Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: TANJIL KNITWEAR LTD.
Address of the Factory	: West Isdair, Tagarpar, Malancha Nagar, Police Line, Fatullah, Narayangonj.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: ACCORD
Date of Structural Inspection	: 2014-06-04
Fire Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Fire Inspection	: 2015-06-22
Electrical Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Electrical Inspection	: 2015-06-22
BKMEA Membership No.	: 1784

BASIC INFORMATION:

The following information was noted:

i. Building Usage Type	: Garment Factory
ii. Structural System	: RCC building.
iii. Floor System	: Beam slab & flat plate.
iv. Floor Area	: Not measured.
v. No. of Stories	: Seven Storied.
vi. Construction Year	: 2007-2009.
vii. Foundation Type	: Pile foundation.
viii. Design Drawings	: Available(Not fully matched with existing condition).
ix. Soil Investigation Report	: Not verified.
x. construction Materials	: Not verified.
xi. Generator	: The generator room is located at the ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

Short Term (Immediate) : 1. A Detail Engineering Assessment is required to review all of the design and loads. Factory Engineer to state the maximum weight that is allowed per square meter. Develop loading plans for this use.

2. Reduce stacking height to ensure total load does not exceed 3 kPa. A Detail Engineering Assessment to review design and loads. Factory Engineer to state the maximum weight that is allowed per square meter. Suggest that state the value on notice boards in this area.

3. Remove heavy storage loading in the area identified above. A Detail Engineering Assessment to review design and loads in area identified above. Factory Engineer to state the maximum weight that is allowed per square meter. Suggest that state the value on notice boards in this area.

4. Factory Engineer to review design, loads and columns stresses in area identified above. Verify in-situ concrete stresses either by cores or existing cylinder strength data for [the identified columns / cores from 4 columns].A Detail Engineering Assessment of Factory to be commenced immediately.

Mid Term (6-weeks) : 1. Adopt some sort of signage/staff guidance to ensure that the maximum weight of storage is not exceeded. (Loading Plans).

2. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. Detail Engineering Assessment to be completed.

3. Factory Engineer to survey the actual conditions and revise the drawings.

4. Request that the Detail Engineering Assessment of the overall building to be carried out and investigate in particular the overall stability and foundation aspects.

Long Term (6-months) : 1. Maintain standards of quality control to ensure that storage procedures are correctly followed so that overloading problems do not arise in the future. Maintain and implement the Loading Plans.

2. Continue to implement load plan.

3. Maintain revised up to date structural drawings.

4. A suitable perimeter parapet wall or guardrail should be constructed along the building perimeter.

5. Factory Engineer to inspect water damaged structures and repair with a suitable method. Waterproofing on the roof slab is required. Moreover the roof slab drainage system should be investigated and improved.

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. • Provide fire extinguisher at 2nd floor and to keep the record for re filling & properly tagged. • The first aid hose and standpipe performance should be checked periodically and properly tagged. • Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase firefighting. • Combustible materials should keep away from electrical appliances and all the lighting in storage area must have protecting covers and wiring must be in conduits. • 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)*	• 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. • Doors in stair should be outward opening, side-swing, self-closing, non-lockable 2 hours fire rated doors in all stair way encloses.(Also require fire rated door at the floor occupied by other tenants) • Prepare design for installation of fire rating smoke proof enclosure. 2 hours fire rating doors for exit should not be less than that of 4 hours fire resistance rating of the walls of the smoke proof fire rated entry lobby.(Also require fire rated entry lobby at the floor occupied by other tenants) • Prepare proper plan and design for fire rated barrier for 2 hour fire rating to cover unprotected window at evacuation pathway. • 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 route of both stairs (stair 1 & stair 2). • Prepare proper plan and design for 4 hours fire rated barriers with 2

	hours fire rated door at 2nd floor boiler room, which located at the adjacent to operational area. • 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 addressable fire alarm. (Also needs to cover the floors occupied by other tenants) • 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. • Prepare proper design and plan for fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. • Complete full design and plan for providing fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. • A suitable public address system should be provided for communicating to all floors as well as facilities to receive messages from all floors. • Visual alarm should be placed at the generator room. • Obtain building approval from issuing authority • Implement to a single fire safety management system with approvals from all tenants in the factory building. • 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)	• Install smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. (Also require fire rated entry lobby at the floor occupied by other tenants) • All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction at ground floor for fire separated corridor. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at which located at the adjacent to final evacuation route of both stairs (stair 1 & stair 2).

	• Provide 4 hours fire rated barriers with 2 hours fire rated door at 2nd floor boiler room, which located at the adjacent to operational area. • Install automatic detection system with addressable fire alarm. (Also needs to cover the floors occupied by other tenants) • 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 • Install fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. • Provide fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor.

(B): Recommendations for Electrical 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 (a week) and should be a regular activity)*	• Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 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. • Provide supports for main service line complete with adequate insulation. • 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 (DB)'s. 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 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 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 and doors to all DBs. Ensure that all electrical panels provided with proper and separate earth potential.
	• 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.

Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	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. • Provide 4 hour fire rated walls & 1.5 hour fire rated door the generator room on ground level. • Relocate the generator room or provide 4 hour fire rated walls & 1.5 hour fire rated door the generator room on ground level. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 26 m2 or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • 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. • 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. • Seal the cable entry-exit points of (DB)'s with non-flammable materials. In addition: 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.