

Soorty Textiles (BD) Ltd. (Extension -2)

Plot # 241-242, Cumilla EPZ, Cumilla, Bangladesh

(23.444788, 91.181981)

24 December 2024

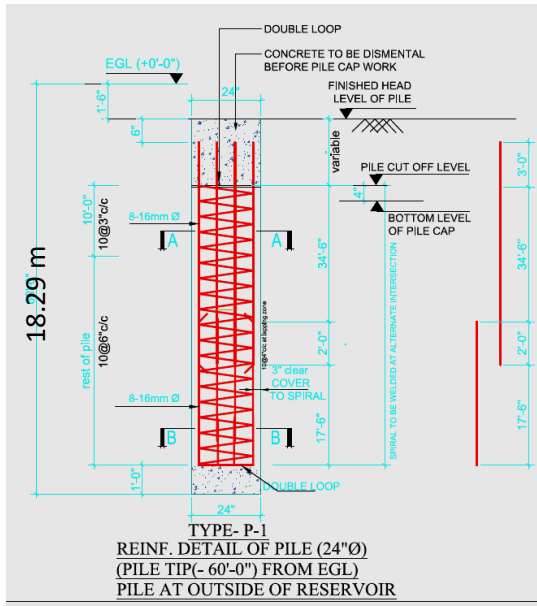


1. Building Information

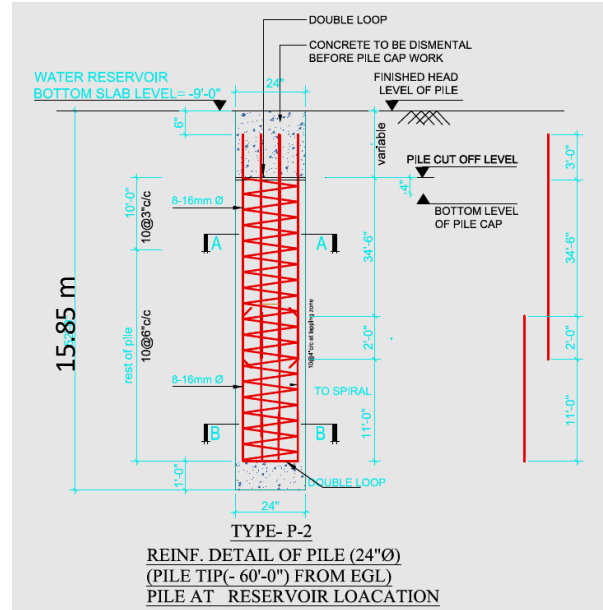
1. **Production Building:** The structure is a seven-storied (G+6) reinforced concrete (RC) building.
2. **Service Building-A:** This is a two-storied (G+1) RC building.
3. **Service Building-B:** This is a two-storied (G+1) RC building.
4. **Security Building:** This is a single-story building (a combination of RC and steel).
5. **Sand collection pit:** This is a single-story building with an underground sand pit.

2. Observation

Observation-1: Inconsistencies in the design report. (Production Building)



Sectional details of P1



Sectional details of P2

Table 3.1.1: Bearing Capacity Check of Pile

Joint Label	Pile Cap Type	Provided Number of Pile	Allowable Pile Capacity	Total Load Bearing Capacity	Reaction Env	Remarks
			Nos			
44	PC6	6.0	285	5130.00	1191.148	OK
45	PC6	6.0	285	5130.00	1190.94	OK
46	PC18	18.0	285	15390.00	4010.062	OK
66	PC18					
82	PC18	8.0	285	6840.00	1827.883	OK
47	PC8					
48	PC6	6.0	285	5130.00	1431.336	OK
49	PC6	6.0	285	5130.00	1188.565	OK
50	PC6	6.0	285	5130.00	1186.081	OK
51	PC6	6.0	285	5130.00	1195.121	OK
52	PC6	6.0	285	5130.00	1202.818	OK
53	PC6	6.0	285	5130.00	1189.588	OK
54	PC6	6.0	285	5130.00	1229.647	OK
55	PC6	6.0	285	5130.00	1194.589	OK
56	PC19	19.0	285	16245.00	4128.847	OK
76	PC19					
83	PC19					
57	PC9	9.0	285	7695.00	1853.098	OK
58	PC6	6.0	285	5130.00	1452.365	OK
59	PC6	6.0	285	5130.00	1094.694	OK
61	PC6	6.0	285	5130.00	1067.008	OK
63	PC4	4.0	285	3420.00	907.884	OK
64	PC8	8.0	285	6840.00	1584.341	OK
65	PC8	8.0	285	6840.00	1376.807	OK

Pile capacity check (Design Report)

9.0 Conclusion and Recommendation

Piles were tested under static axial compressive load. Cast in situ piles of 600mm diameter and 18.0m length were given 2,87,760 kg of load. Produced load - settlement curve excerpts very consistent shape as for a regular pile. The summary of all the test piles is attached below.

