Fakir Fashion Ltd. (Extension - 3)

Dohargaon, Baliapara, Rupgonj.

(23.784146N, 90.587327E)

5 February 2024

RSC RMG SUSTAINABILITY COUNCIL

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1. Building Information

Building-8 (New ETP): Partially 3-storied (G+2) RC building.
Building-10: Single storied RC building.
Building-12: Three storied RC building.
Building-16: Six-storied (G+5) RC building.
Shed-13: Combination of a steel shed and 2-storied (G+2) RC building.
Shed-16: Single storied steel shed.
Shed-19: Single storied prefabricated steel shed with a mezzanine floor.
Shed 20: Single storied steel shed.
Shed 21: Single storied steel shed with a mezzanine floor.

2. Observations

Observation-1: Absence of design documents (Building-8 -New ETP).

Description: As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, no architectural drawing or design reports were available which are required to be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 (part 6, BNBC).

Observation-2: Design strength of concrete is not justified (Building-8 -New ETP).

Project : 12000 M3/ Day Capacity Biological E.T.P. at Fakir Fashion Ltd., Narayangonj.
Sample : **Cylinder** [Mix proportion(as quoted): 1:1.5:3.0, Aggregate Type: Stone chips]
Location : Column
Test : **Compressive Strength [ASTM C39]**
Date of Test : 3/11/2016

TEST REPORT

Sl. No.	Date of Casting as per the Letter	Specimen Designation/ Frog Mark	Specimen Area	Maximum Load	Crushing Strength	Average Crushing Strength	Mode of Failure
			(sq. in)	(lb)	(psi)		
1	17/10/2016	Cylinder-A	28.88	144,992	5,021	---	Combined *
2	(17 days test)	Cylinder-B	30.79	140,513	4,564		Combined *
3		Cylinder-C	30.79	104,684	3,400		Combined *

Note: Samples were received in unsealed condition. *Combined = Mortar and Aggregate failure.

GENERAL NOTES:

1. CONCRETE STRENGTH SHALL BE 4000 Psi UNLESS OTHERWISE MENTIONED.
2. ALL STEEL SHALL BE DEFORMED STEEL OF YIELD STRENGTH, fy = 72,500 Psi
3. 100% COARSE SAND (F.M = 2.5) SHALL BE USED AS FINE AGGREGATE.
4. CLEAR COVER TO STEEL REINF. SHALL BE USED AS FOLLOWS;
   a) 25mm FOR SLAB NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROU
   b) 50mm FOR SLAB AND R.C.C. WALL EXPOSED TO EARTH OR WEATHER.
5. 20mm & 12mm (2:1) DOWN WELL GRADED STONE CHIPS SHALL BE USED AS
6. CURING SHALL BE DONE FOR FOUR WEEKS.
7. LAP LENGTH SHALL BE AS FOLLOWS;-

	Ø20 ROD	Ø16 ROD	Ø12 & Ø10 ROD

Description: Design strength of concrete is considered as 27.58 MPa (4 000 Psi) but strength of concrete is less than the design strength in cylinder test report. Besides, only 3 concrete cylinder test reports were available for the 3 storied structure which doesn't meet the frequency of testing requirement of BNBC. The building engineer is required to verify in-situ material strength by taking adequate number of concrete cores to justify the design strength.

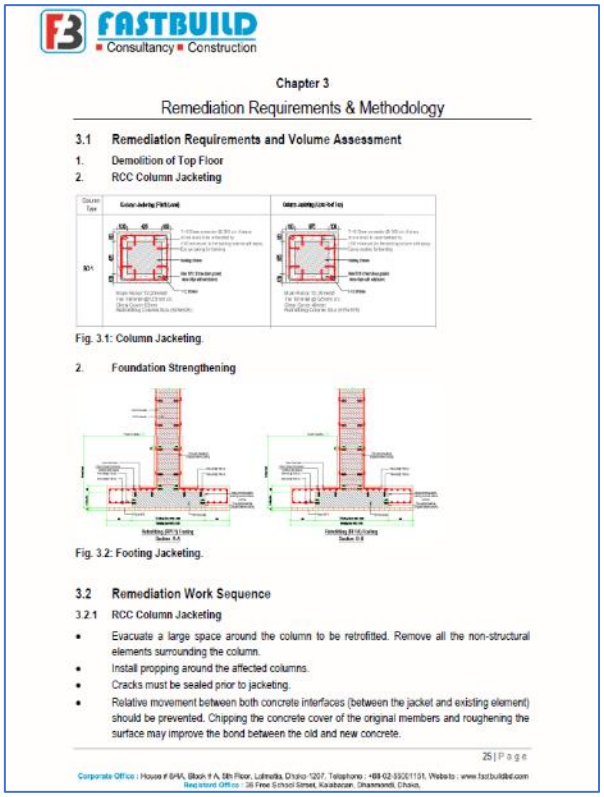
Observation-3: Crack on brick wall at ground floor (Building-8 -New ETP).

