Name of the Factory	:	Tua-Ha Textiles Ltd.
Address of the Factory	:	Kabirpur, Savar, Dhaka, Bangladesh
Present Status of the Factory	:	Under operation.
Structural Assessment Conducted by	:	TUV
Date of Structural Inspection	:	10 November, 2015
Fire Assessment Conducted by	:	TUV
Date of Fire Inspection	:	10 November, 2015
Electrical Assessment Conducted by	:	TUV
Date of Electrical Inspection	:	10 November, 2015
BGMEA & BKMEA Membership No.	:	4906 & 862

BASIC INFORMATION:

The structural system of the R.C.C building from GF to 5th floor was two way beam slab. The following information was noted:

i.	Building Usage Type	:	Garment Factory.
ii.	Structural System	:	RCC Building & Profile Steel Shed.
iii.	Floor System	:	Two way Beam Slab.
iv.	Floor Area	:	The typical plinth area is 11,921.76 sft. and total production floor area is 83,452.32.
v.	No. of Stories	:	7 storey (RCC Building) & Single storey (Steel Shed)
vi.	Construction Year	:	2005 for Building. Unknown for Shed
vii.	Foundation Type	:	Not confirm for all buildings
viii.	Design Drawings	:	Available (has approval for 6-Storey industrial building on 17th July, 2005 from Shimulia Union Porishod Savar.)
ix.	Soil Investigation Report	:	Not available (For Both)
x.	Construction Materials	:	Brick aggregate.
xi.	Generator	:	Ground floor at different 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)	:	N/A
Mid Term (6-weeks)	:	N/A
Long Term (6-months)	:	1. As-built architectural and structural drawings to be prepared for the unapproved floor and submitted for approval by appropriate authority. As part of this process the building engineer will be required to make a number of checks on the as-built construction

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. Provide adequate number of fire extinguisher at all floors of Main building and to keep the record for re filling & properly tagged. Place the extinguisher near the path of exit travel & easily accessible 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 6th floor (Accs. Store) & 2nd floor (finishing) 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*	Open the locking device at stair-3 exit in all floors of Main building to ensure the easy way to outside of building.

carried out within a period of 6 weeks)	Dyeing shed, Prepare proper plan and design for one more exit in a way not to exceed the maximum travel distance 45 meter or If the factory design to equip with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building the length of travel should not be exceed 60 meter. 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. 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. Provide 2 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 transformer, which located at the adjacent to final evacuation route of dyeing shed at south side exit. Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at dyeing shed chemical room, which located at the adjacent to rest of the operational areas. 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 addressable fire alarm. An automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire. 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 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. □ Power backup supply should be provided for fire alarm system. □ Update 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 or implement with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building. □ Install smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. □ Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor transformer, which located at the adjacent to final evacuation route of dyeing shed at south side exit. □ Provide 4 hours fire rated barriers with 2 hours fire rated door at dyeing shed chemical room, which located at the adjacent to rest of the operational areas. □ Install automatic detection system with addressable fire alarm. □ Install dedicated fire pump with alternate backup power supply. □ Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. □ 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*):	□ Over current protection devices (Circuit breakers) should 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*	□ Re-locate oil / fuel tanks away from control panels in generator room. □ All strands cables at exposed ends should be properly soldered / crimped and insulated. □ 1. Disconnect the loads from cable of signs of overloading / abnormal temperature found. 2. Make necessary repairs to avoid further accidents.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	□ 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 transformer / Generator room. □ Provide electrical graded rubber mats of adequate size in front of all distribution panels. □ Install smoke detection and provide firefighting equipment in the substation and generator room. □ Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels. □ 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the signage. 2. The source of illumination should be providing not less than 50 lux. □ Individual Fuse protection should be provided to every 15/20 A 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 (LT/MDB/DB/SDB)'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 looping and bunching of cable at MCCB/MCB and bus bar to 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. □ Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. □ Provide adequate earthing to body and doors to all 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)*	□ 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 substation / transformer / switch rooms. □ Substation room and generator room must be separated with 4 hour fire rated walls and door around the generator and substation room. □ 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. □ For buildings > 20m high, provide at least one vertical shaft of 200 x 400 mm for every 1500 sq.m. floor area. □ Provide and maintain easy access and proper height of panel boards (< 2m from floor level). □ 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 (LT/MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that HT / LT 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 are 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.