121 1 layer(s)	4-121 1 layer(s)	7-121 2 layer(s)	12-121 2 layer(s)
BOTTOM REINF.	11-101 2 layer(s)	9-101 2 layer(s)	11-101 2 layer(s)	3-101 1 layer(s)	2-101 1 layer(s)
SHEAR REINF.	2 legged 121 @ 130 mm c/c	2 legged 121 @ 130 mm c/c	2 legged 121 @ 130 mm c/c	2 legged 121 @ 130 mm c/c	2 legged 121 @ 130 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 665.0 mm AWAY FROM END SUPPORT

VY = -64.94 MX = 32.91 LD= 15

Provide 2 Legged 121 @ 130 mm c/c

\*\*\* WARNING: LENGTH TO DEPTH RATIO FOR MEMBER 4021 IS LESS THAN 2.5.  
DEEP BEAM IS NOT DESIGNED. ASSUMING IT TO BE A PART OF A  
CONTINUOUS BEAM AND AWAY FROM THE CRITICAL SECTION FOR  
ENHANCED SHEAR, ORDINARY SHEAR CHECK IS PERFORMED.,  
OTHERWISE PROVIDE ENSH AND RENSH PARAMETERS \*\*\*



=====

BEAM NO. 4021 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1000.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

Section fails while designing section: 0.0 mm  
 Nominal shear force exceeds tau\_c\_max limit

=====

DESIGN LOAD SUMMARY (KN MET)

SECTION (in mm)	FLEXURE (Maxm. Sagging/Hogging moments)				SHEAR		
	P	MZ	MX	Load Case	VY	MX	Load Case
0.0	0.00	0.00	0.00	5	140.47	-55.28	15
	0.00	-126.22	-55.28	15			
83.3	0.00	0.00	0.00	5	138.90	-55.28	15
	0.00	-114.57	-55.28	15			
166.7	0.00	0.00	0.00	5	137.95	-55.28	15
	0.00	-103.03	-55.28	15			
250.0	0.00	0.00	0.00	5	136.40	-55.28	15
	0.00	-91.61	-55.28	15			
333.3	0.00	0.00	0.00	5	134.92	-55.28	15
	0.00	-80.30	-55.28	15			
416.7	0.00	0.00	0.00	5	133.79	-55.28	15
	0.00	-69.10	-55.28	15			
500.0	0.00	0.00	0.00	5	132.33	-55.28	15
	0.00	-58.02	-55.28	15			
583.3	0.00	0.00	0.00	5	130.97	-55.28	15
	0.00	-47.05	-55.28	15			
666.7	0.00	0.00	0.00	5	129.83	-55.28	15
	0.00	-36.18	-55.28	15			
750.0	0.00	0.00	0.00	5	128.64	-55.28	15
	0.00	-25.42	-55.28	15			
833.3	0.00	0.00	0.00	5	127.56	-55.28	15
	0.00	-14.74	-55.28	15			
916.7	0.00	0.00	0.00	5	126.60	-55.28	15
	0.00	-4.15	-55.28	15			
1000.0	0.00	6.36	-55.28	15	125.69	-55.28	15
	0.00	0.00	0.00	5			

=====

BEAM NO. 4051 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5068.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq. mm)

SECTION	0.0 mm	1267.0 mm	2534.0 mm	3801.0 mm	5068.0 mm
TOP REINF.	423.94 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	0.00 (Sq. mm)	622.39 (Sq. mm)
BOTTOM	224.07	539.51	742.31	413.54	189.46

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1267.0 mm	2534.0 mm	3801.0 mm	5068.0 mm
TOP REINF.	2-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)
BOTTOM REINF.	3-10i 1 layer(s)	7-10i 2 layer(s)	10-10i 2 layer(s)	6-10i 1 layer(s)	3-10i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 130 mm c/c	2 legged 8i @ 130 mm c/c	2 legged 8i @ 130 mm c/c	2 legged 8i @ 130 mm c/c	2 legged 8i @ 130 mm c/c

B E A M N O. 4031 D E S I G N R E S U L T S

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2900.0 mm SIZE: 250.0 mm X 350.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	725.0 mm	1450.0 mm	2175.0 mm	2900.0 mm
TOP REINF.	908.11 (Sq. mm)	359.08 (Sq. mm)	163.34 (Sq. mm)	241.31 (Sq. mm)	778.35 (Sq. mm)
BOTTOM REINF.	631.88 (Sq. mm)	410.66 (Sq. mm)	163.34 (Sq. mm)	277.19 (Sq. mm)	482.37 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	725.0 mm	1450.0 mm	2175.0 mm	2900.0 mm
TOP REINF.	3-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)	2-20i 1 layer(s)	3-20i 1 layer(s)
BOTTOM REINF.	6-12i 1 layer(s)	4-12i 1 layer(s)	2-12i 1 layer(s)	3-12i 1 layer(s)	5-12i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 440.0 mm AWAY FROM START SUPPORT