Description: Crack was found on brick wall at ground floor. The building engineer is required to investigate the reason of crack and repair as per investigation report.

Observation-4: Incomplete as-built drawings (Building-10).

Description: Full set of as-built drawings were not available for the Transformer & Electric Substation building. Building engineer is required to survey the whole structure and prepare complete structural and architectural drawings for the building.

Observation-5: Required retrofitting work required to be carried out as per DEA after reviewed by RSC (Building-12).



FASTBUILD
Consultancy Construction

Chapter 3

Remediation Requirements & Methodology

3.1 Remediation Requirements and Volume Assessment

1. Demolition of Top Floor
2. RCC Column Jacketing

Fig. 3.1: Column Jacketing.

2. Foundation Strengthening

Fig. 3.2: Footing Jacketing.

3.2 Remediation Work Sequence

3.2.1 RCC Column Jacketing

- Evacuate a large space around the column to be retrofitted. Remove all the non-structural elements surrounding the column.
- Install propping around the affected columns.
- Cracks must be sealed prior to jacketing.
- Relative movement between both concrete interfaces (between the jacket and existing element) should be prevented. Chipping the concrete cover of the original members and roughening the surface may improve the bond between the old and new concrete.

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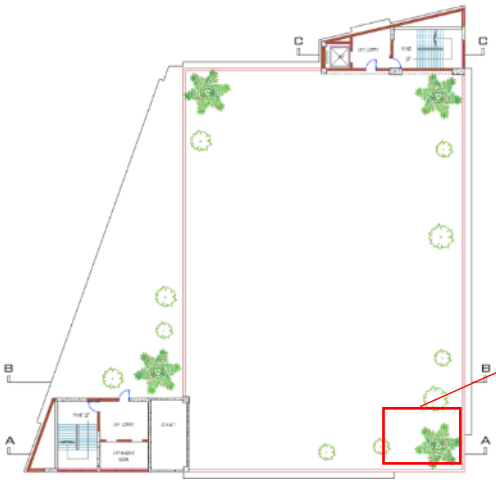
Description: As per the prepared DEA some footings and columns are required to be strengthened. All kinds of retrofitting work are required to be carried out as per DEA after reviewed by RSC. Submit DEA document to the RSC for review.

Observation-06: Crack on brick wall at top floor (Building-12).

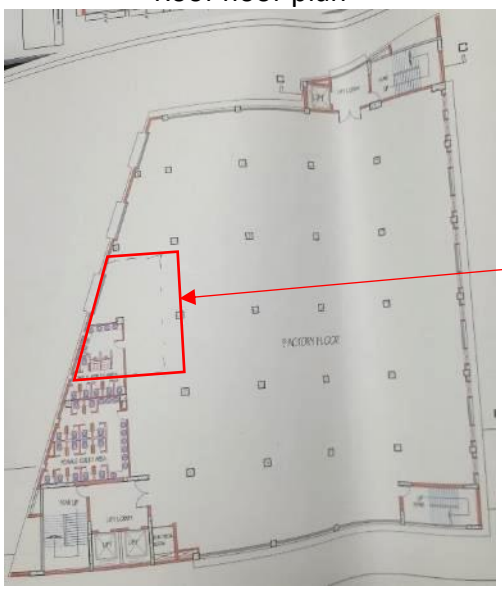
Description: Crack was found on brick wall at top floor. The building engineer is required to investigate the cracked area and repair with a suitable method.

Observation-07: Mismatch in as-built drawing. (Building 16)



Roof floor plan

Stair case at roof



Architectural floor layout

Onsite toilet loaction

Description: During the inspection, a mismatch was found in the architectural floor layout.

- The marked staircase was not shown in architectural roof floor plan.
- The toilet location also doesn't match with the provided architectural floor plan.

The building engineer is required to survey the full structure and update the as-built drawing and design report accordingly.

Observation 08: Absence of design report. (Building 16)

Description: As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. During inspection, the design report was not available on site. Also, to confirm the design strength, the number of cylinders taken are not adequate as per the frequency test criteria of BNBC (Section 5.12).

