4A Yarn Dyeing Ltd.

Kaichabari, Savar, Dhaka-1340, Bangladesh
(23.945831, 90.261923)

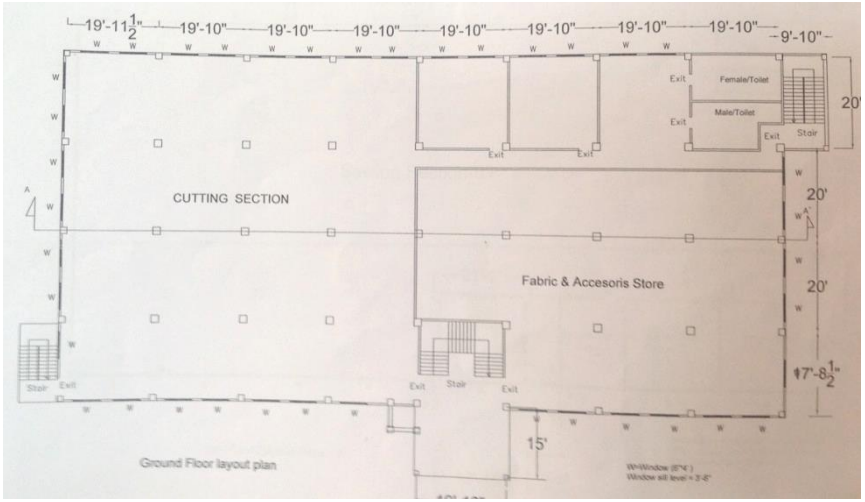
25 March 2014

ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

Highly stressed columns



Typical Column Layout

Outline calculations indicate that the working stresses of columns are at a high level.

Building Engineer to check that columns have been designed to accommodate applied loads including roof extension and heavy finishes.

Brick aggregate observed.

Tested column at lower floors - Brick aggregate observed.

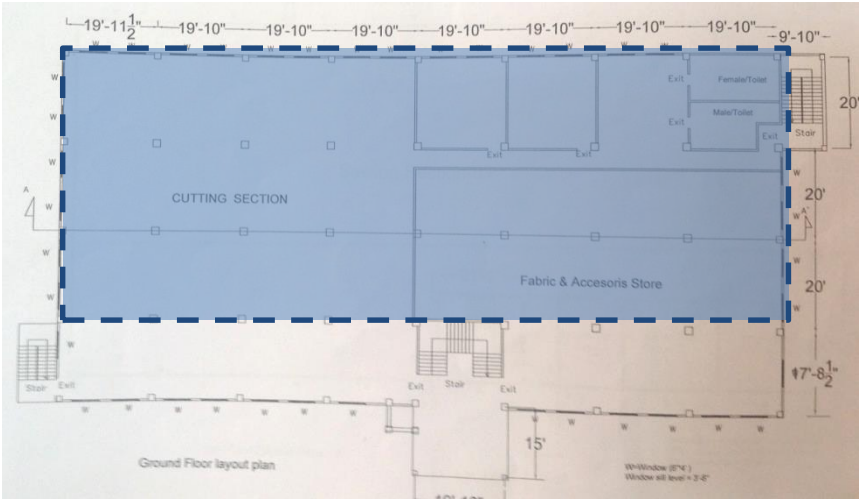
Highly Stress Columns

Vertical Extension

Vertical extension on roof, comprising brick masonry walls with a lightweight steel trussed roof on Building 1. No evidence of horizontal bracing.

No structural or design documentation provided for extension. Subject to uplifting forces.

Evidence of previous storage at roof level.



Check required on roof additions

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Localised areas of high loading

Typical toilet block.

Increased floor build-up in toilet block areas (~150-200mm in cubicles).

Partition walls around block and between additional cubicles

Additional approx. 100mm thick concrete ceiling above toilet blocks.

