

Asrotex

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(90.46031E, 23.62652N)
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Observations

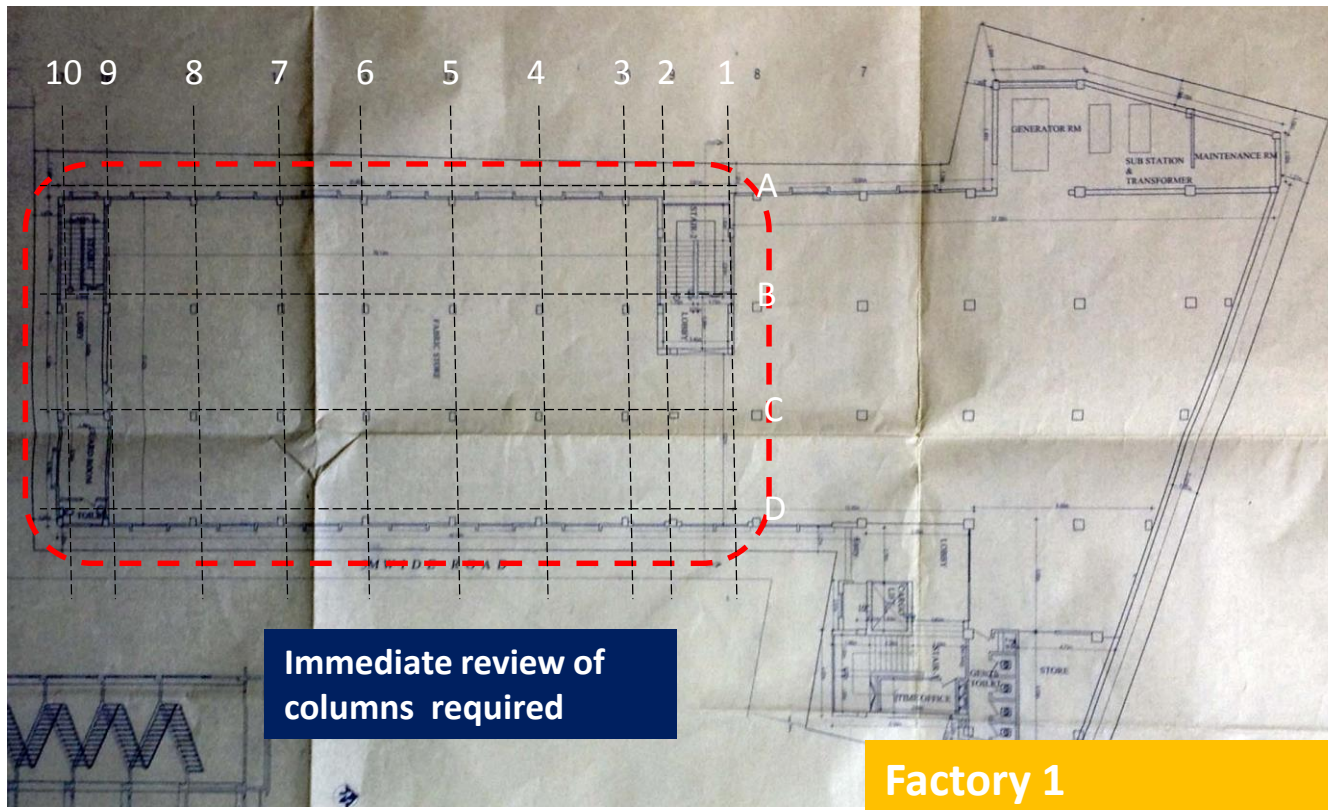
Observations

Factory 1

**Columns appear to be stressed to levels
that require immediate review**

Observations

Preliminary calculations suggest that columns are stressed to levels that require immediate review in Factory 1



Factory 1

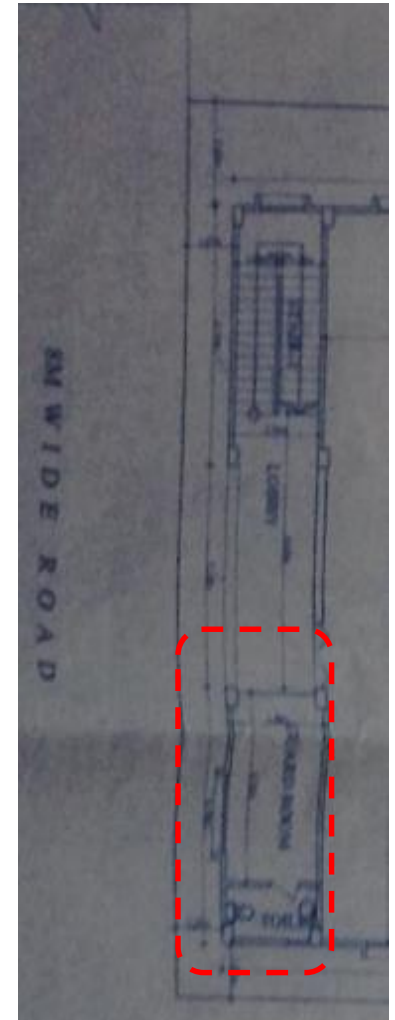
Observations

Cantilever section of Factory 1 not indicated on permit drawings

Observations



Columns C/10 and D/10 do not extend to ground and are supported on cantilever beams at first and second floors – this is not shown on the construction permit drawings

