JM Fabrics Ltd. (Extension)

South Nayapara, 6 No Dogri, Bhawal, Mirzapur, Gazipur.
(24.08956, 90.36990)
11th October 2023

RSC RMG SUSTAINABILITY COUNCIL

Building Information

1. **Building 3:** The structure is a two-storied (G+M+1) prefabricated steel shed.
2. **Building 4:** This structure is a two-storied (G+1) reinforced concrete (RC) building.
3. **Building 5:** The structure is a single storied reinforced concrete RC building.
4. **Shed 1:** This structure is a single storied steel shed.
5. **Shed 2:** This structure is a single storied steel shed.
6. **Shed 3:** This structure is a single storied steel shed.
7. **Shed 4:** This structure is a single storied steel shed.
8. **Shed 5:** This structure is a single storied steel shed.
9. **Shed 6:** This structure is a single storied steel shed.
10. **Shed 7:** This structure is a single storied steel shed.

Observations

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Inconsistencies in design report

Observations: Building-3

Detailed specifications on wind loading on buildings are outlined in BNBC (2006) and here force calculated as per projected area method.

Wind speed= 215 km/hr
Exposure: A (according to BNBC-2006)
Enclosure type: Enclosed
Importance factor=1.0

Calculating with other parameters the sustained wind loads have been assigned on structure frames to all possible directions in STAAD PRO MODEL.

6.4 Seismic Load (E):

Earthquake are one of nature's greatest hazards to life on planet. The impact of this phenomenon is sudden with a little or no warning to make preparations against damages and collapse of buildings/structures. Detailed specifications on seismic loading on buildings are outlined in BNBC (2006). Gazipur is situated on moderate seismic zone and bellow parameter considered for assessment.

Site coefficient, S= 1.5
Seismic Zone coefficient, Z=0.15 (Zone-2)
Importance factor, I=1.0
Response modification coefficient, R =6 (Ordinary moment resisting frame); both direction
Seismic weight, W =1.0* D

This calculation presents the automatically in STAAD MODEL.

General notes for wind and seismic consideration in design report

In design report, no detailed calculation for wind and seismic loading was provided in design report. Only general notes for wind and seismic consideration in design report was provided. Building engineer is required to update the design report incorporating detailed calculation for wind and seismic loading as per BNBC.

Observations: Building-3

Eccentric bracing was observed in the building. Building engineer is required to incorporate the eccentric bracing in the design.

Observations: Building-3

Significant vibration on the AHU room

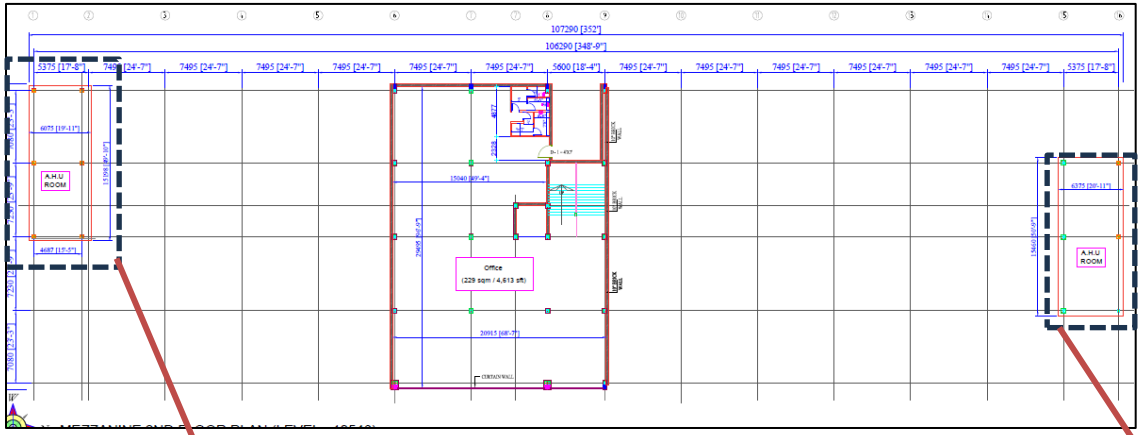
Observation: Building-3

Significant vibration was felt in the AHU roof. Building engineer is required to investigate the long-term effect of the vibration and suggest remediation

Observation: Building-3

Lack of information in as-built drawing

Observation: Building-3



Roof layout plan

During inspection, two steel shed on roof was observed over the two A.H.U room area. However, no structural details of these 2 sheds were available in structural drawing. Building engineer is required to update as-built drawing incorporating all structural details of this sheds.

