

# AMS International (Sweaters) Ltd.

34 Choydana, P.O. National University Gazipur-1704  
(23°57'43.9"N 90°22'47.2"E)

26 APRIL 2014

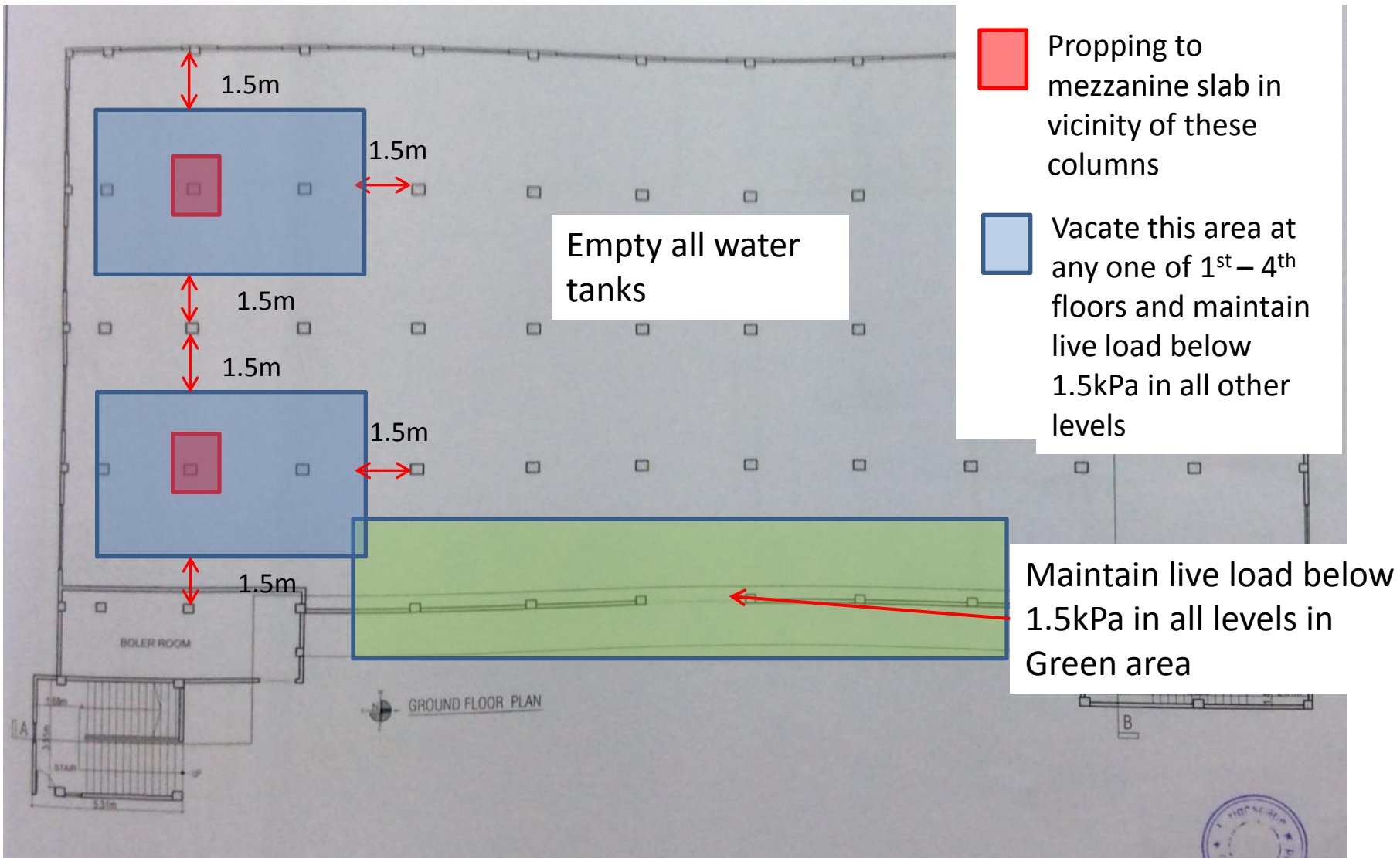


# Executive Summary (continued)

**We do have important and urgent concerns in relation to the adequacy of the structural columns.** Some columns appear to be stressed to levels that require immediate review. The following **immediate** actions are required to be carried out:

