Ananta Huaxiang Ltd. (Extension)

222-223, H1, H2, H3, H4, Aepz, Narayanganj.
(23.677063, 90.523734)
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RSC RMG SUSTAINABILITY COUNCIL

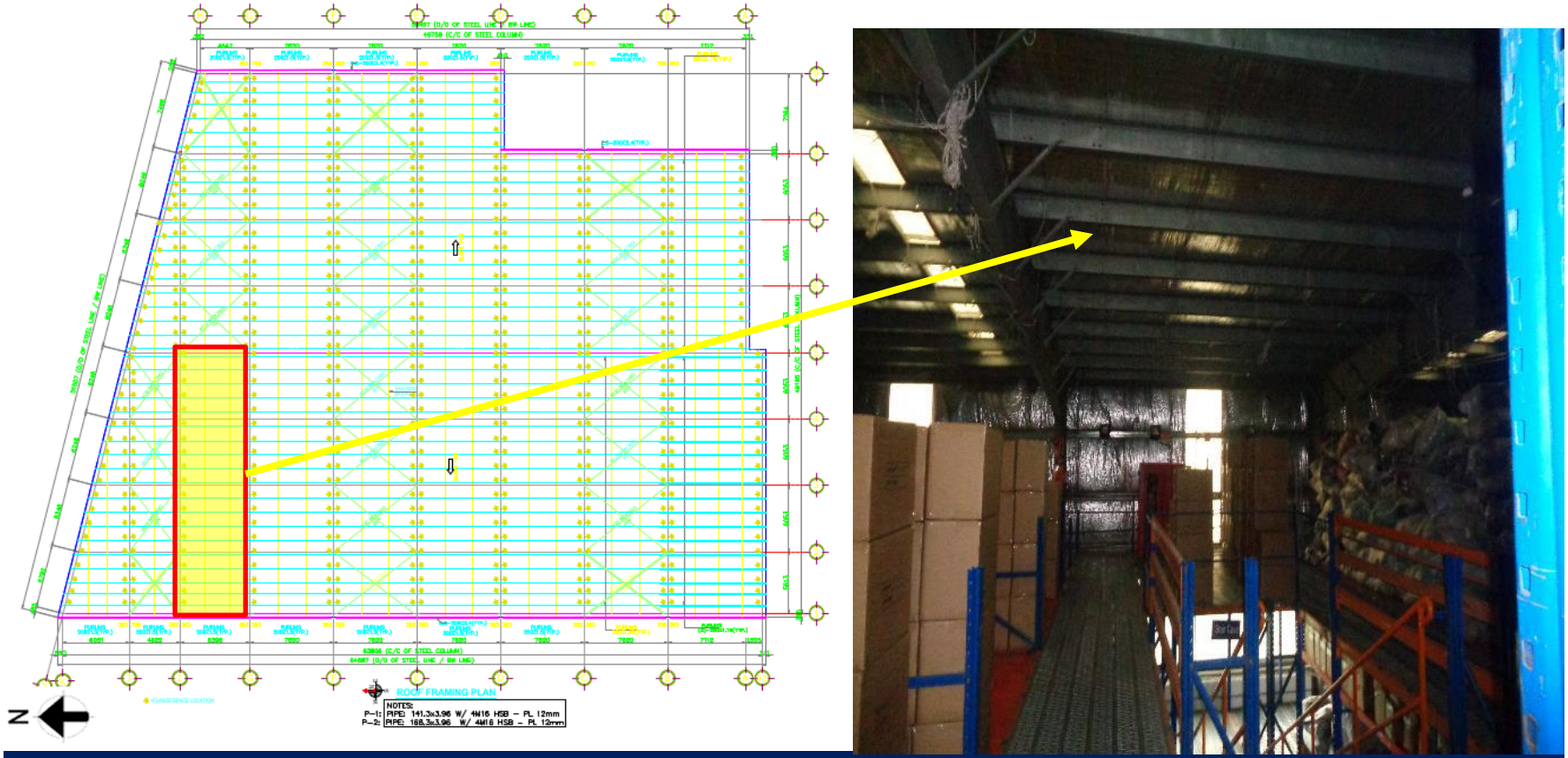
Building Information

01. H-1 Shed: Single-storied prefabricated steel shed.
02. Building-C: Two-storied prefabricated steel building with three rooftop sheds.
03. Gas Generator Building: Single-storied reinforced concrete (RC) building.
04. ETP Building: Single-storied reinforced concrete (RC) platform with a small roof shed.
05. Medical and Childcare: Single-storied reinforced concrete (RC) building.
06. Fire Panel & Security Post-1: Single-storied reinforced concrete (RC) building
07. Fire Pump Room: Single-storied reinforced concrete (RC) building with a basement.
08. RMS Room: Single storied shed which is being used for fire RMS room.
09. Chemical Room: Single-storied reinforced concrete (RC) building.
10. Security Post-2: Single-storied reinforced concrete (RC) building.
11. Utility Building-C: Single-storied reinforced concrete (RC) building.
12. Fire Panel & Security Post-C: Single-storied reinforced concrete (RC) building.