Water tank storage at roof level

Tank storage

Local areas of high loading

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Empty storage at roof level

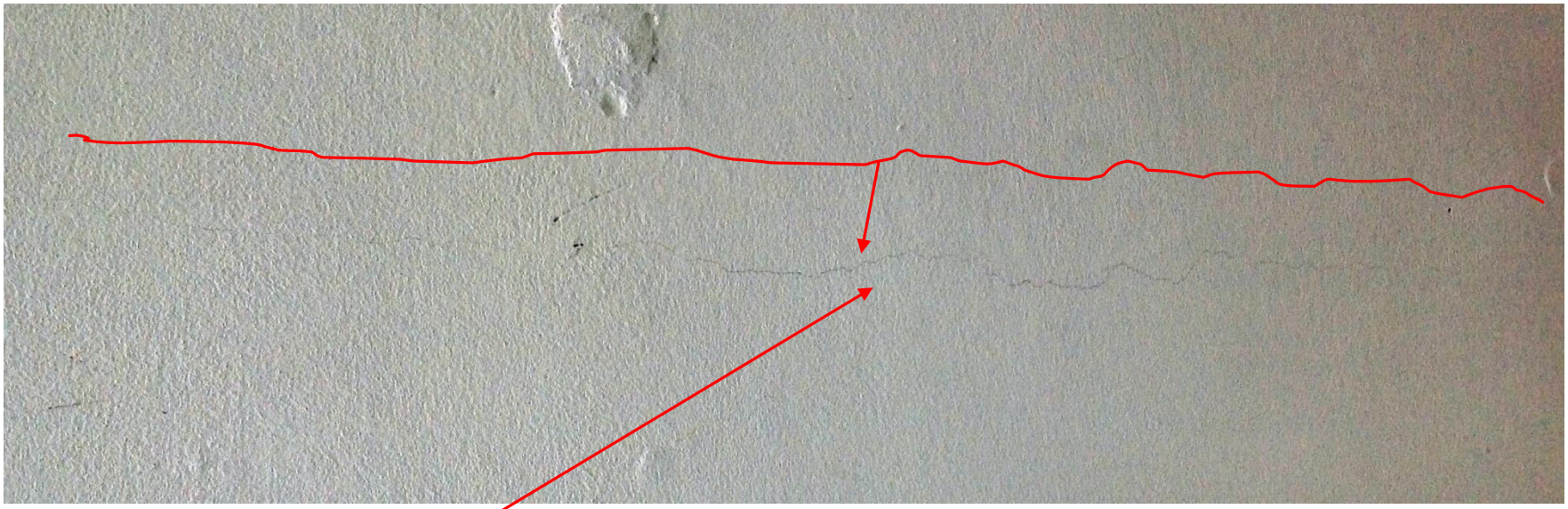
Empty storage area observed at roof level.

Full height brick partitions supported directly on flat slab structure in a number of locations.

Full height partition supported from regular flat slab structure.

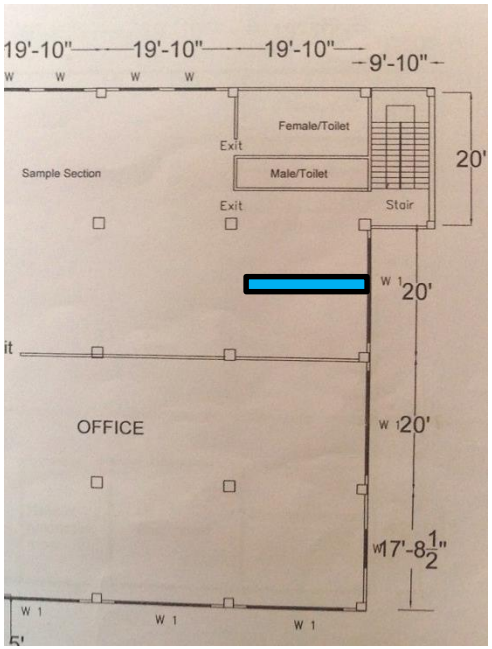
Local areas of high loading.

Cracking in slab below full-height partition



Crack on surface of slab soffit observed at level 1 directly below line of full height brick partition in level 2.

Factory engineer to check adequacy of flat slab structure for as-built brick partitions.



