Viyallatex Ltd.

297 Khairtul, Tongi, Gazipur, Bangladesh
(23.921026N,90.387509E)

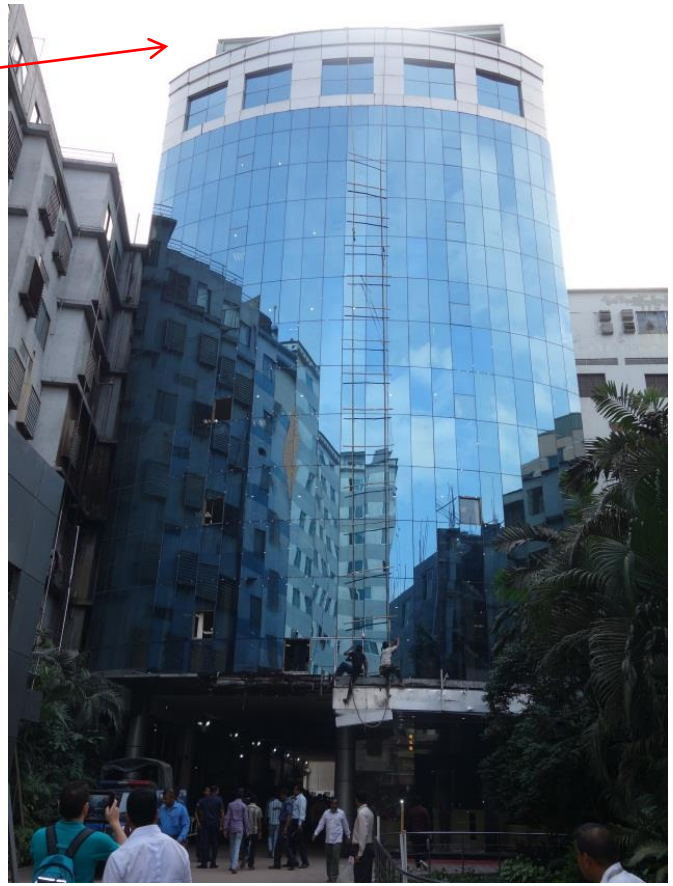
7 December 2013

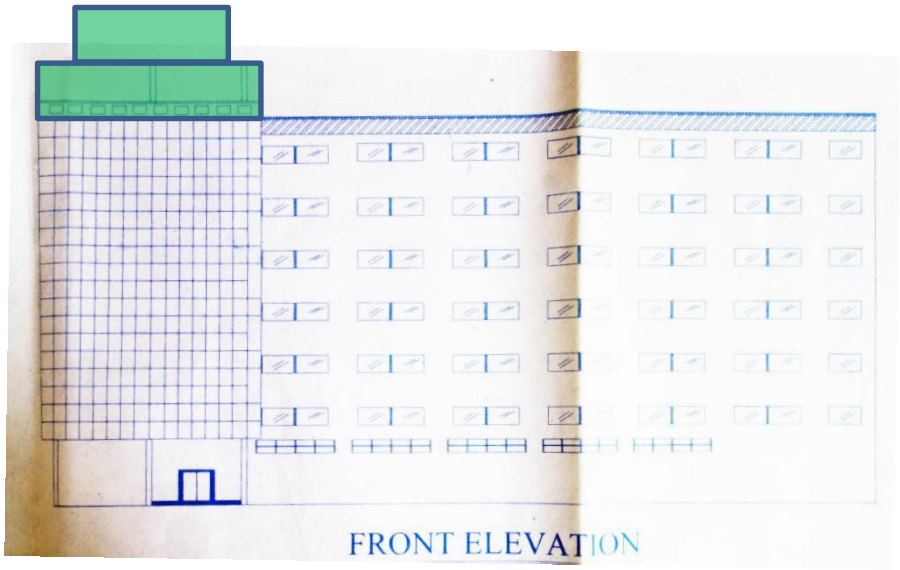
ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

No Permit documentation for 8 storeys + helipad





Permit drawings show a 7 storied building.
2 additional floors have been built (extension occupies 10% roof area)
The jacketed columns are not below this area

