APPENDIX

Data of Stress Resultants in Flat Plate

The data of flat plate for analysis are as follows:

Span		8	m
Thickness		0.25	m
Square column width		0.80	m
Uniform load		1450	kg/m^2
Concrete;	E	21.72E6	kN/m^2
	ν	0.17	
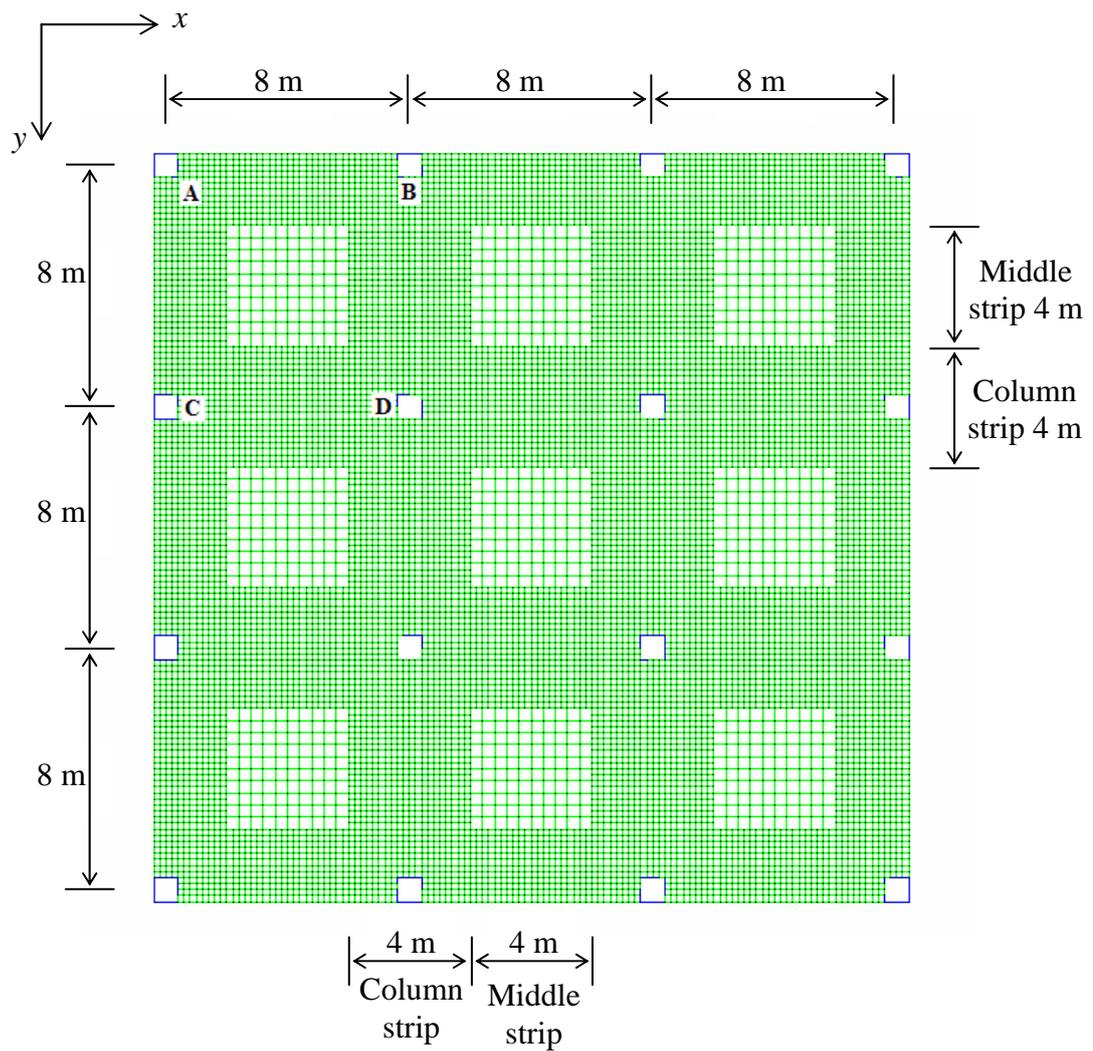
Appendix Figure 1 Plan of flat plate (without opening)

Appendix Table 1 Maximum stress resultants in flat plate without opening

Location	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
A	-214	-214	-3259.57	3259.57
B	-213.22	-222.64	-2814.01	3274.39
C	-222.64	-213.22	-3274.39	2814.01
D	-217.84	-217.84	-1950.05	1950.05

Appendix Table 2 Maximum stress resultants in flat plate with opening at "*in-in*" (Location D)

