SP Garments Ltd.
(Extension Building)

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(24.167001, 90.424543)

31 October 2021

RSC RMG SUSTAINABILITY COUNCIL

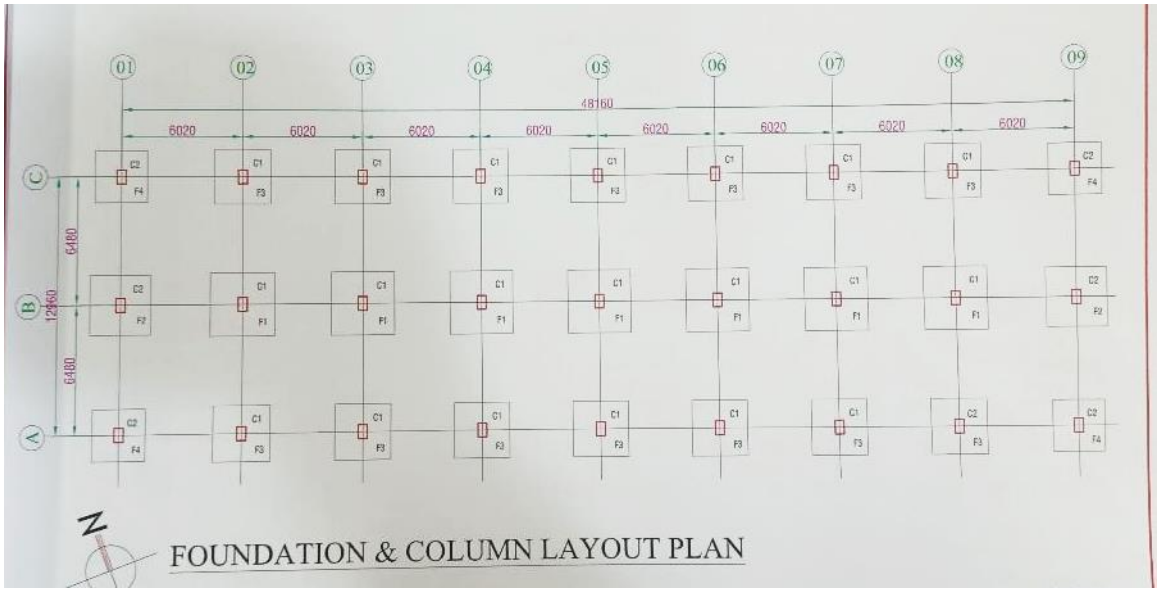
Building information

1. Warehouse Building is a five storied (G+4) steel building.

Observations

Footing stressed above normal design limits

Observations: Warehouse building



FOOTING SCHEDULE

FOOTING INDEX	FOOTING SIZE				THICKNESS		FOUNDATION DEPTH (Df)
	L	L'	B	B'	T_1	T_2	
F1	10'-6"	42"	10'-6"	36"	16"	8"	5'-0"
F2	10'-0"	42"	10'-0"	36"	15"	7"	5'-0"
F3	9'-3"	42"	9'-3"	36"	15"	6"	5'-0"
F4	8'-6"	42"	8'-6"	36"	12"	6"	5'-0"

