

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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Name of the Factory	: RUMANA FASHION LTD.
Address of the Factory	: Chaydana, National University, Gazipur
Dhaka Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 23 April, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 29 April, 2014

**Basic Information:** The present garment factory is a commercial building with beam-column frame system. The following general information was noted:

i.	Building Usage Type	: Garment factory
ii.	Structural System	: 1st–5th floor: RC Beam and slab, Roof: RC Flat slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: Floor area is 16,665.48 sq. ft. per floor
v.	No. of Stories	: 6 storied
vi.	Construction Year	: 1996
vii.	Foundation Type	: Pad foundation
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available (Metro Geotechnical Engineers dated November 1995)
x.	Construction Materials	: Brick aggregated
xi.	Generator	: Outside of building, across compound to SE

**Recommendations for Corrective Action:** The recommendations of corrective action for both Structural and Fire & Electrical Safety are as follows:

### The recommendations for Structural Safety corrective actions are:

#### Immediate (Now):

1. Live Load to be restricted to 1.5kPa on 1st, 2nd, 3rd and 5th floors, 3.0kPa on 4th floor and 1.0 kPa on roof.
2. Building Engineer to review design, loads and column stresses in structure.
3. A Detail Engineering Assessment of the Main Building is to be commenced –see attached scope.
4. Verify insitu concrete stresses by taking 100mm diameter cores from min. 4 columns at ground floor level.
5. Verify reinforcement grade and bar diameter within columns.

#### Mid Term (Within 6 Weeks):

1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Detail Engineering Assessment to be completed.
3. Building Engineer to carry out a design check of the cantilevers to ensure structural integrity of the slabs.

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4. Building engineer to carry out a design check of the concentrated loads imposed on the main factory building from the link bridges and confirm whether the existing structure has capacity to accommodate these loads.
5. Building Engineer to carry out a design check for heavy loads associated with the water tanks at roof level, 5th floor build up, 4th floor storage areas and 4th floor fusing machine and advise on any necessary alterations taking account of floor capacity and column capacity.
6. Building Engineer to survey the structure and prepare a full set of "as-constructed" drawings as part of Detail Engineering Assessment (see Item 1).
7. Building Engineer to check the design and capacity of the lightweight steel roofs and connection details to the ancillary buildings and make any necessary alterations.

### Long Term (Within 6 Months):

1. Continue to implement loading plan.
2. Implement any actions arising from design check.
3. Monitor cracks to beams, slabs, columns and facades.
4. Building Engineer to investigate if cracks are only in the external render, internal plastering.
5. Building Engineer to advise on load reduction and repair and strengthening of the structure if required.

### **The recommendations for Fire Safety corrective actions are:**

#### Immediate (Within 1 month):

1. Remove locking features from all egress doors and gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Remove all combustibles and storage from exit stairs and egress paths.
3. Immediately reduce occupant load to not more than available exit capacity. If possible, provide additional exits in the future to increase capacity.
4. Replace all gates / sliding doors along the means of egress with side-hinged, swinging egress doors. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.

#### Short Term (Within 3 Months):

1. Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction. Where separate storage rooms may not be feasible, provide defined storage areas and limit the storage arrangement as follows:

-Maximum height of 2.4m and maximum area of 23m<sup>2</sup>

-If sprinkler protected: maximum height of 3.66m and maximum area of 93m<sup>2</sup>.

Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.

2. Separate the boiler from egress discharge path by a minimum 2-hr fire-rated construction. Seal and/or protect all openings to maintain the required fire separations.

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3. Provide minimum 1.5-hr fire rated doors and seal all unprotected openings to separate the exit stairs from work areas and other building spaces on all floor levels. Ensure that the fire doors are self-closing and positive latching and that they are provided with fire exit (panic) hardware where serving production floors. If fire doors are required to be held open for functional reasons, provide automatic closing devices tied to the fire alarm system.
4. Provide minimum aisle widths of 36-in.
5. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
6. Test the emergency lighting system on each floor and provide additional emergency fixtures to provide adequate illumination along the means of egress. Provide a minimum illumination of 10 lux at the floor level within exit stairs and exit discharge paths and minimum 2.5 lux along exit access aisles.
7. Remove manual on/off switches from emergency lighting units to prevent them from being switched off.

### Mid Term (within 6 Months):

1. Replace the single-station smoke alarms with automatic smoke detectors tied into the fire alarm system. Configure the fire alarm system to initiate occupant notification upon activation of any two smoke detectors in addition to the manual fire alarm stations, in accordance with NFPA 72.
2. Provide additional notification appliances such that the fire alarm system is audible throughout the building in accordance with NFPA 72.

### Long Term (More than 6 months):

1. Replace the fire alarm system with a new, listed addressable fire alarm system in accordance with NFPA 72.

### **The recommendations for Electrical Safety corrective actions are:**

#### Immediate (Within 1 month):

1. Cable tray must be installed under the cable.
2. The opening should be sealed with proper material.
3. Motor terminal box must be re-installed.
4. Earthing wire must be installed horizontally/vertically, not an angel , inside pipe.
5. Battery terminal cover must be installed.
6. Lint/dust inside duct must be cleaned regularly with vacuum cleaner.
7. PVC flexible pipe must be supported to avoid wire drop.
8. Remove unused materials and protect cable trench from outside.
9. Cable should be supported properly. (horizontally/vertically, not at an angel inside pipe).

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10. Earth wire must be connected with proper size of lug.
11. Clean and remove all the debris.
12. Put the rubber type(insulator) phase separator between phases.
13. Flexible conduit must be installed with proper support, either vertically or horizontally.
14. Opening must be blocked and keep the panel vermin and dust proof.

### Short Term (Within 3 Months):

1. Distribution should be cleaned and all panels must be vermin and dust proof.
2. Replace temporary shimplate to permanent steel shimplate and put the anchoring.
3. Replace the bus bar strips with long ones.
4. Breather oil cup must be filled with transformer oil to required level as instructed by the manufacturer.
5. Raised existing cable trenches in electrical room must be covered with protective covers.
6. Cables passing through permanent walls must be protected in steel pipes and remaining holes around the pipe must be sealed.
7. HT cable dropping from 11kV pole must be protected in steel pipe of required size at least 2m from the ground level to protect from physical injury by moving objects.
8. Remove the wooden frame and install brick wall.

### Mid Term (Within 6 months):

1. Cables inside electrical room should be arranged properly and supported to avoid cable stress.

### Long Term (More than 6 months):

1. Cables must be rearranged and panel back should be always closed.
2. Consult with the manufacturer (Adex) regarding temperature rising and fix.