The building engineer is required to prepare a set of design documents including as built drawings, live load plan at roof and a design report based on in-situ material strength and software-based analysis which shall be prepared in compliance with section 1.9.1, part-6 of BNBC.

Observation-09: Water clogging and lack of drainage system on roof. (Building 16)

Description: During inspection, water ponding was observed on the roof. The building engineer is required to improve adequate slope for drainage purpose.

Observation-10: Absence of design documents (Shed-13).

Description: As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, no architectural drawing or design reports were available which are required to be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 (part 6, BNBC).

Observation 11: Design strength of concrete is not justified (Shed-13).

Sample : **Concrete Cylinder** [Mix proportion (as quoted): Not mentioned, Aggregate Type: Stone chips]
Location : Short Column [Admixture Added (as per letter) : Not mentioned]
Test : **Compressive Strength Test of Concrete Cylinder [ASTM C39]**
Date of Test : 24/3/2022

TEST REPORT

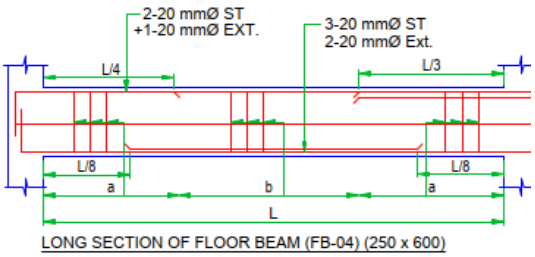
SL No.	Date of Casting as per the letter	Specimen Designation/ Frog Mark	Specimen Area	Maximum Load	Crushing Strength	Average Crushing Strength	Mode of Failure
			(sq. in)	(lb)	(psi)		
1	23/2/2022 (29 days test)	Shed -13 Short Column	11.94	48,557	4,067	**3810 psi** (26.3 MPa) (268 kg/cm²)	Combined *
2		Shed -13 Short Column	12.42	44,349	3,571		Combined *
3		Shed -13 Short Column	12.42	47,154	3,797		Combined *

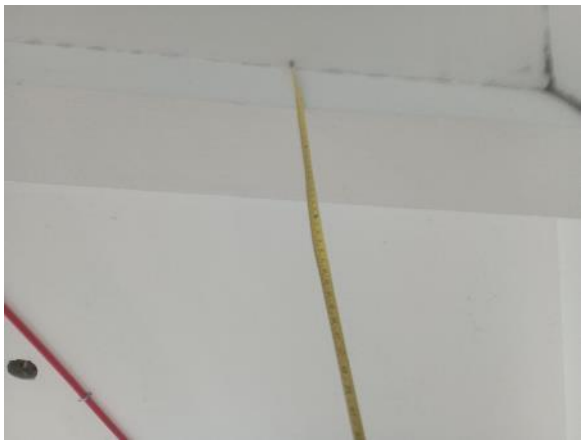
* Combined = Mortar and Aggregate Failure.

NOTES:
f'c = 4.0 KSI, fy = 72.5 KSI. CASTING RATIO :-
CEMENT : SAND : AGGREGATE - 1:1.5:3
USING STONE CHIPS FOR COLUMN CASTING.
USE ADMIXTURE FOR COLUMN CASTING.
CLEAR COVER BELOW EGL 65MM
CLEAR COVER ABOVE EGL 40MM

Description: Design strength of concrete is considered as 27.58 MPa (4 Ksi) but strength of concrete is less than the design strength in cylinder test report. Besides, only one concrete cylinder test report from column was available for the two storied structure. The building engineer is required to take adequate number of concrete cylinder cores to justify the design strength.

Observation 12: Lack of information and discrepancy in as-built drawing (Shed-13).





Description: thickness of column at gable side (east) was measured as 6mm instead of 8mm. No connection details were available. Also, Depth of beam was measured 500 mm instead of 600 mm (shown in drawing). The building engineer is required to update the as-built drawing.

Observation-13: Hairline cracks on floor beams (Shed-13)

Description: Hairline crack was observed on floor and tie beams at several locations. The building engineer is required to investigate the reason of crack and repair as per investigation report.

Observation-14: Falling hazard at staircase (Shed-13)

Description: Railing was not observed at staircase area. The building engineer is required to provide edge protection to avoid falling hazard.

