

Active Composite Mills Ltd.

Dewan Idris Road, Zirabo, Ashulia, Savar.

(23.912511N, 90.308666E)

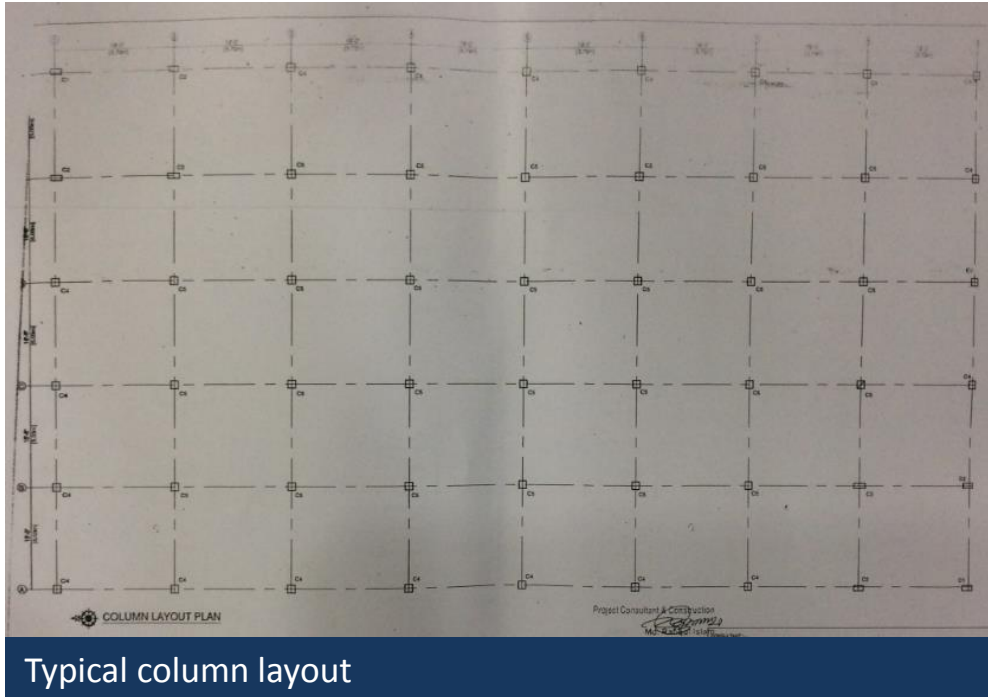
21st June 2014



Observations

Columns in factory building appear to be stressed in excess of normal design limits

Cursory calculations indicate that columns are highly stressed



Building Engineer is to perform detailed calculations (including preparation of a Detail Engineering Assessment) and concrete tests to prove column size and if required:

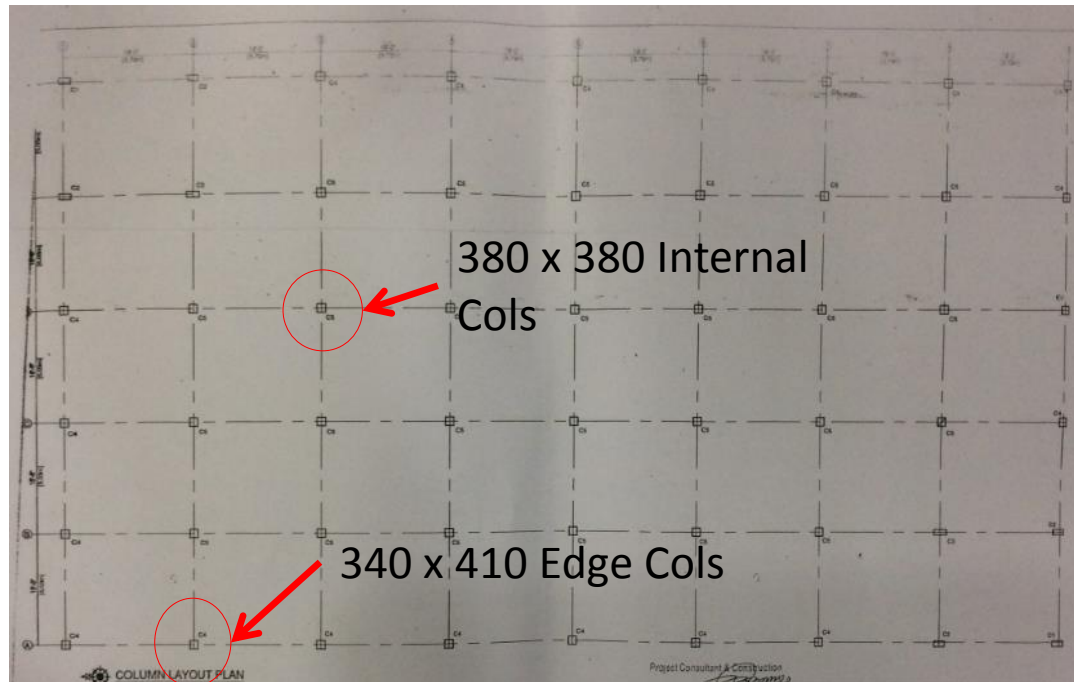
- Reduce loads by vacating floors
- Reinforce columns



