

# R&G (BD) Garment Ltd

Bhabanipur, Gazipur Sadar, Gazipur  
(24.147350585, 90.421449636)  
30 April 2023



# Building Information

1. Main Building is a tenstoried (G+9) reinforced concrete (RC) structure.
2. Canteen Building is a seven storied (G+6) RC structure.
3. Compressor room is a single storied (G) RC structure.
4. Security– 1, Security- 2 and Security– 3 is a single storied RC structure.

# Observations

# Lack of information in design report

Pile foundation was used for the whole building. It has been found two types of piles as per pile length. One type has length of 90ft and another type has 85ft length. The bottom of the 85ft pile is 90 ft below pile from EGL and for 90ft piles 95ft below from EGL. However, the bearing capacity of single pile for 85ft length is found 343 kips from soil test report. Which is lower than the bearing capacity of 90ft length pile. The lower capacity 343 kips has been used for all types of piles for more conservation.

JOINT LOCATION	DL+LL			COLUMN ID	PILE CAP ID	NO. of PILES	x (ft)	z (ft)	$\Sigma x^2$	$\Sigma z^2$	SINGLE PILE ALLOWABLE CAPACITY [Soil Test Report] (kips)	FOS	SINGLE PILE ULTIMATE CAPACITY (kips)	AS PER BNBC-2006 STANDARD		
	P kips	Mx (kips-ft)	Mz (kips-ft)											Developed Load on Critical Pile (kips)	FOS	REMARKS
31	753.0	2.5	14.9	C2	PC2	3	2.5	2.9	12.5	12.5	343	2.50	857.50	254.56	3.37	ABOVE 2.5
32	1241.0	6.4	44.5	C4	PC4	4	3.5	3.5	50.2	50.2	343	2.50	857.50	313.85	2.73	ABOVE 2.5
33	1379.6	23.7	58.5	C4	PC4	4	3.5	3.5	50.2	50.2	381	2.50	952.50	350.70	2.72	ABOVE 2.5
36	549.3	3.7	15.5	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	277.78	3.09	ABOVE 2.5
37	720.8	1.5	6.3	C2	PC2	3	2.5	2.9	12.5	12.5	343	2.50	857.50	241.88	3.55	ABOVE 2.5
38	608.3	1.4	1.4	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	304.45	2.82	ABOVE 2.5
47	504.9	0.8	6.1	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	253.66	3.38	ABOVE 2.5
48	567.4	0.4	2.9	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	284.27	3.02	ABOVE 2.5
49	297.5	3.7	3.8	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	149.52	5.74	ABOVE 2.5
8	743.7	0.4	13.2	C2	PC2	3	2.5	2.9	12.5	12.5	343	2.50	857.50	250.64	3.42	ABOVE 2.5
9	1330.5	1.3	34.1	C4	PC4	4	3.5	3.5	50.2	50.2	343	2.50	857.50	335.13	2.56	ABOVE 2.5
10	1382.7	8.0	36.5	C4	PC4	4	3.5	3.5	50.2	50.2	367	2.50	917.50	348.81	2.63	ABOVE 2.5
1	490.2	2.2	13.6	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	247.81	3.46	ABOVE 2.5
2	716.4	0.5	4.3	C1	PC1	2	2.5	0.0	12.5	0.0	367	2.50	917.50	359.05	2.56	ABOVE 2.5
3	666.1	8.9	4.3	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	333.92	2.57	ABOVE 2.5
4	340.5	7.3	4.7	C1	PC1	2	2.5	0.0	12.5	0.0	343	2.50	857.50	171.21	5.01	ABOVE 2.5
238	520.8	13.7	35.4	SW1	PC9	4	7.5	0.0	125.0	0.0	343	2.50	857.50	273.22	3.14	ABOVE 2.5
237	556.7	12.1	28.7	SW1												
247	502.3	0.6	13.2	C2	PC9	4	7.5	0.0	125.0	0.0	381	2.50	952.50	381.14	2.50	ABOVE 2.5
250	476.8	11.0	1.8	SW1												
255	541.2	31.0	3.1	SW1												

Three pile capacity considered 381-kip, 367-kip & 343-kip in the adequacy table, However in the design review 343 kip considered. Building is required to consider the pile adequacy based on the pile length and borehole location.

