

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

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Name of the Factory	: Tory Fashion Wear Ltd.
Address of the Factory	: Daag # 439, Dhour, Turag, Uttara, Dhaka.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 8 November, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 8 November, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 8 November, 2015
BGMEA Membership No.	: 5189

### **BASIC INFORMATION:**

The surveyed building was a 6-Storey RCC structure with a partial shed-room at south east corner at 6th floor level. The following information was noted:

- i. Building Usage Type : Knit Garment Factory.
- ii. Structural System : RCC beam column system.
- iii. Floor System : RCC Beam slab.
- iv. Floor Area : Ground floor = 3488 sft , Entire building = 25808 sft (Approx.)
- v. No. of Stories : 5 floors + GF ( 6 Storey)
- vi. Construction Year : From ground floor to 3rd floor was constructed in 2003 and from 4th to 5th floor was constructed in 2008
- vii. Foundation Type : Shallow open footing foundation
- viii. Design Drawings : Available (approval for 6 storey RCC building from RAJUK on 2nd March 1999 for industrial use)
- ix. Soil Investigation Report : Available
- x. Construction Materials : Stone chips in all columns, brick aggregate in beams and slabs in all floors.
- xi. Generator : Ground Floor.

### **RECOMMENDATIONS FOR CORRECTIVE ACTION:**

The recommendations of corrective action for both Structural and Fire & Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

The recommendations for **Structural Safety** corrective action are:

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|------------------------|--|
| Short Term (Immediate) | : N/A  |
| Mid Term (6-weeks)     | : N/A  |
| Long Term (6-months)   | : 1. As-built engineering drawings to be prepared for unapproved vertical extension and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a number of checks on as-built construction. |

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The recommendations for **Fire & Electrical Safety** corrective action are:

**(A): Recommendations for Fire Safety Corrective Actions:**

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>N/A</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> The minimum clear width of the pathway should be 0.9 meter</li> <li><input type="checkbox"/> Rearrange the evacuation pathway to ensure the minimum width.</li> <li><input type="checkbox"/> Remove all temporary items from all escape routes, aisles and passageway.</li> <li><input type="checkbox"/> Direct route of access to required exits should be provided through stairways which are maintained free of combustibles.</li> <li><input type="checkbox"/> Provide aisle marking with arrow guiding</li> <li>- It should be clearly visible at all time,</li> <li>- Provide directional signs wherever necessary.</li> <li>-Signage should be uniform</li> <li><input type="checkbox"/> Factory management should checked detection system periodically and maintained the record properly.</li> <li><input type="checkbox"/> The first aid hose and standpipe performance should be checked periodically and properly tagged</li> </ul>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Replace all existing exit doors on evacuation routes, exit doors with side hinged type door, which swing outward and in the direction of travel. Swinging of the door should not constrict the width of the corridor / passage below 0.9 meter.</li> <li><input type="checkbox"/> Remove all locking device from all egress door. All exit doors should be open-able from the side they serve without the use of a key.</li> <li><input type="checkbox"/> Provide handrails on both side of each stairway with height of 0.9m measured from the nose of stair to the top of the handrail.</li> <li><input type="checkbox"/> Doors in stair should be outward opening, side-swing, self closing, non-lockable 1.5 hours fire rated doors in all stair way encloses.</li> <li><input type="checkbox"/> Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor.</li> <li><input type="checkbox"/> Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final evacuation</li> </ul>