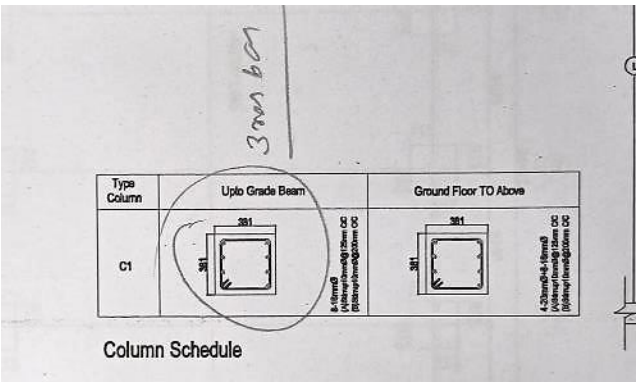
Observation-15: Storage rack found not anchored/braced (Shed-13)

Description: Storage rack was found not anchored/braced. The building engineer is required to anchor/brace all nonstructural elements within the factory.

Observation-16: Trolley impact on RC pedestal columns (Shed-13)

Description: Trolley impact was observed on RC pedestal columns. The building engineer is required to repair the damaged plaster and provide guard to prevent trolley impact on RC pedestal columns.

Observation-17: Inconsistencies in as-built drawings (Shed-16).



Description: Number of rebar in RC column doesn't match with as-built condition. Also, strut member was found offset. Moreover, all sectional and corbel details were not found in as-built drawings. Building engineer is required to survey the whole structure and prepare accurate as-built drawings.

Observation-18: Absence of design documents. (Shed 16)

Description: As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. During inspection, the design report was not available on site. Also, to confirm the design strength, the number of cylinders taken are not adequate as per the frequency test criteria of BNBC (Section 5.12).

The building engineer is required to prepare a set of design documents including as built drawings, live load plan at roof and a design report based on in-situ material strength and software-based analysis which shall be prepared in compliance with section 1.9.1, part-6 of BNBC.

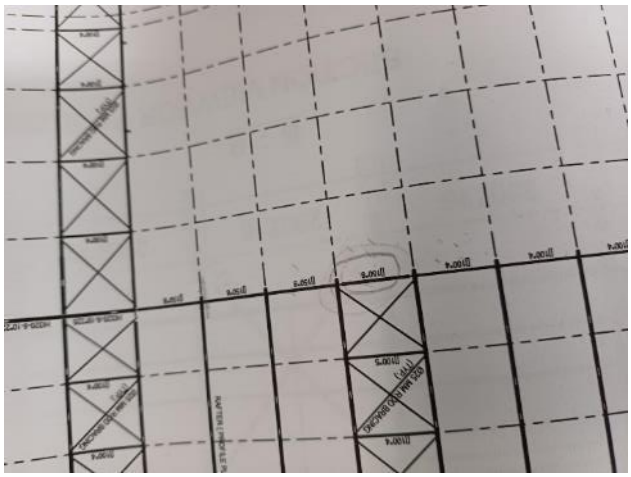
Observation-19: Loose cable bracings (Shed-16).

Description: Loose cable bracing was observed in several locations. Building engineer is required check all the cable bracing and tighten them accordingly.

Observation-20: Storage rack found not anchored/braced (Shed-16)

Description: Storage rack was found not anchored/braced. The building engineer is required to anchor/brace all nonstructural elements within the factory.

Observation-21: Mismatches in as-built drawings (Shed-19).



Description: Size of compression strut in between grid 9 & 10 doesn't match with as-built condition (100 mm was found instead of 150 mm). Moreover, all sectional details were not found in the provided as-built drawings. Building engineer is required to survey the full structure and prepare accurate as-built drawings.

Observation-22: Design report required to be reviewed by RSC for lateral loading. (Shed 19)

Description: A set of design reports was available for the Shed. The design report needs to be reviewed against lateral loading by RSC. Submit the design documents to the RSC for review.

Observation 23: Inconsistencies in design report. (Shed 20)

Description: A Design Report was provided for Shed-20 where steel connection adequacy and foundation adequacy checks were not incorporated. The building engineer is required to revise the design report with all kinds of necessary calculations & consideration and submit it to RSC for review.

Observation-24: Design report required to be reviewed against lateral loading by RSC (Shed 21).

Description: A set of design reports was available for the Shed. The design report needs to be reviewed against lateral loading by RSC. Submit the design documents to the RSC for review.

