Name of the Factory	: Trasco Apparels Ltd.
Address of the Factory	: 47/8, B.B Road, Azahar Super Market, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 28th July, 2015.
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 28th July, 2015.
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 28th July, 2015.
BGMEA Membership No.	: 2055
BKMEA Membership No.	: 95

BASIC INFORMATION:

The assessed factory buildings are a 6-Storey and a 7 Storey RCC building which are marked as Building-1 & Building-2 respectively on date of assessment. The structural system of both buildings is RCC beam column slab frame structure in all floors except 6th floor of Building-2. The 6th floor system of building-2 is GI shed on MS angle supported by RCC column. The following information was noted:

i.	Building Usage Type	: Knit Garment Factory.
ii.	Structural System	: RCC beam column frame structure and GI shed on MS angle supported by RCC column. (For both building)
iii.	Floor System	: RCC beam slab and Shed. (For both building)
iv.	Floor Area	: Plinth level area of Building-1 is 2957 sft. and total area of the factory Building-1 is 18629 sft. (Including all floors and 30% area of roof). Plinth level area of Building-2 is 2632 sft. and total area of the factory Building-2 is 18429 sft. (Including all floors).
v.	No. of Stories	: One no. of 6- Storey and one no. of 7-Storey.
vi.	Construction Year	: Unknown for both building.
vii.	Foundation Type	: Unknown for both building.
viii.	Design Drawings	: Partially available (Building-1 has approval for four storied commercial RCC building from D.I.T, Dhaka, in 3rd June, 1980 and the factory Building-2 has no approval layout plan)
ix.	Soil Investigation Report	: Available for Building-1 but for Building-2 not available.
x.	Construction Materials	: Brick Aggregated (Identified by removing Plaster).
xi.	Generator	: Located at roof of Building-1 in a 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) :

- Identified areas not to be used for storage.
- Factory Engineer to review design, loads and columns stresses in all column.

- Verify insitu concrete stresses by taking 100mm diameter cores or existing cylinder strength data of C2, A2 and F2 columns for Building-1 and F3 and F4 columns for Building-2.
- A Detail Engineering Assessment of Factory to be commenced, see attached Scope.

Mid Term (6-weeks) :

- 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.
- For Building-2 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.

Long Term (6-months) :

- Continue to implement load plan.
- For Building-1 considering six storey building as built architectural and engineering drawing to be prepared. In case of unapproved floors as built architectural and engineering drawing of 4^{th} & 5^{th} floor to be 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.

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*	• Rearrange the evacuation pathway to ensure the minimum width. • 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 check 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. • 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.
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. • 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 1.5 hours fire rated doors in all stair way encloses. And at 4th floor, opening stairway area need be enclose with 2 hour fire rated separation.(Also require fire rated door at the floor occupied by other tenants) • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor. • Prepare proper plan and design for entry lobby of 4 hrs fire rated barrier with 2 hrs fire rated door in the stair

	access from the store • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 4th floor boiler room, which located at the adjacent to production 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 and control panel.(Also needs to cover the floors occupied by other tenants) • 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. • 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)*	• Implement the plan and design for one more exit • All stairway to have direct access to any designated refuge area which requires 2 hour fire rated construction at ground floor for fire separated corridor. • Provide 2 hrs fire rated entry lobby of 4 hrs fire rated barrier with 2 hrs fire rated door in the stair access from the store • Provide 4 hours fire rated barriers with 2 hours fire rated door at 4th floor boiler room, which located at the adjacent to production area. • Install automatic detection system with automatic fire alarm and control panel and control panel.(Also needs to cover the floors occupied by other tenants) • Install dedicated fire pump with alternate backup power supply. • Provide sufficient number of operational hose pipe with respect to area and travel distance as per RMG guideline. • 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*):	N/A
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.
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. • Provide adequate illumination for generator room. • 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. 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. • 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. • 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)'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 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 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 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)*	• Provide adequate ventilation arrangements for indoor generator room. • Provide 4 hour fire rated walls and 2 hours fire rated door all around the generator room on ground level. • Relocate generator set in substation building / adjacent to substation room. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30 m2, or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • 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 (MDBs). • Relocate the MDBs with easy access. Ensure that all MDB should have easy accessibility. • For buildings > 20m high, provide at least one vertical shaft of 200 x 400 mm for every 1500 sq.m. Floor area. • 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. • Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level). • 1. Wooden switchboards / panel boards 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 (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 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.