Name of the Factory	: Comfort Wear Garments.
Address of the Factory	: Jahan Building No: 5 (5th Floor) 74 Agrabad C/A, Chittagong.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 28 December, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 29 December, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 28 December, 2015
BGMEA Membership No.	: 4403

BASIC INFORMATION:

The surveyed building was total six story RCC structure. The following information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC beam column system.
iii.	Floor System	: RCC Beam slab.
iv.	Floor Area	: Total floor area is 44,354 sq. ft. approx
v.	No. of Stories	: 6 Storey
vi.	Construction Year	: 1992-93
vii.	Foundation Type	: Shallow foundation (As per approval documents)
viii.	Design Drawings	: Available (The building has approval from CDA on 22th June, 1992 for 6 storied commercial building, as-built structural drawing was not available)
ix.	Soil Investigation Report	: Available
x.	Construction Materials	: Brick aggregate.
xi.	Generator	: 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)	: None
Mid Term (6-weeks)	: 1. Factory Engineer to review design, loads and columns stresses in area identified above. 2. Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for E2 column.
Long Term (6-months)	: 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

2. As built engineering drawing to be prepared for entire building. 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*	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. Factory management should check alarm call points, alarm & detection system periodically and maintained the record properly. Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly. Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase fire fighting. Provide aisle marking with arrow guiding. Remove all temporary items from all escape routes, aisles and passageway. The first aid hose and standpipe performance should be checked periodically and properly tagged. The minimum clear width of the pathway should be 0.9 meter
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. Exit door should have minimum clear width 0.9 meter. Prepare proper plan & design for staircase. - Minimum clear width should be 0.9 meter. 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. (Also require fire rated door at the floor occupied by other tenants). □ Provide 2 hour fire rated construction at unprotected opening window, which is adjacent to external staircase. □ Exit door should have minimum clear width 0.9 meter. □ Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor at ground floor. □ 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 exit. □ Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 5th floor boiler room, which located at the adjacent to finishing section. □ 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. (Also needs to cover the floors occupied by other tenants) □ Install Manual activation call point at all exit routes □ 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*	□ Install staircase as per plan and design. - Minimum clear width should be 0.9 meter.

carried out within a period of 6 months)	□ 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 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final exit. □ Provide 4 hours fire rated barriers with 2 hours fire rated door at 5th floor boiler room, which located at the adjacent to finishing section. □ Install automatic detection system with automatic fire alarm and control panel.(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

(B): Recommendations for Electrical Safety Corrective Actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	None
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 tanks away from control panels in generator room. □ 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 distribution panel. □ Install smoke detection in the generator room. □ Individual Fuse protection should be provided to every 15A socket. □ 1. Remove all the inflammable materials from surrounding of electrical circuitry at DB. 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. □ Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. □ 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 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 DB. 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. □ Provide 1.5 hour fire rated door of the generator room on ground level. □ Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 25m2, 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. □ Review capacity of standby generator on basis of loads for essential lighting. Replace generator with larger capacity or install second generator if review indicates existing unit is too small. □ 1. Wooden Fuse Base 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). □ 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.