Cottonex Fashions Limited

Plot No. 12 & 13, Kalurghat Heavy I/A, Mohora, Chandgaon, Chattogram-4208
(22.384306, 91.869389)
19 October 2023

RSC RMG SUSTAINABILITY COUNCIL

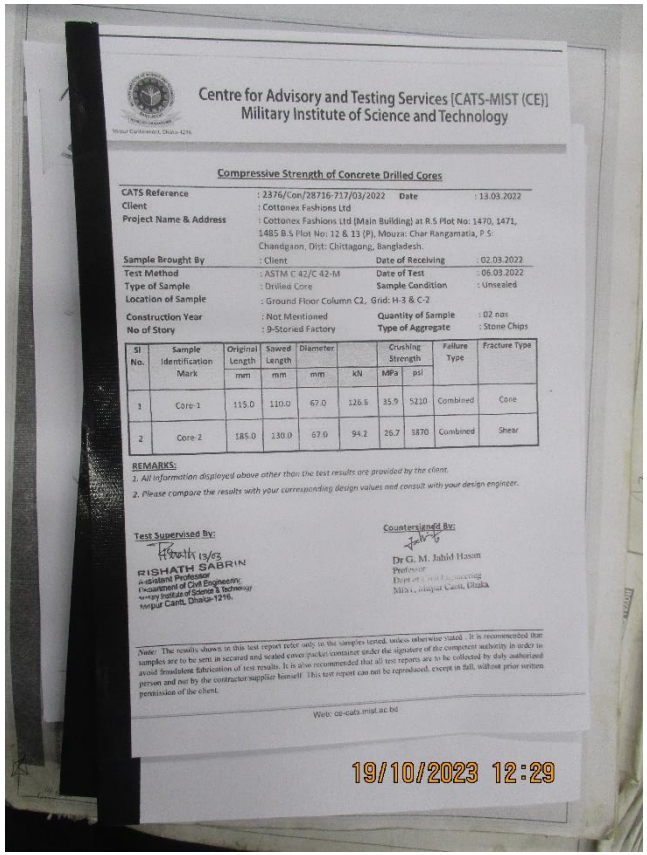
Building Information

1. **Production Building:** Nine-storied (G+8) reinforced concrete (RC) building including a partial storey at the roof.
2. **Utility Building:** RC building of two storied (G+1) with fire pumproom in the basement.
3. **Security Post:** Single-storied reinforced concrete (RC) building.

Observations

Inconsistencies in Design report

Observation: Production Building



Centre for Advisory and Testing Services [CATS-MIST (CE)]
Military Institute of Science and Technology

Compressive Strength of Concrete Drilled Cores

CATS Reference : 2376/Con/28716-717/03/2022 Date : 13.03.2022
Client : Cottonex Fashions Ltd
Project Name & Address : Cottonex Fashions Ltd (Main Building) at R.S Plot No: 1470, 1471, 1485 B.S Plot No: 12 & 13 (P), Mouza: Char Rangamatia, P.S: Chandgaon, Dist: Chittagong, Bangladesh.
Sample Brought By : Client Date of Receiving : 02.03.2022
Test Method : ASTM C 42/C 42-M Date of Test : 06.03.2022
Type of Sample : Drilled Core Sample Condition : Unsealed
Location of Sample : Ground Floor Column C2, Grid: H-3 & C-2
Construction Year : Not Mentioned Quantity of Sample : 02 nos
No of Story : 9-Storied Factory Type of Aggregate : Stone Chips

Sl No.	Sample Identification Mark	Original Length mm	Sawed Length mm	Diameter mm	kN	Crushing Strength MPa	Crushing Strength psi	Failure Type	Fracture Type
1	Core-1	115.0	110.0	67.0	126.6	35.9	5210	Combined	Cone
2	Core-2	185.0	130.0	67.0	94.2	26.7	3870	Combined	Shear

REMARKS:
1. All information displayed above other than the test results are provided by the client.
2. Please compare the results with your corresponding design values and consult with your design engineer.