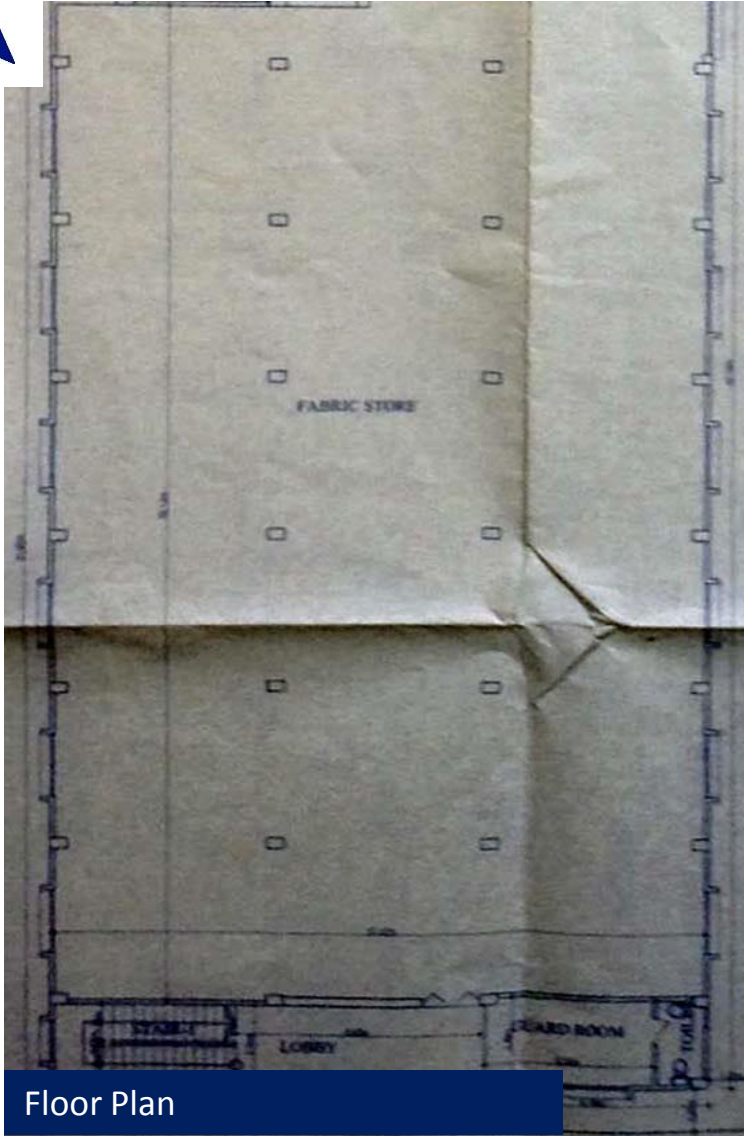


Construction Permit Drawing provided

Observations

Flat slab to 5th floor of Factory 1

Observations



Moment frame stability system (column/beam) does not extend to top of building.

No punching shear reinforcement indicated on structural drawings provided

Floor Plan

Observations

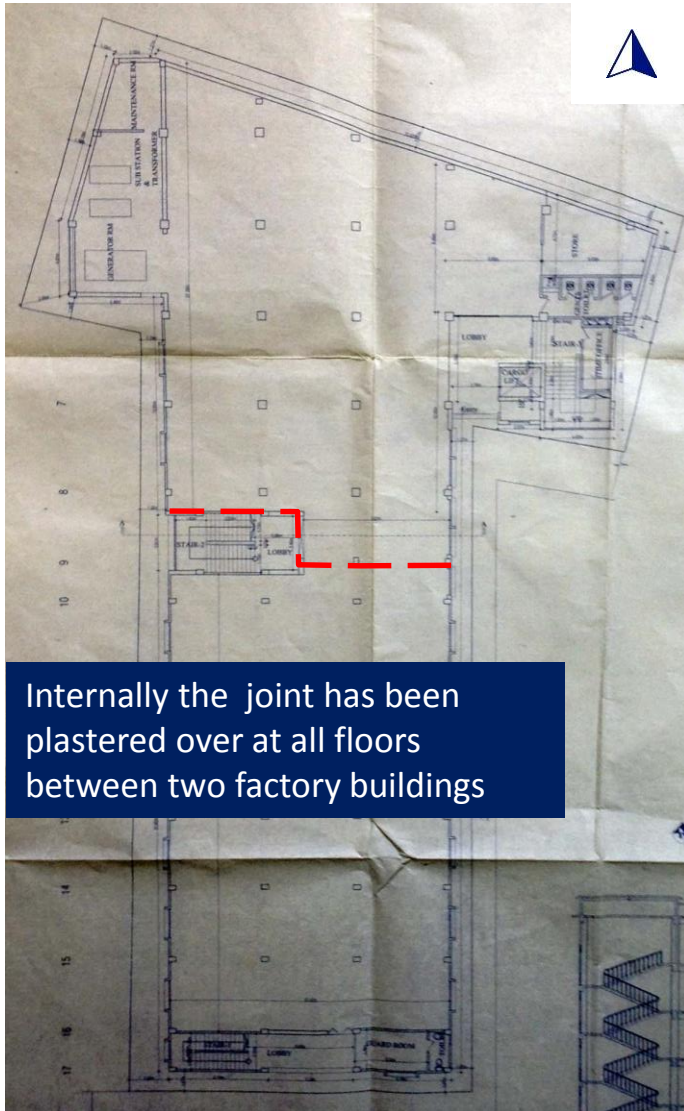
**Movement joint between Factory 1 and
Factory 2 buildings is stitched across**

