Name of the Factory	: Dhaka Pullovers Ltd.
Address of the Factory	: 63, Golartak, Mirpur, Dhaka-1216, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 23rd April, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 23rd April, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 23rd April, 2015
BGMEA Membership No.	: 3873

BASIC INFORMATION:

There were two buildings within the factory premises. One of them was 5 storey RCC structure and the other one was 4 storey Brick Masonry structure. The structural system of the RCC building is beam column frame and beam slab floor system. The buildings were adjacent to each other and from 1st floor to 3rd floor were interconnected. Dhaka Pullovers Ltd. has occupied all floors of both buildings as rental basis. The following general information was noted:

i.	Building Usage Type	: Sweater Factory.
ii.	Structural System	: RCC Beam Slab Frame (Building 1) and Brick wall slab frame (Building 2).
iii.	Floor System	: RCC Beam Slab (Building 1) and Brick wall slab (Building 2).
iv.	Floor Area	: Building 1: Ground floor = 1650 sft. Entire building = 8250 sft (Approx.) Building 2: Ground floor = 2965 sft. Entire building = 11810 sft (Approx.)
v.	No. of Stories	: Building-1: 4 floors + GF (5 Storey) Building-2: 3 floors + GF (4 Storey)
vi.	Construction Year	: Building-1: GF to 4th floor in 1992, Building-2: GF to 3rd floor in 1992.
vii.	Foundation Type	: Shallow foundation.
viii.	Design Drawings	: Unavailable for both building.
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Brick Aggregate.(In column)
xi.	Generator	: Generator is kept on south-east corner and outside the building under 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) : None.

Mid Term (6-weeks) :

- As built architectural and engineering drawings to be prepared and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a

number of checks on the structural design as described in the following recommendations.

- Sections of plaster finish on beam to be removed to investigate if cracks penetrate the building structure. Investigation needed to determine why cracks occurring.

Long Term (6-months) :

- Sections of plaster finish on wall to be removed to investigate if cracks penetrate the load bearing wall. Investigation needed to determine why cracks occurring.

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*):	• None.
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. Provide directional signs wherever necessary. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • The hose pipe 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 distribution board.
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. • Within 6 Weeks, Prepare proper plan & design for exit door. - 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. • Prepare proper plan & design for discharge floor exit door. - Minimum clear width should be 0.9 meter. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at generator and boiler which are located at ground floor adjacent to stair exit-1 and stair exit-2 in final evacuation route • Provide 1.5 hours fire rated door at Fabric storage room for separation for other operational 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. • Produce design and plan for automatic detection system with automatic fire alarm. • Install adequate numbers of manual activation call point at all exit routes • 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. • Replace existing 1 inch hose pipe replace with 1.5 inch hose pipe to meet the requirement of RMG guideline. • Prepare plan and design for dedicated water storage tank for firefighting operation.

	• Visual alarm should be placed at the generator room. • Obtain fire license with cover area from issuing authority • Obtain building approval from 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 exit door as per plan and design. - Minimum clear width should be 0.9 meter. • Install discharge floor exit door 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 which is at generator and boiler which are located at ground floor adjacent to stair exit-1 and stair exit-2 in final evacuation route • 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*):	• 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 / fuel tanks away from control panels in generator room. • All strands cables at exposed ends should be properly soldered / crimped and insulated. • 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)*	• 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. • All unwanted materials should be removed from transformer / Generator room. • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. • Individual Fuse protection should be provided to every 15/20 A socket. • 1. All stranded conductors > 6mm2 to be provided with cable sockets. 2. All stranded conductors < 6 mm2, at exposed end should be soldered / crimped. • 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 (LT/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. • 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 4 hour fire rated walls all around the transformer / generator room on ground level. • 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. • 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 (LT/MDBs). • Relocate the MDBs with easy access. Ensure that all MDBs / SDBs should have easy accessibility. • 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 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). • 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 / 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.