1. The water tanks on the roof should be emptied and should be relocated to a suitable position. The Building Engineer should confirm that the proposed location is capable of supporting water tank loading.
2. The areas highlighted on following page should be vacated at floors indicated and loads reduced to a maximum of 1.5kPa at all other levels
3. The mezzanine at ground floor should be propped down to the ground floor slab so it does not load the columns in question. The Building Engineer should determine the location and number of props required.
4. A Detail Engineering Assessment of the as-constructed **Main Factory Building** is requested and this should commence immediately to the requirements of the scope attached and addressing the concerns as noted. We would recommend that the Detail Engineering Assessment for this building be completed **within 6 weeks** of receiving this report.

If the Building owners are not in a position to complete these actions immediately, the building should be re-classified as **Category Red** and evacuated.



Location plan showing required load reductions

# Observations

**High column stresses  
Detail Engineering Assessment required**

**Outline calculations indicate that working stresses in the areas highlighted in the Executive Summary are high.  
Carry out load reductions as indicated in Executive Summary**



A Detail Engineering Assessment of the building is required (See attached Scope) .  
Engineer is to perform detailed calculations based on as-constructed dimensions, and  
carry out concrete tests to prove column size.

## Columns strength

# Undocumented additional steel structure



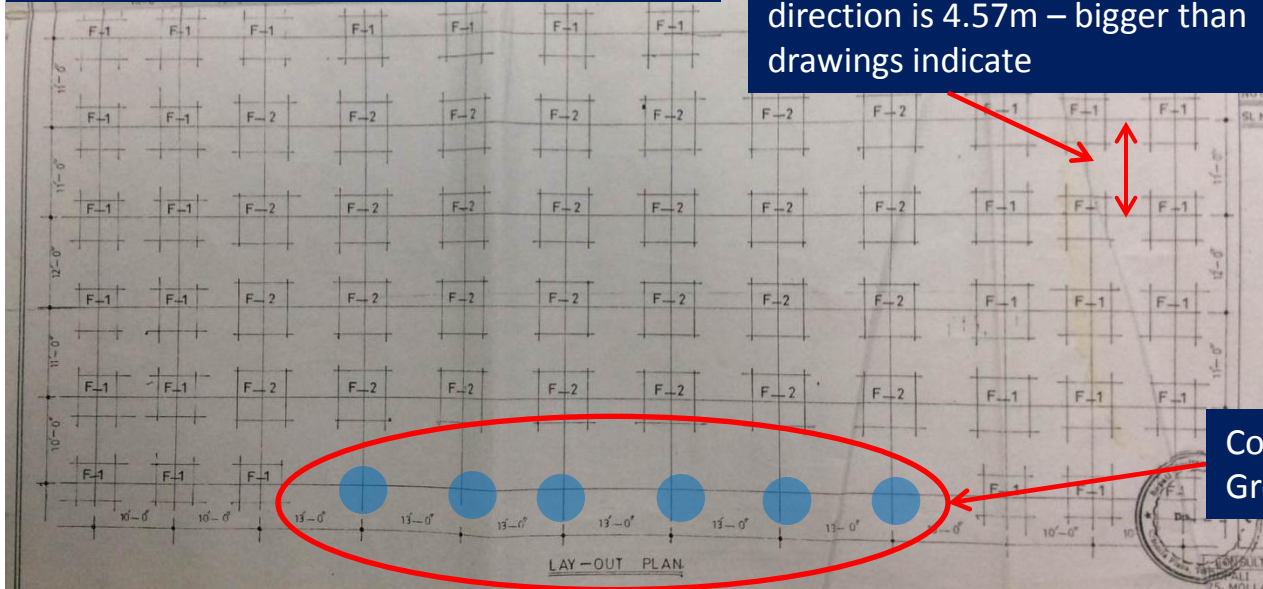
Building Permit for Building is for 5 storeys - the steel structure is not in scope of permit.  
Non-engineered lightweight steel roof addition does not appear to be strong enough to withstand severe wind events, with limited lateral stability system