Test Supervised By:
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Assistant Professor
Department of Civil Engineering
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Mirpur Cantt, Dhaka-1216.

Countersigned By:
Dr G. M. Jahid Hasan
Professor
Dept. of Civil Engineering
MIST, Mirpur Cantt, Dhaka

Note: The results shown in this test report refer only to the samples tested, unless otherwise stated. It is recommended that samples are to be sent in secured and sealed cover packet/container under the signature of the competent authority in order to avoid fraudulent fabrication of test results. It is also recommended that all test reports are to be collected by duly authorized person and not by the contractor/supplier himself. This test report can not be reproduced, except in full, without prior written permission of the client.

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Table 3.1: Equivalent Crushing Strength of Concrete (Column)

Sample No.	Core test result	Diameter of Core (inch)	Diameter Effect	Damage Effect	Modified Core test result	Average	kc	Number of sample	Standard deviation	coeffecient of variation	Equivalent Concrete strength according to ACI 562 sec. 6.4.3
1	5960	2.640	1.04	1.06	6575.36	6481.58	2.4	2	132.62	0.02	5445.03
2	5790	2.640	1.04	1.06	6387.81						

4-nos of concrete cores taken from column (5210psi, 3870psi, 5960psi & 5790psi); but two core value (5960psi & 5790psi) used in calculating the equivalent concrete strength.

Also, total 14 sets of cylinder test reports was available on site, but location was not mentioned in the reports.

Observation: Production Building

- ***Earthquake/Seismic Load:***

The calculation of earthquake loads conforms to BNBC. These calculations are based on the Section 2.5; Part # 6 of BNBC.

For the calculation of possible earthquake load on the whole structure The Equivalent Static Force Method is adopted as Lateral Force Method [*BNBC '06; Part # 6; Section # 2.5.5.1*].

As per equivalent static force method total design base shear is calculated from the following equation.

$V = \frac{ZIC}{R}W$ [*Ref: BNBC-2006; Part# 6; Chapter-2; Equation # 2.5.1*]

Where,

Z = Seismic Zone Coefficient [*BNBC '06; Part # 6; Table # 6.2.22*]
= 0.15 (Gazipur is under Seismic Zone 2)
I = Structural Importance Coefficient [*BNBC '06; Part # 6; Table # 6.2.23*]
= 1.0 (Standard Occupancy Structures)
R = Response Modification Coefficient for Structural System
[*BNBC '06; Part # 6; Table # 6.2.24*]
= 9 (for Dual system share wall with IMRF RCC Portion)
[*Pictorial evidence for verification is provided in 00.03: Appendix II_Detail Investigation Report*]
W = Total Seismic Dead Load [*BNBC '06; Part # 6; Section # 2.5.5.2*]
C = Numerical coefficient given by the following relation

$$C = \frac{1.25S}{T^{2/3}}W$$

Response modification co-efficient, R value considered as 9 for IMRF (Dual system) but no calculation/justification is provided for the consideration.

7.6 Design Review of Foundation

According to soil test report done by "Soil Investigation" dated March 2017, capacity of 600mm dia piles with length of 39m is given below;

Bore Hole No.	Allowable Total Pile Capacity (Tons) FoS=3.0	Average Allowable Total Pile Capacity (Tons) FoS=3.0	Average Allowable Total Pile Capacity (Kips) FoS=2.5
B.H. -1	113.45		
B.H. -2	110.75	113.6409091	272.7381818
B.H. -3	121.5		
B.H. -4	114.8		
B.H. -5	81.5		
B.H. -6	106.25		
B.H. -7	113.85		
B.H. -8	109		
B.H. -9	119.9		
B.H. -10	127.95		
B.H. -11	131.1		

Pile capacity calculation in design report

As per provided design report in pile capacity calculation factory used the average data of eleven (11) boreholes. But some bore hole capacity is lower than the average value. Building engineer is required to provide calculation/justification for using the average value in pile capacity calculation.