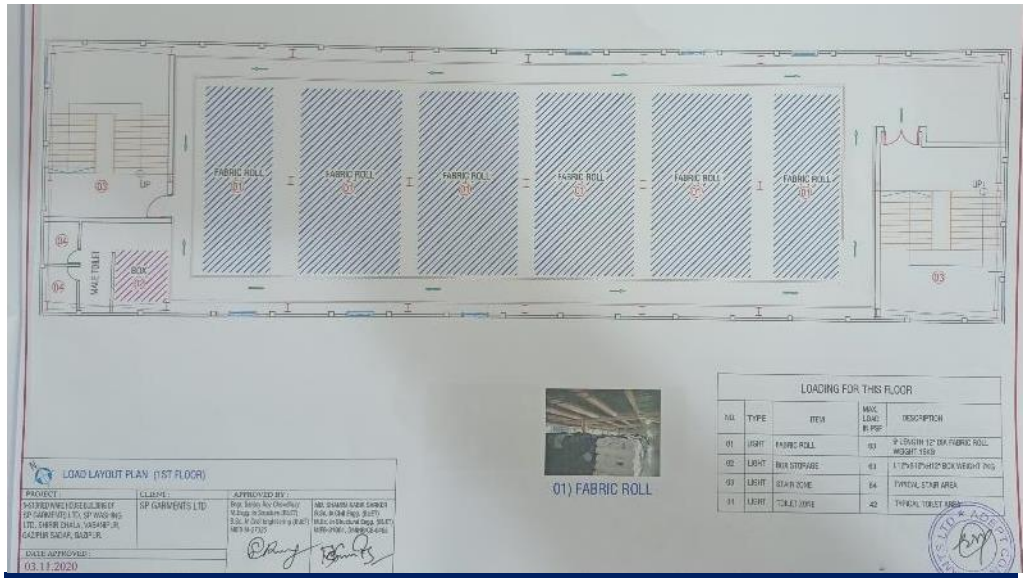
Floor Loading

Cursory calculation indicates that footings are stressed above normal design limit considering 6 kPa (for store building) floor live load, equivalent concrete strength from core test value (f'c 2.227 ksi (15.35 MPa) and allowable bearing capacity 3.86 ksf (FS 2.5). The building engineer is required to review design, load, column & footing stress.

Observations: Warehouse building

Prepared design report not comply with BNBC

Observations: Warehouse building



Floor live load plan with 63 psf (3 kN/m2) loading limit

Floor Loading

As per BNBC, the minimum floor live load for light storage is 6 kN/m2 (125 psf). The storage in this building is designed for 3 kN/m2 live loads.
The building engineer is required to revise the storage live load limit based on BNBC requirement.

4.5	INDUSTRIAL, STORAGE & HAZARDOUS (Occupancy - G, H & J)	Workshop, factory, warehouse	1 Light workroom without storage	3.0 2.7
			2 Machinery hall & circulation area	4.0 4.5
1.8			3 Factory, workshop etc.	5.0 4.5
			4 Manufacturing : light	6.0 4.5
			heavy	12.0 9.0 (5)
2.7			ice	15.0 9.0 (5)
4.5			5 Printing plant :	(5)
			Press room	7.0 11.0
			Composing and linotype room	5.0 9.0 (5)
2.7			Paper storage room	12.0 9.0 (5)
			6 Motor room, fan room etc. including the weight of machinery	7.5 4.5
4.5			7 Cold storage, grain storage	15.0 9.0 (5)
4.5			8 Storage warehouses : light	6.0 4.5 (5)
			heavy	12.0 9.0
4.5			9 Foundries	20.0 12.0
7.0				

Observations: Warehouse building

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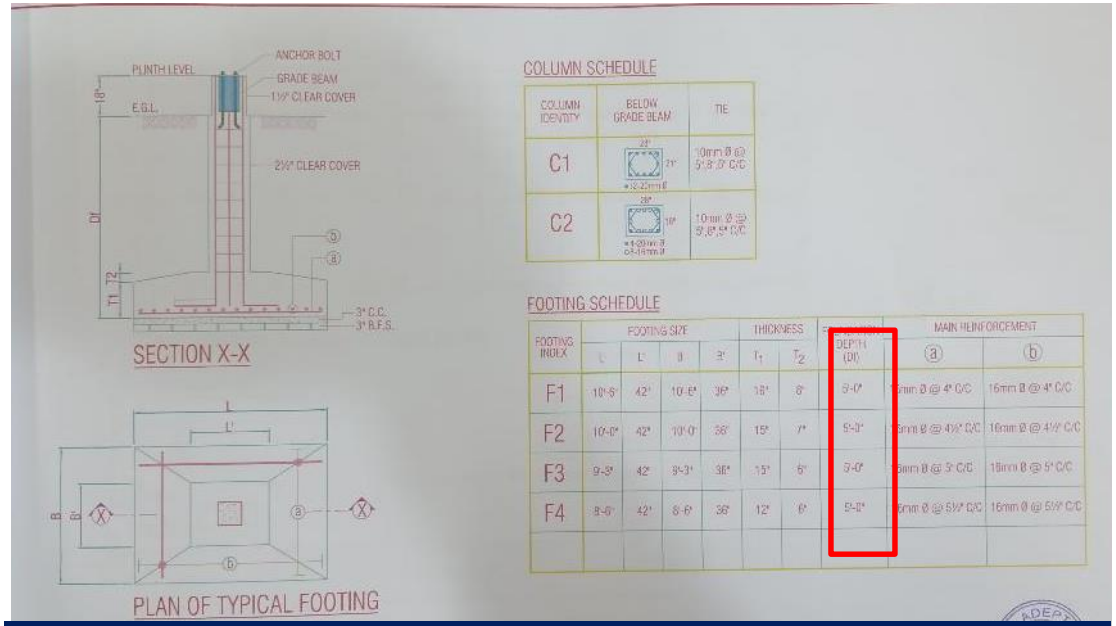