Observations

Irregular roof bracing system and slender columns

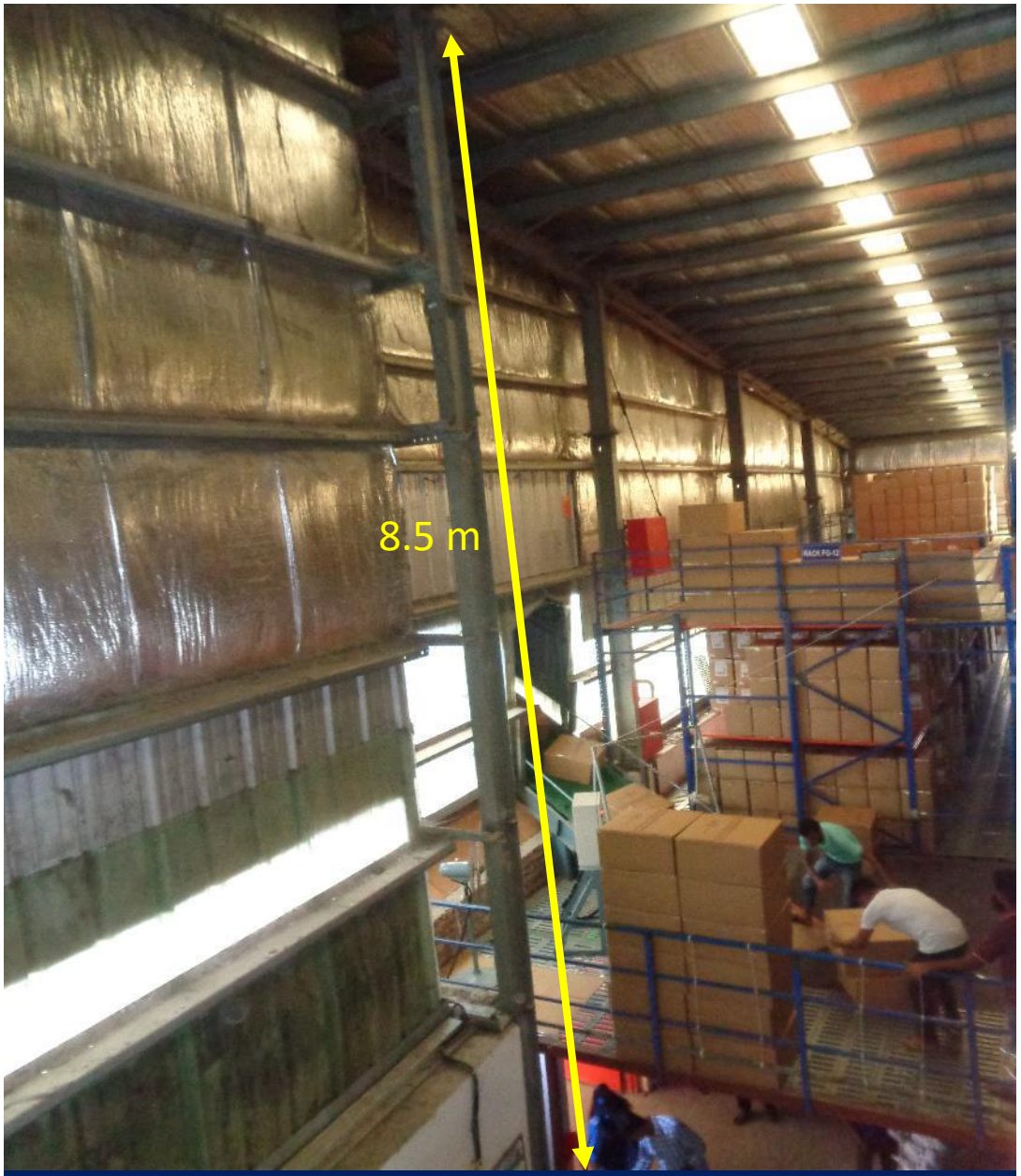
Observation: H-1 Shed



Roof bracing is not continuous at the marked location

Roof bracing is not continued at the highlighted area. Irregular roof bracing system observed for the lateral load path. Building engineer is required to check the lateral stability system for the shed.

Observations: H-1 Shed



Steel column with long unsupported length

The column size is F-125mmX6mm Web-262mmX4mmm and the unsupported column is 8.5 m which indicates slenderness in highlighted columns due to long unsupported length. Building engineer is required to review the design of the column considering the slenderness effect.

Observations: H-1 Shed

Corrosion on steel members

Observation: H-1 Shed

Corrosion on steel column

