

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Acme Apparels (Pvt) Ltd. |
| Address of the Factory | : 1461/A, CEPZ, By Lane Omur Shah Para, South Middle Halishahar, Chittagong, Bangladesh. |
| Present Status of the Factory | : Under Operation. |
| Structural Assessment Conducted by | : TUV |
| Date of Structural Inspection | : 22 nd March, 2015. |
| Fire Assessment Conducted by | : TUV |
| Date of Fire Inspection | : 22 nd March, 2015. |
| Electrical Assessment Conducted by | : TUV |
| Date of Electrical Inspection | : 22 nd March, 2015. |
| BGMEA Membership No. | : 1164. |

BASIC INFORMATION:

The assessed factory building was a 3 -Storey RCC building with a vertical extension on roof. The structural system of the building is RCC beam column frame and beam slab floor system. 1st & 2nd floor of building were occupied by the assessed factory as rental basis. The following information was noted:

- i. Building Usage Type : Garment Factory
- ii. Structural System : RCC beam column frame system.
- iii. Floor System : RCC beam slab floor system.
- iv. Floor Area : The typical plinth area is 5400sft. and total production floor is 10800 sft.
- v. No. of Stories : 3-Storey.
- vi. Construction Year : 1998.
- vii. Foundation Type : Shallow Foundation.
- viii. Design Drawings : Unavailable.
- ix. Soil Investigation Report : Unavailable.
- x. Construction Materials : Brick aggregate. (Identified by removing plaster)
- xi. Generator : Ground floor at northern side of main building.

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:

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| Short Term (Immediate) | : None. |
| Mid Term (6-weeks) | : <ul style="list-style-type: none">• As built architectural and 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. |
| Long Term (6-months) | : <ul style="list-style-type: none">• Exposed rebar needs to be covered by lean graded concrete as per direction of building engineer. |

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

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| <p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p> | <p>N/A</p> |
| <p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p> | <ul style="list-style-type: none"> • The minimum clear width of the pathway should be 0.9 meter. • Remove all temporary items from all escape routes, aisles and passageway. • Direct route of access to required exits should be provided through stairway which are maintained free of combustibles. • Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. <ul style="list-style-type: none"> - 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. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • Provide fire extinguisher at occupied roof 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. • 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. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety |

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| | Plan & should kept record properly. |
| <p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p> | <ul style="list-style-type: none"> • Produce proper plan and design to provide step/ramp with hand rail for smooth evacuation from GF south side of the final egress route, and at 2nd floor north-west corner exit route to outside of the factory. • 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 exit door. - Minimum clear width should be 0.9 meter. • Prepare proper plan & design for staircase. - Minimum clear width should be 0.9 meter. • Prepare proper plan & design for another staircase. - Minimum clear width should be 0.9 meter. Or rearrange the occupant load at floor wise to fulfill the requirement. • 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 0.75 hours fire rated doors in all stair way encloses. (Also require fire rated door at the floor occupied by other tenants) • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 1st floor- substation room & 2nd floors boiler room, which located at the adjacent to production area. • 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 |

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| | <p>doors. Aisles should be provided with a minimum 2 lux.</p> <ul style="list-style-type: none"> • 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) • Install Manual activation call point at all exit routes • An automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire. • 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. • 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 building approval from issuing authority • 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. |
| <p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p> | <ul style="list-style-type: none"> • Execute the step/ramp with hand rail for smooth evacuation from GF south side of the final egress route, and at 2nd floor north-west corner exit route to outside of the factory. • Install exit door as per plan and design. - Minimum clear width should be 0.9 meter. • Install another staircase as per plan and design. - Minimum clear width should be 0.9 meter. • Provide 4 hours fire rated barriers with 2 hours fire rated door at 1st floor-substation room & 2nd floors boiler room, which located at the adjacent to production area. • Install automatic detection system with automatic fire |

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| | <p>alarm and control panel.(Also needs to cover the floors occupied by other tenants)</p> <ul style="list-style-type: none"> • 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. |
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(B): Recommendations for Electrical Safety corrective actions:

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| <p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p> | N/A |
| <p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p> | N/A |
| <p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p> | <ul style="list-style-type: none"> • Necessity and capacity of the electrical substation shall be set by regulations in the Electricity Act or by the relevant electrical utilities. • 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. • 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. • 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign. 2. The source of illumination should be providing not less than 50 lux. • Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. |

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| | <ul style="list-style-type: none"> • 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 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 cable penetrations through walls adequately with fire resistive elements. • Provide adequate earthing to body and doors to all DBs. Ensure that all electrical panels provided with proper and separate earth potential. |
| <p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p> | <ul style="list-style-type: none"> • 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. • Substation should be on lowest floor level, with easy |

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| | <p>access for maintenance.</p> <ul style="list-style-type: none">• Make suitable arrangements to prevent storm water to enter substation / transformer room.• Provide 4 hour fire rated walls all around the generator room on ground level.• Relocate generator set in substation building / adjacent to substation room.• Provide and maintain proper clearance in all sides of generator for ease of maintenance.• 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 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.• 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. |
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