Name of the Factory	:	TOTAL TEX KNIT LTD.
Address of the Factory	:	Dewaliabari (Dighirpar), Konabari, Gazipur
Present Status of the Factory	:	Under operation.
Structural Assessment Conducted by	:	TUV
Date of Structural Inspection	:	10 March, 2015
Fire Assessment Conducted by	:	TUV
Date of Fire Inspection	:	10 March, 2015
Electrical Assessment Conducted by	:	TUV
Date of Electrical Inspection	:	10 March, 2015
BKMEA Membership No.	:	1594

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, Single Steel shed.
iii.	Floor System	:	RCC Beam slab.
iv.	Floor Area	:	The typical plinth area of RCC building is 6470 sq. ft. and The typical plinth area of one storey steel shed building is 6500 sq. ft. The total production floor of RCC building is 19500 sq. ft. and The total production floor of steel shed building is 6500 sq. ft.
v.	No. of Stories	:	3 Storey, Single Storey.
vi.	Construction Year	:	2008
vii.	Foundation Type	:	Shallow foundation
viii.	Design Drawings	:	Not Available
ix.	Soil Investigation Report	:	Available
x.	Construction Materials	:	Brick aggregate.
xi.	Generator	:	Northern side of 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:

Short Term (Immediate) : N/A

Mid Term (6-weeks) : N/A

Long Term (6-months) : 1. Factory Engineer to review design of all the cantilevers, columns and structural elements with actual condition. Carry out any remedial actions for inconsistent structural elements as directed by the Building Engineer.

2. The connection of steel structure needs to be checked by building engineer and the bracing system is required to ensure the

stability of the structure. Carry out any remedial actions as directed by the Building Engineer.

3. Factory Engineer to review design of the stair and structural members with actual condition. Carry out any remedial actions for unapproved stair as directed by the Building Engineer.

4. Sections of plaster finish of slabs, walls and beams to be removed to investigate if cracks penetrate the building structure or wall. Carry out any remedial actions as directed by the Building Engineer for cracks on wall

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

(A): Recommendations for Fire Safety Corrective Actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• The minimum clear width of the pathway should be 0.9 meter • Remove all temporary items from all escape routes, aisles and passageway. • Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - Illuminated exit sign should be posted above the exit door, - It should be clearly visible at all time, - Provide directional signs wherever necessary. - All exit doors should be clearly marked for easy identification. -Signage should be uniform • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • The first aid hose and standpipe performance should be checked periodically and 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.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Prepare proper plan and design for one more exit in a way not to exceed the maximum travel distance • 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. • Prepare proper plan & design for another staircase. -

	Minimum clear width should be 0.9 meter. • Doors in stair should be outward opening, side-swing, self closing, non-lockable 0.75 hours fire rated doors in all stair way encloses. • Provide 1 hour fire rated construction at unprotected opening window, which is adjacent to external staircase. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator & boiler room, which located at the adjacent to final exit. • 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. • 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. • Install Manual activation call point at all exit routes • An automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire. • 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. • Visual alarm should be placed at the generator room. • Obtain the boiler license from the proper issuing authority • Obtain the boiler operator license from the proper issuing authority.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Implement the plan and design for one more exit • Install another staircase as per plan and design. - Minimum clear width should be 0.9 meter. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator & boiler room, which located at the adjacent to final exit. • 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:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• Over current protection devices (Circuit breakers) to be installed at all distribution panels
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	• All strands cables at exposed ends should be properly soldered / crimped and insulated. • Relocate switchboards away from gas stoves / sinks / washing area / laundry (> 2.5 m) .
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 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. • Necessity and capacity of the electrical substation shall be set by regulations in the Electricity Act or by the relevant electrical utilities. • All unwanted materials should be removed from Generator room. • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the generator room. • 1. All stranded conductors > 6mm2 to be provided with cable sockets. 2. All stranded conductors < 6 mm2, at exposed end should be soldered / crimped. • 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.

	• Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. • 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 proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards. • Provide cable connections with properly soldered / welded lugs at (MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. • 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. • 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. • 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 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. • Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30m2, or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • Relocate the MDBs with easy access. Ensure that all MDBs / SDBs should have easy accessibility. • Energy meters should be installed at convenient height (At least 1.5 m above ground) with proper protection. • Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level).

	• 1. Wooden switchboards boards should be replaced by 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 (MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that (MDB/DB/SDB)'s 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 / 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. • Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.