Corrosion was found in the steel members. Building engineer is required to apply rust proofing on the corroded areas to protect the steel members from corrosion.

Observations: H-1 Shed

Steel rack found not anchored at base

Observation: H-1 Shed

Corrosion on steel column

Corrosion was found in the steel members. Factory is required to apply rust proofing on the corroded areas to protect the steel members from corrosion.

Observations: H-1 Shed

Inconsistencies in design report

Observations: Building-C

- The RSC on Fire and Building Safety in Bangladesh Building Standard.

STRUCTURAL FRAMING SYSTEM

Selection of structural system depends on the building layout, column spacing, floor height, maintenance requirement and available construction method.

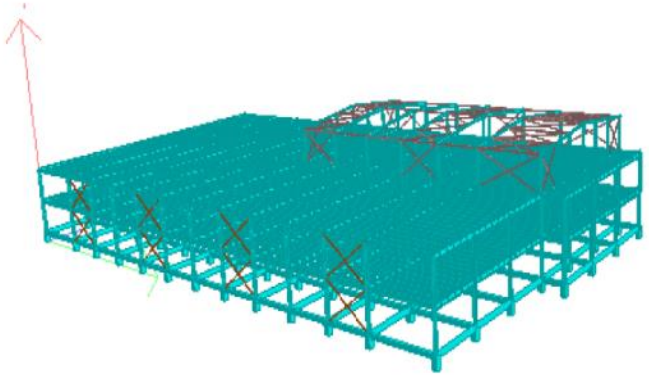


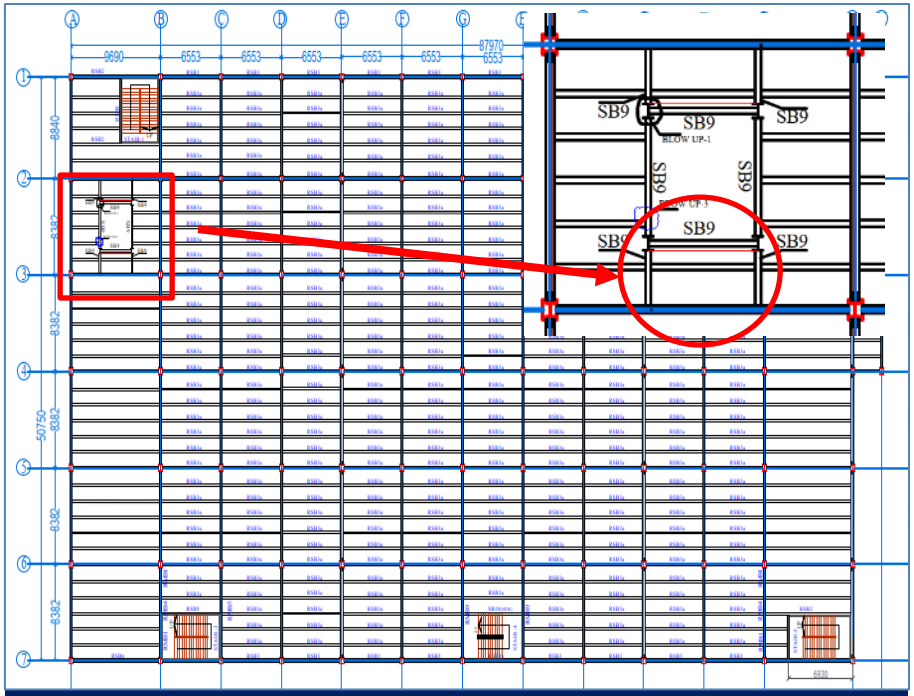
Fig: 3d Rendering View of shed.