Observations

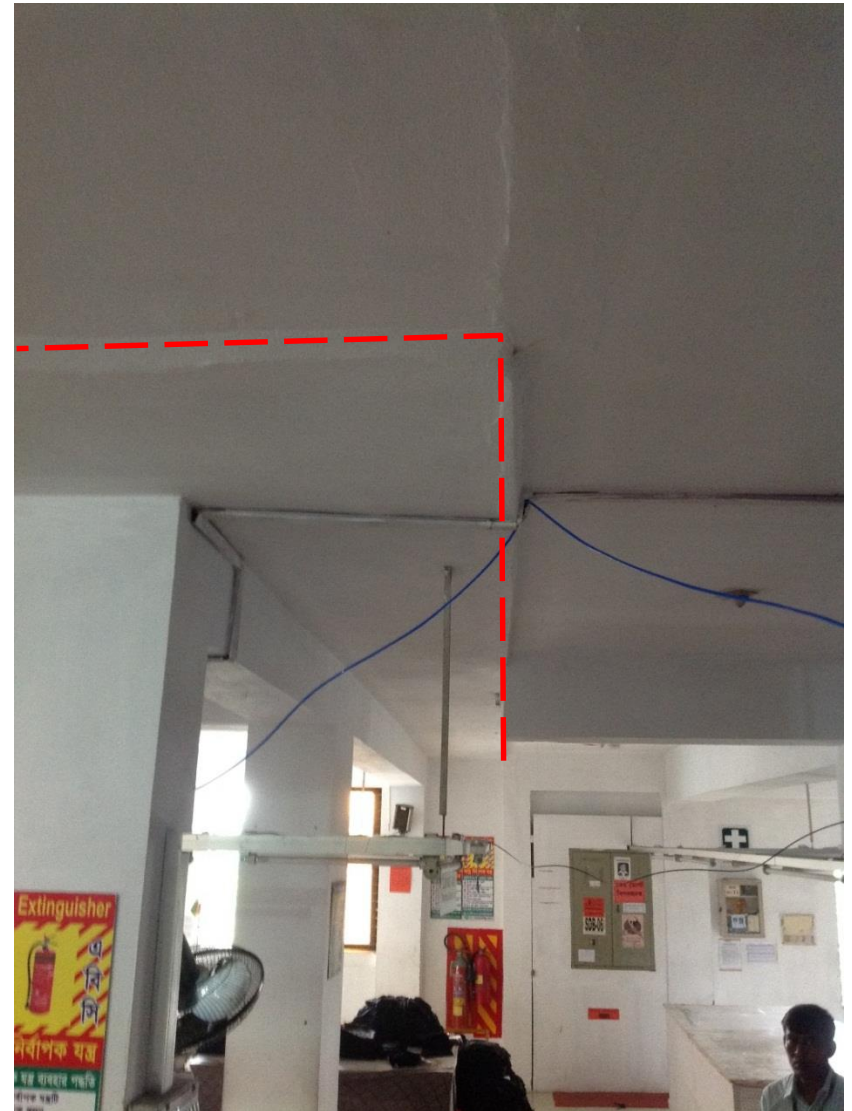


Factory 1 and 2 appear to have been built with no expansion joint. At 6th and 7th floors, Factory 2 is built across the connection line between the 2 buildings below

Observations



Internally the joint has been plastered over at all floors between two factory buildings



