

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

Name of the Factory	: TEX ZONE KNIT WEAR LTD.
Address of the Factory	: Plot # B-6, Tongi, BSCIC I/E, Tongi, Gazipur
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 2 April, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 2 April, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 2 April, 2015
BKMEA Membership No.	: 1623

### **BASIC INFORMATION:**

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC Beam Slab Frame.
iii. Floor System	: RCC Beam slab.
iv. Floor Area	: First floor = 5,126 sft , Entire building = 10,770 sft (Approx.)
v. No. of Stories	: 2 storey
vi. Construction Year	: 2008
vii. Foundation Type	: Isolated column footing foundation
viii. Design Drawings	: Available (approval for 6 storey RCC building from Tongi BSCIC on 6th May 2009 for industrial use)
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: East of the building side.

### **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:

Short Term (Immediate)	:
Mid Term (6-weeks)	: 1. The connections and support of steel stair need to be checked by building engineer. Lateral bracing is required to ensure the stability of the stair against lateral thrust
Long Term (6-months)	: 1. Water proofing and proper roof drainage system need to be implemented as directed by the guidance of building engineer. 2. Exposed rebar need to be covered by lean graded concrete as directed by building engineer.

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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>• The minimum clear width of the pathway should be 0.9 meter</li> <li>• Remove all temporary items from all escape routes, aisles and passageway.</li> <li>• Direct route of access to required exits should be provided through stairway which is maintained free of combustibles.</li> <li>• Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level.</li> <li>• Factory management should be checked alarm call points, alarm &amp; detection system periodically and maintained the record properly.</li> <li>• The hose pipe performance should be checked periodically and properly tagged.</li> <li>• Provide additional firefighting equipment like sand &amp; water buckets near exit or easily accessible area for first phase fire fighting.</li> <li>• Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan &amp; should kept record properly</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>• 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>• 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>• Prepare proper plan &amp; design for exit door. - Minimum clear width should be 0.9 meter.</li> <li>• 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>• Prepare proper plan &amp; design for discharge floor exit door. - Minimum clear width should be 0.9 meter.</li> <li>• Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at boiler room.</li> <li>• Provide 1.5 hours fire rated door at fabric store,ground floor for separation for other operational area.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor boiler room, which located at the adjacent to operational area.</li> <li>• 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>• 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>• Produce design and plan for automatic detection system with automatic fire alarm.</li> <li>• Install Manual activation call point at all exit routes</li> <li>• An automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire.</li> <li>• Provide adequate nos. of smoke detectors to cover the whole factory building.</li> <li>• Prepare proper design and plan tfor dedicated fire pump with alternate backup power supply.</li> <li>• Replace existing 1 inch hose pipe replace with 1.5 inch hose pipe to meet the requirement of RMG guideline.</li> <li>• Prepare plan and design for dedicated water storage tank for firefighting operation.</li> <li>• Power backup supply should be provided for fire alarm system.</li> <li>• Visual alarm should be placed at the generator room.</li> <li>• Obtain the boiler license from the proper issuing authority.</li> <li>• 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>• Install exit door as per plan and design. - Minimum clear width should be 0.9 meter.</li> <li>• Install discharge floor exit door as per plan and design. - Minimum clear width should be 0.9 meter.</li> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated doors at boiler room.</li> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor boiler room, which located at the adjacent to operational area.</li> <li>• Install automatic detection system with automatic fire alarm.</li> <li>• Install dedicated fire pump with alternate backup power</li> </ul>

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	<p>supply.</p> <ul style="list-style-type: none"> <li>• Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline.</li> <li>• Stand pipe supplying first aid hose should have minimum pressure of 200 KPa.</li> <li>• 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>	<ul style="list-style-type: none"> <li>• Over current protection devices (Circuit breakers) to be installed at some distribution panels.</li> </ul>
<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>• All strands cables at exposed ends should be properly soldered / crimped and insulated.</li> <li>• Relocate the open type switchboards in dry / ventilated areas, away from batteries / chemical fumes</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>• 1. Provide updated SLD matching the existing installation at the factory. 2. SLD to indicate exact positions of all points of switch boxes and other outlets. 3. SLD to be approved by the engineer-in-charge.</li> <li>• 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. 2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. 3. As built drawing to be approved by the engineer-in-charge.</li> <li>• 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>• All unwanted materials should be removed from transformer / Generator room.</li> <li>• Provide rubber mats of adequate size in front of all distribution panels.</li> <li>• Install smoke detection and provide firefighting equipment in the substation and generator room.</li> <li>• Provide and maintain clear and legible identifications numbers &amp; names on all incoming and outgoing circuits of HT / LT panels.</li> <li>• Adequate number of caution boards should be kept in the substation room.</li> </ul>

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	<ul style="list-style-type: none"> <li>• 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>• Individual Fuse protection should be provided to every 15/20 A socket.</li> <li>• 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records.</li> <li>• 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>• Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards.</li> <li>• 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 and glands.</li> <li>• Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation.</li> <li>• 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>• 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>• Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.</li> <li>• Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.</li> <li>• 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>• Provide adequate earthing to body and doors to all MDBs / DBs. 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>• Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline; the area should be 42m<sup>2</sup>, or relocate the substation/ transformer room.</li> <li>• Maintain the minimum height of 3.6 m for the substation room. Increase the height or relocate it.</li> <li>• Provide adequate ventilation arrangements for indoor</li> </ul>

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	<p>substation.</p> <ul style="list-style-type: none"><li>• Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30m<sup>2</sup>, or relocate the generator room.</li><li>• Provide and maintain proper clearance in all sides of generator for ease of maintenance.</li><li>• 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><li>• Provide and maintain easy access and proper height of switchboard / panel boards (&lt; 2m from floor level).</li><li>• 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials.</li><li>• Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).</li><li>• 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>• Seal the cable entry-exit points of (LT/MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that LT panels / Switchgears to be vermin / damp proof. 2. Ensure all unused holes / openings in DBs to be blocked properly.</li><li>• 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 2. Ensure that connections between conductors / equipments provided to durable electrical continuity and adequate mechanical strength and protection. 3. The continuous earth connection is provided back to the main intake supply earth.</li><li>• 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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