A.H.U Shed on roof

Observation: Building-3

Bolt missing and connection gap

Observation: Building-3

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Bolt missing and significant gaps observed in rafter-column joint at several locations. Building engineer is required to install the missing bolts.

Bolt missing

Gap observed in connections

Observation: Building-3

Non-Engineered steel stair

North

Undocumented external steel stair

South

There are external undocumented steel stairs from the 1st floor to the roof which was poorly connected to the RC beams of Building-3. Therefore, the connection of steel members to RC beams appeared to be inadequate. The Building engineer is required to check the connection adequacy as part of EA.

Observations: Building-3

Absence of design documents

Observations: Building-4

Building-4

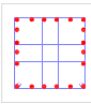
As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, design report was not available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Observations: Building-4

Discrepancies in as-built drawing

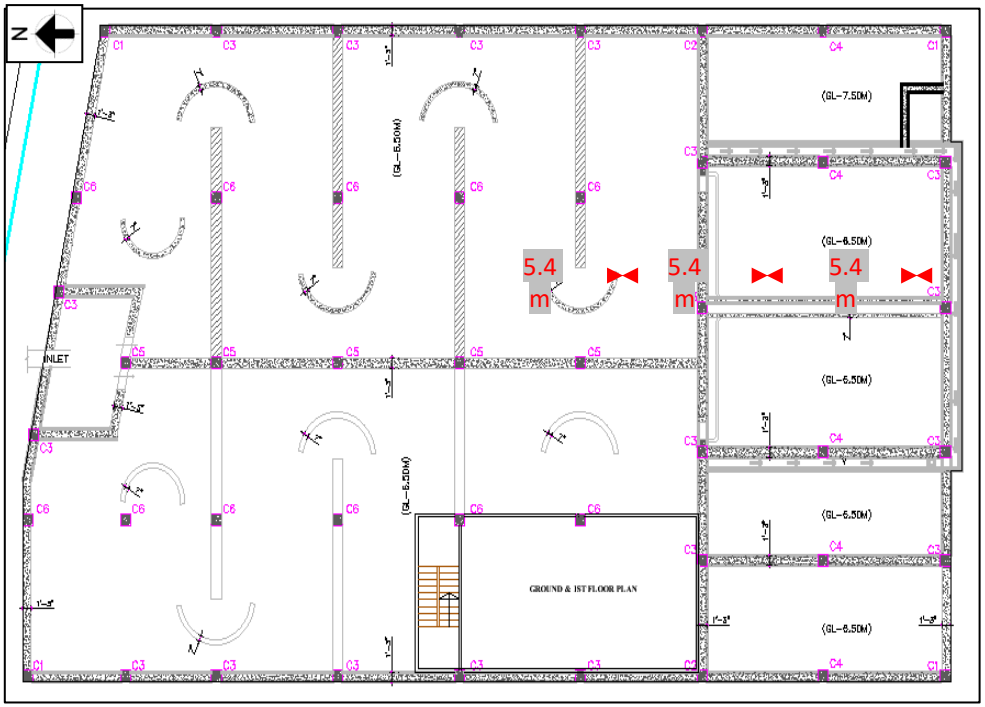
Observations: Building-4

COLUMN SCHEDULE

C1	C2	C3	C4	C5	C6
					
18"X18" 12–ø20	18"X18" 12–ø20 & 4–ø16	18"X18" 16–ø20	18"X18" 16–ø20	18"X18" 16–ø20	20"X20" 20–ø20

Ties ø10 @ 4"c/c & 3" Clear Covering

Column Schedule



Column Layout

As per the column schedule from the available structural drawing, the dimension of column C6 was shown 20" X 20". However, during the inspection, all C6 columns were measured 15" X 20". Building engineer is required to resurvey the whole structure and update the as-built drawing accordingly.

Observations: Building-4

Apparently non engineered shed

Observations: Shed-2

Poor connection between steel members

This shed appeared to be non-engineered due to poor connection and inadequate member size. Building engineer is required to check the connection adequacy for uplift forces as part of EA and implement remediation work where required.

