LCB INTERNATIONAL (BD) LTD.

Plot 48, Sector 7, CEPZ, Chattogram

(22.299803, 91.776259)

11 February 2025

RSC RMG SUSTAINABILITY COUNCIL

Level 5, Shanta Forum, 187, 188/B,
Bir Uttam Mir Shawkat Sarak, Tejgaon,
Dhaka- 1208, Bangladesh
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1. Building Information:

Production Building: Seven-storied (G+6) reinforced concrete (RC) building

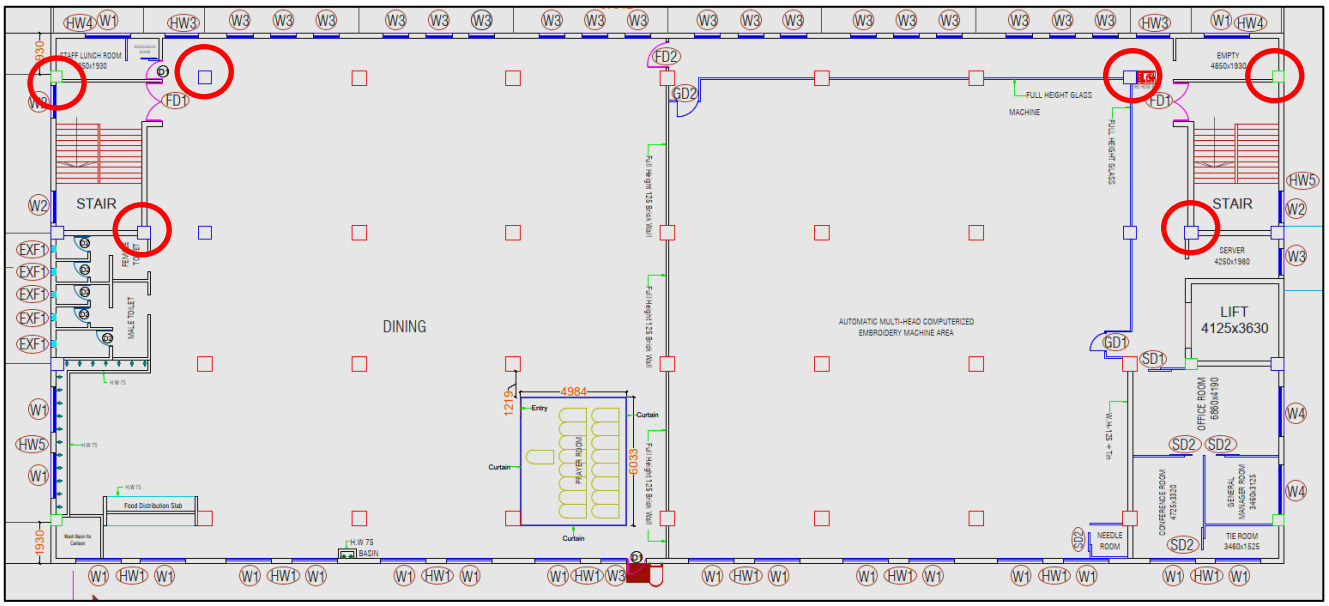
Security, Childcare and Fire Pump Room: Single-storied RC building with a basement (B+G).

Compressor Room: Single-storied RC building

Wastage Shed: Single-storied non-engineered steel shed

2. Observation

Observation-1: Columns to be stressed above normal design limit (Production Building).



Description: Cursory calculation indicates that marked columns are stressed above normal design limit considering the live load 6 kPa on the 1st & 6th floors and 5 kPa on the 2nd to 5th floor, minimum concrete strength (16.34 MPa) based on aggregate type (minimum concrete strength has been considered due to insufficient cylinder test report) & rebar strength 420 MPa.

Observation-2: Inconsistencies in EA report (Production Building).

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

DEPARTMENT OF CIVIL ENGINEERING

CONCRETE LABORATORY

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		1					Combined *
2		2					Combined *
3		3					Combined *

Notes: Samples were received in sealed condition. * Combined = Mortar and Aggregate failure.