Location of partition wall at level 2 and crack in slab below

Crack in soffit of slab below full-height partition

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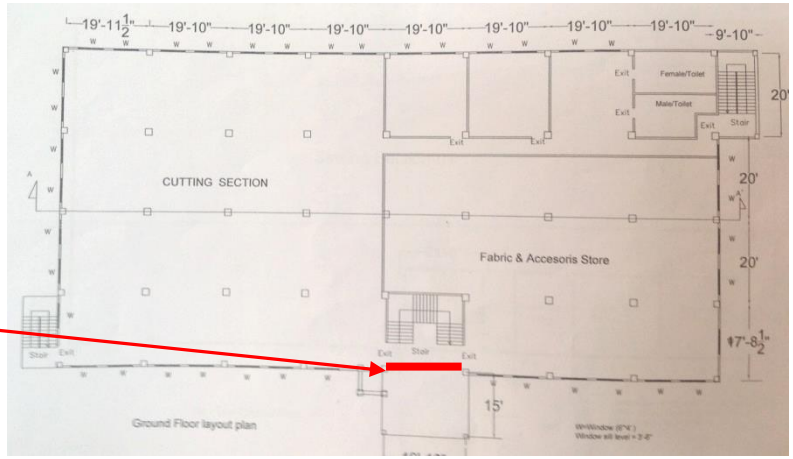
Unrestrained parapet at roof level



Location of parapet adjacent to water tank storage.

Roof parapet in the water tank storage area observed to be unrestrained and out of plumb.

Unrestrained parapet at roof level

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Undocumented single storey industrial and utility buildings

No roof bracing observed in single storey industrial building. Cantilevering perimeter walls are the only evident stability structure.

Priority Actions

Problems Observed

1. Highly stressed columns
2. Undocumented vertical extensions
3. Cracking in slab below full-height partition
4. Localised areas of high loading in all buildings
5. Unrestrained parapet at roof level
6. Undocumented single storey industrial and utility buildings

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Highly stressed columns	Factory Engineer to review design, loads and columns stresses including any additional loading as documented in the observations chapter.	**6-weeks**
2	Highly stressed columns	Verify insitu concrete stresses either by 100mm diameter cores or existing cylinder strength data for cores from minimum 4 columns.	**6-weeks**
3	Highly stressed columns	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-months**
4	Undocumented vertical extensions	The Building Engineer should check the load plans and confirm that the main building structure is capable of safely supporting the additional loading on the structure from the roof extension.	**6-weeks**
5	Undocumented vertical extensions	Building Engineer to provide detailed calculations for the temporary rooftop structures and the associated light steel roofs. These should confirm their ability to withstand all wind loading pressure, suctions and uplift forces.	**6-months**
6	Undocumented vertical extensions	Building engineer to check, collect information and produce accurate and complete as-built documentation.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
7	Cracking in slab below full-height partition	Flat slab capacity to be assessed for additional loading due to brick partitions, and extent of cracking within slab depth to be investigated.	**6-weeks**
8	Cracking in slab below full-height partition	Remove partitions if required by design check	**6-months**
9	Cracking in slab below full-height partition	Repair slab if required following investigation of crack	**6-months**
10	Cracking in slab below full-height partition	Design check of building required prior to installing any new brick partition walls.	**6-months**
11	Localised areas of high loading in all buildings	Extent of build-up loading in toilet and wash areas to be surveyed and weight of water tanks on roof to be assessed. The capacity of floor & roof slabs to be assessed to confirm that the structure is designed to carry these loads.	**6-weeks**
12	Localised areas of high loading in all buildings	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. Loading plans to be put on each factory floor.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
13	Unrestrained parapet at roof level	Building engineer to assess stability of the roof partitions.	**6-weeks**
14	Unrestrained parapet at roof level	Repairs to be carried out as required by engineering assessment.	**6-months**
15	Undocumented single storey industrial and utility buildings	Building Engineer to verify that building has an appropriate lateral stability system and submit relevant design document	**6-weeks**
16	Undocumented single storey industrial and utility buildings	Carry out remedial work if required.	**6-months**
17	Undocumented single storey industrial and utility buildings	Building engineer to assess single storey utility building and confirm its ability to withstand all wind loading pressure, suctions and uplift forces	**6-months**