Observations: Shed-2

Lack of Lateral Stability

Observation: Shed-3, Shed-4, Shed-5 & Shed-6

Shed-3

Shed-4

Shed-5

No bracing/Compression strut was provided along the long direction.

Shed-6

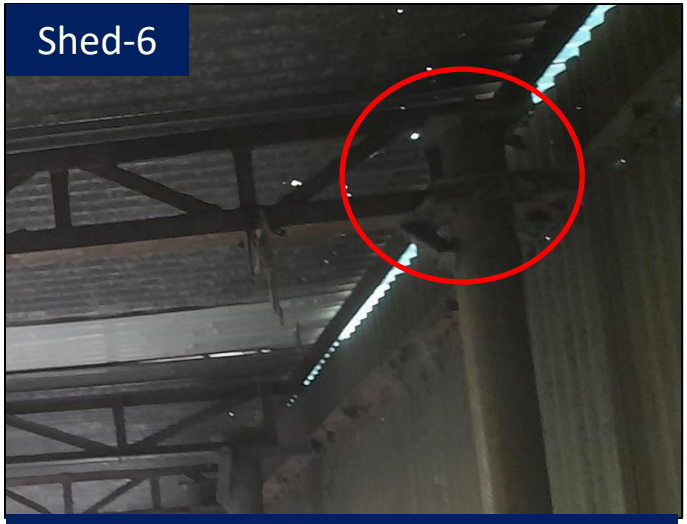
Truss frame along short direction.

Truss frame is provided along short direction. Any compression member along long direction with any lateral bracing was not available. Therefore, lateral stability along long direction is questionable. Building engineer is required to check the lateral stability for Shed-3, Shed-4, Shed-5 & Shed-6.

Observations: Shed-3, Shed-4, Shed-5 & Shed-6

Purlin inserted to brick wall

Truss welded with rebar of RC column



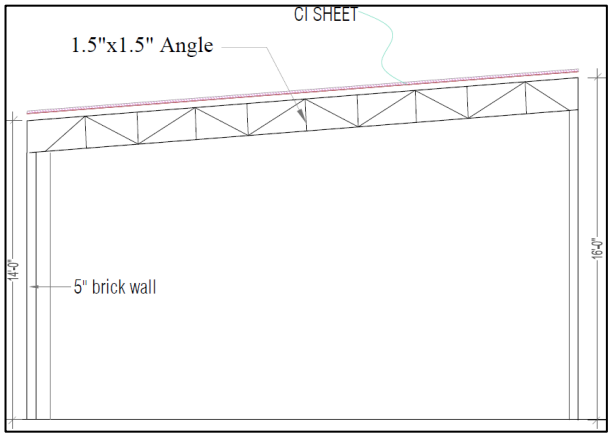
Poorly welded truss with steel pipe

Trusses of Shed-3, Shed-4, Shed-5 & Shed-6 were found arbitrarily welded with rebar of RC column and inserted to brick wall therefore connection of steel members to brick wall and RC columns was appeared to be inadequate. The Building engineer is required to check the connection adequacy for uplift forces as part of EA.

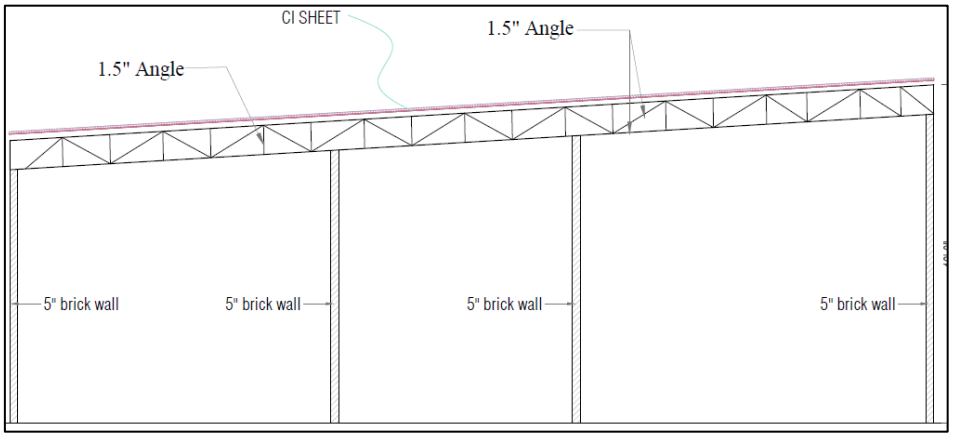
Observations: Shed-3, Shed-4, Shed-5 & Shed-6

