

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Sadat Sweaters Ltd. |
| Address of the Factory | : Uttar Lehailkoir, National University, Joydevpur, Gazipur |
| Present Status of the Factory | : Shutdown condition. |
| Structural Assessment Conducted by | : TUV |
| Date of Structural Inspection | : 1 st April, 2015 |
| Fire Assessment Conducted by | : TUV |
| Date of Fire Inspection | : 1 st April, 2015 |
| Electrical Assessment Conducted by | : TUV |
| Date of Electrical Inspection | : 1 st April, 2015 |
| BGMEA Membership No. | : 4919 |

BASIC INFORMATION:

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

- i. Building Usage Type : Sweater Factory.
- ii. Structural System : Truss profile shed supported by RCC column, GI pipe and masonry wall..
- iii. Floor System : Truss profile shed and partially wooden frame profile shed.
- iv. Floor Area : Knitting shed 12500 sq. ft, winding shed 1872 sq.ft. Finishing shed 13580 sq.ft office and finishing shed 5504 sq.ft. Total ground floor area of those four sheds are 33456 sq. ft.
- v. No. of Stories : Single storey
- vi. Construction Year : Single phase in 2008
- vii. Foundation Type : Not mentioned
- viii. Design Drawings : Not available.(For all shed)
- ix. Soil Investigation Report : Not Available
- x. Construction Materials : Brick aggregate.
- xi. Generator : Available at finishing 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:

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| Short Term (Immediate) | : N/A |
| Mid Term (6-weeks) | : 1. As-built architectural and structural drawings to be prepared for knitting & winding shed and submitted for approval for all shed buildings by appropriate authority. 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 recommendation |
| Long Term (6-months) | : 1. Slenderness of MS pipe column needs to be checked by building engineer. The lateral system is required to ensure the stability of structure & Carry out any remedial actions as directed |

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by the Building Engineer for slenderness and lateral stability system.

2. Plasters need to be removed for inspection in affected areas to check by building engineer whether the structural walls are affected or not.

3. The connection of steel structure needs to be checked by building engineer. The bracing system and tie between purlin are required to ensure the stability of the steel shed and Carry out any remedial actions as directed by the Building Engineer for non-engineered connection and bracing system

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"> • 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, - All exit doors should be clearly marked for easy identification. - Signage should be uniform • Periodically check alarm call points, alarm & detection system - Maintain the record properly. • Provide fire extinguisher at all shed building and to keep the record for re filling & properly tagged. • Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase fire fighting. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety 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"> • 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. • Prepare proper plan & design for emergency exit door. - Minimum clear width should be 0.9 meter. • Prepare proper plan & design for discharge floor exit door. - Minimum clear width should be 0.9 meter. • Prepare proper plan and design for 4 hrs fire rated barriers |

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| | <p>with 2 hrs fire rated doors at ground floor generator and boiler room which located at the adjacent to finishing section.</p> <ul style="list-style-type: none"> • 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. • Design and plan to provide automatic detection system with automatic fire alarm. • Install Manual activation call point at all exit routes • Automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire. • Design and plan to install dedicated fire pump with alternate backup power supply. • plan and design to provide dedicated water storage tank for firefighting operation • Power backup supply should be provided for fire alarm system. • Visual fire alarm should be place at the high noise area. (Generator & boiler room) • Obtain fire license with mention area from issuing authority • Obtain the valid 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"> • Install emergency 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 hrs fire rated barriers with 2 hrs fire rated doors at ground floor generator and boiler room which located at the adjacent to finishing section. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline. • 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> | <ul style="list-style-type: none"> • Over current protection devices (Circuit breakers) should be installed at all distribution panels |
| <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> | <ul style="list-style-type: none"> • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. |
| <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"> • 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 illumination for substation. • 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. • 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. • 1. All stranded conductors > 6mm² to be provided with cable sockets 2. All stranded conductors < 6 mm², at exposed end should be soldered / crimped. • Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. • 1. Overhead service connections should be covered and meet the requirements mentioned in RMG Guidelines. 2. Provide supports for main service line complete with adequate insulation. • 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 (LT/MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands. |

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| | <ul style="list-style-type: none"> • 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 separate earthing connection to electrical equipments. 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. |
| <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"> • Provide 4 hour fire rated walls all around the transformer / generator room on ground level. • 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. • Relocate the MDBs with easy access. Ensure that all MDBs / SDBs should have easy accessibility. • Energy meters should be installed at convenient height (At least 1.5 m above ground) with proper protection. • 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. • 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. • Power cables/ telecommunication cables / antenna cables should be laid separately. • 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 (LT/MDB/DB/SDB)'s with |

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| | <p>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.</p> <ul style="list-style-type: none">• 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. |
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