Name of the Factory	:	A Plus Sweater
Address of the Factory	:	Tangori, Savar, Dhaka, Bangladesh.
Present Status of the Factory	:	Under Operation.
Structural Assessment Conducted by	:	TUV
Date of Structural Inspection	:	23rd January, 2015.
Fire Assessment Conducted by	:	TUV
Date of Fire Inspection	:	23rd January, 2015.
Electrical Assessment Conducted by	:	TUV
Date of Electrical Inspection	:	23rd January, 2015.
BGMEA Membership No.	:	4996.

BASIC INFORMATION:

The assessed factory building is a 3 storied RCC building. The structural system of the building is beam column frame system at ground floor, flat plat system at 1st floor and GI shed on MS angle at 2nd floor. The following information was noted:

i.	Building Usage Type	:	Sweater Factory.
ii.	Structural System	:	RCC beam slab frame on GF and flat slab system on 1st floor and GI shed on MS angle at 2nd floor.
iii.	Floor System	:	RCC beam slab, flat slab and shed roof.
iv.	Floor Area	:	The typical plinth area is 6500 sft. and total production floor is 19,700 sft.
v.	No. of Stories	:	3-Storey.
vi.	Construction Year	:	Unknown.
vii.	Foundation Type	:	Unknown.
viii.	Design Drawings	:	Unavailable.
ix.	Soil Investigation Report	:	Unavailable.
x.	Construction Materials	:	Brick aggregate.
xi.	Generator	:	Separate Structure.

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) :

- Sections of plaster finishing to slab need to be removed to investigate if cracks penetrate the building structure. Investigation needed to determine reasons for cracks.

Mid Term (6-weeks) :

- Building engineer to verify the design of stability system.
- Carry out any remedial actions as directed by the Building Engineer for regarding cracks in slab.

Long Term (6-months) :

- Carry out any remedial actions as directed by the Building Engineer regarding absence of lateral stability system.
- Building engineer needs to carry out design check of steel bridge.
- Carry out any remedial actions as directed by the Building Engineer regarding steel bridge on canopy.

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*	• Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - 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. • Fire extinguisher should be provided at the ground floor storage area. Also keep record for re filling updatation and properly tagged. • Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase firefighting.
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. • Stair treads should be of nominal uniformity.

	Differences more than 25mm from the adjacent steps are be modified to be within this tolerance. • Provide 1 hour fire rated construction at unprotected opening window, which is adjacent to external stai Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at electrical substation, which is located adjacent to final exit. • Seal all openings in walls with fire resistant materials having 1 hour fire rating. • 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. • The manual activation call point should be installed at all exit route of the building. • An automatic alarm system must be provided throughout the factory; also required at 2nd floor and at the adjacent factory building. 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. • Implement to a single fire safety management system with approvals from all tenants in the factory building.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Provide 4 hours fire rated barriers with 2 hours fire rated doors at electrical substation, which is located adjacent to final exit. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Provide standpipe with sufficient number of hose pipe with respect to area and travel distance as per RMG guideline.

(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*	• 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. • 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 cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • All unwanted materials should be removed from Generator room.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Provide rubber mats in front of LT & HT panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. 1. Provide High / Medium Voltage DBs marked with "Danger" signage. 2. Ensure that all DBs shall have marked with "Danger" signage. • 1. Provide and maintain at least 10 lux illumination at floor level. 2. Provide alternate / emergency backup for illuminating the exit signs for at least 30 minutes. • Individual Fuse protection should be provided to every 15/20 A socket. • 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.

	• 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 MDBs. Ensure that all the electrical connections are properly secured with lugs and glands. • Select conductors with adequate sizing without exceeding permissible thermal limits for insulation. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases. • 1. Replace all flexible cables/wires with fixed wiring. Avoid use of flexible wires/cords for fixed machines. 2. Flexible cords may only be used for the connections of portable equipments. • 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 MDBs 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. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline. The area should be 45m2. • Increase the height of substation room. The minimum height of the substation room shall be 3.6 m, as RMG guideline, or relocate it. • Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels. • Provide adequate cable trenches with non-flammable

	covers at substation areas. • Relocate generator set in substation building / adjacent to substation 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. • Energy meters should be installed at convenient height (At least 1.5 m above ground) with proper protection. • Seal the cable penetrations though walls adequately with fire resistive elements. • Seal the opening of wall at wiring passing through wall/roof/floor partitions. Ensure that all cable penetrations though walls should be adequately sealed with fire resistive elements. • 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.