VY = 67.21 MX = -1.13 LD= 13

Provide 2 Legged 12i @ 120 mm c/c

SHEAR DESIGN RESULTS AT 440.0 mm AWAY FROM END SUPPORT

VY = -68.87 MX = 0.95 LD= 15

Provide 2 Legged 12i @ 120 mm c/c

BEAM NO. 4032 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3300.0 mm SIZE: 250.0 mm X 350.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	825.0 mm	1650.0 mm	2475.0 mm	3300.0 mm
TOP REINF.	819.83 (Sq. mm)	233.88 (Sq. mm)	0.00 (Sq. mm)	272.80 (Sq. mm)	845.06 (Sq. mm)
BOTTOM REINF.	406.45 (Sq. mm)	281.69 (Sq. mm)	163.86 (Sq. mm)	355.36 (Sq. mm)	489.42 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	825.0 mm	1650.0 mm	2475.0 mm	3300.0 mm
TOP REINF.	11-10i 2 layer(s)	3-10i 1 layer(s)	2-10i 1 layer(s)	4-10i 1 layer(s)	11-10i 2 layer(s)
BOTTOM REINF.	6-10i 1 layer(s)	4-10i 1 layer(s)	3-10i 1 layer(s)	5-10i 1 layer(s)	7-10i 2 layer(s)
SHEAR REINF.	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c	2 legged 8i @ 120 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 440.0 mm AWAY FROM START SUPPORT

VY = 63.90 MX = -1.63 LD= 13  
Provide 2 Legged 12i @ 120 mm c/c

SHEAR DESIGN RESULTS AT 440.0 mm AWAY FROM END SUPPORT

VY = -62.32 MX = 0.99 LD= 15  
Provide 2 Legged 12i @ 120 mm c/c

BEAM NO. 4048 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2575.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	643.8 mm	1287.5 mm	1931.3 mm	2575.0 mm
TOP REINF.	1616.35 (Sq. mm)	674.76 (Sq. mm)	188.95 (Sq. mm)	629.49 (Sq. mm)	1688.24 (Sq. mm)
BOTTOM REINF.	1359.25 (Sq. mm)	689.81 (Sq. mm)	188.95 (Sq. mm)	480.09 (Sq. mm)	1017.53 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	643.8 mm	1287.5 mm	1931.3 mm	2575.0 mm
TOP REINF.	9-161 2 layer(s)	4-161 1 layer(s)	2-161 1 layer(s)	4-161 1 layer(s)	9-161 2 layer(s)
BOTTOM REINF.	7-161 2 layer(s)	4-161 1 layer(s)	2-161 1 layer(s)	3-161 1 layer(s)	6-161 2 layer(s)
SHEAR REINF.	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT

VY = 132.96 MX = -1.10 LD= 13  
Provide 2 Legged 121 @ 130 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT

VY = -150.87 MX = 2.05 LD= 15  
Provide 2 Legged 121 @ 130 mm c/c

BEAM NO. 4049 DESIGN RESULTS

FEEDBACK M30 Fe415 (Main) Fe415 (Sec.)  
LENGTH: 1750.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	437.5 mm	875.0 mm	1312.5 mm	1750.0 mm
TOP REINF.	1614.86 (Sq. mm)	1079.07 (Sq. mm)	571.52 (Sq. mm)	247.01 (Sq. mm)	0.00 (Sq. mm)
BOTTOM REINF.	477.63 (Sq. mm)	485.69 (Sq. mm)	469.60 (Sq. mm)	512.59 (Sq. mm)	518.93 (Sq. mm)

STAAD SPACE

-- PAGE NO. 442

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	437.5 mm	875.0 mm	1312.5 mm	1750.0 mm
TOP REINF.	9-161 2 layer(s)	6-161 2 layer(s)	3-161 1 layer(s)	2-161 1 layer(s)	2-161 1 layer(s)
BOTTOM REINF.	7-101 2 layer(s)	7-101 2 layer(s)	6-101 1 layer(s)	7-101 2 layer(s)	7-101 2 layer(s)
SHEAR REINF.	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT

