Mantrust Sweater Ltd

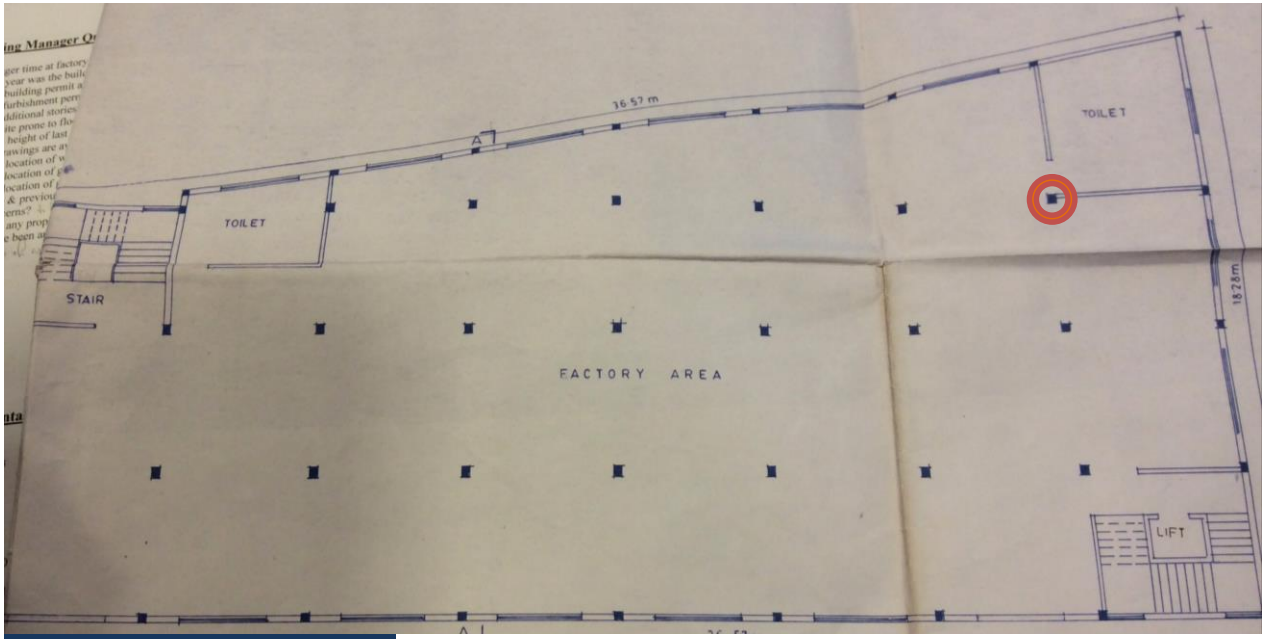
Vogra, Chandana, Gazipur
(23.980267N,90.379992E)
20 May 2014

ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

Small column sizes leading to high column stresses



Column tested

Typical column layout

Tested ground floor column – brick aggregate

Due to the small column sizes and the high number of storeys the column stresses are generally high for all columns.

Detail Engineering Assessment and immediate load reductions required.

High column stresses

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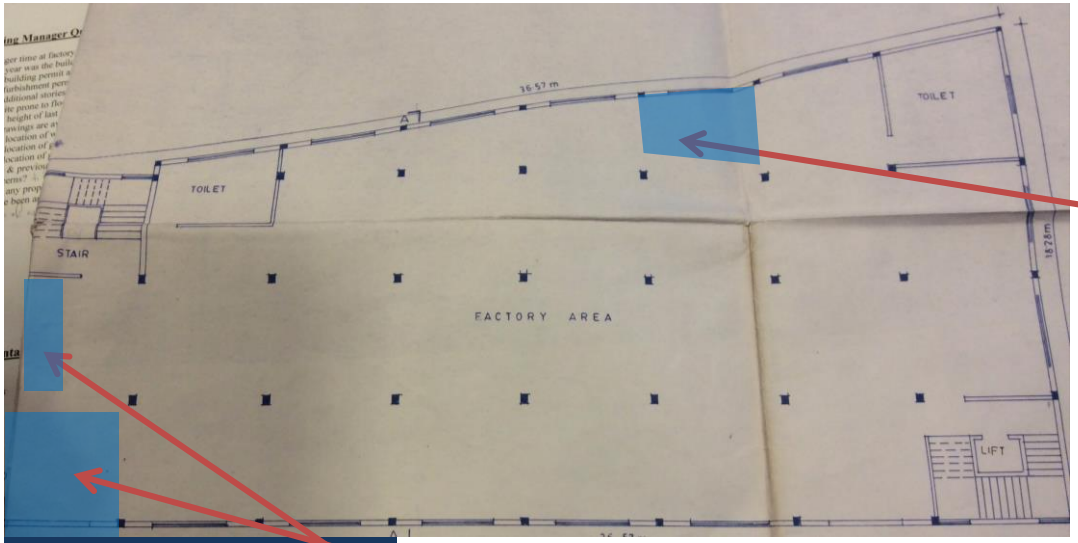
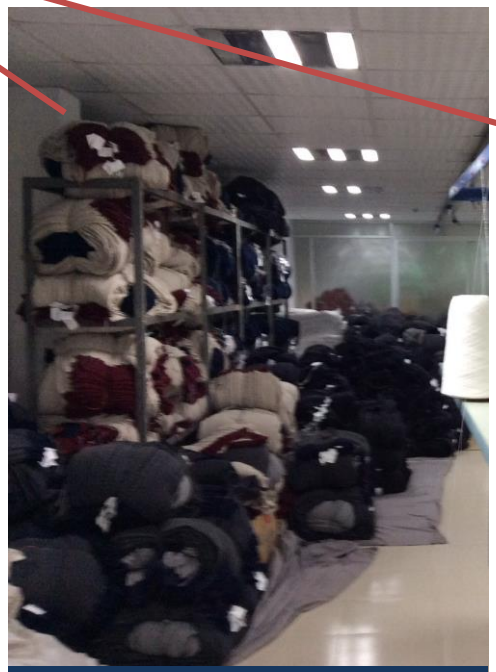
High storage loads in some areas



Typical Floor Plan

3rd Floor loading

Building Engineer to create controlled loading plans for all floors which will designate where storage can be placed.