Foundation Details

As per bore layout only bore hole 1, 2 & 3 are under the warehouse building and the allowable bearing capacity of soil is 4 ksf (max) (FS2.5) at 1.5 m depth from EGL.
But in design report soil allowable bearing capacity is consider more than 5 ksf (FS 2.5).
The building engineer is required to revise the design report with proper information.

Table 3.1.1: Bearing Capacity Check of Footings as per BNBC

Joint Label	Foundation Type	Provided Foundation Size	Bearing Capacity	FoS (From Soil Test Report)	Ultimate Load Bearing Capacity	Reaction (DL + LL)	Available FoS (For Existing Foundation)	Remarks (Minimum FoS=2.5)
		sft	ksf		kip	kip		
1	F4	72.3	5.5533	2.5	1003.07	233.111	4.30	OK
2	F2	100.0	5.2600	2.5	1315.00	360.872	3.64	OK
3	F4	72.3	5.5533	2.5	1003.07	198.025	5.07	OK
4	F3	85.6	5.3933	2.5	1153.67	273.116	4.22	OK
5	F1	110.3	5.1067	2.5	1407.53	526.101	2.68	OK
6	F3	85.6	5.3933	2.5	1153.67	289.918	3.98	OK
7	F3	85.6	5.3933	2.5	1153.67	255.054	4.52	OK
8	F1	110.3	5.1067	2.5	1407.53	321.967	4.37	OK
9	F3	85.6	5.3933	2.5	1153.67	258.308	4.47	OK
10	F3	85.6	5.3933	2.5	1153.67	254.706	4.53	OK
11	F1	110.3	5.1067	2.5	1407.53	320.311	4.39	OK
12	F3	85.6	5.3933	2.5	1153.67	256.669	4.49	OK
13	F3	85.6	5.3933	2.5	1153.67	257.273	4.48	OK
14	F1	110.3	5.1067	2.5	1407.53	320.405	4.39	OK
15	F3	85.6	5.3933	2.5	1153.67	254.326	4.54	OK
16	F3	85.6	5.3933	2.5	1153.67	260.612	4.43	OK
17	F1	110.3	5.1067	2.5	1407.53	320.341	4.39	OK
18	F3	85.6	5.3933	2.5	1153.67	253.748	4.55	OK
19	F3	85.6	5.3933	2.5	1153.67	262.328	4.40	OK
20	F1	110.3	5.1067	2.5	1407.53	321.801	4.37	OK
21	F3	85.6	5.3933	2.5	1153.67	252.385	4.57	OK
22	F3	85.6	5.3933	2.5	1153.67	293.78	3.93	OK
23	F1	110.3	5.1067	2.5	1407.53	505.988	2.78	OK
24	F3	85.6	5.3933	2.5	1153.67	241.604	4.78	OK
25	F4	72.3	5.5533	2.5	1003.07	163.183	6.15	OK
26	F2	100.0	5.2600	2.5	1315.00	348.082	3.78	OK
27	F4	72.3	5.5533	2.5	1003.07	223.214	4.49	OK