Test pile no	Dia of Pile (mm)	Type of Pile	Pile length from EGL	Allowable Load Capacity (kg)	Gross Settlement (mm)	Net Settlement (mm)
TP-01	600	Cast in Situ	18.0m	1,41,667	18.20	6.75
TP-02	600	Cast in Situ	18.0m	1,40,000	18.70	6.94
TP-03	600	Cast in Situ	18.0m	1,40,000	18.67	6.92
TP-04	600	Cast in Situ	18.0m	>1,42,880	17.15	6.36
TP-05	600	Cast in Situ	18.0m	>1,42,880	15.57	5.77
TP-06	600	Cast in Situ	18.0m	>1,42,880	15.87	5.89
TP-07	600	Cast in Situ	18.0m	>1,42,880	15.97	5.92
TP-08	600	Cast in Situ	18.0m	>1,42,880	15.83	5.87
TP-09	600	Cast in Situ	18.0m	>1,42,880	18.01	6.68

Pile load test report

Description: As-built drawings showed two types of pile P1 (length 18.29m) and P2 (length 15.85m). But in design report, the capacity used to check pile capacity is 285 kip (each pile). Also, for SMRF consideration joint shear check was missing in the design report as per BNBC.

The building engineer is required to address the issues mentioned and revise the design report and submit the revised design documents to the RSC for review.

Observation-2: Unbraced storage racks on different floors. (Production Building)



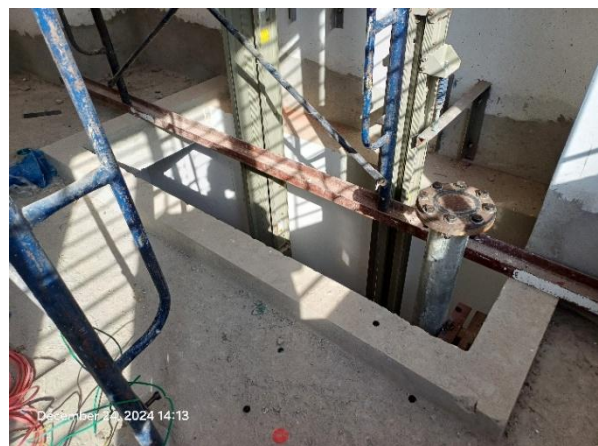
Description: Unbraced storage racks were observed on different floors. The building engineer is required to provide anchorage/bracing to the storage racks to protect them from falling hazards.

Observation-3: Column Susceptible to trolley impact. (Production Building)



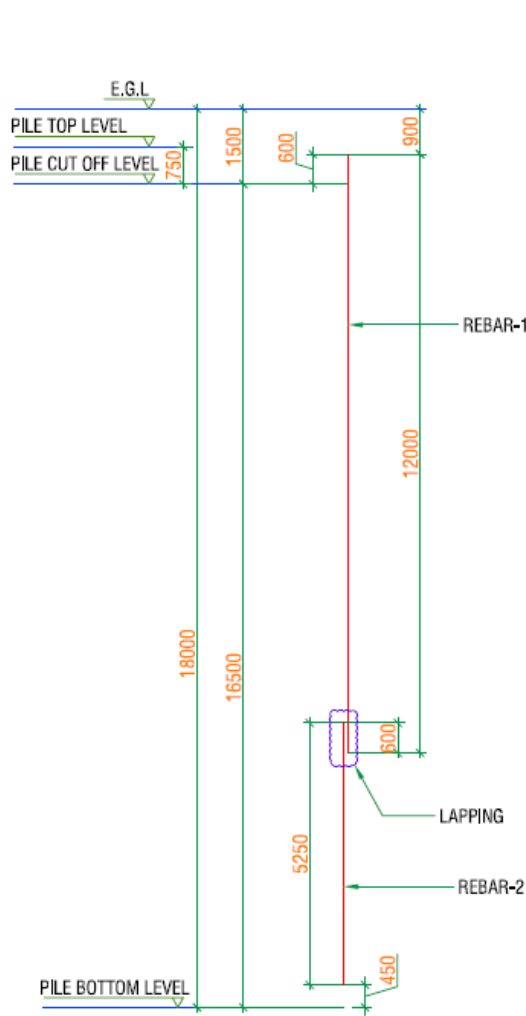
Description: Columns are susceptible to trolley impact on different floor levels. Building engineer is required to take necessary action to prevent the trolley impact with the columns.

