

## **Summary of Preliminary Assessment on Structural, Fire and Electrical Safety**

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Name of the Factory	: SK Apparels Ltd. (Building-3)
Address of the Factory	: Shovapur, Rajfulbaria, Savar, Dhaka
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 24 May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 24 May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 24 May, 2015
BGMEA Membership No.	: 5781

### **BASIC INFORMATION:**

The building is a one storied non-engineered roof truss corrugated Iron (CI) shed. The following information was noted:

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|-------------------------------|--|
| i. Building Usage Type        | : Garment Factory.   |
| ii. Structural System         | : Truss corrugated PEB shed.   |
| iii. Floor System             | : N/A.   |
| iv. Floor Area                | : 1125 sft   |
| v. No. of Stories             | : 1 storied  |
| vi. Construction Year         | : 2012.  |
| vii. Foundation Type          | : Spread Footing   |
| viii. Design Drawings         | : Available: approval plan, architectural drawing.<br>Not Available: as built machine layout plan, materials test reports, structural design drawing |
| ix. Soil Investigation Report | : Not Available  |
| x. Construction Materials     | : N/A.   |
| xi. Generator                 | : Outside of 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) | :   |
| Mid Term (6-weeks)     | : 1. Building Engineer to check the structure and connection against suctional wind force.  |
| Long Term (6-months)   | : 1. Update calculations showing the structural adequacy of the building structure taking into account the factory design imposed loading and the as built structure.<br>2. Develop a set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings. |

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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>	<p>Factory manager or director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</p> <p>Ensure adequate numbers of fire drills under the Fire Safety Plan.</p> <p>All the firefighting equipment's need to test with proper documents.</p> <p>Factory needs to have sufficient number and width of marked aisles in all floors of all sheds and buildings where aisles need not be less than the most restrictive of the following: (a) 1.1 m where serving an occupant load of more than 50; (b) 0.9 m where serving an occupant load of 50 or less.</p> <p>Factory needs to have sufficient total width of marked aisles (5 mm per occupant) in all floors of the sheds and buildings. Factory needs to ensure adequate numbers of exit signs which need to be visible from any positions and comply with the following conditions:          (a) The color and design of lettering, arrows and other symbols on exit signs needs to be in high contrast with their background;          (b) Words on the signs needs to be at least 150 mm with a stroke of not less 20 mm; (c) The source of illumination, contrast, intensity and luminance needs to be at least 50 lux, 0.5, 5.0 foot-candles and 0.2 cd/m<sup>2</sup> respectively.</p> <p>Lights in storage area needed to be installed with protective covers and conduits.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Need to have as built drawing with floor machine layout showing means of escape.</p> <p>Illuminated emergency light needs to be covered in all floors, exits, staircases and aisles. The intensity of illumination by means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated with escape lighting to a level of not less than 2.5 lux at floor level.</p> <p>Emergency back-up power needs to be connected for critical</p>

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	fire safety system and not less than 30 minutes in case of failure of power supply.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Factory needs to have a proper pre-plan for fire department. Factory needs to maintain minimum width of exit 0.9 m and height 2 m.</p> <p>(a) Factory needs to ensure minimum of 2.3 m<sup>2</sup> of space per occupant; (b) Reduce the occupants from the sewing shed or shift occupants from sewing shed to another floors.</p> <p>Storage area need to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors Boiler and generator rooms need to have a 4 hours fire resistance wall and entry also needs to have 2 hours fire rated door.</p> <p>(a) Every portion of building needs to be covered and all effectively enclosed spaces need to be considered separately based on the limits of spacing for types of detectors concerned. Staircases need to be covered by detectors on each floor. (b) Each bay shall be considered as separate compartment and detectors shall be installed considering each bay an independent compartment. (c) Hoist, elevators and similar openings, windows, doors, ventilators and inlet ducts of an air-conditioning system shall be covered by detector.</p> <p>Factory needs to install manually operated electrical fire alarm system with single or multiple call boxes as well as automatic fire alarm system for centralized automatic fire detection and alarm system.</p> <p>Factory needs to install control panel for centralized automatic fire detection and alarm system.</p> <p>Install proper standpipe system having at least 75 mm dia of standpipe.</p> <p>Factory needs to install 1 riser per 1000 m<sup>2</sup> of floor area and 38 mm diameter of fabric hoses with variable nozzle.</p> <p>Install standard standpipe and hose system with fire pump to ensure required hose pressure at the highest and most remote part of the building.</p> <p>Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</p> <p>Factory needs to install dedicated fire pump with sufficient capacity and backup power.</p>

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	Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.
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### ***(B): Recommendations for Electrical Safety Corrective Actions:***

<p><b>Immediate</b></p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>Ensure cables are properly terminated at its point of termination using appropriate size and type of lug.</p>
<p><b>Short Term</b></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>	<p>Provide two separate and distinct connections of earthing for each generator.</p> <p>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Ensure proper earthing connections at all electrical equipment. Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Ensure inspection for earthing system is being completed and documented.</p>
<p><b>Mid Term</b></p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Install appropriate number and type of safety signage and fire-fighting equipment at generator room. Also ensure graded rubber mats are provided in front of all distribution boards.</p> <p>Provide Instruction board for first aid and artificial respiration in the generator room.</p> <p>Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</p> <p>Rewire to ensure single cable at busbar and/or circuit breaker terminal to avoid loose connection, overloading and separate controlling of each circuit/branch circuit.</p> <p>Replace wooden bases with metal clad construction for mounting the lighting boards and switch controls.</p> <p>Ensure all electrical wiring/cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical equipment and wiring.</p>

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	<p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Connect all metal in the building to the building earthing system.</p> <p>Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point, ) of overheating { ambient+( 20°C-40°C)} and take proper action.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</p> <p>Inspect electrical switchgear and panel boards on an annual basis.</p> <p>Ensure overhead service connections led via roof poles or service masts made of GI pipe having a bend at the top and installed on the outer wall.</p> <p>Ensure the generator room has adequate fire separation from the production area/main building.</p> <p>Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. Replace Circuit breakers with metal enclosed body.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is obtained as per list.</p> <p>Provide adequate covers on cable trenches/channel. Ensure surface/exposed wiring are run either horizontally and vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support.</p> <p>Provide proper cable terminator/conductor for stranded</p>

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	<p>conductors.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the building.</p>
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