Table: Average Strength Calculation of Column and Shear wall

Sl. No	Sample	Strength at 28 days psi	Standard Deviation	Average, psi
1	Column	5295	775.919274	6562.1602
2	Column	7080		
3	Column	6771		
4	Column	6810		
5	Column	7050		
6	Column	5507		
7	Column	7167		
8	Column	5265		
9	Column	5780		
10	Column	6200		
11	Column	7710		
12	Column	6801		
13	Column	5517		
14	Column	6442		
15	Column	7530		
16	Column	6840		
17	Column	7130		
18	Column	5840		
19	Shear Wall + Column	7588		
20	Shear Wall + Column	5220		
21	Shear Wall + Column	5890		
22	Shear Wall + Column	7513		
23	Shear Wall + Column	6550		
24	Shear Wall + Column	7728		
25	Shear Wall + Column	7059		
26	Shear Wall + Column	6720		
27	Shear Wall + Column	5576		
28	Shear Wall + Column	6911		
29	Shear Wall + Column	6813		

Concrete strength considered 5000 psi in the design report. However, no calculation was provided in the design report according to BNBC 5.12 provision to satisfy the frequency of testing and evaluation of concrete strength.

From BNBC-2006, Table 6.5.5			
Design Strength, f'c (psi)	Required Strength, f'cr (psi)	Cylinder Average Strength, f'c (psi)	Remarks
5000	6232.5	6562.160234	Satisfactory

# Poor roof drainage system

**Observation: Main Building**



Water ponding was found at roof floor due to rainwater and leakage of pipeline of water.

Building engineer is required to provide adequate drainage system to avoid water ponding on the roof.

# Dampness found in roof slab

**Observation: Main Building**



Dampness on slab soffit

During inspection, dampness found at several place of roof slab. Building engineer is required to investigate the reason & extent of dampness and provide remedial measure accordingly.

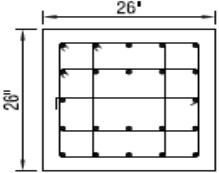
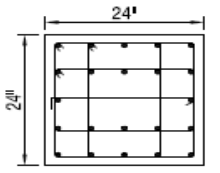
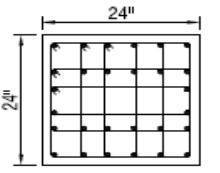
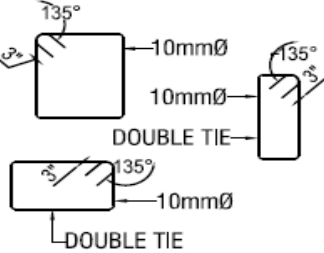
## Observation: Main Building

**FoS of some isolated footing in below the limit**



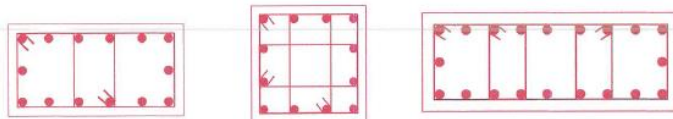
# Inconsistency in as-built drawing

### SCHEDULE OF COLUMN REINFORCEMENT

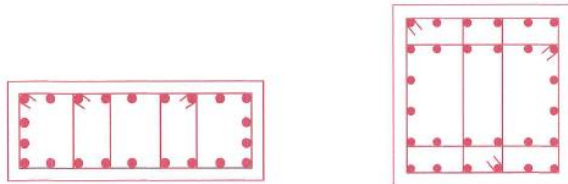
COLUMN ID	UP TO GRADE BEAM Clear Cover=2.5" Stone chpls	GRADE BEAM TO 2nd FLOOR Clear Cover=1.5" Stone chpls	3rd FLOOR TO ABOVE Clear Cover=1.5" Stone chpls	TIE DETAILS
C5				
	TIE SPACING 4" C/C	TIE SPACING 4"~6" ~4" C/C	TIE SPACING 4"~6" ~4" C/C	

Provided as built drawing

C5=12	26"X26" 28-20mm Ø Bar.	24"X24" 28-20mm Ø Bar.	24"X24" 20-20mm Ø Bar.
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C1=12"X24"  
14-20mmØ bar.    C2=16"X16"  
12-20mmØ bar.    C3=12"X36"  
20-20mmØ bar.