Prayer room, RO room and walkway not considered in analysis model

Prayer room, RO room and walkway at roof level

Load of Prayer room, RO room and walkway not considered in analysis model. Building engineer is required to update the analysis model as per onsite condition and update the design report accordingly.

Observations: Building-C

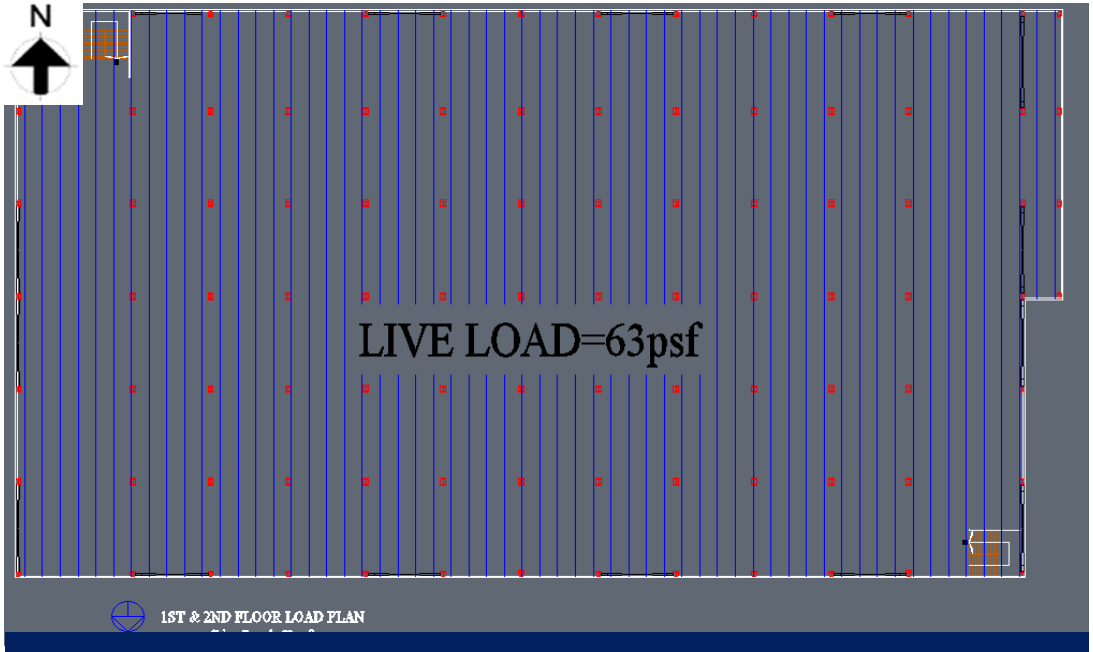


Highlighted beam was shown in drawing

Highlighted beam was not found on site

Highlighted beam was shown in drawing but not found on site. Building engineer is required to update the as-built drawing, analysis model as per onsite condition and update the design report accordingly.

Observations: Building-C



Live load plan- typical floor

Live load on typical floor is considered as 3 kPa in prepared load plan. As per BNBC- Part 6, live load for light storage areas is required to be considered minimum 6 kPa. However, the Building engineer is required to revise the load plan as per BNBC requirement and check the design accordingly.

Storage on 1st floor

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	(5) 4.5
		heavy	12.0	9.0
		9 Foundries	20.0	12.0

Live load table (BNBC)

Observations: Building-C

Stagnant water on roof slab

Observation: Building-C

Water ponding on roof slab due to poor drainage system

Stagnant water was found on the roof slab. Building engineer is required to improve the drainage system to drain out the stagnant water.

Observations: Building-C

Corrosion on steel members

Corrosion in steel column

Corrosion was found in the steel members. Building engineer is required to apply rust proofing on the corroded areas to protect the steel members from corrosion.

Observations: Building-C

Non-structural elements found unbraced/not anchored

Storage rack found within the building without braced/anchored

Building engineer is required to brace/anchor all non-structural elements.

