Padma Satel Arab Fashions Ltd.
P & K Fashion Ltd.
Luna Fashion Ltd.

Luna Complex, Joybangla road, Borobari, Gazipur, Dhaka

(23.93645, 90.39146)

29th June 2014

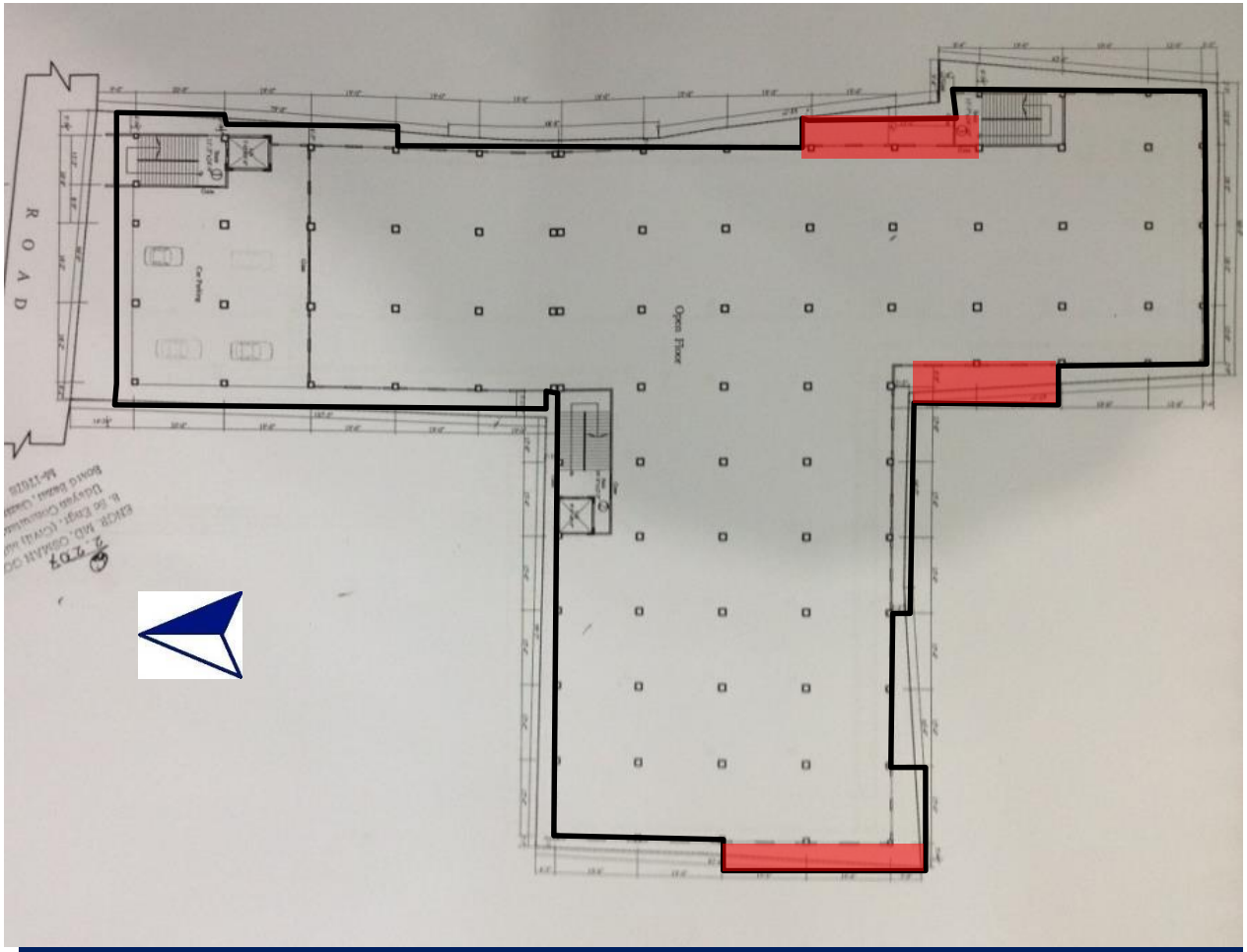
ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

Cursory calculations indicate column stresses are high

Cursory calculations indicate that stresses are high in all columns. In particular, columns supporting cantilevers with toilet blocks are very highly stressed.