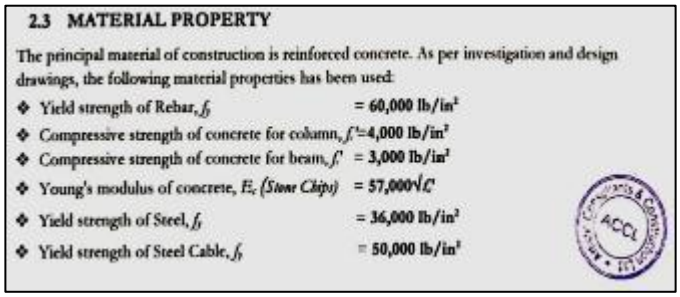
Countersigned by:

Dr. A. B. M. Badruzzaman
Professor
Department of Civil Engineering
BUET, Dhaka-1000, Bangladesh

Test Performed by:

19-05-21

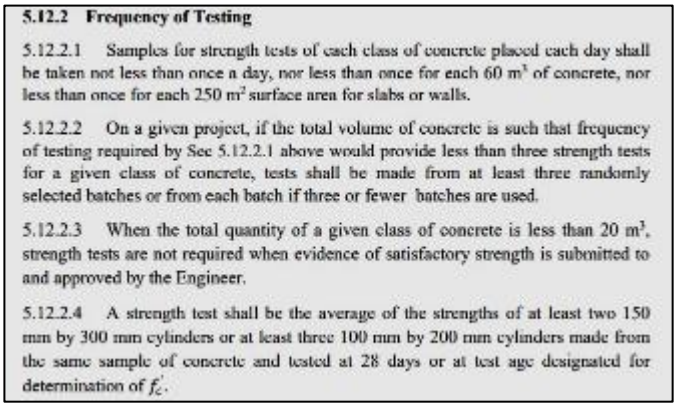
Dr. Provat Kumar Saha
Assistant Professor
Department of Civil Engineering
BUET, Dhaka-1000, Bangladesh



2.3 MATERIAL PROPERTY

The principal material of construction is reinforced concrete. As per investigation and design drawings, the following material properties has been used:

- Yield strength of Rebar, f_y = 60,000 lb/in²
- Compressive strength of concrete for column, f'_c=4,000 lb/in²
- Compressive strength of concrete for beam, f'_c = 3,000 lb/in²
- Young's modulus of concrete, E_c (Stone Chips) = $57{,}000\sqrt{f'_c}$
- Yield strength of Steel, f_y = 36,000 lb/in²
- Yield strength of Steel Cable, f_y = 50,000 lb/in²



5.12.2 Frequency of Testing

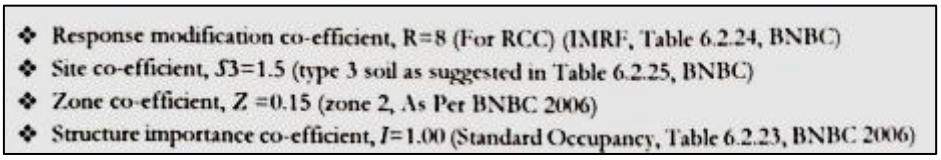
5.12.2.1 Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 60 m³ of concrete, nor less than once for each 250 m² surface area for slabs or walls.

5.12.2.2 On a given project, if the total volume of concrete is such that frequency of testing required by Sec 5.12.2.1 above would provide less than three strength tests for a given class of concrete, tests shall be made from at least three randomly selected batches or from each batch if three or fewer batches are used.

5.12.2.3 When the total quantity of a given class of concrete is less than 20 m³, strength tests are not required when evidence of satisfactory strength is submitted to and approved by the Engineer.

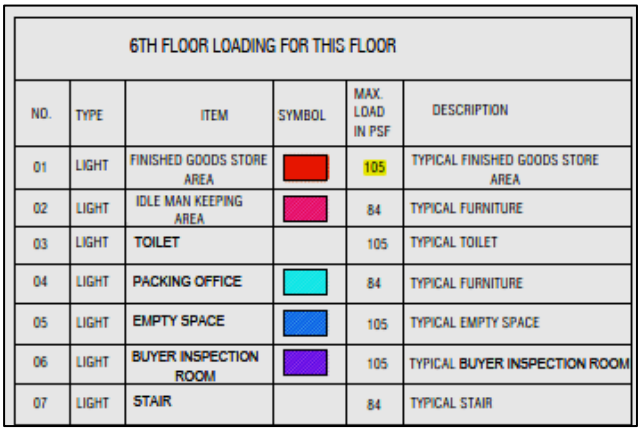
5.12.2.4 A strength test shall be the average of the strengths of at least two 150 mm by 300 mm cylinders or at least three 100 mm by 200 mm cylinders made from the same sample of concrete and tested at 28 days or at test age designated for determination of f'_c.

Description: In the EA report, concrete strength is considered 4000 psi for column and 3000 psi for beam, but the available test reports are insufficient to meet the evaluation & frequency of testing criteria of BNBC. The building engineer is required to evaluate concrete strength by taking concrete cores, revise the EA report accordingly and submit to RSC for review.