Observation: Production Building

Live load consideration

Observation: Production Building

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
		3 Factory, workshop etc.	5.0	4.5
		4 Manufacturing : light	6.0	4.5
		heavy	12.0	9.0 (5)
		ice	15.0	9.0 (5)
		5 Printing plant :		(5)
		Press room	7.0	11.0
		Composing and linotype room	5.0	9.0 (5)
		Paper storage room	12.0	9.0 (5)
		6 Motor room, fan room etc. including the weight of machinery	7.5	4.5
		7 Cold storage, grain storage	15.0	9.0 (5)
		8 Storage warehouses : light	6.0	4.5 (5)
		heavy	12.0	9.0
		9 Foundries	20.0	12.0

Minimum storage live load 6 kPa in BNBC

Live load considered 5 kPa on the storage areas which doesn't comply BNBC requirement.

Live load consider 5 kPa on the storage areas

Storage on floor

Observation: Production Building

Dampness at celling of roof floor

Observation: Production Building

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Dampness on slab soffit

Dampness on the celling of the roof floor was observed. Building engineer is required to seal the source of water and repair the damp areas with suitable methods.

Observation: Production Building

Column susceptible to vehicle impact

Column at loading-unloading zone

Column adjacent to the loading-unloading area is susceptive to vehicle impact. The building engineer is required to provide separate barrier and signage to avoid possible vehicle impact on column.

Observation: Production Building

Signage of water ponding on roof

Observation: Production Building

Water ponding on the roof

Signage of water ponding on the roof

The factory is required to improve roof drainage system with adequate slope and provide sufficient water outlets to drain out water.

Observation: Production Building

Falling Hazard

Observation: Production Building

Falling hazard from stair roof top

Falling hazard from stair roof top

Falling hazard observed in the stair roof top. Building engineer is required to take necessary measures to avoid possible falling hazard.

Observation: Production Building

Inconsistencies in Design report

Observation: Utility Building

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Pile capacity calculation in design report

As per provided design report in pile capacity calculation factory used the average data of eleven (11) boreholes. But some bore hole capacity is lower than the average value. Building engineer is required to provide calculation/justification for using the average value in pile capacity calculation.

Observation: Utility Building

Mismatches in as built drawings

Observation: Utility Building

Marked beams layout not matched with on-site condition

Cantilever beams shown in drawing of utility building at stair roof top, but not found on site.
Building engineer is required to confirm the location of the beams and update the drawings.

Observation: Utility Building

Problems Observed

Production Building:

Item 1: Inconsistencies in Design report.

Item 2: Live load consideration.

Item 3: Dampness at celling of roof floor.

Item 4: Column susceptible to vehicle impact.

Item 5: Signage of water ponding on roof.

Item 6: Falling Hazard.

Utility Building:

Item 7: Inconsistencies in Design report.

Item 8: Mismatches in as built drawings.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Inconsistencies in Design report. (Production Building)	Building engineer is required to address the inconsistencies in the design report.	6-weeks
02	Inconsistencies in Design report. (Production Building)	Carryout remedial works where required.	6-months
03	Live load consideration. (Production Building)	Building engineer is required to prepare live load plan as per BNBC requirements.	6-weeks
04	Live load consideration. (Production Building)	Implement and maintain the floor live load as per the prepared load plan.	6-weeks
05	Dampness at celling of roof floor. (Production Building)	Building engineer is required to seal the source of water and repair the damp areas with a suitable method.	6-weeks
06	Column susceptible to vehicle impact. (Production Building)	The building engineer is required to provide separate barriers and signage to avoid possible vehicle impact on the column.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
07	Signage of water ponding on roof. (Production Building)	Building engineer is required to improve the roof drainage system with adequate slope and provide sufficient water outlets to drain out water.	6-months
08	Falling Hazard. (Production Building)	Building engineer is required to take necessary measures to avoid possible falling hazard.	6-weeks
09	Inconsistencies in Design report. (Utility Building)	Building engineer is required to address the inconsistencies in the design report.	6-weeks
10	Inconsistencies in Design report. (Utility Building)	Carryout remedial works where required.	6-months
11	Mismatches in as built drawings. (Utility Building)	Building engineer is required to confirm the location of the beams and update the drawings.	6-weeks