VY = 114.33 MX = 3.23 LD= 13  
Provide 2 Legged 121 @ 130 mm c/c

BEAM NO. 4050 DESIGN RESULTS

M30 Fe415 (Main) Fe415 (Sec.)  
LENGTH: 3400.0 mm SIZE: 250.0 mm X 400.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	850.0 mm	1700.0 mm	2550.0 mm	3400.0 mm
TOP REINF.	187.92 (Sq. mm)	0.00 (Sq. mm)	199.96 (Sq. mm)	740.69 (Sq. mm)	1692.09 (Sq. mm)
BOTTOM REINF.	608.14 (Sq. mm)	453.27 (Sq. mm)	644.94 (Sq. mm)	702.60 (Sq. mm)	787.68 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	850.0 mm	1700.0 mm	2550.0 mm	3400.0 mm
TOP REINF.	2-161 1 layer(s)	2-161 1 layer(s)	2-161 1 layer(s)	4-161 1 layer(s)	9-161 2 layer(s)
BOTTOM REINF.	6-121 1 layer(s)	5-121 1 layer(s)	6-121 1 layer(s)	7-121 2 layer(s)	7-121 2 layer(s)
SHEAR REINF.	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c	2 legged 81 @ 130 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

STRUCTURAL DESIGN OF A  
( G + IV ) - STORIED RESIDENTIAL BUILDING

AT PREMISES NO.

6, MITRA COLONY, WARD NO.- 121

UNDER THE KOLKATA MUNICIPAL CORPORATION

Calculated by :

**D.Ghosh, B.E.(civil) ,**

AMIE, KMC ESE No.- II/228

96/5/4, Pathak Para Road,

Kolkata - 700060, Ph.- 9432331763

## CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

### STRUCTURAL ANALYSIS & DESIGN :-

#### REFERENCES OF IS CODES :-

- i) IS : 456 - 2000 ; Code of Practice for Plain and Reinforcement Concrete.
- ii) SP -16 : Design Aids for Reinforced Concrete to IS : 456 – 1978
- iii) IS : 1786- 1985 ; Specification for high strength Deformed Bars & wires for Concrete Reinforcement.
- iv) IS : 875 -1987 ; Code of Practice for Design Loads ( other than earthquake ) for Building and Structures.

#### ASSUMPTIONS :

##### A. GENERAL :-

- i) The structure consist of a no. Of frames in Longitudinal & Transverse direction.
- ii) The working loads are multiplied by the following factor to obtain the Ultimate Design Load.

Under DL + LL only ----- 1.5

Under DL + Reduced LL + Seismic/ wind ----- 1.2

##### B. MATERIALS OF CONSTRUCTION :-

- i) Nominal Mix Concrete Grade M-20 ( consumption of cement 7.5 to 8 bags/ m<sup>3</sup>
- ii) Reinforcement Grade – Fe-500
- iii) P.C.C. - 75 mm thick and projection from the edge of Foundation is 50 mm ( Grade of concrete – M – 7.5 )

Calculated by :  
**D.Ghosh, B.E.(civil )**,  
AMIE, KMC ESE No.- II/228  
96/5/4, Pathak Para Road,  
Kolkata – 700060, Ph.- 9432331763

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Sheet no. 1

## CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

### C. CLEAR COVER FOR REINFORCEMENT :-

- i) Foundation slab and beam - 50 mm
- ii) Columns - 40 mm
- iii) Floor Slab - 15 mm
- iv) Floor Beam - 25 mm

All measurement should be taken from Main reinforcement.

Lap length of Reinforcement Bar =  $50 \times D$ , where  $D$  = dia. Of bar

Calculated by :  
**D.Ghosh, B.E.(civil) ,**  
AMIE, KMC ESE No.- II/228  
96/5/4, Pathak Para Road,  
Kolkata – 700060, Ph.- 9432331763

Signature

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## CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

### DESIGN OF SLAB

#### SLAB MKD. S-2

$$l_x = 4.35 \text{ m} \ \& \ l_y = 5.15 \text{ m}$$

$l_y/l_x = 5.15 / 4.35 = 1.20 < 2$ , thus this is a two-way slab with two adjacent edges discontinuous

Refer Table - 26 of IS :456- 2000, moment coefficients are- 0.060, 0.045, 0.047, 0.035

Provide 110 mm thick slab.