Size ($a \times b$) (m $\times$ m)	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
0.4×0.4	-224.12	-231.01	-2093.86	2098.10
0.8×0.4	-229.55	-243.59	-2228.10	2234.63
1.2×0.4	-233.03	-252.19	-2318.17	2326.31
1.6×0.4	-235.35	-258.12	-2380.08	2390.58
0.4×0.8	-230.65	-242.85	-3103.58	2268.86
0.8×0.8	-235.26	-254.85	-2357.43	2392.72
1.2×0.8	-237.92	-262.16	-2432.40	2467.05
1.6×0.8	-239.60	-266.89	-2481.25	2516.99
0.4×1.2	-243.74	-264.45	-3270.81	2633.46
0.8×1.2	-245.85	-272.86	-2607.40	2697.43
1.2×1.2	-246.95	-277.57	-2623.12	2733.12
1.6×1.2	-247.55	-280.39	-2649.95	2756.09
0.4×1.6	-248.31	-283.63	-3346.15	2892.24
0.8×1.6	-249.42	-288.90	-2765.05	2917.66
1.2×1.6	-249.84	-291.40	-2785.24	2928.45
1.6×1.6	-249.93	-292.57	-2794.65	2933.64

Appendix Table 3 Maximum stress resultants in flat plate with opening at "*in-ex*" (Location D)

Size ($a \times b$) (m$\times$m)	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
0.4×0.4	-220.48	-209.94	-1796.69	2151.72
0.8×0.4	-233.64	-210.06	-1938.83	2113.02
1.2×0.4	-242.62	-213.66	-2033.84	2171.67
1.6×0.4	-248.80	-216.06	-2100.17	2235.73
0.4×0.8	-233.12	-211.40	-1979.97	3397.67
0.8×0.8	-245.66	-216.18	-2108.94	2629.24
1.2×0.8	-253.28	-218.93	-2185.75	2293.63
1.6×0.8	-258.20	-220.66	-2237.03	2344.01
0.4×1.2	-256.73	-225.97	-3105.05	3535.38
0.8×1.2	-265.43	-228.13	-2663.99	2850.09
1.2×1.2	-270.36	-229.26	-2486.66	2528.51
1.6×1.2	-273.27	-229.87	-2510.03	2532.98
0.4×1.6	-277.29	-230.81	-2853.77	3577.25
0.8×1.6	-282.76	-231.95	-2692.60	2944.65
1.2×1.6	-285.37	-232.38	-2703.34	2682.02
1.6×1.6	-286.60	-232.46	-2708.20	-2691.63

Appendix Table 4 Maximum stress resultants in flat plate with opening at "*edge*" (Location B)

Size ($a \times b$) (m $\times$ m)	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
0.4×0.4	-185.95	-218.29	-2063.21	3355.43
0.8×0.4	-166.93	-208.99	-2028.15	3409.67
1.2×0.4	-146.29	-200.09	-1968.01	3378.76
1.6×0.4	-127.14	-192.47	-1916.23	3320.68
0.4×0.8	-168.46	-180.28	-2591.97	4226.76
0.8×0.8	-141.10	-170.52	-2569.93	3562.13
1.2×0.8	-118.49	-163.12	-2498.84	3266.43
1.6×0.8	-99.76	-157.13	-2429.47	3087.54
0.4×1.2	-148.48	-157.94	-4562.89	4404.46
0.8×1.2	-119.88	-155.12	-4331.41	3774.37
1.2×1.2	-97.63	-150.11	-4166.86	3489.39
1.6×1.2	-79.99	-145.47	-4037.32	3312.14
0.4×1.6	-135.98	-122.91	-5560.76	4427.95
0.8×1.6	-105.74	-123.49	-5308.16	3810.44
1.2×1.6	-83.40	-120.92	-5075.35	3533.10
1.6×1.6	-66.24	-118.00	-4900.61	3357.92

Appendix Table 5 Maximum stress resultants in flat plate with opening at "*all-edge*"

Location	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
A	-262.47	-262.47	-3928.43	3928.43
B	-151.03	-127.21	-4675.21	4492.70
C	-127.21	-151.03	-4492.70	4675.21
D	-264.81	-264.81	-2453.92	2453.92

Appendix Table 6 Maximum stress resultants in flat plate with opening at "*all-in*"

Location	M_x (kNm/m)	M_y (kNm/m)	Q_x (kN/m^2)	Q_y (kN/m^2)
A	-217.23	-218.39	-3335.77	3366.89
B	-224.37	-248.06	-3089.05	3705.72
C	-236.62	-222.42	-3522.44	2989.59
D	-273.78	-227.12	-2861.48	3583.25