Typical floor layout

Typical toilet block

Brick aggregate

Toilet blocks supported by cantilever slabs

Observation

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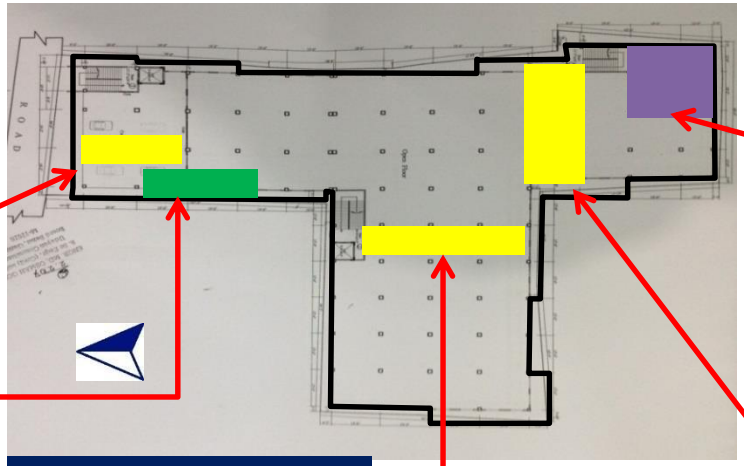
Localized areas of high loading

Areas of high loading on structure including cantilevers. No load management plan available for the building.

3rd floor – Finished goods store



Typical Floor Plan

6th floor – Bonded warehouse

7th floor – Fabric rolls

3rd floor – Fabric bundles

3rd floor – Cardboard store

Observation

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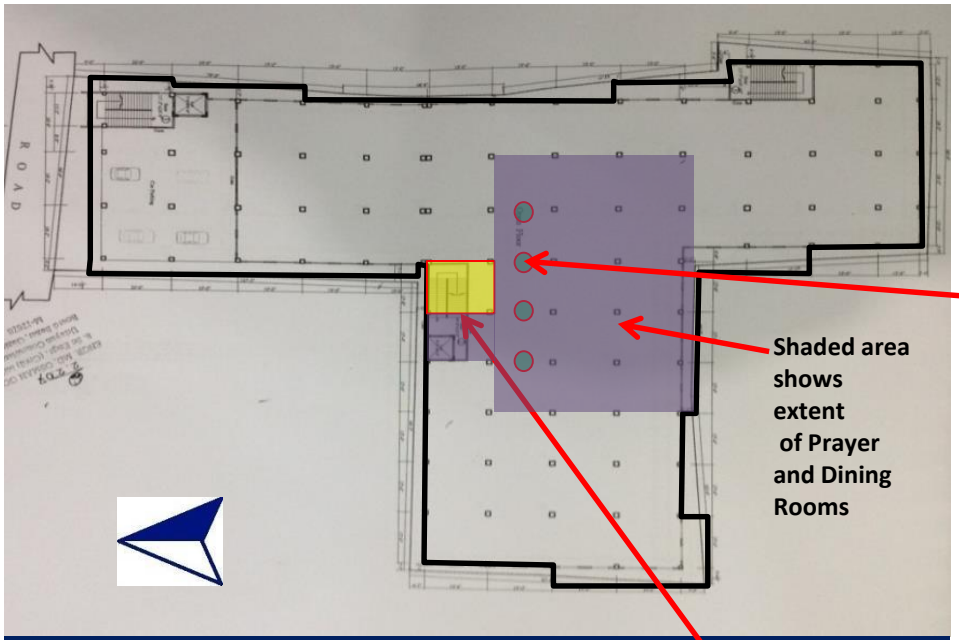

Roof Plan

4 no. plastic water tanks

Concrete water tank

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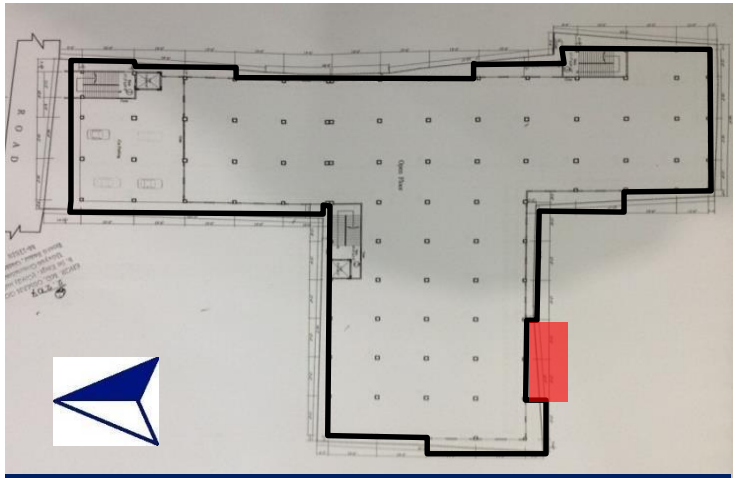
Apparently non-engineered steel fire escape stairs