Additional storey

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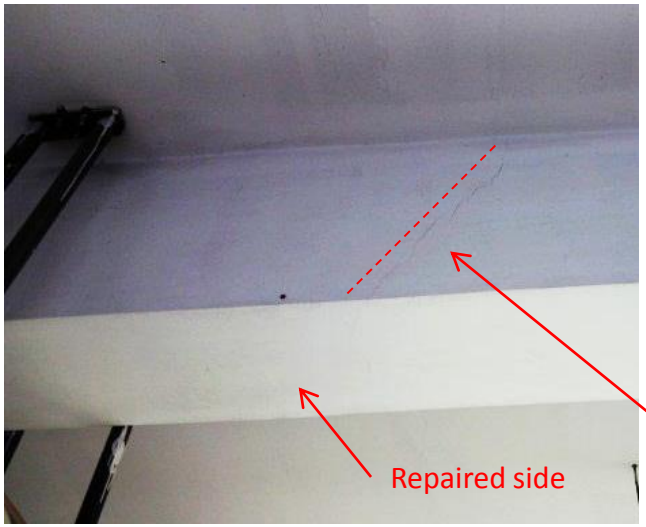
Cracking on beam and slabs in Unit 1



Some cracks on beams detected. General repair and painting on cracks made recently.
Most beams with new plaster on bottom side.

Factory has certificates indicating crack are in plaster not in concrete. Many of the cracks appear to be shrinkage related - others not.
Building Engineer to ensure inclined cracks on beams are only in the plaster

Cracking in beams and slabs

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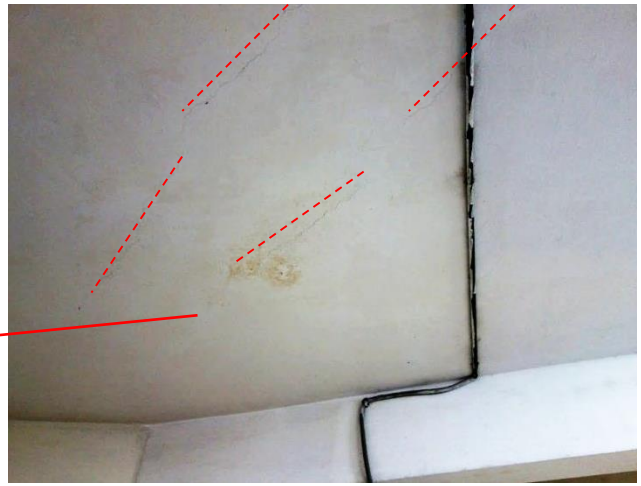
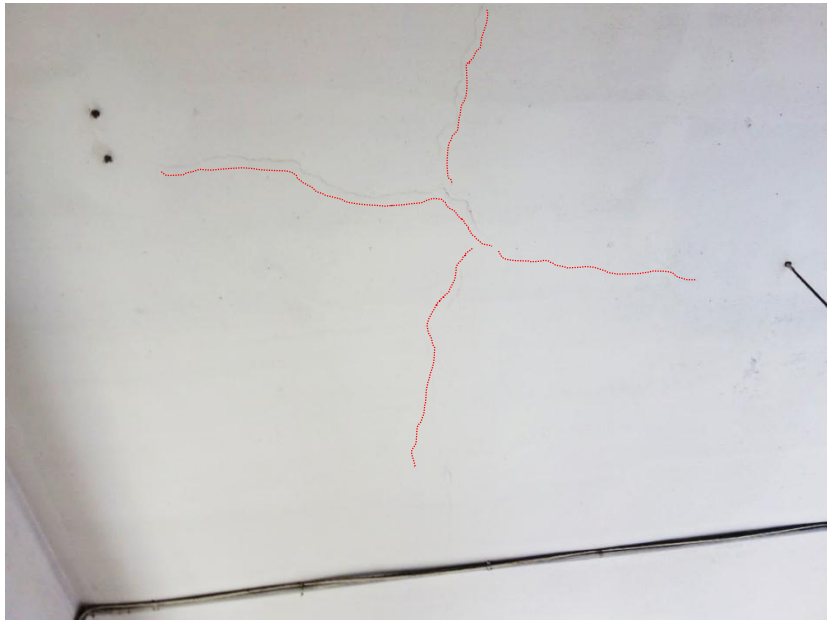


