

MAS Intimates Bangladesh Pvt. Ltd. (9550)

FSFB #1, Karnaphuli Export Processing Zone, North Patenga, Chittagong

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Identified Priority 1 Concerns

Storage loading on the first floor of the two-storey office building considerably exceeds design load and should be reduced.

Priority 1 Concern

To the left is the most heavily loaded area of the building identified, with a quick calculation establishing around 6kN/m² area load. Below is another image on the same floor, demonstrating the uncontrolled loading present.



35kg per roll, ÷ (1.65m x 0.275m plan area), x 8 rolls high, = 617kg/m²

Identified Priority 2 Concerns

Roof of main factory building has been built-up to allow water runoff. The build-up has deteriorated however, and should be repaired.

The warehouse building has a potentially incomplete system of lateral stability.

The warehouse building roof girders have no lateral bracing to their bottom flange.

Mezzanines within the warehouse building are of questionable construction, particularly regarding the support system of higher-level mezzanines.

Identified Priority 2 Concerns continued

Drawings of the office building and warehouse were inadequate, with structural details not provided and architectural layout drawings not matching site conditions.

Some connection bolts were omitted in the warehouse roof structure.

1st Priority 2 Concern

Below is a characteristic flat area of the roof, where the surfacing course is clearly worn away and brittle, exposing the aggregate beneath.

Above is the roof build-up around the legs of the rooftop water tank, where the build-up is at its thickest and the deterioration is most evident.



It is evident in these areas that the build-up on top of the roof slab is just loose brick aggregate, with a very thin screed on top. In principle the build-up is ok, allowing runoff of water from the roof, but it must be repaired and covered to ensure that water cannot penetrate through it, and into the structural slab.



2nd Priority 2 Concern (Continued over page)

A report by CUET has previously been carried out, but this gives only a generalised statement regarding lateral stability.

The image above shows the portal frame providing stability for the warehouse in one direction. In the other direction, concrete columns support steel columns above, and no system of bracing or lateral restraint was evident.

The image to the right is annotated to show the direction in which the stability system is to be established/improved.



2nd Priority 2 Concern Continued.

This image shows the upper portion of the warehouse building, where steel columns are present, supported by the concrete columns at lower level.

At this level in particular, the lateral stability system is not clear. The roof is quite high, yet there is no system of lateral stability in one direction and the capability of the roof for diaphragm action must also be confirmed.



As shown in this image, there is no restraint to the bottom flange of the roof girders. It is only at rigid supports that compression is generated in this flange under normal gravity loading, however in a wind uplift loading condition, significant portions of the bottom flange are in compression, and should be suitably restrained against lateral torsional buckling.



4th Priority 2 Concern

The image to the right shows that there are multiple levels of mezzanine within the warehouse. These are heavily loaded with storage and are of questionably lightweight construction, with only 24mm thick board spanning 600mm. Also, the higher levels of mezzanine introduce very large buckling lengths for the vertical members supporting them.



To the left is the leg of a 3rd mezzanine-level column, which is actually supported directly from the mezzanine level below. Most of these legs are over the joist-lines below, but this is not always the case.

5th Priority 2 Concern

To the left is the architectural plan of the office building, showing a rectangular plan layout with a porch and an external stair. Below is the South elevation, indicated on the drawing to the left, which shows extensions both to the South and East.

Existing areas not indicated on drawing.

In addition to the overall layout inaccuracies indicated here, the internal column layout observed did not match the drawing above, with some beam spans being almost double what is indicated on the drawings.



6th Priority 2 Concern



This image shows a connection between primary roof members in the warehouse building. As can clearly be seen, a bolt is missing and should be replaced.