Lack of information in as-built drawing

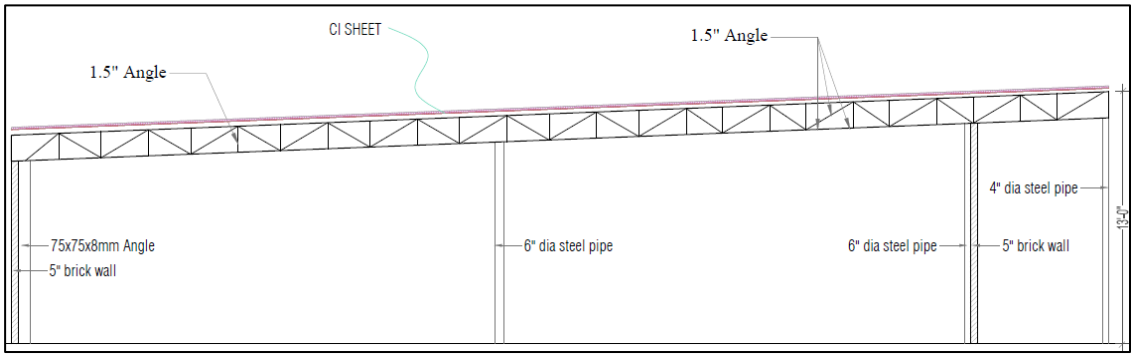
Observations: Shed-3, Shed-4, Shed-5 & Shed-6



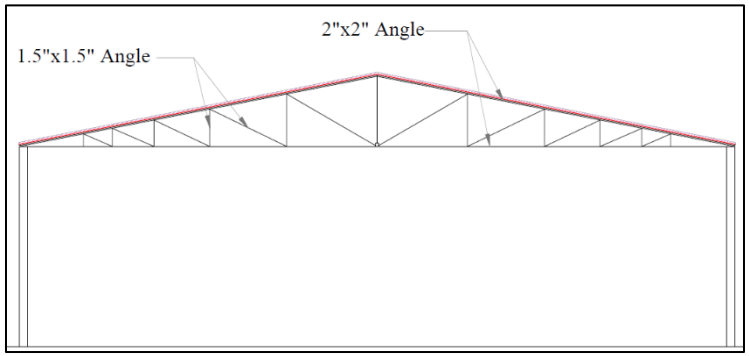
Shed-3



Shed-4



Shed-5



Shed-6

In available structural drawing, structural details like dimension and thickness of steel members for Shed-3, Shed-4, Shed-5 & Shed-6 were not provided. Building engineer is required to resurvey the whole structure and update as-built drawing accordingly.

Observations: Shed-3, Shed-4, Shed-5 & Shed-6

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Lack of Lateral Stability

Observation: Shed-7

Portal frame along short direction.

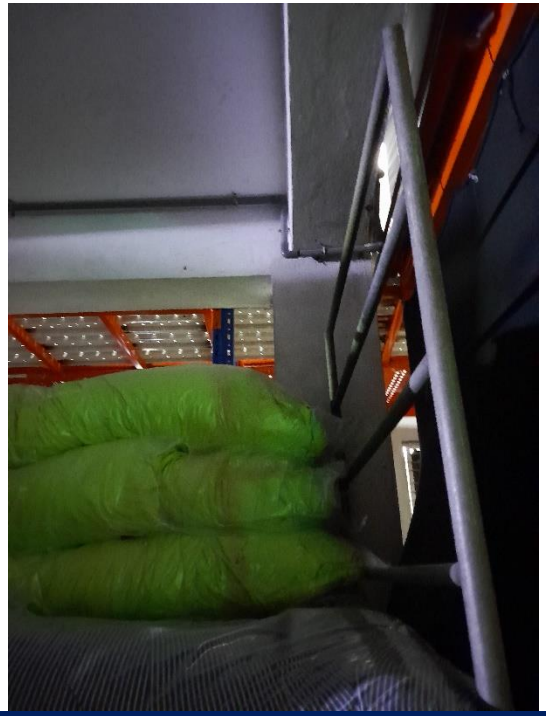
No bracing/Compression strut was provided along the long direction.