Tested ground floor column –
Brick aggregate confirmed

High punching shear stresses in suspended slabs in factory building

Cursory calculations indicate high punching shear stresses in the suspended slabs



Typical column layout

Building Engineer to perform detailed calculations and concrete tests to prove punching capacity of floor slabs and, if required:

- Reduce load on slabs
- Reinforce shear capacity of slabs

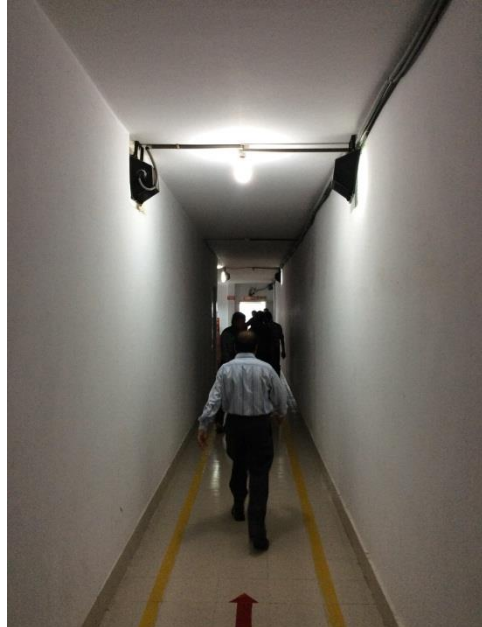
Observations

Localised areas of high loading on suspended slabs

Localised areas of high loading on suspended slabs



Toilet build-up on suspended slabs



5th Floor Brick partition walls on suspended slab



5th Floor Material storage – Load height limits indicated on columns are not based on calculations

Localised areas of high loadings were observed in all floors. A load management plan was in place, but no calculations were carried out to justify the applied loads.

Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to floor capacity and column capacity.