3. Action Plan

Observation	Action Plan	Timeline
Absence of design documents (Building-8 -New ETP).	The building engineer is required to prepare a set of design report with a set of structural drawing in compliance with section 1.9.1.1 and section 1.9.1.2 (part 6, BNBC).	within 6 weeks
	Implement remediation work if required.	within 6 months
Design strength of concrete is not justified (Building-8 -New ETP).	The building engineer is required to verify in-situ material strength by taking adequate number of concrete cores to justify the design strength. Incorporate the equivalent concrete core test result in the design report.	within 6 weeks
Crack on brick wall at ground floor (Building-8 -New ETP).	The building engineer is required to investigate the reason of crack and repair as per investigation report.	within 6 weeks
Incomplete as-built drawings (Building-10).	Building engineer is required to survey the whole structure and prepare complete structural and architectural drawings for the building.	within 6 weeks
Required retrofitting work required to be reviewed by the RSC (Building-12).	Prepared retrofitting scheme along with DEA is required to submit to the RSC for review against lateral loading.	within 6 weeks
	All kind of retrofitting work required to be carried out as per DEA after reviewed by RSC.	within 6 months
Crack on brick wall at top floor (Building-12).	The building engineer is required to investigate the cracked area and repair with a suitable method.	within 6 weeks
Mismatch in as-built drawing. (Building 16)	The building engineer is required to survey the full structure and update the as-built drawing and design report accordingly.	within 6 weeks
Absence of design report. (Building 16)	The building engineer is required to prepare a set of design documents including as built drawings, live load plan at roof and a design report based on in-situ material strength and software-based analysis which shall be prepared in compliance with section 1.9.1, part-6 of BNBC.	within 6 weeks
	Produce and actively manage a loading plan for all floor plates within the factory Building considering floor, column, and foundation capacity.	within 6 weeks
	Carry out suggested remedial works if required.	within 6 months
	Implement allowable floor loading plan.	within 6 months

Water clogging and lack of drainage system on roof. (Building 16)	The building engineer is required to improve adequate slope for drainage purpose.	within 6 months
Absence of design documents (Shed-13).	The building engineer is required to prepare a set of design report with a set of structural drawing in compliance with section 1.9.1.1 and section 1.9.1.2 (part 6, BNBC).	within 6 weeks
	Implement remediation work if required.	within 6 months
Design strength of concrete is not justified (Shed-13).	The building engineer is required to verify in-situ material strength by taking adequate number of concrete cores to justify the design strength. Incorporate the equivalent concrete core test result in the design report.	within 6 weeks
Lack of information and discrepancy in as-built drawing (Shed-13).	The building engineer is required to update the as-built drawing.	within 6 weeks
Hairline cracks on floor beams (Shed-13)	The building engineer is required to investigate the reason of crack and repair as per investigation report.	within 6 weeks
Falling hazard at staircase (Shed-13)	The building engineer is required to provide edge protection to avoid falling hazard.	within 6 weeks
Storage rack found not anchored/braced (Shed-13)	The building engineer is required to anchor/brace all nonstructural elements within the factory.	within 6 months
Trolley impact on RC pedestal columns (Shed-13)	The building engineer is required to repair the damaged plaster and provide column guard to prevent trolley impact on RC pedestal columns.	within 6 weeks
Inconsistencies in as-built drawings (Shed-16).	Building engineer is required to survey the whole structure and prepare accurate as-built drawings.	within 6 weeks
Absence of design documents. (Shed 16)	The building engineer is required to prepare a set of design documents including as built drawings, live load plan at roof and a design report based on in-situ material strength and software-based analysis which shall be prepared in compliance with section 1.9.1, part-6 of BNBC.	within 6 weeks
	Implement remediation work if required.	within 6 months
Loose cable bracings (Shed-16).	Building engineer is required check all the cable bracing and tighten them accordingly.	within 6 months
Storage rack found not anchored/braced (Shed-16)	The building engineer is required to anchor/brace all nonstructural elements within the factory.	within 6 months

Mismatches in as-built drawings (Shed-19)	Building engineer is required to survey the full structure and prepare accurate as-built drawings.	within 6 weeks
Design report required to be reviewed by RSC for lateral loading. (Shed 19)	The design report needs to be reviewed against lateral loading by the RSC. Submit the design documents to the RSC for review.	within 6 weeks
	Implement remediation work if required.	within 6 months
Inconsistencies in design report. (Shed 20)	The building engineer is required to revise the design report with all kinds of necessary calculations & consideration and submit it to RSC for review.	within 6 weeks
	Carry out suggested remedial works if required.	within 6 months
Design report required to be reviewed against lateral loading by RSC (Shed 21).	The design report needs to be reviewed against lateral loading by the RSC. Submit the design documents to the RSC for review.	within 6 weeks
	Implement remediation work if required.	within 6 months