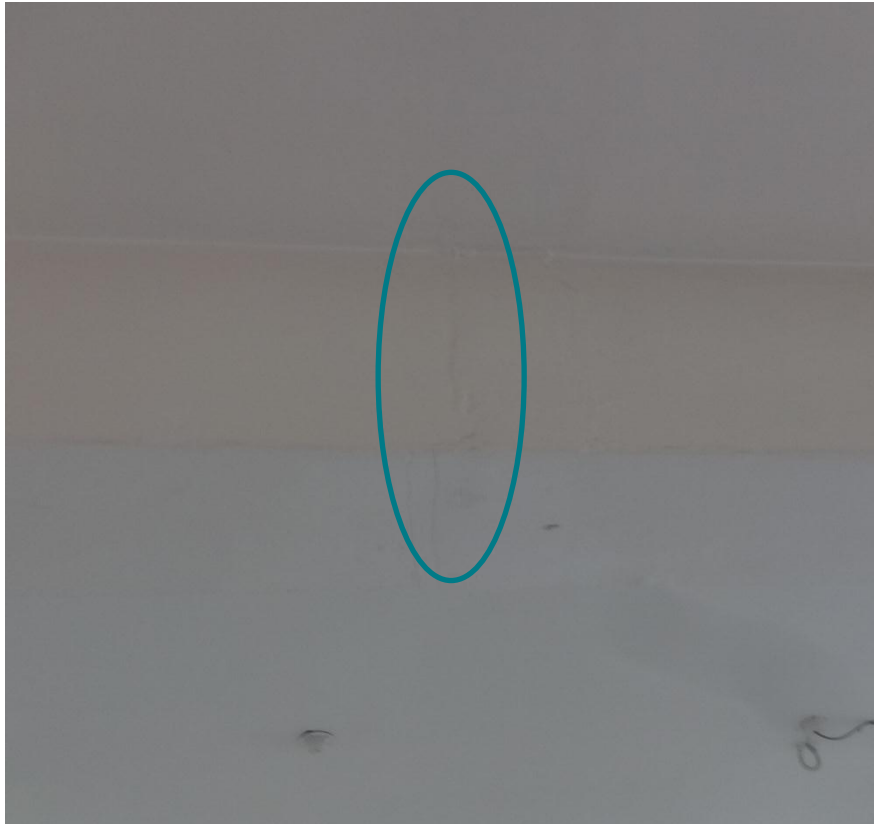
It is important that the warehouse building is carefully inspected to ensure that any other locations where such omissions have taken place are rectified.

Identified Priority 3 Concerns

Hairline tension cracks were evident in the main factory building, which were broken out locally to establish poorly formed concrete construction.

Priority 3 Concern

Below is a hairline crack through the mid-span of an internal floor beam, as was observed in several locations around the building. The image to the right shows where the plaster was carefully removed over the crack, revealing poorly laid concrete.



Several cracked beams were scanned on site, and a level of reinforcement which seemed to correspond to the structural drawings was established.

Overall Stability System



The concrete-framed main factory building and office building gain their stability through rigid beam-column connections (left) and masonry infill walls. However the warehouse building has no evident system of lateral stability in the direction shown on the image below. As mentioned previously, a CUET report has been carried out, but it gives very little consideration to the lateral stability of the warehouse.



It is recommended that the CUET report be updated to include thorough lateral stability analysis of the warehouse and the office, as was done for the factory building.

Water Ingress at Roof Level



An attempt has been made to prevent ponding by creating a sloped build-up at roof level. As can be seen above, this has not always been successful, while in many locations the surfacing on the build-up has deteriorated to an extent where water can easily penetrate (right).

The build-up should be repaired, and a suitable waterproof coating applied, to ensure that water cannot penetrate the structural roof slab.



Priority Actions

Problems Observed Summary

ITEM 1: (Priority 1) Excessive storage on first floor of office building, to be reduced.

ITEM 2: (Priority 2) Roof build-up on the main factory building has deteriorated to allow water ingress, and should be repaired.

ITEM 3: (Priority 2) Warehouse building roof girders have no bottom flange restraint.

ITEM 4: (Priority 2) Lateral stability system of warehouse building does not seem comprehensive, and should be investigated further.

