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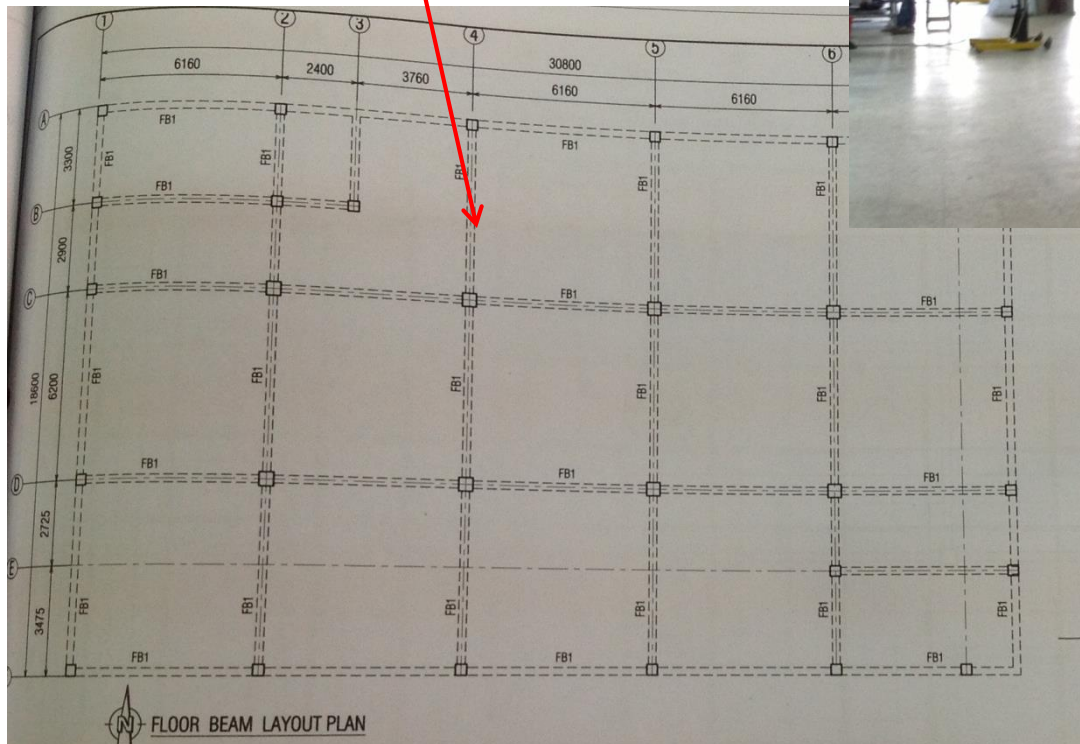
29 September 2013



Observations

Structural drawings do not match as-built Building #1

As-builts indicate beam and slab construction with 500x500 internal columns



Structure is flat slab with column heads on 450x450 cols

Flexural cracking observed in slab soffits in Building #1 and Building #3

Crack on underside of slab



**Check for design code loading and
justify/reduce allowable loads**

Check on roof tie-downs in Building #3



Lightweight steel roof

Steel roof truss

**Steel truss connection to
column to be verified**

**Check adequacy of roof
tie-down**

Limit density of loading in Building #1 suspended levels



**Material stacked to
2m on Level 2**

**Plan and height
restrictions to be
introduced to
prevent future
overloading.**

**Check on roof structure to Building #2 with
Water Tank partially on cantilever**



**Water tanks mounted
on concrete plinths**

**Engineer to check that
beam and cantilever
slab have been
designed to
accommodate loads.**

Water causing damage to building exteriors



**Building 1 unmanaged
roof drainage causing
damage to façade and
structure**

**Water causing damage
to building facade**



**Building 4 roof water not
draining and possibly
causing corrosion to
structure**

**Water possibly causing
damage and corrosion**

Uncontrolled debris from demolition of concrete structure at roof of Building #1



**No debris protection for
Building 1 roof demolition**

**No debris protection for
structure and adjacent street**

Priority Actions

Problems Observed

1. Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2
2. Flexural cracking observed to soffit of slabs in Building #3 and Building #1
3. Lightweight steel roof to Building #3 to be adequately tied down for severe wind events
4. Limit density of loading in Building #1 suspended levels
5. Water tank located on Building #2 partially on cantilever
6. Water causing damage to building exterior
7. Uncontrolled debris from demolition of concrete structure at roof of Building #1

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Building #1 not to be used for storage / empty central storage area on 2nd floor.	Immediate - Now
2	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Factory Engineer to review design, loads and columns stresses in area identified above.	Immediate - Now
3	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Verify insitu concrete stresses either by cores or existing cylinder strength data for cores from at least 4 columns in each building	Immediate - Now

Item No.	Observation	Recommended Action Plan	Recommended Timeline
4	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	A Detail Engineering Assessment of Factory Building #1 and #2 to be commenced	Immediate - Now
5	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Complete Detail Engineering Assessment for Building #1 and #2	6-weeks
6	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Factory Engineer to review design, loads and columns stresses in Building #2	6-weeks

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 Elevation 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
7	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 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
8	Verify in-situ concrete strengths and compare with design stress in columns (internal columns in Building #1 & #2 initially and then elsewhere). Remove all storage loads in Building#1 at Level 2	Implement load management plan	6-Months
9	Flexural cracking observed in slab soffits in Building #1 and Building #3	Building Engineer to check design for code loading and justify/reduce allowable load as necessary	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
10	Lightweight steel roof to Building #3 to be adequately tied down for severe wind events	Addition structures should be Designed and upgraded to support code vertical and wind loads by the building Engineer, or they should be vacated and removed.	6-Months
11	Materials stacked in densely spaced piles within Building #1	Building Engineer to create controlled loading plans for all floors in all Buildings designating where storage can be placed and can not be placed.	6-Months
12	Water tank located on Building #2 partially on cantilever	Verify that beam/slab has sufficient capacity to support fully filled water tank plus concrete plinth	6-Months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
13	Water causing damage to building exterior	Engineer to inspect water damaged exterior and propose a suitable repair.	6-Months
14	Uncontrolled debris from demolition of concrete structure at roof of Building #1	Ensure safety net/ crash decks in place prior to demolition continuing	6-weeks
15	Uncontrolled debris from demolition of concrete structure at roof of Building #1	Continue to carry out demolition works in safe manner	6-weeks