Observations

Cracking and evidence of repairs to structural elements

Cracking and evidence of repairs to structural elements



Cracking observed around column heads and along column strips



Cracking and water ingress in the soffit of the 6th floor slab



Cracks in façade on 4th floor

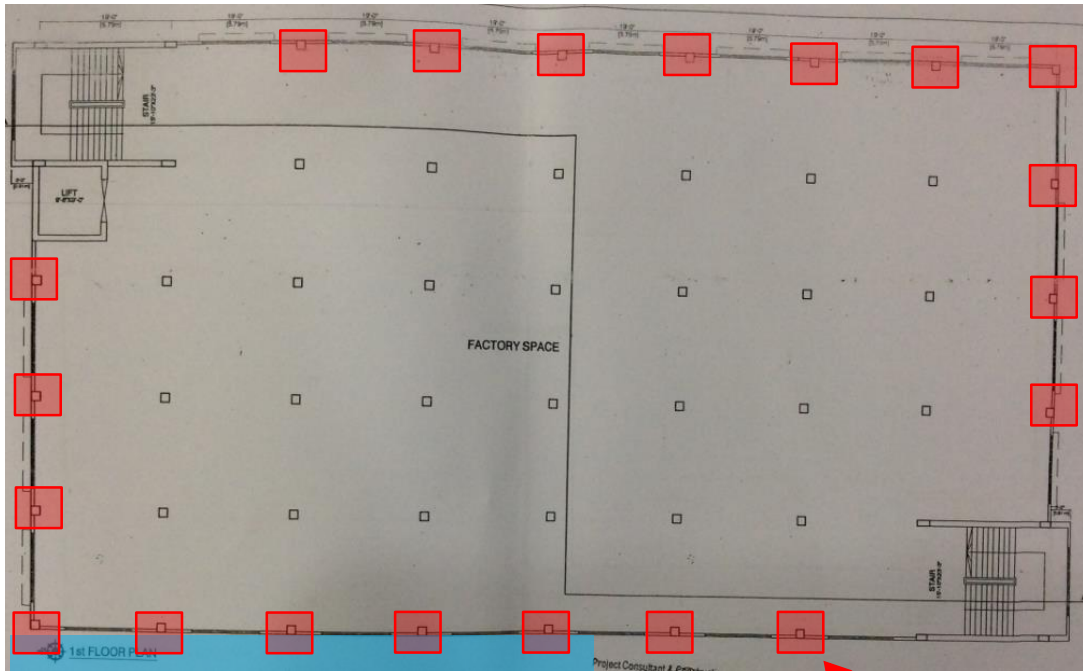


Repairs to soffit of 3rd floor slab

Observations

Structural drawings not consistent with the as-constructed arrangement of the factory

Structural drawings not consistent with the as-constructed arrangement of the factory



Cantilever on 1st floor not shown on drawing

Constructed perimeter columns smaller than indicated on the structural drawings. Building engineer to survey and update drawings as required.

- The 6th floor has not been constructed in the manner indicated on the drawings.
- Internal building layouts where indicated do not match the as-constructed building layout

Observations

Priority Actions

Problems Observed

1. Columns in factory building appear to be stressed in excess of normal design limits
2. High punching shear stresses in suspended slabs in factory building
3. Localised areas of high loading on suspended slabs
4. Cracking and evidence of repairs to structural elements
5. Structural drawings not consistent with the as-constructed arrangement of the factory

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Factory Engineer to review design, loads and column stresses.	Immediate - Now
2	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for or 100mm dia. cores from 4 columns.	Immediate - Now
3	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Verify existing reinforcement in columns.	Immediate - Now
4	Cursory calculations for the Main Factory Building indicate columns are highly stressed	A Detail Engineering Assessment of Main Factory to be commenced, see attached Scope.	Immediate - Now
5	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	6-weeks
6	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Detail Engineering Assessment to be completed	6-weeks
7	Cursory calculations for the Main Factory Building indicate columns are highly stressed	Continue to implement load management 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
8	Cursory calculations indicate high punching shear stress in suspended slabs of Main Factory Building	As part of Detail Engineering Assessment (see Item 1), Factory Engineer to review design, loads and punching stresses in slabs	Immediate - Now
9	Cursory calculations indicate high punching shear stress in suspended slabs of Main Factory Building	Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for or 100mm dia. cores from 4 different areas on each slab, remote from columns.	Immediate - Now
10	Cursory calculations indicate high punching shear stress in suspended slabs of Main Factory Building	Results of flat slab review to be input to Loading Plan.	6-weeks
11	Cursory calculations indicate high punching shear stress in suspended slabs of Main Factory Building	Continue to implement load management plan	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Localised areas of high loading on suspended slabs	Apply loading plan to all areas of the factory.	6-weeks
13	Localised areas of high loading on suspended slabs	Continue to implement load management plan	6-months
14	Cracking and evidence of repairs to structural elements	As part of Detail Engineering Assessment (see Item 1), Building Engineer to investigate the cracking on the soffit of the 6th floor where water was observed to be penetrating the slab.	6-weeks
15	Cracking and evidence of repairs to structural elements	The cause of the cracking should be identified and remediated as required, including corrosion protection to the reinforcement.	6-weeks
16	Cracking and evidence of repairs to structural elements	Building engineer to record all cracking throughout building and monitor on an on-going basis.	6-months
17	Cracking and evidence of repairs to structural elements	If further cracking occurs, Building Engineer to investigate and remediate as appropriate.	6-months
18	Structural drawings not consistent with the as-constructed arrangement of the factory	As part of Detail Engineering Assessment (see Item 1), Building Engineer to carry out survey of as-constructed building.	6-weeks
19	Structural drawings not consistent with the as-constructed arrangement of the factory	As part of Detail Engineering Assessment (see Item 1), develop full engineering as-built drawings showing structure, loading, elements, dimensions, levels, foundations and framing on Plan, Section and Elevational drawings.	6-months