Loading intensity on Floor =  $8.0 \text{ Kn/m}^2$

$$\begin{aligned} (\text{Moment})_{\text{maxm}} &= 1.5 \times 8.0 \times (4.35)^2 \times 0.060 \\ &= 13.62 \text{ Kn.-m} \end{aligned}$$

Refer Table - 16 of SP -16 , Reinforcement provided as follows :

At middle Portion: 10 O @ 100 mm c/c

Along both-ways

At end Portion : top - 10 O @ 100 mm c/c

: bottom- 10 O @ 200 mm c/c

Calculated by :  
**D.Ghosh, B.E.(civil)** ,  
AMIE, KMC ESE No.- II/228  
96/5/4, Pathak Para Road,  
Kolkata - 700060, Ph.- 9432331763

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CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

**SCHEDULE OF SLAB**

Thickness of all slab = 110 mm

Slab Mkd.	Thickness Of Slab ( mm )	Reinforcement along Shorter Direction		Reinforcement along Longer Direction	
		At Middle Portion	At End Portion	At Middle Portion	At End Portion
S-1	110	8 O @ 150 mm c/c	8 O @ 150 mm c/c ( top ) & 8 O @ 300 mm c/c ( bottom )	8 O @ 150 mm c/c	8 O @ 150 mm c/c ( top ) & 8 O @ 300 mm c/c ( bottom )
S-2	110	10 O @ 100 mm c/c	10 O @ 100 mm c/c ( top ) & 10 O @ 200 mm c/c ( bottom )	10 O @ 100 mm c/c	10 O @ 100 mm c/c ( top ) & 10 O @ 200 mm c/c ( bottom )
S-3	125	Top- 10 O @ 100 mm c/c & Bottom- 10 O @ 125 mm c/c		8 O @ 100 mm c/c ( Both Top & Bottom )	

Calculated by :  
**D.Ghosh, B.E.(civil)** ,  
 AMIE, KMC ESE No.- II/228  
 96/5/4, Pathak Para Road,  
 Kolkata – 700060, Ph.- 9432331763

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CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

**SCHEDULE OF COLUMN**

COLUMN MKD	Column size & Reinforcement from Foundation to 2 <sup>nd</sup> Floor Level	Column size & Reinforcement from 2 <sup>nd</sup> Floor Level to Roof
C-1,C-5,C-6,C-11,C-16,C-17, C-18,C-19,C-20	250 X 450 8 NOS. 16 O & 2 NOS. 12 O	250 X 450 4 NOS. 16 O & 4 NOS. 12 O
C-2,C-3,C-4,C-12,C-21,C-22	250 X 500 12 NOS. 16 O	250 X 500 6 NOS. 16 O & 4 NOS. 12 O
C-7,C-8,C-9,C-10,C-13,C-14,C-15	250 X 600 12 NOS. 20 O	250 X 600 6 NOS. 16 O & 6 NOS. 12 O

USE 8 O STIRRUPS @ 200 MM C/C

Calculated by :  
**D.Ghosh, B.E.(civil )**,  
AMIE, KMC ESE No.- 11/228  
96/5/4, Pathak Para Road,  
Kolkata – 700060, Ph.- 9432331763

Signature

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**CALCULATION SHEET**

Premises No.- 6, MITRA COLONY, WARD NO.- 121

**SCHEDULE OF BEAM**

Beam Mkd.	Size of Beam i.e. Width x Depth ( mm x mm)	SUPPORT LONG REINFORCEMENT		SPAN LONG REINFORCEMENT		Stirrups
		TOP	BOTTOM	TOP	BOTTOM	
B-1	250 x 350	2 - 16 O + 2 - 12 O	2 - 16 O	2 - 16 O	2 - 16 O + 2 - 12 O	8 O @ 150 mm c/c
B-2	250 x 350	2 - 16 O + 2 - 16 O	2 - 16 O	2 - 16 O	2 - 16 O + 2 - 12 O	8 O @ 150 mm c/c
B-3	250 x 400	2 - 16 O + 2 - 16 O	2 - 16 O	2 - 16 O	2 - 16 O + 2 - 12 O	8 O @ 150 mm c/c
B-4	250 x 400	3 - 16 O + 3 - 16 O	3 - 16 O	3 - 16 O	3 - 16 O + 2 - 16 O	8 O @ 150 mm c/c
B-5	250 x 400	2 - 16 O + 2 - 12 O	2 - 16 O	2 - 16 O	2 - 16 O + 2 - 16 O	8 O @ 150 mm c/c
B-6	250 x 350	2 - 16 O + 2 - 16 O	2 - 16 O	2 - 16 O	2 - 16 O + 2 - 16 O	8 O @ 150 mm c/c

Calculated by :  
**D.Ghosh, B.E.(civil) ,**  
 AMIE, KMC ESE No.- II/228  
 96/5/4, Pathak Para Road,  
 Kolkata - 700060, Ph.- 9432331763

Signature

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## CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

### DESIGN OF FOUNDATION

FOUNDATION MKD F - 6 ( UNDER COLUMN C-5,C-7,C-15 & C-22 )

Total load coming from Columns =  $( 68.10 + 120.70 + 141.60 + 105.40 ) \times 2/3 = 284.53 \text{ t}$

Self wt. Of Foundation = 28.45 T ( assume 10 % of column load )

Therefore, total load act on soil =  $284.53 + 28.45 = 312.98 \text{ T}$

Bearing capacity of Soil =  $7.4 \text{ t/m}^2$  ( Refer Soil Report 1 )

Foundation Area required =  $312.98 / 7.40 = 42.29 \text{ m}^2$

Provide 2.8 m wide strip with 1.2 m projection from each edge.