The steel fire escape stairs appears to be non-engineered. The main issues observed are:

- Overall stability under vertical and horizontal loads does not appear to have been achieved
- Bearing of stair to concrete landing appears inadequate
- Section sizes appear to be slender
- Corrosion of the structure has lead to holes in the tube sections



Typical Floor Plan

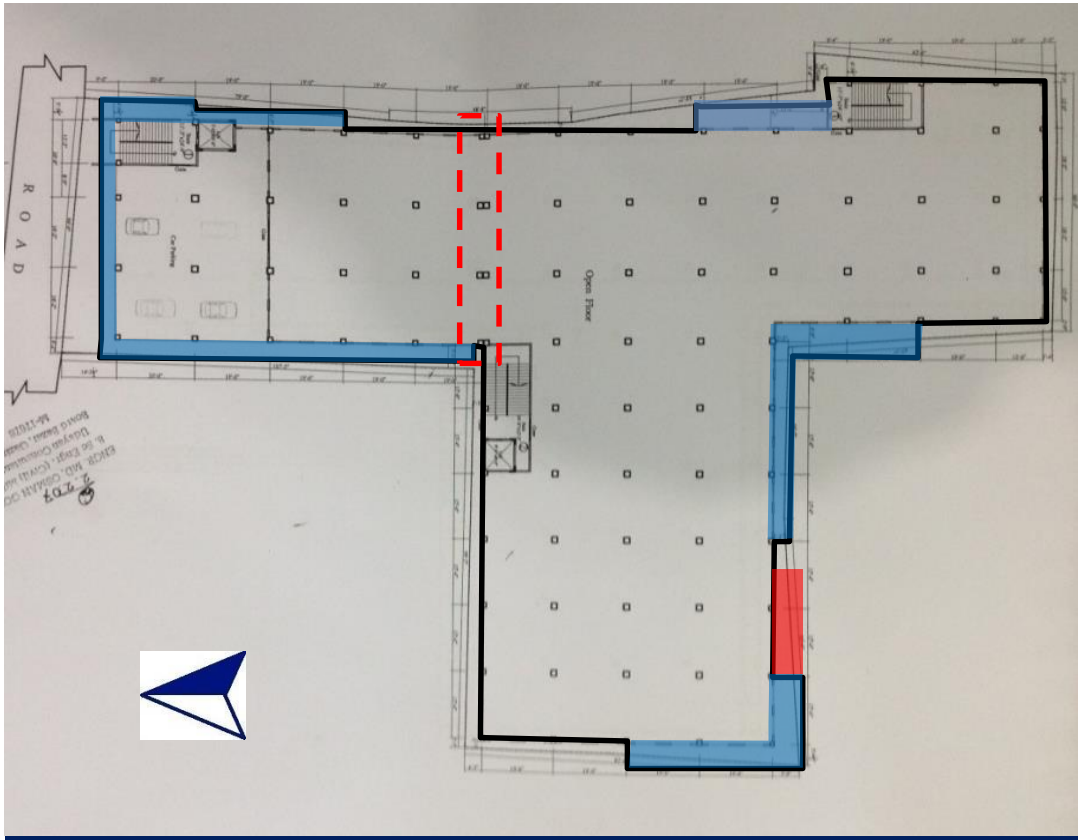
Bearing detail

EW Building stair elevation

Steel stair Location

Observation

Inconsistencies between structural drawings and as built construction



Typical floor Layout

Double columns shown on drawings, single column built

Cantilevers not on structural drawings

Undocumented steel escape stairs

Observed floor plate layout

Steel escape stairs and cantilever structure to the south of E-W Building

Observation

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Cantilever structure to North of N-S Building