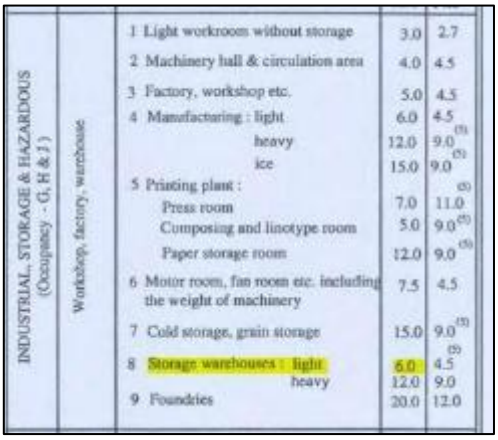
- Response modification co-efficient, R=8 (For RCC) (IMRF, Table 6.2.24, BNBC)
- Site co-efficient, $S3$=1.5 (type 3 soil as suggested in Table 6.2.25, BNBC)
- Zone co-efficient, Z =0.15 (zone 2, As Per BNBC 2006)
- Structure importance co-efficient, I=1.00 (Standard Occupancy, Table 6.2.23, BNBC 2006)

Description: Response modification co-efficient, R-value considered as 8 for IMRF, but detailed calculation/justification is not provided (both beam & column) for consideration.



6TH FLOOR LOADING FOR THIS FLOOR

NO.	TYPE	ITEM	SYMBOL	MAX. LOAD IN PSF	DESCRIPTION
01	LIGHT	FINISHED GOODS STORE AREA		105	TYPICAL FINISHED GOODS STORE AREA
02	LIGHT	IDLE MAN KEEPING AREA		84	TYPICAL FURNITURE
03	LIGHT	TOILET		105	TYPICAL TOILET
04	LIGHT	PACKING OFFICE		84	TYPICAL FURNITURE
05	LIGHT	EMPTY SPACE		105	TYPICAL EMPTY SPACE
06	LIGHT	BUYER INSPECTION ROOM		105	TYPICAL BUYER INSPECTION ROOM
07	LIGHT	STAIR		84	TYPICAL STAIR



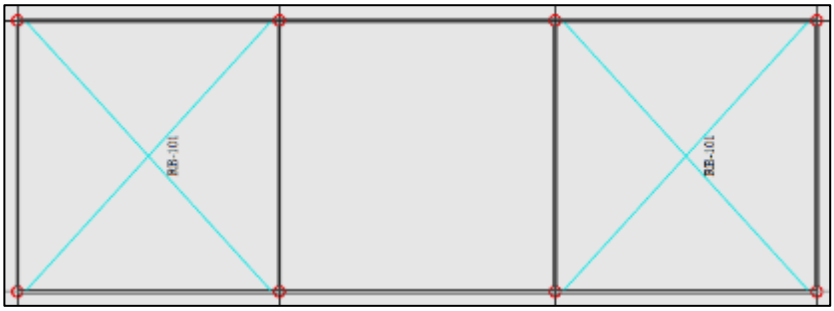
INDUSTRIAL, STORAGE & HAZARDOUS (Occupancy - G, H & J)	Workshop, factory, warehouse	1 Light workroom without storage	3.0	2.7
		2 Machinery hall & circulation area	4.0	4.5
		3 Factory, workshop etc.	5.0	4.5
		4 Manufacturing : light	6.0	4.5
		heavy	12.0	9.0 (5)
		ice	15.0	9.0 (5)
		5 Printing plant :		(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

Description: Storage live load has been considered as 105 psf on the 6th floor in load plan. But as per BNBC minimum live load criterion, storage live load must be considered 125 psf. The factory is required to consider 125 psf for storage live load and update DEA accordingly.