Therefore, Total length of the strip footing = 15.193 m

& Foundation area provided =  $15.193 \times 2.80 = 42.82 \text{ m}^2 > ( A )_{\text{reqd.}}$  O.K.

Therefore Net upward pressure =  $312.98 / 42.82 = 7.35 \text{ t/m}^2 < \text{Allowable B.C. of Soil}$  O.K.

#### DESIGN OF FOUNDATION SLAB :

Assume width of Rib Beam = 400 mm

$$M_u = 1.5 \times 7.35 \times ( 1.20 )^2 \times 0.5 \text{ t-m} \\ = 7.94 \text{ t-m}$$

Provide 350 mm thk. Slab (  $d = 294 \text{ mm}$  ) & considering 1.0 m length of strip

$$M_u / ( b \times d^2 ) = 7.94 \times 10^7 / ( 1000 \times 304^2 ) \\ = 0.86 \text{ N/mm}^2$$

Refer, Table -1 of SP -16 ,  $p_t = 0.257 \%$

$$( A_{st} )_{\text{reqd}} = 7.55 \text{ cm}^2$$

Reinforcement Provided as Follows :-

Along shorter direction - 12  $\phi$  @ 125 mm c/c

&

Along longer direction - 8  $\phi$  @ 100 mm c/c

Calculated by :

**D.Ghosh, B.E.(civil) ,**

AMIE, KMC ESE No.- II/228

96/5/4, Pathak Para Road,

Kolkata - 700060, Ph.- 9432331763

Signature

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**CALCULATION SHEET**

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**DESIGN OF RIB BEAM :**

$$M_u = 1.5 \times (2.80 \times 7.35) \times (1.2)^2 \times 0.5 \text{ t-m}$$

$$= 22.22 \text{ t-m}$$

Section Provided : 450 x 650

$$M_u / (b \times d^2) = 22.22 \times 10^7 / (450 \times 600^2)$$

$$= 1.38 \text{ N/mm}^2$$

Refer, Table -1 of SP -16,  $p_t = 0.428 \%$

$$(A_{st})_{reqd} = 11.55 \text{ cm}^2$$

Reinforcement Provided as Follows :-

At Support	At Span
Top - 1 nos. 16O + 2 nos. 20 O	Top - 3 nos. 16O + 2 nos. 20 O
Bottom- 5 nos. 16 O	Bottom- 3 nos. 16 O

Calculated by :  
**D.Ghosh, B.E.(civil) ,**  
AMIE, KMC ESE No.- II/228  
96/5/4, Pathak Para Road,  
Kolkata - 700060, Ph.- 9432331763

Signature

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CALCULATION SHEET

Premises No.- 6, MITRA COLONY, WARD NO.- 121

**SCHEDULE OF FOUNDATION**

Depth of Foundation = **1.5 m below Existing Ground Level**

Fnd Mkd	Type Of Fnd.	Under Column Mkd.	Length ( m )	Width ( m )	Thick-ness Of slab ( mm )	Reinforcement in Slab	
						Along Shorter Direction	Along Longer Direction
F-1	Isolated Footing	C-1	2.40	2.20	350 to 200	12 O @ 125 mm c/c	12 O @ 125 mm c/c
F-2		C-6,C-11,C-16	2.60	2.60	”	”	”
F-3	Strip Footing	C-2,C-8,C-12 & C-17	12.293	2.80	”	12 O @ 125 mm c/c	8 O @ 100 mm c/c
F-4		C-3,C-9 & C-13	10.125	2.60	”	12 O @ 150 mm c/c	8 O @ 100 mm c/c
F-5		C-4,C-10 & C-14	10.125	2.60	”	”	”
F-6		C-18,C-19,C-20 & C-21	12.000	2.40	”	”	”
F-7		C-15,C-7,C-15 & C-22	15.193	2.80	”	12 O @ 125 mm c/c	8 O @ 100 mm c/c

Calculated by :  
**D.Ghosh, B.E.(civil),**  
 AMIE, KMC ESE No.- II/228  
 96/5/4, Pathak Para Road,  
 Kolkata – 700060, Ph.- 9432331763

Signature

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