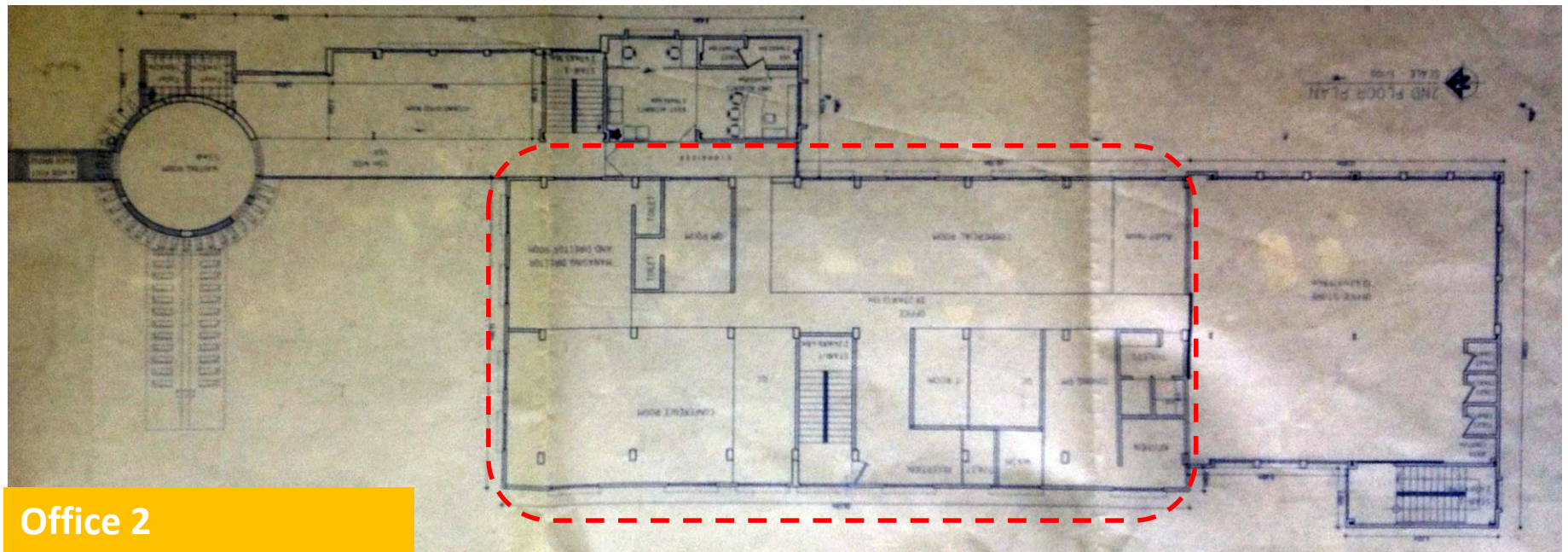
Observations

Office 2

**Columns appear to be stressed to levels
that require review**

Observations

Preliminary calculations suggest that all columns are stressed to levels that require further review in Office 2

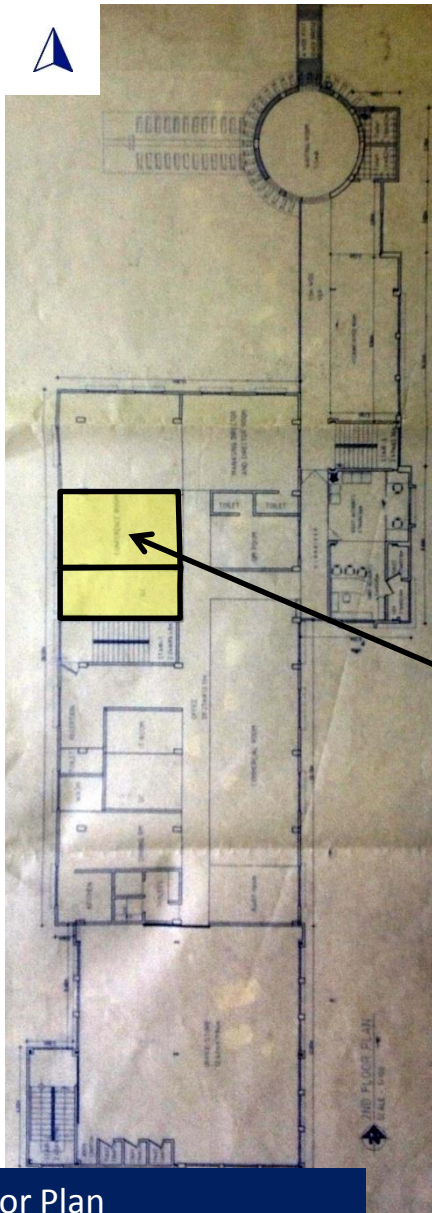


Office 2

Observations

Uncontrolled Storage Loads in Office 2

Observations



Floor Plan



2m high bags of fabric off-cuts =
3.6kPa approx.



Observations

Deficiencies observed to steelwork connections in the Office buildings

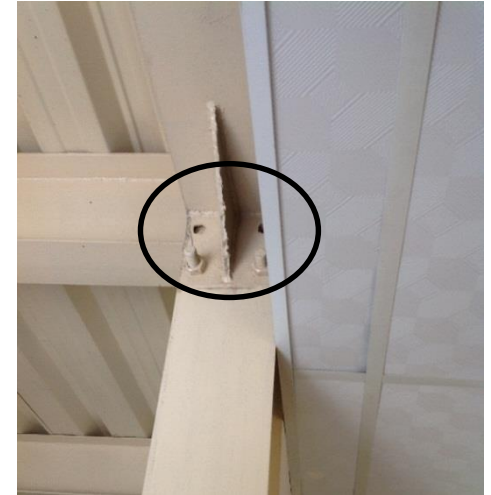
Observations

Beam web has been cut back before it reaches the supporting RC wall

Steel-concrete connections in Office 3
(1st Floor slab, near entrance)

Steel-concrete connection detail unknown – reportedly the concrete was broken out locally and rebar exposed, with end plate welded direct to rebar

