Name of the Factory	: Authentic Garments (Pvt) Ltd.
Address of the Factory	: 273/A, New Chaktai, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 27th July, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 27th July, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 27th July, 2015
BGMEA Membership No.	: 2333.

BASIC INFORMATION:

The assessed factory building has 2 segments. Segment-1 is a 4 - Storey RCC building & segment-2 is a 3- storey RCC building. Both segment 1 & 2 are adjoining to each other where a construction joint had been observed. At segment-1; Ground floor is occupied by different types of grocery shops. 1st floor is occupied by a boarding named as Unique Boarding. 2nd & 3rd floor of the building is occupied by Authentic Garments (Pvt.) Ltd. as a rental basis. At segment 2; ground floor is occupied by land owner's storage facility. 1st floor is seen abandoned but it was verbally confirmed that it was also a storage facility. 2nd floor is occupied by Authentic Garments (Pvt.) Ltd. The 3rd floor of segment-1 & 2nd floor of segement-2 are in same level. The structural system of both building was beam column frame and beam slab floor system. The following general information were noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC beam column frame system for both building.
iii.	Floor System	: RCC beam slab system for both building.
iv.	Floor Area	: Operational floor area of the factory is approx. 12359 sft.
v.	No. of Stories	: Segment-1 is a 4 – Storey and segment-2 is a 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	: Located at ground floor in front of stair.

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 finish to columns, beams & slabs mentioned to be removed to investigate if cracks penetrate the building structure and take the remedial action immediately.

Mid Term (6-weeks) :

- A Detail Engineering Assessment of Factory to be commenced, see attached Scope.

- As built architectural & 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.
- Factory Engineer to review design, loads and columns stresses in area identified above.
- Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for C7 or 100mm dia. cores from 4 columns.

Long Term (6-months) :

- Detail Engineering Assessment to be completed.
- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

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 • 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 • Provide fire extinguisher at 2nd & 3rd floor and to keep the record for re filling & properly tagged. • 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. • 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 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. • 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) • 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 with 1.5 hrs fire rated door 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 stair exit 02. • Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 2nd 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 and control panel.(Also needs to cover the floors occupied by other tenants) • 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. • Visual alarm should be placed at the generator room. • Obtain valid fire license / permit from issuing authority with covering all occupied area of the factory. • Obtain building approval from issuing authority • 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)*	• Implement the plan and design for one more exit in opposite side of existing exit. • Install staircase as per plan and design. - Minimum clear width should be 0.9 meter. • All stairway to have direct access to any designated refuge area which requires 2 hour fire rated construction with 1.5 hrs fire rated door 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 stair exit 02. • Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Provide 4 hours fire rated barriers with 2 hours fire rated door at 2nd 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. • Provide sufficient number of hose pipe with respect to area on each floor and travel distance as per RMG guideline. • 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.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Provide adequate illumination for Generator room. • All unwanted materials should be removed from Generator room. • Provide rubber mats of adequate size in front of distribution panel DBs. • Install heat 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. • 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.

	• Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. • Avoid looping and bunch of cable at 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. • 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 equipment's. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. • Provide separate earthing connection to electrical equipment's. 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 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. • Provide adequate ventilation arrangements for indoor substation. • 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. • 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. • Wooden Socket board should be replaced by 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 DBs with non-flammable materials. In addition: 1. Ensure all unused holes / openings in DBs/SDBs 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's 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.