Bearing capacity in design report

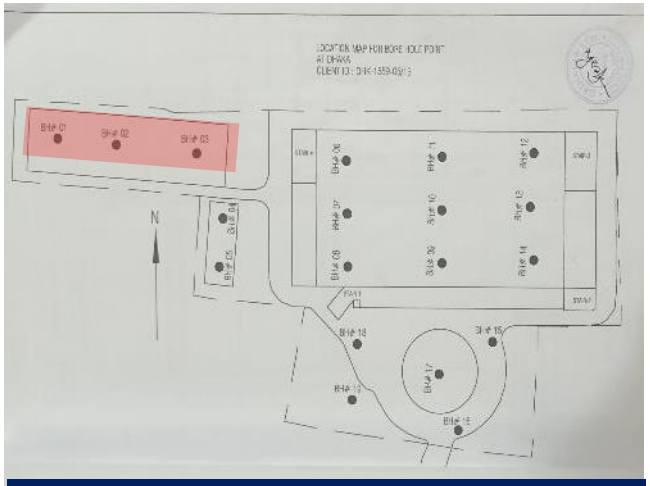
REPORT

Client ID: DHK-1559-05/13

Table # 01: Bearing Capacities of the Shallow Foundation from FIELD TESTS (Values in MPa, F. S. = 2.50)

Bore Hole	Depth in m	Field SPT	Bearing Capacity (MPa) For Strip Footing	Bearing Capacity (MPa) For Circular or Square Footing
01	1.5	15	0.182	0.192
	3.0	16	0.286	0.314
	4.5	12	0.233	0.261
02	1.5	14	0.164	0.173
	3.0	16	0.286	0.314
	4.5	19	0.384	0.425
03	1.5	15	0.182	0.192
	3.0	14	0.246	0.271
04	1.5	14	0.164	0.173
	3.0	18	0.315	0.345
	4.5	16	0.333	0.370
05	1.5	13	0.147	0.156
	3.0	16	0.286	0.314
	4.5	16	0.333	0.370
06	1.5	12	0.131	0.141
	3.0	16	0.286	0.314
	4.5	13	0.259	0.290

Bearing capacity of Bore 1,2 & 3



Bore Layout

Observations: Warehouse building

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Discrepancies between as-built condition and drawings

Observations: Warehouse building

SCHEDULE OF STEEL COLUMN

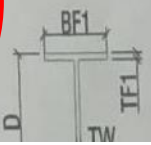
NAME	D (mm)	TW (mm)	BF1 (mm)	TF1 (mm)	BF2 (mm)	TF2 (mm)
C101	400	8	200	12	250	14
C102	400	8	200	12	250	14
C103	400	8	200	12	250	14
C104	400	8	200	12	250	14