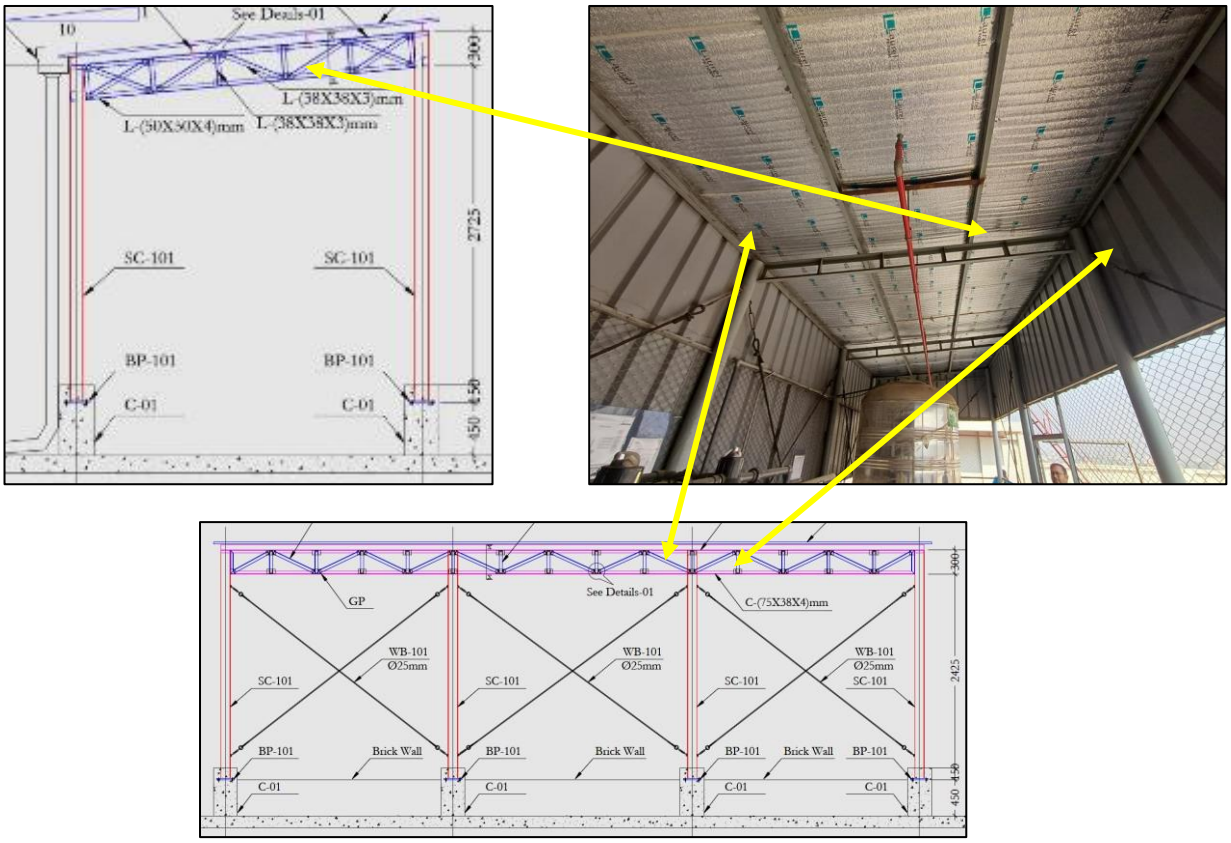
Observation-3: Discrepancies in as-built drawings (Production Building).

200 mm build-up at 3rd-floor toilet

100 mm false slab at typical floor toilet area



Roof bracing layout (RO plant)



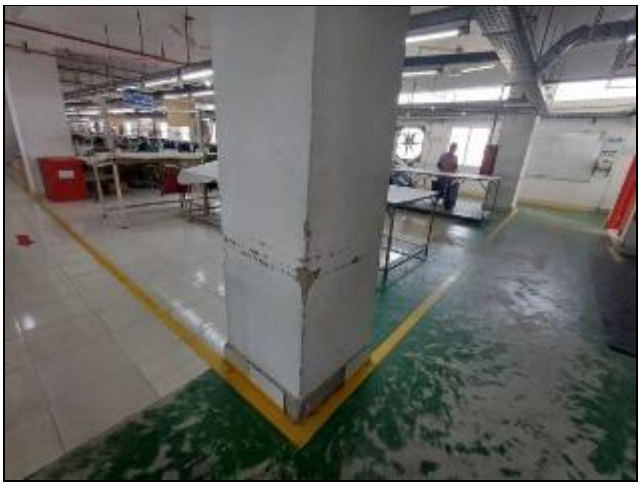
Description: During the inspection, undocumented 200 mm build-up at the 3rd-floor toilet and 100 mm false slab at typical floor toilets were observed. Roof bracing was missing, and truss mismatches were observed at the RO plant shed.

The building engineer is required to survey the whole structure and update as-built drawings as per site conditions.

Observation-4: Loose cable bracing in RO plant shed (Production Building).

Description: During the inspection, cable bracings were found in loose condition. The factory is required to tighten all loose bracings.

Observation-5: Column susceptible to trolley/vehicle impact (Production Building).



Trolley impact on typical floor column

Susceptible to vehicle impact

Description: During the inspection, column edges of several floors were found affected due to trolley impact and several columns at ground floor loading/unloading area are susceptible to vehicle impact. The factory is required to provide safety barriers to protect the columns from trolley/vehicle impact.