Missing bolts observed in Office 3



Observations



Steel deck roof to Office 2 appears inadequately tied down to the main structure

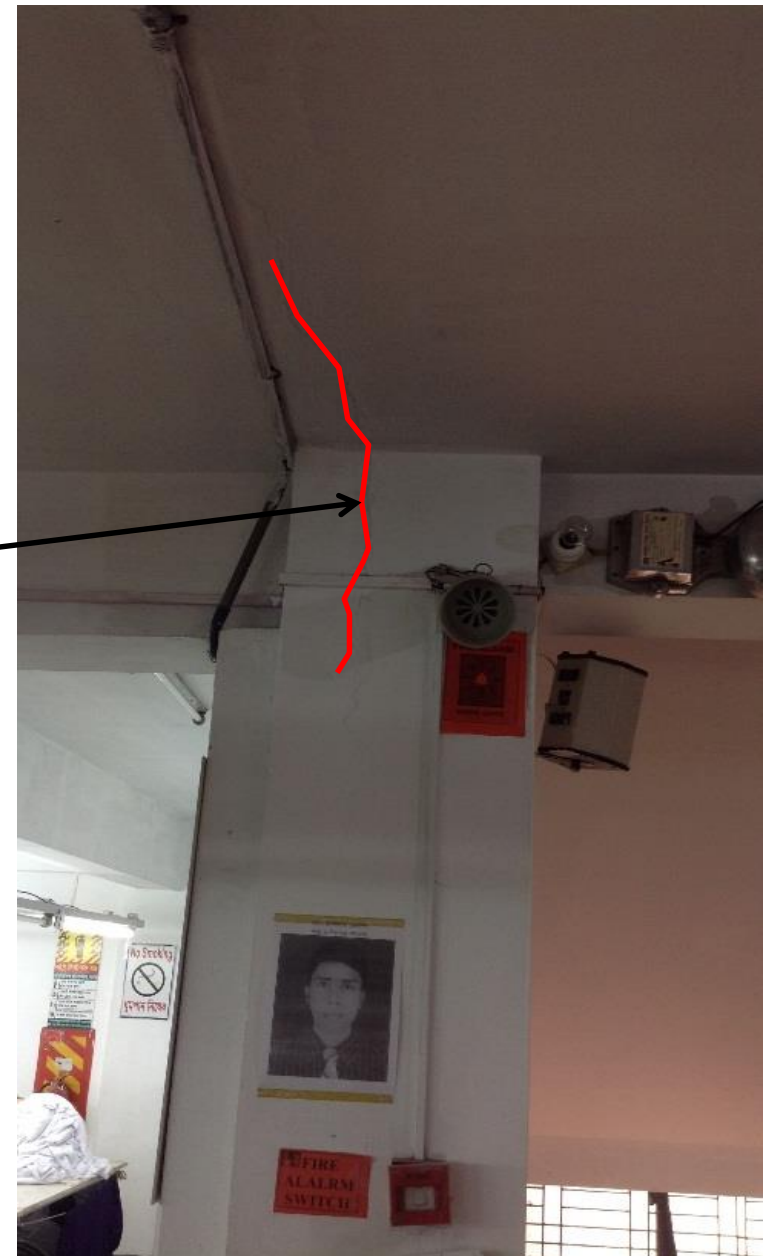
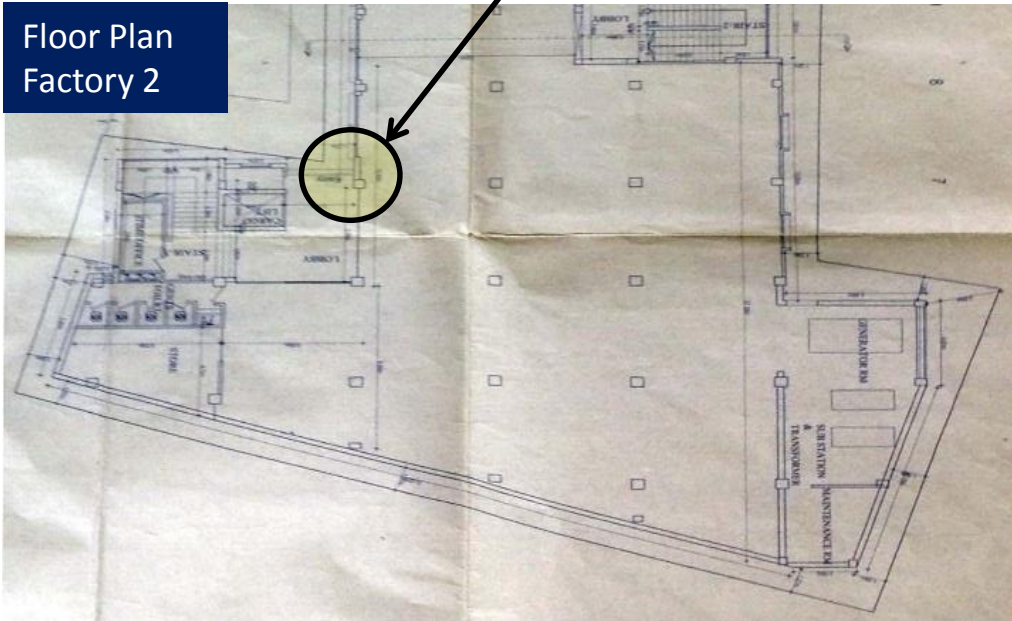
Observations