Observation 4: Falling Hazard through slab opening (Production Building).



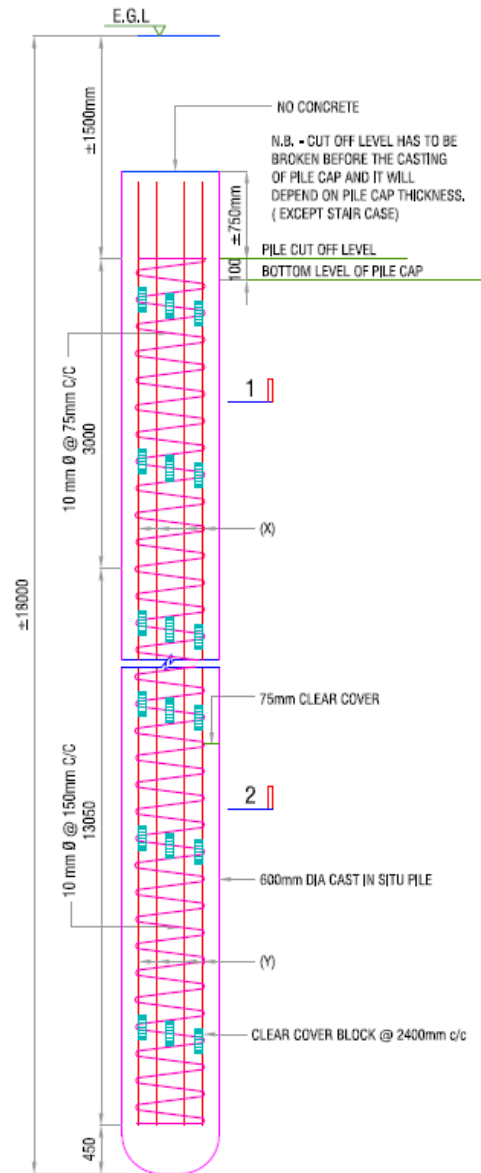
Description: Falling hazard was observed through the slab opening in the spiral conveyor room and electrical room. The building engineer is required to take necessary measures to avoid possible falling hazards.

Observation-5: Inconsistencies in the design report. (Service Building -A)



REBAR CUTTING DETAIL FOR PILE

REINFORCEMENT :	
VERTICAL REINF. UP TO L1 (X)	VERTICAL REINF. BELLOW L1 (Y)
8-16 mm Ø ST	8-16 mm Ø ST



TYPICAL LONG SEC. OF PILE-P1

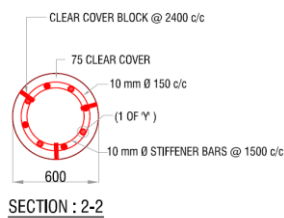
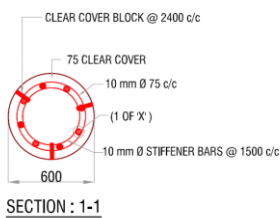


Table 3.1.1: Pile Capacity Check as per BNBC

Joint Label	FZ kip	Total Load kip	Pile Capacity kip	Pile Nos	Final Pile Nos Nos
3	127.744	127.744	135	0.95	1
7	156.654	156.654	135	1.16	1
17	89.47	89.47	135	0.66	1
20	100.787	100.787	135	0.75	1
				Total =	4
			Diameter = 24 in		
			Length = 50 ft from EGL		
			Capacity = 102		
			FoS = 2.5		
			Rebar = 7-16mm		

Description: The as-built drawings showed the pile length from EGL as 18m, but in the design report, it was considered 15.24m. Also, 8 no's 16mm bar was provided in the pile as per the as-built drawing, but the calculation shows 7 no's 16mm rebar. However, the pile requirement is more than one in the joint label '7', but the final pile number is one.

2.4.4 Earthquake Load (E)

Proper structural design of any Building structure must include loads due to earthquake shaking. Although there has been no major incident of earthquake hazard in the recent past of Bangladesh, earthquakes are not uncommon in this area. Scientific geological study of the earth crust below Bangladesh shows that Bangladesh does fall in moderate to high seismic risk zone. Statistical evidence from past major and minor earthquake incidents shows that a major earthquake is overdue in the recent times of geological scale. Therefore, it is necessary to prepare against any possible earthquake hazard. It should be kept in mind that the objective of earthquake resistance Building design is not to make a strong Building which can resist any damage due to earthquake. Instead, the earthquake-resistant design aims at minimizing the possible damage and casualty to an acceptable level.

Regarding the earthquake resistant structural design, the specific design code must be followed. For the analysis and design checking of this Building, the equivalent static force method of BNBC (2020) is followed. The main considerations for the calculation of earthquake load are given below.