C4=12"X40"  
22-20mmØ bar.    C5=24"X24"  
28-20mmØ bar.

Provided construction drawing

During inspection, mismatch found in column schedule of C5 column. As per provided as built drawing 22-20 mm re-bar shown in C5 column at ground floor, but in construction drawing 28-20 mm re-bar shown in C5 column at ground floor. Building engineer is required to survey the full building and update the as-built drawing accurately.

**Tested area not filled with specification**

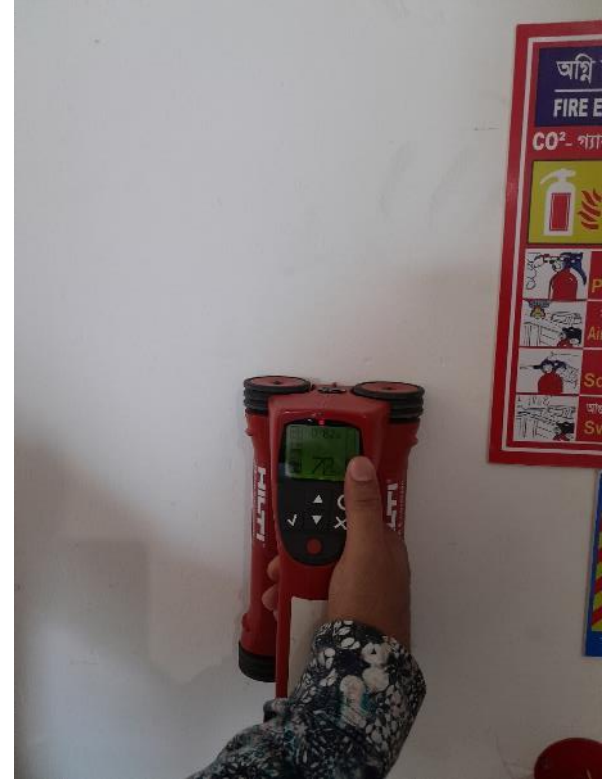


Tested areas found unfilled in all buildings.  
Building engineer is required to fill all the  
tested area by suitable method.

# Test Carried Out



Stone chips aggregate concrete in all structures



Ferro Scanning

# Priority Actions

# Problems Observed

## Main Building

Item 1: Lack of information in design report.

Item 2: Poor roof drainage system.

Item 3: Dampness found in roof slab.

## Canteen Building

Item 4: FoS of some isolated footing in below the limit.

Item 5: Inconsistency in as-built drawing.

## All Structure

Item 6: Tested area not filled with specification.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Lack of information in design report. (Main Building)	Building is required to consider the pile adequacy based on the pile length and borehole location.	6-weeks
02	Lack of information in design report. (Main Building)	Building engineer is required to evaluate the material strength as per BNBC 5.12.	6-weeks
03	Lack of information in design report. (Main Building)	Building engineer is required to revise design report as per BNBC 1.9.1.	6-weeks
04	Lack of information in design report. (Main Building)	Carryout remedial works where required.	6-months
05	Poor roof drainage system. (Main Building)	Building engineer is required to provide adequate drainage system to avoid water ponding on the roof.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Dampness found in roof slab. (Main Building)	Building engineer is required to investigate the reason & extent of dampness and provide remedial measure accordingly.	6-weeks
07	FoS of some isolated footing in below the limit. (Canteen Building)	Building engineer is required to review the design of foundation load and stresses.	6-weeks
08	FoS of some isolated footing in below the limit. (Canteen Building)	Carry out remedial works where required.	6-months
09	Design code consideration. (Canteen Building)	Building engineer is required to evaluate the building as per BNBC 2020 code.	6-weeks
10	Design code consideration. (Canteen Building)	Carry out remedial works where required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
11	Inconsistency in as-built drawing. (Canteen Building)	Building engineer is required to prepare accurate as-built drawing.	6-weeks
12	Tested area not filled with specification. (All Structure)	Building engineer is required to fill the tested areas by suitable method.	6-weeks