Cracks to internal RC columns Factory 2 and Office 2

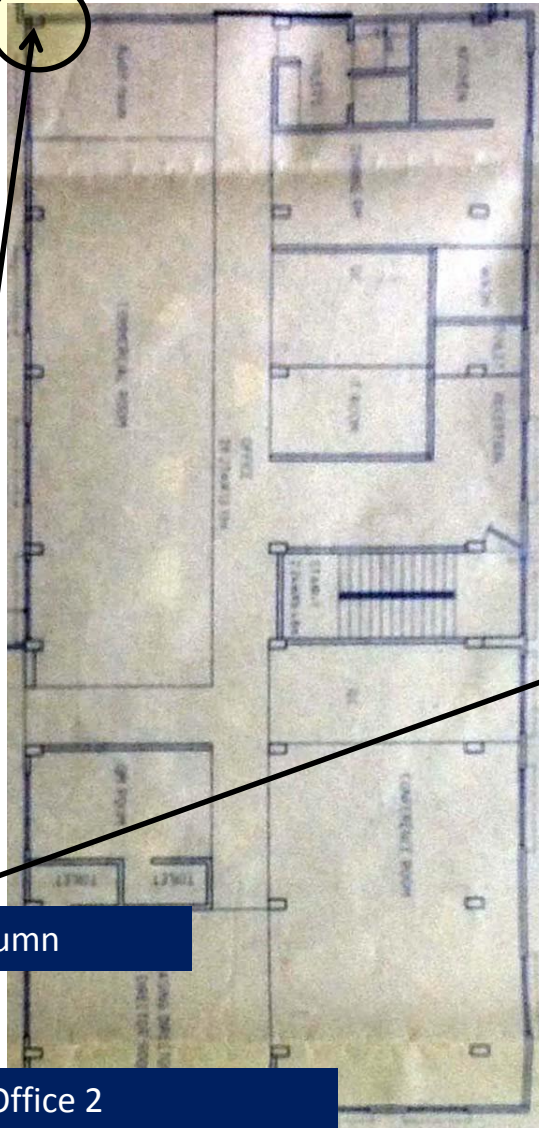
Observations

Crack in the column under the beam requires review

Floor Plan
Factory 2

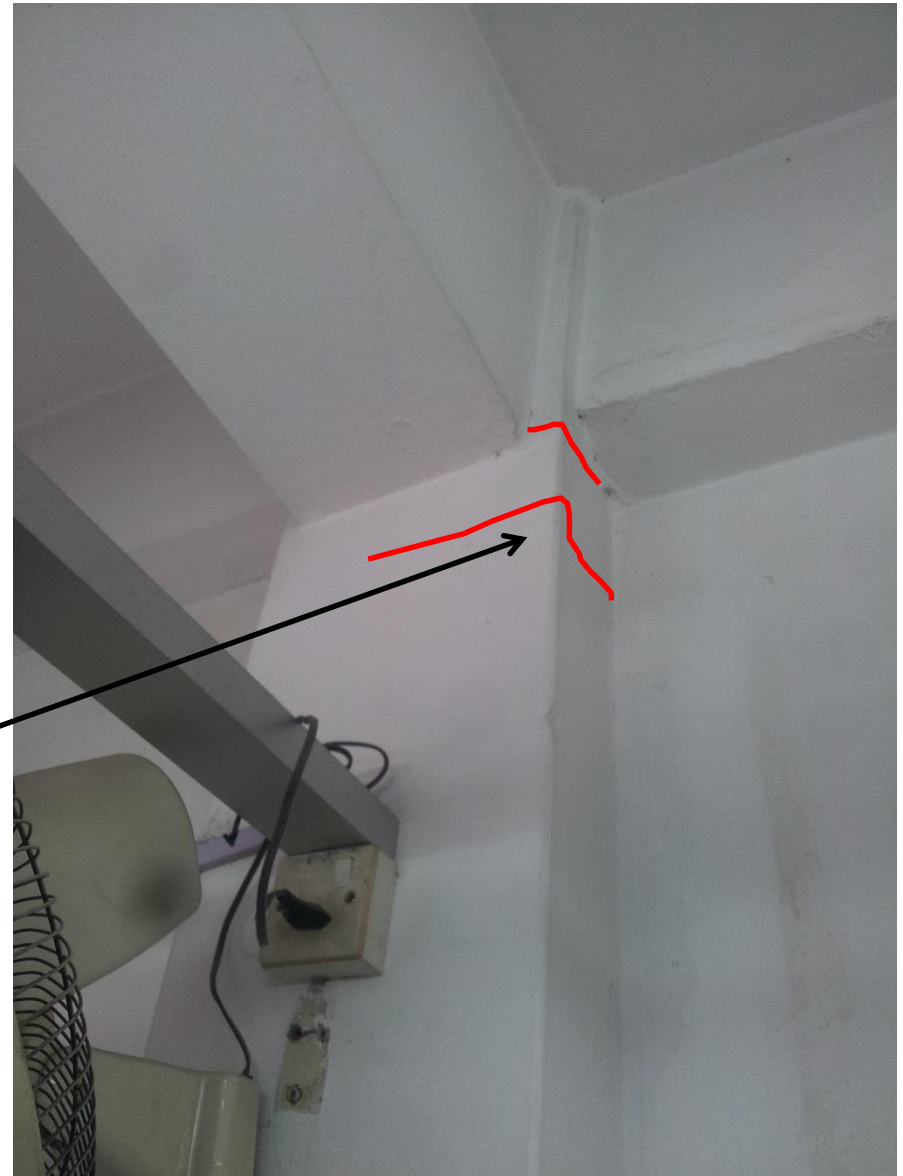


Observations



Crack in the corner column

Floor Plan – Office 2