Observation-6: Dampness on brick wall (Production Building).



Description: During the inspection, dampness on brick walls was observed at several locations. The factory is required to repair the dampness with suitable methods.

Observation-7: Crack in brick wall (Production Building).


Description: During the inspection, cracks in brick walls were observed at several locations. The factory is required to repair the crack with suitable methods.

Observation-8: Non-structural elements found unbraced/not anchored (Production Building).


Unbraced/unanchored racks on 3rd floor

Description: Unbraced and unanchored steel storage racks were found on the 3rd floor.

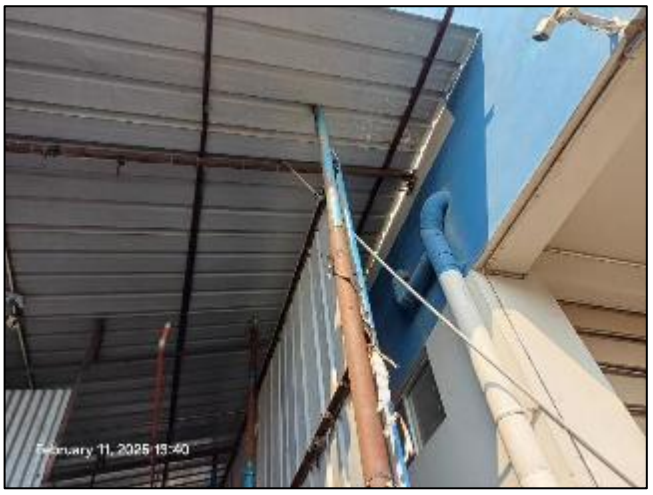
The factory is required to brace/anchor all non-structural elements (storage racks) to prevent falling during seismic.

Observation-9: Inconsistencies in as-built drawings (Security, Child Care and Fire Pump Room).

Isometric View

Description: A separate as-built drawing was available for the childcare and Security room. However, the structures are structurally connected by underground water tanks. The building engineer is required to survey the field condition and update the as-built drawings.

Observation-10: Non-engineered shed (Wastage Shed)



Description: Non-engineered framing and connection was observed. The building engineer is required to provide the necessary alternatives to make the structure stable. Otherwise, replace it with an engineered one.

Observation-11: Corrosion on steel member (Production Building, Wastage Shed)

Lift canopy at roof of Production Building

Wastage Shed

Description: During the inspection, corrosion was observed on several steel members. The factory is required to remove rust and apply anti-corrosive paint on steel members.

3. Action Plan:

Item No.	Observation	Action Plan	Timeline
1	Columns to be stressed above normal design limit (Production Building).	The building engineer is required to review design, loads and column stresses	within 6 weeks
2		Carry out suggested remedial works if required.	within 6 months
3		Continue to implement the load plan	within 6 months
4	Inconsistencies in EA report (Production Building)	Verify in situ concrete strength by collecting minimum of 4 nos. cores from columns and 4 nos. from beams/slabs	within 6 weeks
5		The building engineer is required to revise the EA report and submit it to RSC for review.	within 6 weeks
6	Discrepancies in as built drawings (Production Building)	The building engineer is required to survey the whole structure and update the as-built drawings.	within 6 weeks
7	Loose cable bracing in RO plant shed (Production Building)	The factory is required to tighten all loose bracings.	within 6 weeks
8	Column susceptible to trolley/vehicle impact (Production Building)	The factory is required to provide a safety barrier to protect the columns from trolley/vehicle impact.	within 6 weeks
9	Dampness on brick wall (Production Building)	The factory is required to repair the dampness with suitable methods.	within 6 weeks
10	Crack in brick wall (Production Building)	The factory is required to repair the crack with suitable methods.	within 6 weeks
11	Non-structural elements found unbraced/not anchored (Production Building)	The factory is required to brace/anchor all non-structural elements (storage racks) to prevent falling during Seismic.	within 6 weeks
12	Inconsistencies in as-built drawings (Security, Child Care and Fire Pump Room)	The building engineer is required to survey the whole structure and update the as-built drawings.	within 6 weeks
13	Non-engineered shed (Wastage Shed)	The building engineer is required to provide the necessary alternatives to make the structure stable. Otherwise, replace it with an engineered one.	within 6 weeks
14	Corrosion on steel member (Lift canopy at roof of Production Building)	The factory is required to remove rust and apply anti-corrosive paint on steel members.	within 6 weeks
15	Corrosion on steel member (Wastage Shed)	The factory is required to remove rust and apply anti-corrosive paint on steel members.	within 6 weeks