Name of the Factory	: Blp Warm Fashion Ltd.
Address of the Factory	: Rahman Tower, N0-1 Rail Gate, Muradpur, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 28th May, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 28th May, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 28th May, 2015
BGMEA Membership No.	: 3904.

BASIC INFORMATION:

The assessed factory building was a 9 Storey RCC building including one semi basement. The frame system of the building is flat slab with periphery beam. There was a shed at top floor of this building which covers 58% area of the plinth. The factory operates in the total building on a rental basis. The following general information were noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC flat plate frame system.
iii.	Floor System	: Flat Slab with periphery beam System.
iv.	Floor Area	: The typical plinth area is 10321.7 sft. and total production floor is 51,608.5sft.
v.	No. of Stories	: 9 Storey. (With a semi basement floor.)
vi.	Construction Year	: 2003.
vii.	Foundation Type	: Deep Foundation.
viii.	Design Drawings	: Available (Approval from Chittagong Development Authority on 19th January, 2009 for 9-Storey with one semi basement commercial building)
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Stone aggregate.
xi.	Generator	: Housed in an ancillary 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) :

- Factory Management to remove any storage loading from column supporting floors.
- Factory Engineer to review design, loads and columns stresses in area identified above.
- Verify in situ concrete stresses by 100mm dia. cores for A1 and E4 columns.

Mid Term (6-weeks) :

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

Long Term (6-months) :

- Continue to implement load plan
- 2. Building Engineer needs to check existing flat slab system. Lateral system is required to ensure stability of the structure.

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*	• 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. • Factory management should be checked alarm call points & manual alarm system periodically and maintained the record properly. • Provide right number of fire extinguisher at all floors and to keep the record for re filling & properly tagged. • The first aid hose and standpipe performance should be checked periodically and properly tagged.
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. • Doors in all stairs with other tenants floor, should be outward opening, side-swing, self-closing, non-lockable 2 hours fire rated self-closing door in all stair way encloses. • Prepare design for installation of fire rating smoke proof enclosure. 2 hours fire rating doors for exit should not be less than that of 4 hours fire resistance rating of the walls of the smoke proof fire rated entry lobby at all floor with other tenants. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room which located adjacent to stair -02 final exits. • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor at ground floor. • Produce proper design and plan for 2 hours fire separation for lift wells. • Prepare proper plan for 4 hours fire walls and 2 hours fire rated self-closing doors in basement level. • Prepare proper plan and design for 2 hours fire rated door and 4 hours fire rated wall at 3rd floor boiler room, which located at the adjacent to washing 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 addressable fire alarm for all floor and all 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. • Prepare proper design and plan for fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. • Complete full design and plan for providing fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. • A suitable public address system should be provided for communicating to all floors as well as facilities to receive messages from all floors. • Power backup supply should be provided for fire alarm system. • Visual alarm should be placed at the generator room. • Obtain the fire license with full covered area from the proper issuing authority. • Implement to a single fire safety management system with approvals from all tenants in the factory building. • 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 smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located adjacent to Stair-02 final exit. • Implement the design for 2 hours fire rated walls for lift wells • Implement the plan for fire separation 4 hours fire walls and 2 hours fire rated self-closing doors in basement level. • Provide 2 hour's fire rated door and 4 hours rated wall at 3rd floor boiler room, which located at the adjacent

	to washing section. • All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction at ground floor for fire separated corridor to finished directly to outside. • Install automatic detection system with addressable fire alarm for all floor and all 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 • Install fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. • Provide fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor.

(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*	• Do repair of oil leakages at transformer room. Ensure that there should not any oil leakage in the oil type transformer. • 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)*	• All unwanted materials should be removed from Generator room. • Provide rubber mats of adequate size in front of distribution panels. • Install smoke detection and provide firefighting

	equipment in the substation and generator room. • Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of LT panels. • Adequate number of caution boards should be kept in the substation 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 distribution panel. • Provide cable connections with properly soldered / welded lugs at DBs. 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 opening of wall at wiring passing through roof partitions. Ensure that all cable penetrations though walls should be adequately sealed with fire resistive elements. • Provide proper separate earthing/grounding to

	generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. • 1. Provide sufficient and separate earthing for LT panels in substation room. 2. Provide adequate number of earth electrodes. • 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 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)*	• 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. • Area of substation to meet requirements of Table 4.3 of RMG Guideline; the area should be 45 m2, or relocate the substation room. • Maintain the minimum height of 3.6 m for the substation room. Increase the height or relocate it. • Provide adequate ventilation arrangements for indoor substation and generator room. • Provide 4 hour fire rated walls and door all around the generator and substation room. • Provide adequate cable trenches with non-flammable covers at substation areas. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 48 m2 for 252kW and 30m2 for 80kW 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. • For buildings > 20m high, provide at least one vertical shaft of 200 x 400 mm for every 1500 sq.m. floor area. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • 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)'s with non-flammable materials. In addition: 1. Ensure that 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.