For BNBC-2020,

- 1 Zone co-efficient, $Z = 0.2$ (zone II, as per BNBC 2020)
- 2 Structure importance co-efficient, $I = 1$ (Occupancy Category III, Table 6.2.17, BNBC-20)
- 3 Response modification co-efficient for RCC, $R = 8.0$ (Table 6.2.19, BNBC-20)
- 4 System Overstrength factor, $\Omega_0 = 3.0$
- 5 Deflection amplification factor, $C_d = 5.5$

Description: Response modification co-efficient, R value considered as 8 for SMRF but no calculation/justification is provided for consideration.

The building engineer is required to address the issues mentioned, revise the design report, and submit the revised design documents to the RSC for review.

Observation-6: Construction materials on the roof level. (Service Building -A)



Description: Construction materials were found on the roof level. The building engineer is required to remove all kinds of construction materials from the roof.

Observation-7: Inconsistencies in the design report. (Service Building -B)

For BNBC-2020,

- 1 Zone co-efficient, $Z = 0.2$ (zone II, as per BNBC 2020)
- 2 Structure importance co-efficient, $I = 1$ (Occupancy Category II, Table 6.2.17, BNBC-20)
- 3 Response modification co-efficient for RCC, $R = 8.0$ (Table 6.2.19, BNBC-20)
- 4 System Overstrength factor, $\Omega_0 = 3.0$
- 5 Deflection amplification factor, $C_d = 5.5$
- 6 Site class = SD (Table 6.2.13, BNBC-20)

Description: Response modification co-efficient, R value considered as 8 for SMRF but no calculation/justification is provided for consideration.

The building engineer is required to address the issue mentioned, revise the design report, and submit the revised design documents to the RSC for review.

Observation-8: Exposed re-bar on the roof level. (Service Building -B)



Description: Exposed re-bar was observed on the roof, which is prone to corrosion. The building engineer is required to provide anti-corrosive coating on the exposed rebar.

Observation-9: Standing water and dampness on the roof. (Service Building -B)



Description: Standing water and dampness were observed on the roof. Building engineer is required to improve the drainage system on the roof and repair the dampness with a suitable method.

Observation-10: Construction materials on the roof level. (Service Building -B)



Description: Construction materials were found on the roof level. Building engineer is required to remove all kinds of construction materials from the roof.

Observation-11: Column susceptible to vehicle impact. (Service Building -B)



Description: The ground floor of this building is part of an internal road. So, columns in the ground floor area are susceptible to vehicle impact. The building engineer is required to provide separate barriers around the column to prevent vehicle impact.

3. Action Plan:

SI No	Observation	Action Plan	Timeline
01	Inconsistencies in the design report. (Production Building)	The building engineer is required to address the issues mentioned and revise the design report and submit the revised design documents to the RSC for review.	within 6 weeks
02		Carry out suggested remedial works if required.	within 6 months
03	Unbraced storage racks on different floors. (Production Building)	The building engineer is required to provide anchorage/bracing to the storage racks to protect them from falling hazards.	within 6 months
04	Column Susceptible to trolley impact. (Production Building)	Building engineer is required to take necessary action to prevent the trolley impact with the columns.	within 6 months
05	Falling Hazard through slab opening (Production Building).	Building engineer is required to take necessary measures to avoid possible falling hazards.	Immediate
06	Inconsistencies in the design report. (Service Building -A)	The building engineer is required to address the issues mentioned, revise the design report, and submit the revised design documents to the RSC for review.	within 6 weeks
07		Carry out suggested remedial works if required.	within 6 months
08	Construction materials on the roof level. (Service Building -A)	Building engineer is required to remove all kinds of construction materials from the roof.	within 6 weeks
09	Inconsistencies in the design report. (Service Building -B)	The building engineer is required to address the issue mentioned, revise the design report, and submit the revised design documents to the RSC for review.	within 6 weeks
10		Carry out suggested remedial works if required.	within 6 months
11	Exposed re-bar on the roof level. (Service Building -B)	The building engineer is required to provide anti-corrosive coating on the exposed rebar.	within 6 weeks
12	Standing water and dampness on the roof. (Service Building -B)	Building engineer is required to improve the drainage system on the roof and repair the dampness with a suitable method.	within 6 weeks
13	Construction materials on the roof level. (Service Building -B)	Building engineer is required to remove all kinds of construction materials from the roof.	within 6 weeks

14	Column susceptible to vehicle impact. (Service Building -B)	The building engineer is required to provide separate barriers around the column to prevent vehicle impact.	within 6 weeks
----	---	---	----------------