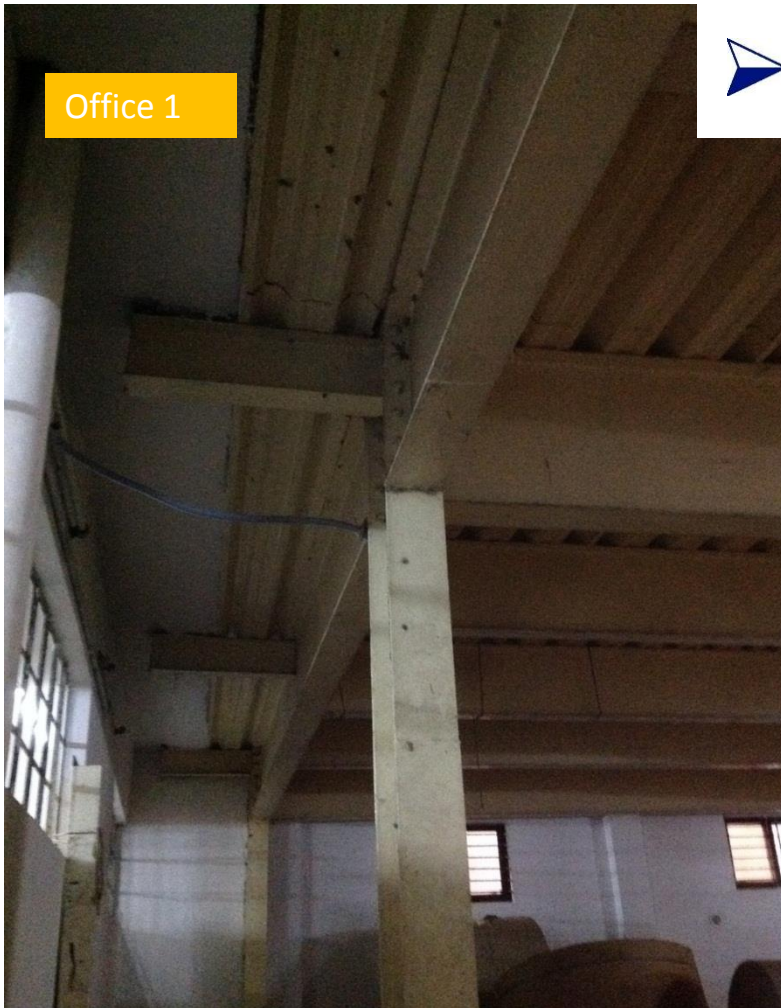
Observations

**No distinct lateral stability system in
Office 1 and Office 3**

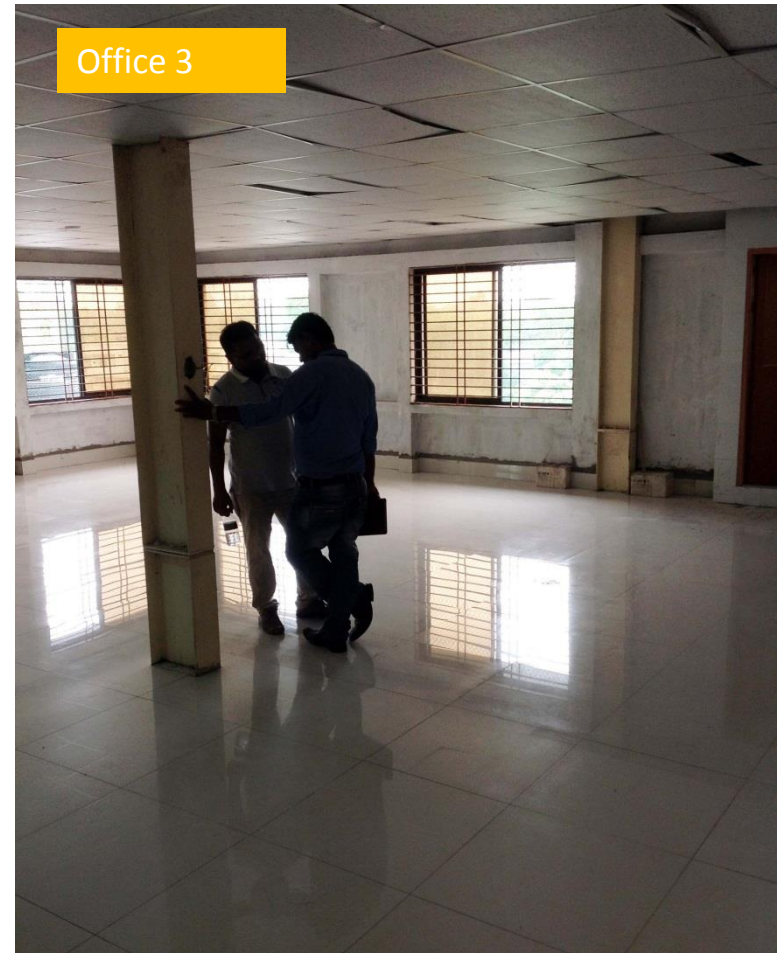
Observations



Office 1



No vertical bracing was found in Office 1 steel structure. Composite decks assumed to act as diaphragms but connectivity to beams is unknown



