

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Sir Denim Ltd.
Address of the Factory	: 202, Afnan, Plaza, Mollartek, Dakhin Khan Uttara, Dhaka.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Structural Inspection	: 2015-06-17
Fire Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Fire Inspection	: 2015-06-17
Electrical Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Electrical Inspection	: 2015-06-17
BGMEA Membership No.	: 4753

BASIC INFORMATION:

The following information was noted:

- i. Building Usage Type : Garment Factory
- ii. Structural System : R.C.C beam-slab structure.
- iii. Floor System : RCC Beam Slab system.
- iv. Floor Area : The typical plinth area of 6 storied RCC building is 32,112sft.
Total Operational area is 96,338 sft.
- v. No. of Stories : 10-Storey + 1 Basement
- vi. Construction Year : 2011
- vii. Foundation Type : Cast-In-Situ RCC Pile foundation.
- viii. Design Drawings : Available.
- ix. Soil Investigation Report : Available.
- x. construction Materials : Stone Aggregate.
- xi. Generator : South side at ground floor of the building.

RECOMMENDATIONS FOR CORRECTIVE ACTION: No Critical or high risk observations were found during the day of assessment in the factory. During the assessment, some non-conformity was found for which long term corrective action is recommended.

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: N/A
Long Term (6-months)	: 1. As built 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 structural design.

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

(A): Recommendations for Fire Safety corrective actions:

<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 • Rearrange the evacuation pathway to ensure the minimum width. • Remove all temporary items from all escape routes, aisles and passageway. • Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways. <ul style="list-style-type: none"> - Illuminated exit sign should be posted above the exit door - Provide directional signs wherever necessary. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • Provide sufficient fire extinguisher at factory building and to keep the record for re filling. • The first aid hose and standpipe performance should be checked periodically and properly tagged. • 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 exit door. - Minimum clear width should be 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 2 hours fire rated doors in all stair way encloses.(Also require fire rated door at the floor occupied by other tenants) • 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

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	<p>fire resistance rating of the walls of the smoke proof fire rated entry lobby.</p> <ul style="list-style-type: none">• Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor 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 evacuation route.• 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 4 hours fire rated barriers with 2 hours fire rated door at 4th floor boiler room, which located at the adjacent to operational area.• 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.• Produce design and plan for automatic detection system with automatic fire alarm.(Also needs to cover the floors occupied by other tenants)• Install Manual activation call point at all exit routes.• 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.• Replace existing 1 inch hose pipe replace with 1.5 inch hose pipe to meet the requirement of RMG guideline.• Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline.• 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.• Visual alarm should be placed at the generator room.• Obtain fire license / permit from issuing authority.
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	<ul style="list-style-type: none"> • Implement to a single fire safety management system with approvals from all tenants in the factory building.
<p>Long Term</p> <p>(The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none"> • Install exit door as per plan and design. <ul style="list-style-type: none"> - Minimum clear width should be 0.9 meter. • Install staircase as per plan and design. <ul style="list-style-type: none"> - Minimum clear width should be 0.9 meter. • Install smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. • 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. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to evacuation route. • Implement the plan for fire separation 4 hours fire walls and 2 hours fire rated self-closing doors in basement level. • Provide 4 hours fire rated barriers with 2 hours fire rated door at 4th floor boiler room, which located at the adjacent to operational area... • Install automatic detection system with automatic fire alarm.(Also needs to cover the floors occupied by other 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.

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(B): Recommendations for Electrical Safety corrective actions:

<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 <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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated. • 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"> • Provide rubber mats of adequate size in front of distribution panel (MDB, DBs, and SDBs). • Install smoke detection and provide firefighting equipment in the generator room. • 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 cable connections with properly soldered / welded lugs at (MDB/DB/SDB)'s. 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

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	<p>fuse size, marking for DBs identifying end use load, voltage, number of phases.</p> <ul style="list-style-type: none"> • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • 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 all MDB/DB/SDBs. 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. • Provide adequate ventilation arrangements for Generator room. • Provide 4 hour fire rated walls all around the generator room on ground level. • 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. • Provide calibrated Ammeters at distribution boards (MDB / DB). • For buildings > 20m high, provide at least one vertical shaft of 200 x

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	<p>400 mm for every 1500 sqm. Floor area.</p> <ul style="list-style-type: none">• Provide standby power for lifts by a self-contained generator set to be operated automatically.• 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 MDB/DB/SDBs with non-flammable materials. In addition: 1. Ensure that MDB / DB 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'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.
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