ITEM 5: (Priority 2) Mezzanines in the warehouse building are very lightweight construction, and in some cases are supported on top of one another. Further assessment required.

ITEM 6: (Priority 2) Some connection bolts were missing from the warehouse roof structure.

Problems Observed Summary (Continued)

ITEM 7: (Priority 2) Inadequate or incorrect drawings of office building and warehouse. Site conditions to be surveyed and drawings to be amended.

ITEM 8: (Priority 3) Hairline cracks on several internal downstand beams evident. Any progression to be monitored by the factory.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Excessive storage on first floor of office building, to be reduced.	Stacking of rolls of fabric to be immediately reduced to a maximum of 4 rolls in height.	Immediate – Now
2	Excessive storage on first floor of office building, to be reduced.	Factory Engineer to produce a loading plan, with maximum storage heights being established, to ensure that 3kN/m ² is not exceeded.	6-weeks
3	Excessive storage on first floor of office building, to be reduced.	Loading plan to be adhered to, with factory managers and supervisors to ensure compliance.	6-months
4	Roof build-up on the main factory building has deteriorated to allow water ingress, and should be repaired.	Existing build up to be locally repaired/replaced where deteriorated, to ensure and constant and even slope towards the perimeter of the building. Total thickness of the build-up should not be increased from its existing level.	6-weeks
5	Roof build-up on the main factory building has deteriorated to allow water ingress, and should be repaired.	Apply a waterproof coating or membrane to ensure that water cannot infiltrate the build-up. Monitor condition of the roof and carry out regular maintenance wherever necessary.	6-months
6	Warehouse building roof girders have no bottom flange restraint.	Factory Engineer to design appropriate positioning and spacing of bottom flange restraint.	6-weeks
7	Warehouse building roof girders have no bottom flange restraint.	Bottom flange restraint to be implemented, under the supervision of capable Engineer to ensure suitable installation to ensure full restraint is established.	6-months
8	Lateral stability system of warehouse building does not seem comprehensive, and should be investigated further.	CUET Engineering Assessment should be developed to establish capacity of existing structure against normal lateral loading. Suitable system of restraint to be established, if considered that existing stability system is not adequate.	6-weeks
9	Lateral stability system of warehouse building does not seem comprehensive, and should be investigated further.	Implement and structural alterations deemed necessary by the aforementioned Engineering Assessment.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
10	Mezzanines in the warehouse building are very lightweight construction, and in some cases are supported on top of one another. Further assessment required.	Mezzanine manufacturer's advice to be sought, concerning the capacity of the existing structure. Particular consideration to be given to existing floor deck capacity, and appropriateness of supporting one mezzanine off another.	6-weeks
11	Mezzanines in the warehouse building are very lightweight construction, and in some cases are supported on top of one another. Further assessment required.	Implement any structural changes deemed necessary by the mezzanine manufacturer.	6-months
12	Some connection bolts were missing from the warehouse roof structure.	Warehouse to be thoroughly surveyed to establish all locations of missing bolts at connections or other fixing points.	6-weeks
13	Some connection bolts were missing from the warehouse roof structure.	Bolts to be reinstated, using a size and grade of bolt consistent with the original design. If connection design is not available, Factory Engineer to advise on specification.	6-months
14	Inadequate or incorrect drawings of office building and warehouse. Site conditions to be surveyed and drawings to be amended.	Existing layout and construction to be surveyed in the office building and warehouse.	6-weeks
15	Inadequate or incorrect drawings of office building and warehouse. Site conditions to be surveyed and drawings to be amended.	Following the aforementioned survey, architectural and structural 'as-built' drawings to be produced.	6-months
16	Hairline cracks on several internal downstand beams evident. Any progression to be monitored by the factory.	Cracking of beams to be monitored by in-house factory staff. If any progression or opening-up is observed, structural engineer to be immediately contacted for further assessment.	6-months