Office 3

Simple connections and slender (minor axis) columns suggests the building is not a moment frame. Large window openings in perimeter walls

Priority Actions

Problems Observed

- ITEM 1:** Factory 1 Columns appear to be stressed to levels that require immediate review
- ITEM 2:** Cantilever section of Factory 1 not indicated on permit drawings
- ITEM 3:** Flat slab to 5th floor of Factory 1
- ITEM 4:** Movement joint between Factory 1 and Factory 2 buildings is stitched across
- ITEM 5:** Office 2 Columns appear to be stressed to levels that require review
- ITEM 6:** Uncontrolled Storage Loads in Office 2
- ITEM 7:** Deficiencies observed to steelwork connections in the Office buildings
- ITEM 8:** Cracks to internal RC columns Factory 2 and Office 2
- ITEM 9:** No distinct lateral stability system in Office 1 and Office 3

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	Existing loading intensity on all floors is to be maintained or reduced.	Immediate - Now
2	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	Factory Engineer to review design, loads and column stresses for all columns.	Immediate - Now
3	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	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
4	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	Verify existing reinforcement (steel grade, bar diameter and spacing) in columns.	Immediate - Now
5	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	A Detailed Engineering Assessment of factory to be commenced, see attached scope	Immediate - Now

Item No.	Observation	Recommended Action Plan	Recommended Timeline
6	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	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
7	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	Detailed Engineering Assessment to be completed.	6-weeks
8	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	Make structural alterations if required as advised by Engineer	6-months
9	Factory 1 Columns appear to be stressed to levels that require immediate review Cantilever section of Factory 1 not indicated on permit drawings	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. 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 No.	Observation	Recommended Action Plan	Recommended Timeline
10	Flat slab to 5th floor of Factory 1 Calculations indicate high punching shear stresses in suspended slab	A Detail Engineering Assessment of the building to be commenced, see attached Scope	Immediate - Now
11	Flat slab to 5th floor of Factory 1 Calculations indicate high punching shear stresses in suspended slab	Factory Engineer to review design, loads and punching shear stresses in slab.	6-weeks
12	Flat slab to 5th floor of Factory 1 Calculations indicate high punching shear stresses in suspended slab	Verify insitu concrete strengths (using minimum of 4 No. 100mm dia. cores taken from slabs). Verify existing reinforcement (steel grade, bar diameter and spacing) in slabs.	6-weeks
13	Flat slab to 5th floor of Factory 1 Calculations indicate high punching shear stresses in suspended slab	Detailed Engineering Assessment to be completed.	6-weeks
14	Flat slab to 5th floor of Factory 1 Calculations indicate high punching shear stresses in suspended slab	Continue to implement load management plan	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
15	Movement joint between Factory 1 and Factory 2 buildings is stitched across	Factory Engineer to assess the connectivity of Factory 1 and Factory 2 and the impact on their stability systems	6-weeks
16	Movement joint between Factory 1 and Factory 2 buildings is stitched across	Carry out ant structural alterations and waterproofing repairs as advised by the Structural Engineer.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Building Engineer to review design, loads and stresses in all columns.	6-weeks
18	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Building Engineer to verify insitu concrete strength by taking 100mm diameter cores from 4 columns.	6-weeks
19	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Building Engineer to verify grade of steel reinforcement and no. and diameter of main column bars.	6-weeks
20	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity	6-weeks
21	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Continue to implement load plan	6-months
22	Office 2 Columns appear to be stressed to levels that require review Uncontrolled Storage Loads in Office 2	Make structural alterations if required as advised by Engineer.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
23	Deficiencies observed to steelwork connections in the Office buildings	Building Engineer to inspect the steel connections and advise on any necessary remedial actions.	6-months
24	Cracks to internal RC columns Factory 2 and Office 2	Sections of plaster finish to columns to be removed to investigate if cracks penetrate the building structure.	6-weeks
25	Cracks to internal RC columns Factory 2 and Office 2	Building Engineer to review design of elements to confirm if cracks are structural	6-months
26	Cracks to internal RC columns Factory 2 and Office 2	Cracks in structural members to be repaired as necessary	6-months
27	No apparent distinct lateral stability system in Office 1 and Office 3	Structural Engineer to carry out a full stability analysis of the Office buildings	6-months
28	No apparent distinct lateral stability system in Office 1 and Office 3	Any retrofitting or strengthening to be carried out as directed by the Structural Engineer.	6-months