# Inconsistencies in Documentation

Floor plan on structural drawing (undated )

Typical grid spacing in this direction is 4.57m – bigger than drawings indicate

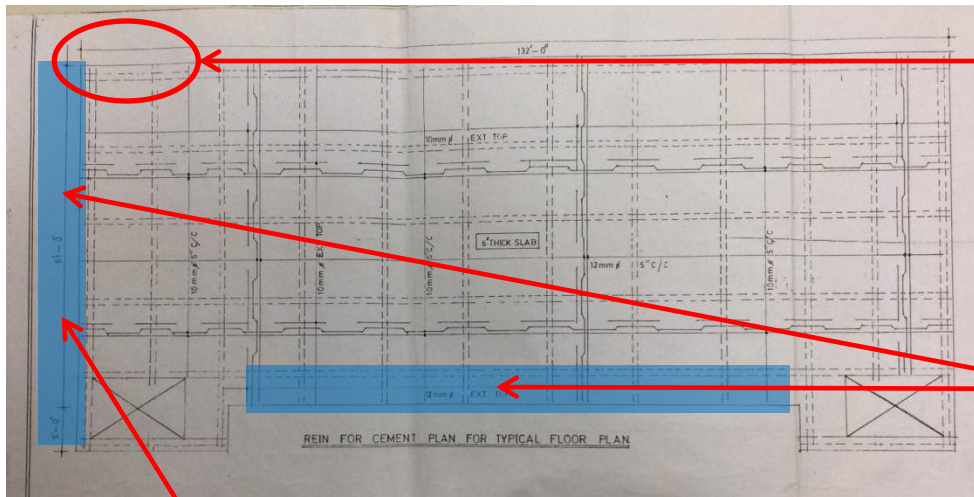


Columns in these locations from Ground to first not shown on drawing

Floor plans from permit, structural and as-built drawings do not fully reflect as-constructed building, as noted



Inaccurate design documents

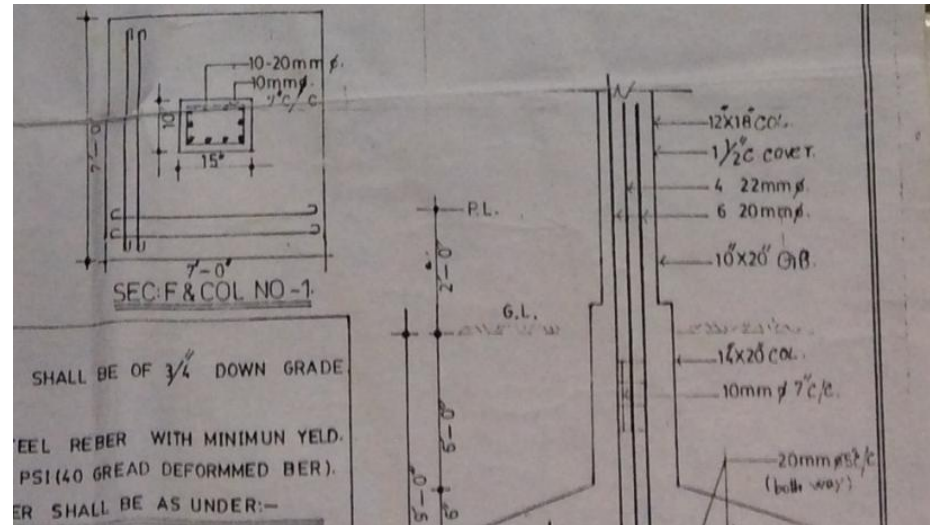


Perimeter structure is off grid in this area over full height of building

Slab cantilevers not shown or not shown accurately in areas indicated



Extent of cantilever on south elevation (brick pier shaded)



Columns are typically smaller than indicated on drawings.  
 Typical internal columns:  
 Specified: 300 x 450  
 Actual: 300 x 385