Portal frame is provided along the short direction. Any compression member along long direction with any lateral bracing was not available. Therefore, lateral stability along long direction is questionable. Building engineer is required to check the lateral stability of the structure.

Observation: Shed-7

Lack of as-built drawing of mezzanine floor

Observation: Shed-7



RC mezzanine structure.

During inspection, a single storied RC mezzanine floor was observed inside Shed-7 which was structurally separated. However, as-built drawing was not available for this structure. Building engineer is required to prepare full set of as-built drawings incorporating all structural details of this structure.

Observation: Shed-7

Problems Observed

Building-3:

Item 01: Inconsistencies in design report.
Item 02: Significant vibration on the AHU room
Item 03: Lack of information in as-built drawing.
Item 04: Bolt missing and connection gap.
Item 05: Non-Engineered steel stair.

Building-4:

Item 06: Absence of design documents.
Item 07: Discrepancies in as-built drawing.

Shed-2:

Item 08: Apparently non engineered structure.

Shed-3, 4, 5 & 6:

Item 9: Lack of Lateral Stability.
Item 10: Lack of information in as-built drawing.

Shed-7:

Item 11: Lack of Lateral Stability.
Item 12: Lack of as-built drawing of mezzanine floor.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Inconsistencies in design report (Building-3)	Building engineer is required to update the design report incorporating detailed calculation for wind and seismic loading as per BNBC.	6-weeks
02	Inconsistencies in design report (Building-3)	Carry out remedial works if required.	6-months
03	Significant vibration on the AHU room (Building-3)	Significant vibration was observed in the AHU roof. Building engineer is required to investigate the long-term effect of the vibration and suggest remediation.	6-weeks
04	Significant vibration on the AHU room (Building-3)	Carry out remedial works if required.	6-months
05	Lack of information in as-built drawing (Building-3)	Building engineer is required to update as-built drawing incorporating all structural details of these sheds.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Bolt missing and connection gap (Building-3)	Building engineer is required to repair the gap in connections with a suitable method.	6-weeks
07	Bolt missing and connection gap (Building-3)	Install the missing bolt where necessary.	6-weeks
08	Non-Engineered steel stair (Building-3)	The Building engineer is required to check the connection adequacy for uplift forces as part of EA.	6-weeks
09	Non-Engineered steel stair (Building-3)	Implement remedial work where required.	6-months
10	Absence of design documents (Building-4)	Building is required to prepare a set of design report in compliance with section 1.9.1.1 (part-6, BNBC).	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
11	Absence of design documents (Building-4)	Implement remediation work if required.	6-months
12	Discrepancies in as-built drawing (Building-4)	Building engineer is required to resurvey the whole structure and update the as-built drawing accordingly.	6-weeks
13	Apparently non engineered structure (Shed-2)	Building engineer is required to check the connection adequacy for uplift forces as part of EA otherwise replace with engineered structure.	6-weeks
14	Apparently non engineered structure (Shed-2)	Implement remedial work where required.	6-months
15	Lack of Lateral Stability (Shed-3, Shed-4, Shed-5 & Shed-6)	Building engineer is required to check the lateral stability and connections of the shed.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
16	Lack of Lateral Stability (Shed-3, Shed-4, Shed-5 & Shed-6)	Complete remedial works where necessary.	6-months
17	Lack of information in as-built drawing (Shed-3, Shed-4, Shed-5 & Shed-6)	Building engineer is required to update as-built drawing incorporating all structural details of these sheds.	6-weeks
18	Lack of Lateral Stability (Shed-7)	Building engineer is required to check the lateral stability of the shed and prepare an Engineering Assessment (EA) report.	6-weeks
19	Lack of Lateral Stability (Shed-7)	Complete remedial works where necessary.	6-months
20	Lack of as-built drawing of mezzanine floor (Shed-7)	Building engineer is required to prepare full set of as-built drawings incorporating all structural details of this structure.	6-weeks