Cantilever structure to the Soutwest of the N-S Building

Observation

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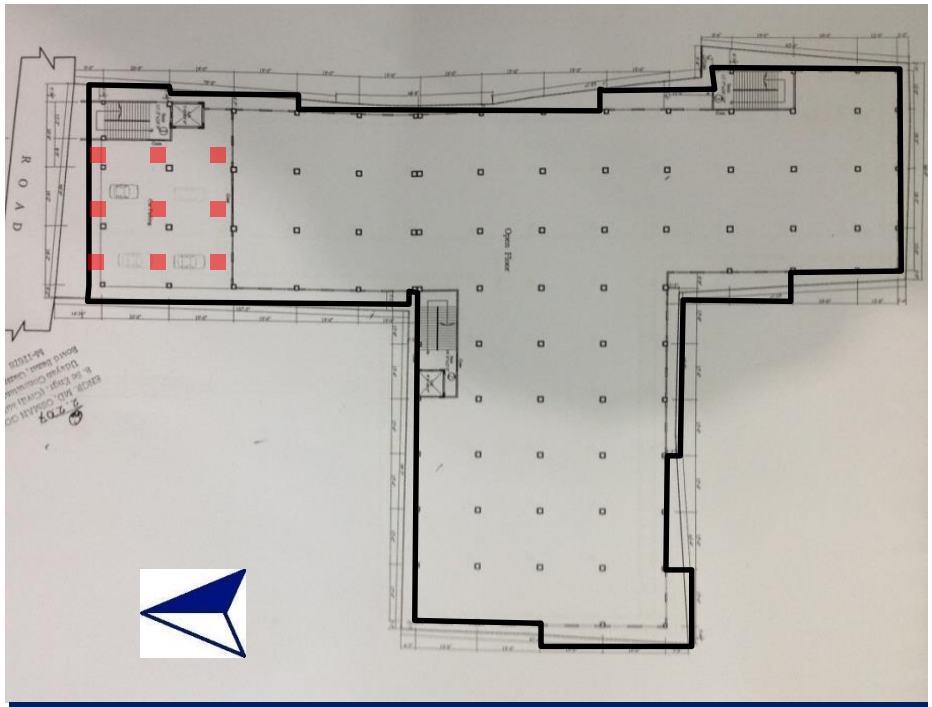
Column protection at ground floor delivery area

The ground floor columns in the parking/delivery area were partially surrounded by a metal angle frame. These frames appeared light and may provide little protection to the column if struck by a vehicle.



Typical floor Layout

Ground floor columns with steel angle protections

Angle steel frames at columns

Observation

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Priority Actions

Problems Observed

ITEM 1: Cursory calculations indicate column stresses are high
ITEM 2: No floor load management plan
ITEM 3: Apparently non-engineered steel fire escape stairs
ITEM 4: Inconsistencies between structural drawings and as built construction
ITEM 5: Column protection at ground floor delivery area

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Cursory calculations indicate column stresses are high	Factory Engineer to review design, loads and column stresses for all columns.	**Immediate - Now**
2	Cursory calculations indicate column stresses are high	Verify insitu concrete strength using min. 4 no. 100mm dia. Cores taken from the ground floor columns (or existing cylinder strength data if available for 4 column locations).	**Immediate - Now**
3	Cursory calculations indicate column stresses are high	Verify existing reinforcement (steel grade, bar diameter and spacing) in columns.	**Immediate - Now**
4	Cursory calculations indicate column stresses are high	A Detailed Engineering Assessment of factory to be commenced, see attached scope	**Immediate - Now**
5	Cursory calculations indicate column stresses are high	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. This should include a safe level to which any water tanks can be filled.	**6-weeks**
6	Cursory calculations indicate column stresses are high	Detailed Engineering Assessment to be completed.	**6-weeks**
7	Cursory calculations indicate column stresses are high	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
8	No floor load management plan	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity (refer to Item 1).	**6-weeks**
9	No floor load management plan	Continue to implement load management plan.	**6-months**
10	Apparently non-engineered steel fire escape stairs on southern elevation of the EW building	Building engineer to review capacity of steel stair giving consideration to overall stability, section sizes used, stair bearing details and quality of fabrication	**6-weeks**
11	Apparently non-engineered steel fire escape stairs on southern elevation of the EW building	Building engineer to propose an necessary alterations/strengthening works	**6-weeks**
12	Apparently non-engineered steel fire escape stairs on southern elevation of the EW building	Ensure any necessary remedial works as advised by the Building Engineer are undertaken.	**6-months**
13	Inconsistencies between structural drawings and as built construction	Building engineer to survey building and prepare As-Built drawings as part of the Detail Engineering Assessment (refer to Item 1).	**6-weeks**
14	Inconsistencies between structural drawings and as built construction	Building engineer to identify “as built” cantilever slab and supporting column reinforcement and confirm adequacy of the structural sections.	**6-weeks**
15	Column protection at ground floor delivery area	Building engineer to review capacity of column protection to vehicular impact and propose strengthening works if required	**6-weeks**