# Inaccurate design documents

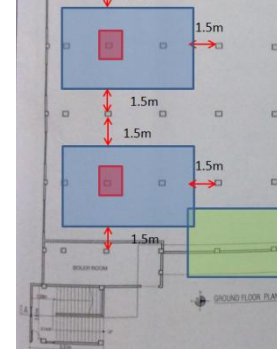
# Priority Actions

# Problems Observed

1. Concrete column strength
2. Undocumented partial additional steel structure
3. Inconsistencies in design documentation

# Item 1 and actions

Verify concrete strengths



## Priority 1

(Immediate - Now)

- **Immediately relocate water tanks to a suitable location (to be confirmed by Building Engineer) and vacate areas highlighted in blue at any one of 1<sup>st</sup> to 4<sup>th</sup> floors**
- **Immediately prop mezzanine at ground floor around columns highlighted in red above (prop size and location to be confirmed by Building Engineer)**
- Building Engineer to review design, loads and columns stresses in all columns.
- Verify insitu concrete strengths either by 100mm diameter cores or existing cylinder strength data for cores from min. 4 columns.
- A Detail Engineering Assessment of Factory to be commenced, see attached Scope.

## Priority 2

(within 6-weeks)

- Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to floor capacity and column capacity.
- Detail Engineering Assessment to be completed.

## Priority 3

(within 6-months)

- Continue to implement load plan

# Detail Engineering Assessment

This Schedule develops a minimum level of information, Analysis and testing expected as part of a Detail Engineering Assessment.

The Building(s) have been visually assessed and it is deemed necessary that a detailed engineering assessment be carried out by a competent Engineering Team employed by the factory Owner.

This Request should be read in conjunction with the BUET developed Tripartite Guideline document for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of this document should be referenced. This document also gives guidance on required competency of Engineering Team.

We expect that the following will be carried out:

1. Development of Full Engineering As-Built Drawings showing Structure, loading, elements, dimensions, levels, foundations and framing on Plan, Section and Elevational drawings.
2. The Engineering team are to carry out supporting calculations with a model based design check to assess the safety and serviceability of the building against loading as set out in BNBC-2006, Lower rate provisions can be applied in accordance with the Tripartite Guidelines following international engineering practice, justification for these lower rate provisions must be made.
3. A geotechnical Report describing ground conditions and commenting on foundation systems used/proposed.
4. A report on Engineering tests carried out to justify material strengths and reinforcement content in all key elements studied.
5. Detailed load plans shall be prepared for each level showing current and potential future loading with all key equipment items shown with associated loads.
6. The Engineering team will prepare an assessment report that covers the following:
  - As-Built drawings including
    - Plans at each level calling up and dimensioning all structural components
    - Cross sectional drawings showing structural beams, slabs, floor to floor heights, roof build-ups and Basic design information of the structure
  - Highlight any variation between As-built compared to the designed structure
  - Results of testing for strength and materials
  - Results of geotechnical assessment and testing/investigation
  - Details of loading, inputs and results of computer modelling
  - Commentary on adequacy/inadequacy of elements of the structure
  - Schedule of any required retrofitting required for safety or performance of Structure

Any proposals for Retrofitting to follow guidance developed in the Tripartite Document

# Item 2 and actions

Undocumented partial additional storey with lightweight steel roof

## Priority 1

(Immediate - Now)

- None required

## Priority 2

(within 6-weeks)

- Building Engineer to survey and prepare as-built drawings for additional structure as part of Detail Engineering Assessment (see Item 1).
- Building Engineer to carry out design checks on additional structure as part of Detail Engineering Assessment, in particular resistance to wind uplift, given the current connection details

## Priority 3

(within 6-months)

- Carry out any upgrade measures required as part of the design checks or remove structure

# Item 3 and actions

Structural drawings do not match current arrangement of the structure

## Priority 1

(Immediate - Now)

- None required

## Priority 2

(within 6-weeks)

- Building Engineer to carry out dimensioned as-built survey of the building
- Collect and produce accurate complete as-built drawings as part of Detail Engineering Assessment.

## Priority 3

(within 6-months)

- None required