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	<p>routes.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at ground floor generator &amp; boiler room, which located at the adjacent to fabric store.</li> <li><input type="checkbox"/> In case of openings in slab / floors, provide vertical enclosures extending above and below such openings. Walls of such openings should have at least 2 hours fire resistance rating.</li> <li><input type="checkbox"/> The egress paths should be illuminated with emergency lighting with power back-up supply &amp; illumination should be a minimum of 10 lux for all corridors &amp; exit doors. Aisles should be provided with a minimum 2 lux.</li> <li><input type="checkbox"/> Produce design and plan for automatic detection system with automatic fire alarm.</li> <li><input type="checkbox"/> Install Manual activation call point at all exit routes</li> <li><input type="checkbox"/> Provide adequate nos. of smoke detectors at all bay to cover the whole factory building.</li> <li><input type="checkbox"/> Prepare proper design and plan for dedicated fire pump with alternate backup power supply.</li> <li><input type="checkbox"/> Replace existing 1 inch hose pipe with 1.5 inch hose pipe to meet the requirement of RMG guideline.</li> <li><input type="checkbox"/> Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline.</li> <li><input type="checkbox"/> Visual alarm should be placed at the generator room.</li> <li><input type="checkbox"/> Obtain the boiler license from the proper issuing authority.</li> <li><input type="checkbox"/> Obtain the boiler operator license from the proper issuing authority.</li> </ul>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction with 1.5 hrs fire rated door at ground floor for fire separated corridor.</li> <li><input type="checkbox"/> Provide 4 hour's fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final evacuation routes.</li> <li><input type="checkbox"/> Provide 4 hour's fire rated barriers with 2 hours fire rated door at ground floor generator &amp; boiler room, which located at the adjacent to fabric store.</li> <li><input type="checkbox"/> Install automatic detection system with automatic fire alarm.</li> <li><input type="checkbox"/> Install dedicated fire pump with alternate backup power supply.</li> <li><input type="checkbox"/> Provide sufficient number of hose pipe with respect to area and travel distance as per</li> </ul>

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	<p>RMG guideline.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stand pipe supplying first aid hose should have minimum pressure of 200 KPa.</li> <li><input type="checkbox"/> Provide dedicated storage tank for firefighting operation</li> </ul>
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### **(B): Recommendations for Electrical Safety Corrective Actions:**

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	N/A
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> All strands cables at exposed ends should be properly soldered / crimped and insulated.</li> <li><input type="checkbox"/> 1. Disconnect the loads from cable of signs of overloading / abnormal temperature found.</li> <li><input type="checkbox"/> 2. Make necessary repairs to avoid further accidents.</li> </ul>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Refill the silica gel. Ensure that accessories of transformers like breathers, vent pipe, buchholz relay, silica gel must be in order at substation.</li> <li><input type="checkbox"/> Install smoke detection and provide firefighting equipment in the substation and generator room.</li> <li><input type="checkbox"/> Provide and maintain clear and legible identifications numbers &amp; names on all incoming and outgoing circuits of HT / LT panels.</li> <li><input type="checkbox"/> Provide cable connections with properly soldered / welded lugs at (LT/MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs.</li> <li><input type="checkbox"/> Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation.</li> <li><input type="checkbox"/> Avoid looping and bunching of cable at MCCB/MCB and bus bar to use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards.</li> <li><input type="checkbox"/> Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases.</li> <li><input type="checkbox"/> Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.</li> <li><input type="checkbox"/> Seal the cable penetrations through walls adequately with fire resistive elements.</li> <li><input type="checkbox"/> Provide proper separate earthing/grounding to generator.</li> </ul>

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	<p>Ensure that generator body frame to have two separate and distinct connections to the earth / ground.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Provide adequate earthing to body and doors to all DBs.</li> </ul> <p>Ensure that all electrical panels provided with proper and separate earth potential.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> 1. Provide updated SLD matching the existing installation at the factory.</li> <li>2. SLD to indicate exact positions of all points of switch boxes and other outlets.</li> <li>3. SLD to be approved by the engineer-in-charge.</li> </ul> <ul style="list-style-type: none"> <li><input type="checkbox"/> Substation should be on lowest floor level, with easy access for maintenance.</li> <li><input type="checkbox"/> Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline; the area should be 45 m<sup>2</sup>, or relocate the substation/ transformer room.</li> <li><input type="checkbox"/> Maintain the minimum height of 3.6 m for the substation room. Increase the height or relocate it.</li> <li><input type="checkbox"/> Provide 4 hour fire rated walls all around the generator room on ground level.</li> <li><input type="checkbox"/> Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).</li> <li><input type="checkbox"/> Seal the cable entry-exit points of (LT/MDB/DB/SDB)'s with non-flammable materials. In addition:             <ol style="list-style-type: none"> <li>1. Ensure that HT / LT panels / Switchgears to be vermin / damp proof.</li> <li>2. Ensure all unused holes / openings in DBs to be blocked properly.</li> </ol> </li> <li><input type="checkbox"/> 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.</li> <li>2. Ensure that connections between conductors / equipments provided to durable electrical continuity and adequate mechanical strength and protection.</li> <li>3. The continuous earth connection is provided back to the main intake supply earth.</li> <li><input type="checkbox"/> Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.</li> </ul>