Observations: Building-C

Inconsistencies in design report

Discussion & Conclusion:

- Column Capacity : The Column found adequate.
- Beam Capacity : The Beams found adequate in axial force.
- Foundation Check : The file found adequate.
- Slab Deflection :

LIVE LOAD : Allowable limit $\frac{19x12}{360} = 0.63\ in$

$$\frac{5}{384} x \frac{wl^4}{EI}$$

$$= 0.0130x \frac{0.284\ x\ (19x12)^4}{12x29000x125} = 0.22\ in < 0.63\ in$$

DEAD LOAD : Allowable limit $\frac{19x12}{240} = 0.95\ in$

$$\frac{5}{384} x \frac{wl^4}{EI}$$

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$$0.0130x \frac{0.84\ x\ (19x12^4)}{12x29000x125} = 0.67\ in < 0.95\ in$$

So, Deflection is adequate

So, the RCC structure is safe.

Beam, column, footing stated to be adequate, No design check was found for beam, column & footing

Strength Estimation of Concrete and Reinforcing Bar:

1	Yield Strength of steel	f_y	60,000 psi
2	Compressive Strength of Concrete	f'_c	3,500 psi
3	Young's Modula's of Concrete for Column & Beam	E_c	57,000$\sqrt{f'c}$ (for Stones chips)
4	Unit weight of reinforced concrete =		150 pcf
5	Unit weight of brickwork =		120 pcf

f'c considered 3.5ksi, No test report found for the beam, column, slab

In the design report the beam, column, footing were stated to be adequate, but no design check was found for beam, column & footing. Building engineer is required to update the design report with all possible adequacy check.

Also, concrete compressive strength (f'c) considered 3.5ksi, but no test report found for the beam, column, slab. Building engineer is required to check the issue according to BNBC chapter-5 and update the design report accordingly.

Observations: Gas Generator Building

Falling hazard at roof level

No parapet wall found at roof level

Building engineer is required to provide edge protection to prevent falling hazards.

Observations: Gas Generator Building

Priority Actions

Problems Observed

H-1 Shed:

Item 01: Irregular roof bracing system and slender columns

Item 02: Corrosion on steel members

Item 03: Steel rack found not anchored at base

Building-C:

Item 04: Inconsistencies in design report

Item 05: Stagnant water on roof slab

Item 06: Corrosion on steel members

Item 07: Non-structural elements found unbraced/not anchored

Gas Generator Building:

Item 08: Inconsistencies in design report

Item 09: Falling hazard at roof level

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Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Irregular roof bracing system and slender columns. (H-1 Shed)	Building engineer is required to check the lateral stability system for the shed.	6-weeks
02	Irregular roof bracing system and slender columns. (H-1 Shed)	Building engineer is required to carryout adequacy check of the columns considering slenderness effect and update the design report accordingly.	6-weeks
03	Irregular roof bracing system and slender columns. (H-1 Shed)	Carry out the remedial works if required.	6-months
04	Corrosion on steel members . (H-1 Shed)	Factory is required to apply rust proofing on the corroded areas to protect the steel members from corrosion.	6-weeks
05	Steel rack found not anchored at base. (H-1 Shed)	Factory is required to brace/anchor all non-structural elements.	6-weeks
06	Inconsistencies in design report. (Building-C)	Building engineer is required to prepare the design report in compliance with section 1.9.1.1 (BNBC).	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
07	Inconsistencies in design report. (Building-C)	Carry out the remedial works if required.	6-months
08	Stagnant water on roof slab. (Building-C)	Factory is required to improve drainage system and apply water proofing on roof slab.	6-weeks
09	Corrosion on steel members. (Building-C)	Factory is required to apply rust proofing on the corroded areas to protect the steel members from corrosion.	6-weeks
10	Non-structural elements found unbraced/not anchored. (Building-C)	Factory is required to brace/anchor all non-structural elements.	6-weeks
11	Inconsistencies in design report. (Gas Generator Building)	Factory is required to brace/anchor all non-structural elements.	6-weeks
12	Inconsistencies in design report. (Gas Generator Building)	Carry out the remedial works if required.	6-months
13	Falling hazard at roof level. (Gas Generator Building)	Factory is required to provide edge protection to prevent falling hazard.	6-weeks