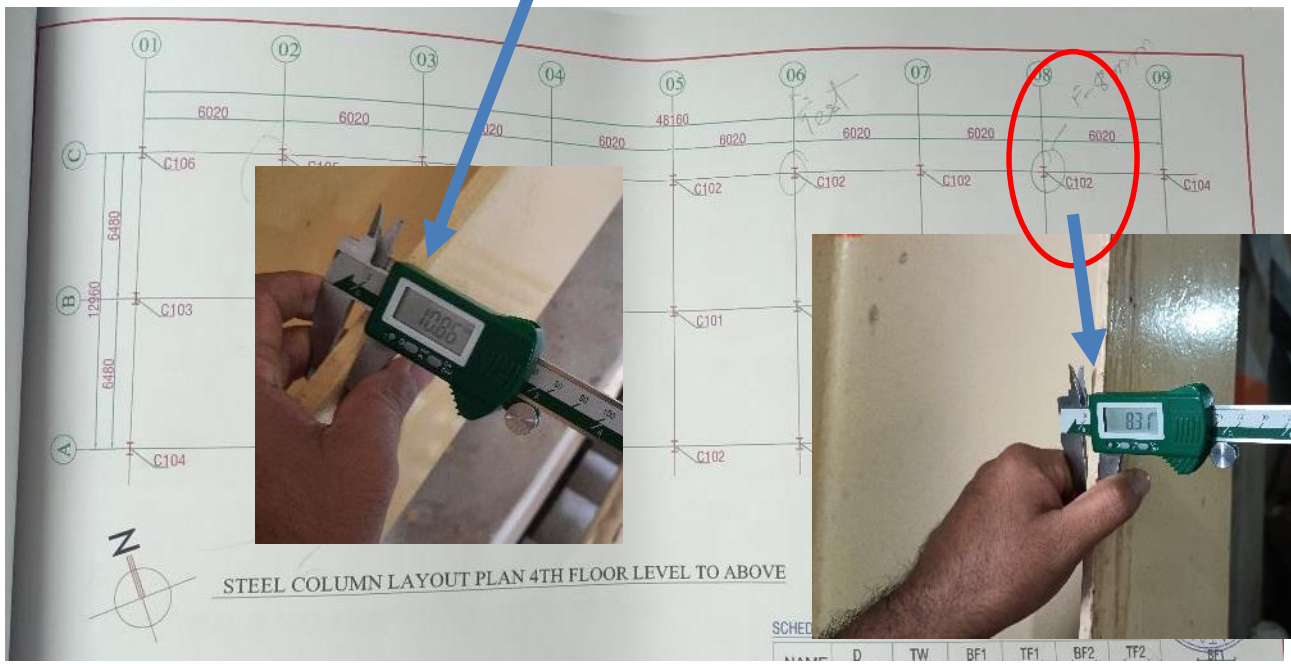
SCHEDULE OF STEEL MAIN BEAM

NAME	D (mm)	TW (mm)	BF1 (mm)	TF1 (mm)
MB301	400	8	140	12

10 mm Stair

SCHEDULE OF STEEL SUB BEAM





Flange thickness of steel column C-102 at grid 08-C and C-103 at 4th floor level were found 8 mm instead of 10 mm and 10 mm instead of 12 mm, respectively.
Also, the flange thickness of Main Beam at stair was found 10 mm instead of 12 mm

Observations: Warehouse building

Bolt missing in steel connection

Bolt missing

Bolt missing in several connection joint. Building engineer is required to identify the all locations and install missing bolt accordingly.

Bolt missing

Observations: Warehouse building

Corrosion in steel member

Corrosion in steel member was observed in several locations. The building engineer to investigate the reason of corrosion and suggest proper remedial measure accordingly.

Corrosion in joint

Corrosion in sub-beam

Observations: Warehouse building

Priority Actions

Problems Observed

Warehouse Building:

Item 01: Footing stressed above normal design limits.

Item 02: Prepared Design report not comply with BNBC.

Item 03: Discrepancies between as-built condition and drawings.

Item 04: Bolt missing in steel connection.

Item 05: Corrosion in steel member.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Footing stressed above normal design limits.	As part of Detail Engineering Assessment (DEA) Building engineer is required to review design, load & footing stress.	6-weeks
02	Footing stressed above normal design limits.	Produce and actively manage a set of floor loading plan within the factory building considering foundation, column and floor capacity.	6-weeks
03	Footing stressed above normal design limits.	Carry out remedial works as per DEA recommendations.	6-months
04	Footing stressed above normal design limits.	Implement floor load plan.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
05	Prepared Design report not comply with BNBC.	The building engineer to check the occupancies and update the floor live loading plan for the building based on BNBC loading requirements and capacity of building floor, column & foundations.	6-weeks
06	Prepared Design report not comply with BNBC.	Revise the design report considering actual soil bearing capacity.	6-weeks
07	Prepared Design report not comply with BNBC.	Implement the floor loading plan (posting load plan, providing signage and maintaining loadings)	6-months
08	Discrepancies between as-built condition and drawings.	Building engineer is required to survey the structure and produce as-built drawing as per BNBC section 1.9.1	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
09	Bolt missing in steel connection.	Building engineer is required to identify the all locations and install missing bolt accordingly.	6-weeks
10	Corrosion in steel member.	The building engineer to investigate the reason of corrosion and suggest proper remedial measure accordingly.	6-weeks
11	Corrosion in steel member.	Take necessary measures to prevent further corrosion and repair the corroded steel members as per engineer's suggestion.	6-months