Moisture indicates cracking is not only in plaster. Water comes from upper floor

Building Engineer to check cracks in slabs and define a repair system if required



Cracking in beams and slabs

Roof stability system without vertical bracing

Knitting shed and Dyeing sheds have no vertical bracing system. Bracing system on roof does not continue vertically to column base.

Stability system of these sheds are incomplete Vertical stability system in the vertical planes required

Building engineer to carry out a stability analysis and provide additional stability system

Stability system

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Non engineered structures

Lift landing structure does not appear to have been engineered
Weak weld connections and unstable slender supports
Building Engineer to check design and propose reinforcement.

Non engineered structure

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Documentation Issues

Structural drawings were not shown for sheds, Unit-1 roof and Unit-2 roof

Documentation Issues

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Structural drawings were not shown for sheds, Unit-1 roof and Unit-2 roof

Documentation Issues

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Tests carried out

Rebound test & Ferroscaner Unit 1

Rebound test & Ferroscaner Unit 2

Test carried out

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Priority Actions

Problems Observed

ITEM 1: Concrete strength in Unit-1 columns
ITEM 2: Concrete strength in Unit-2 columns
ITEM 3: Additional 2 levels above office area in Unit-1 are not on the permit drawings
ITEM 4: Cracking in beam and slabs
ITEM 5: Horizontal stability of steel frames for sheds
ITEM 6: Non engineered structures in landing for cargo lift in unit-2
ITEM 7: Documentation issues

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	Maintain current use of the floors and don´t change use or increase occupation, either of which could increase loading. Ensure no floor has more than 2kN/m2 live load (Occupancy or storage)	**Immediate - Now**
2	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	Factory Engineer to review design, loads and columns stresses in area identified in full report.	**Immediate - Now**
3	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	Verify insitu concrete stresses either by cores or existing cylinder strength data for cores from 4 columns.	**Immediate - Now**
4	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	A Detail Engineering Assessment of Unit 1 to be commenced, see attached Scope.	**Immediate - Now**
5	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	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	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	Detail Engineering Assessment for Unit 1 to be completed.	**6-weeks**
7	Verify concrete strengths in internal columns from ground floor to 3rd floor in Unit-1	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	Verify concrete strengths in internal columns of ground floor in Unit-2	Factory Engineer to review design, loads and columns stresses in area identified in full report.	**6-weeks**
9	Verify concrete strengths in internal columns of ground floor in Unit-2	Verify insitu concrete stresses either by cores or existing cylinder strength data for cores from 4 columns.	**6-weeks**
10	Verify concrete strengths in internal columns of ground floor in Unit-2	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-months**
11	Additional 2 levels above office area in Unit-1 are not on the permit drawings	Provide as built drawings and design justification for additional structures. A building permit should be obtained.	**6-months**
12	Cracking on beam and slabs: Beam at level 5 Roof flat slab bottom side at levels 4, 3 and 2	Monitor cracks on slab. Conduct regular inspection of cracks. Investigate if cracks are only in the plastering.	**6-months**
13	Cracking on beam and slabs: Beam at level 5 Roof flat slab bottom side at levels 4, 3 and 2	If cracks grow larger, removing all items above the slab and close working areas below the affected areas . Engage an engineer to investigate, repair and strengthen the slab.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
14	Horizontal stability of steel frames for sheds	Building engineer to carry out a stability analysis and provide additional stability system	**6-months**
15	Non engineered structure in landing for cargo lift in Unit-2	Building engineer to check the structures and propose additional reinforcements and stability system if it is required	**6-months**
16	Documentation issues Steel structures design were not shown for sheds and steel roofs for both concrete buildings Unit-1 and Unit-2	Building engineer to collect information and complete documentation	**6-months**