

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

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Name of the Factory	: Tradefare Gloves Ltd.
Address of the Factory	: 96-98, Choydana, National University. Gazipur, Bangladesh
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	:
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 9 September, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 9 September, 2015
BGMEA Membership No.	: 2986

### **BASIC INFORMATION:**

The surveyed building was 6 storied RCC building in the factory premises. The following information was noted:

- i. Building Usage Type :
- ii. Structural System :
- iii. Floor System :
- iv. Floor Area :
- v. No. of Stories :
- vi. Construction Year :
- vii. Foundation Type :
- viii. Design Drawings :
- ix. Soil Investigation Report :
- x. Construction Materials :
- xi. Generator :

### **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) | : |
| Mid Term (6-weeks)     | : |
| Long Term (6-months)   | : |

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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"/> Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level.</li> <li>- Illuminated exit sign should be posted above the exit door,</li> <li>- It should be clearly visible at all time,</li> <li>- Provide directional signs wherever necessary.</li> <li>- All exit doors should be clearly marked for easy identification.</li> <li>-Signage should be uniform</li> <li><input type="checkbox"/> Provide fire extinguisher at 5th floor and to keep the record for re filling &amp; properly tagged.</li> <li><input type="checkbox"/> The first aid hose and standpipe performance should be checked periodically and properly tagged.</li> <li><input type="checkbox"/> Provide additional firefighting equipment like sand &amp; water buckets near exit or easily accessible area for first phase fire fighting</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.(Also require fire rated door at the floor occupied by other tenants)</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,</li> </ul>

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	<p>which located at the adjacent to final exit</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area.</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"/> The stairway should be illuminated with emergency lighting with power back-up supply &amp; illumination should be a minimum of 10 lux for stairway.</li> <li><input type="checkbox"/> Produce design and plan for automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants)</li> <li><input type="checkbox"/> Install Manual activation call point at all exit routes</li> <li><input type="checkbox"/> Automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire.</li> <li><input type="checkbox"/> Prepare proper design and plan for dedicated fire pump with alternate backup power supply.</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"/> Power backup supply should be provided for fire alarm system.</li> <li><input type="checkbox"/> Visual alarm should be placed at the generator room.</li> <li><input type="checkbox"/> Obtain update fire license / permit from issuing authority</li> <li><input type="checkbox"/> Cover all units / floors in a valid fire license</li> <li><input type="checkbox"/> Implement to a single fire safety management system with approvals from all tenants in the factory building.</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 and 1.5 hour fire rated door at ground floor for fire separated corridor.</li> <li><input type="checkbox"/> Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final exit</li> <li><input type="checkbox"/> Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area.</li> <li><input type="checkbox"/> Install automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants)</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</li> </ul>

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	<p>and travel distance as per 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"/> Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.</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"/> Provide rubber mats of adequate size in front of distribution panel MDB.</li> <li><input type="checkbox"/> Install heat detector and provide firefighting (Fire extinguisher and smoke detector) equipment in the generator room.</li> <li><input type="checkbox"/> 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign.</li> <li>2. The source of illumination should be providing not less than 50 lux.</li> <li><input type="checkbox"/> Individual Fuse protection should be provided to every 15/20 A socket.</li> <li><input type="checkbox"/> 1. All stranded conductors &gt; 6mm<sup>2</sup> to be provided with cable sockets.</li> <li>2. All stranded conductors &lt; 6 mm<sup>2</sup>, at exposed end should be soldered / crimped.</li> <li><input type="checkbox"/> Provide suitable &amp; non-flammable protected supports and shades for hanged light fittings/fixtures.</li> <li><input type="checkbox"/> The electrical panels to be of metal case and should be marked with “Danger 415 Volts” and identified with proper phase marking and danger signage.</li> <li><input type="checkbox"/> Provide cable connections with properly soldered / welded lugs at (MDB/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</li> </ul>

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	<p>insulation.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Avoid looping and bunch of cable at MCCB/MCB or bus bar terminal, 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 MDBs 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"/> 1. Replace all flexible cables/wires with fixed wiring; avoid use of flexible wires/cords for fixed machines.</li> <li>2. Flexible cords may only be used for the connections of portable equipments.</li> <li><input type="checkbox"/> Provide separate earthing connection to electrical equipments. Ensure that earth potential provided for all parts of equipment / installation (other than live parts) and that continuous earth connection is provided back to the main intake supply earth.</li> <li><input type="checkbox"/> Provide adequate earthing to body and doors to MDB. Ensure that all electrical panels provided with proper and separate earth potential.</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"/> 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> <li><input type="checkbox"/> 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc.</li> <li>2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation.</li> <li>3. As built drawing to be approved by the engineer-in-charge.</li> <li><input type="checkbox"/> Provide 4 hour fire rated walls all around the generator room on ground level.</li> <li><input type="checkbox"/> Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30 m<sup>2</sup>, or relocate the generator room.</li> <li><input type="checkbox"/> Provide and maintain proper clearance in all sides of generator for ease of maintenance.</li> <li><input type="checkbox"/> 1. Design to have proper segregation of different end used loads.</li> <li>2. Wiring design to have separate and distinct sub-circuits for power and heating system.</li> </ul>

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	<p>3. All DBs to be placed conveniently.</p> <p>4. Wiring to be neat, tidy and located near ceiling.</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Provide calibrated Ammeters at distribution boards (MDB).</li><li><input type="checkbox"/> Relocate the MDBs with easy access. Ensure that all MDBs should have easy accessibility.</li><li><input type="checkbox"/> Review capacity of standby generator on basis of loads for essential lighting / AC / Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small.</li></ul> <p>1. Wooden switchboards, Socket board should be replaced by non-flammable materials.</p> <p>2. Prefer switchboards made of non-flammable materials.</p> <ul style="list-style-type: none"><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"/> Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes.</li><li><input type="checkbox"/> Seal the cable entry-exit points of (MDB) with non-flammable materials. In addition:<ul style="list-style-type: none"><li>1. Ensure all unused holes / openings in MDB to be blocked properly.</li></ul></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></ul> <ul style="list-style-type: none"><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>
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