

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Trust Knitwear Inds. Ltd.
Address of the Factory	: Indrapur Road, Bhabanipur, Mirzapur, Gazipur, Bangladesh.
Present Status of the Factory	: Shut down
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 24 th July 2015.
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 24 th July 2015.
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 24 th July 2015.
BGMEA Membership No.	: 4373

BASIC INFORMATION:

The assessed factory building is a 2 storied RCC building and a one no. single storey prefabricated steel shed in factory premises. The framing system of RCC building was flat plate with drop panel and peripheral beam. The framing system of the shed was profile sheeted rafter supported by RCC columns. All floors of RCC building and full floor of shed were occupied by Trust Knitwear Ltd. as ownership basis. The following information was noted:

- i. Building Usage Type : Garment factory.
- ii. Structural System : Flat slab with drop panel and peripheral beam Pre-fabricated Steel Shed.
- iii. Floor System : Flat plate floor slab with drop panel and peripheral beam.
- iv. Floor Area : The typical plinth area is 25455 sft. and total production floor area is 36,669.71.
- v. No. of Stories : 2 storey (RCC Building) and Single storey (Steel Shed)
- vi. Construction Year : 2006 for both.
- vii. Foundation Type : Unknown for both building.
- viii. Design Drawings : Unavailable for both building.
- ix. Soil Investigation Report : Unavailable for both building.
- x. Construction Materials : Brick aggregate (Identified by removing Plaster).
- xi. Generator : Ground floor at steel shed.

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) : None.

Mid Term (6-weeks) :

- As built architectural and engineering drawing to be prepared and submitted for approval by appropriate authority. As part of this process building engineer will be required to make a number of checks on the as-built construction.

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Long Term (6-months)

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- Exposed rebar needs to be covered by lean graded concrete as per direction of building engineer.
- Factory Engineer to review design of slab of all floors to measure the lateral capacity of structure.

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"> • The minimum clear width of the pathway should be 0.9 meter • Factory management should be check alarm call points, alarm & detection system periodically and maintained the record properly. • Refill the fire extinguisher and to keep the record for re filling & properly tagged. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly.
<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"> • 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. • 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. • 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. • Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • The egress paths should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for all corridors & exit doors. Aisles should be provided with a minimum 2 lux.

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	<ul style="list-style-type: none"> • The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. • Produce design and plan for automatic detection system with automatic fire alarm. • Provide adequate nos. of smoke detectors to cover the whole factory building. • Prepare proper design and plan for dedicated fire pump with alternate backup power supply. • Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline. • Power backup supply should be provided for fire alarm system. • Visual alarm should be placed at the generator room. • Obtain fire license with mention covered area from issuing authority • Obtain building approval from issuing authority • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing authority.
<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"> • Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. • Provide dedicated storage tank for firefighting operation.

(B): Recommendations for Electrical Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities</i></p>	<p>N/A</p>
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<p><i>have been rectified):</i></p>	
<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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated.
<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"> • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. • 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign. 2. The source of illumination should be providing not less than 50 lux. • Individual Fuse protection should be provided to every 15A socket. • 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. • Provide cable connections with properly soldered / welded lugs at DBs. Ensure that all the electrical connections are properly secured with lugs. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. • Avoid bunch of cable at MCCB/MCB terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • Seal the cable penetrations through walls adequately with fire resistive elements.

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	<ul style="list-style-type: none"> • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. • Provide separate earthing connection to electrical equipment. 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. • Provide adequate earthing to body to DB. Ensure that all electrical panels provided with proper and separate earth potential.
<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"> • 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. • 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. • Make suitable arrangements to prevent storm water to enter generator area. • Provide 1.5 hour fire rated door all around the generator room on ground level. • 1. Design to have proper segregation of different end used loads. 2. Wiring design to have separate and distinct sub-circuits for power and heating system. 3. All DBs to be placed conveniently. 4. Wiring to be neat, tidy and located near ceiling. • Provide calibrated Ammeters, Voltmeters at distribution boards (MDB). • Review capacity of standby generator on basis of loads

	<p>for essential lighting. Replace generator with larger capacity or install second generator if review indicates existing unit is too small.</p> <ul style="list-style-type: none">• 1. Wooden switchboards should be replaced by non-flammable materials.2. Prefer switchboards made of non-flammable materials.• Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).• Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes.• Seal the cable entry-exit points of (DB)'s with non-flammable materials. In addition:<ol style="list-style-type: none">1. Ensure that DB panels / Switchgears to be vermin / damp proof.2. Ensure all unused holes / openings in DBs to be blocked properly.• 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.2. Ensure that connections between conductors / equipment 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.• Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.
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