3rd Floor loading

5th Floor loading

High storage loads

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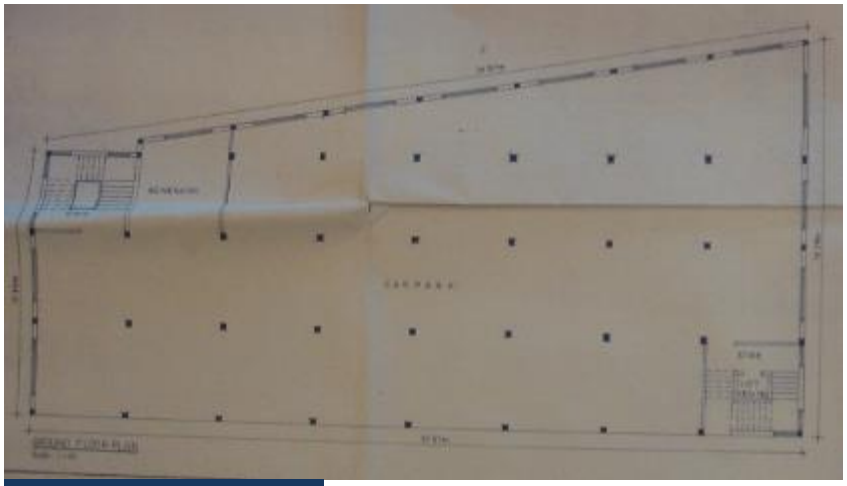
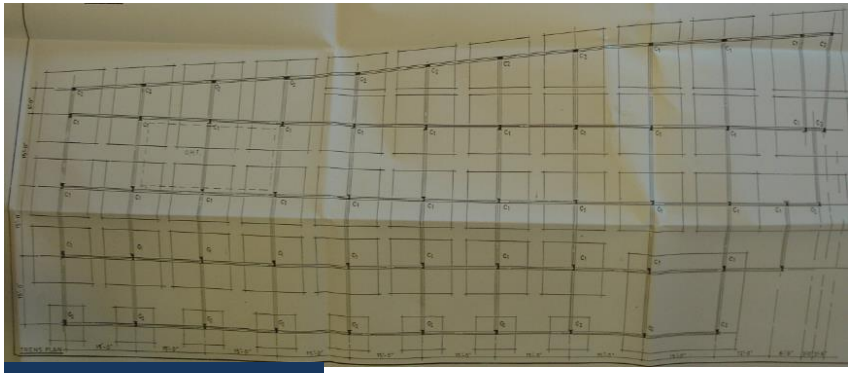
Inconsistent permit documentation



Permit drawing



Structural drawing

The building permit for commercial use was given by LGED only in July 2011 when the building was already completed up to the 5th floor. It is unclear what the written restriction on the permit drawing “only layout plan approved” means.

The structural drawings are from May 2014 when the whole building was already built. They are inconsistent with the permit drawing with regards to the building geometry in several areas.

Inconsistent permit documentation

Priority Actions

Problems Observed

1. Small column sizes leading to high column stresses
2. High storage loads in some areas
3. Inconsistent permit documentation

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Small column sizes leading to high column stresses	Two of the upper levels (i.e. two of 1st, 2nd, 3rd, 4th, 5th or 6th floors) are to be evacuated of all personnel, storage and equipment.	**Immediate - Now**
2	Small column sizes leading to high column stresses	The area around the toilets in the south-east corner at each upper level is to be vacated of storage and equipment and limited to access to the toilets only – see diagram in full report.	**Immediate - Now**
3	Small column sizes leading to high column stresses	Loads in all other areas are to be limited to 1.5kPa at each upper level. Factory Engineer to review design, loads and columns stresses for all columns.	**Immediate - Now**
4	Small column sizes leading to high column stresses	Verify insitu concrete stresses either by 100mm diameter cores or existing cylinder strength data for min. 4 columns.	**Immediate - Now**
5	Small column sizes leading to high column stresses	A Detail Engineering Assessment of Factory to be commenced, see attached scope.	**Immediate - Now**
6	Small column sizes leading to high column stresses	Detail Engineering Assessment to be completed.	**6-weeks**
7	Small column sizes leading to high column stresses	Produce and actively manage a loading plan for all floors within the building giving consideration to floor capacity and column capacity.	**6-weeks**
8	Small column sizes leading to high column stresses	Continue to implement load plan	**6-months**

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. T his 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 No.	Observation	Recommended Action Plan	Recommended Timeline
9	High storage loads in some areas	Reduce loads at upper levels as noted in Item 1	**Immediate - Now**
10	High storage loads in some areas	Comply with loading plan as noted in Item 1	**6-weeks**
11	High storage loads in some areas	Continue to implement load plan	**6-months**
12	Inconsistent permit documentation	As part of Detail Engineering Assessment (see Item 1), Building Engineer to survey building as constructed.	**6-weeks**
13	Inconsistent permit documentation	Building Engineer to produce as-constructed documentation.	**6-months**