

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

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Name of the Factory	: Southeast Sweaters Ltd.
Address of the Factory	: 2893-2894, Dakkinkhan Chairman Bari, Uttara, Dhaka-1230, Bangladesh.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: BUET
Date of Structural Inspection	: 2014-11-17
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-04-25
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-04-25
BGMEA Membership No.	: 3624

### **BASIC INFORMATION:**

The following general information was noted:

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|-------------------------------|---|
| i. Building Usage Type        | : Garment Factory.  |
| ii. Structural System         | : RCC beam-column frame.  |
| iii. Floor System             | : Beam slab.  |
| iv. Floor Area                | : Approximately 18,530 sft per floor.   |
| v. No. of Stories             | : Existing four storied.  |
| vi. Construction Year         | : 1999-2000   |
| vii. Foundation Type          | : Isolated column footings (as per drawing).  |
| viii. Design Drawings         | : As-built drawings partially available.  |
| ix. Soil Investigation Report | : Available (5N and Associates. New Elephant Road, Dhaka, May 2013).  |
| x. construction Materials     | : Reinforced Concrete (No test report on construction materials is Available), Coarse aggregate: Brick chips. |
| xi. Generator                 | : Located outside the main building.  |

**RECOMMENDATIONS FOR CORRECTIVE ACTION:** The following general information was noted:

Short Term (Immediate) : N/A

Mid Term (6-week) : N/A

Long Term (6-months) :

- A minimum of 4 number 4 inch diameter cores are to be taken (3 inch if taken from columns) within next 6 months. A scanning of rebar's of the columns at the ground floor locations is also to be accomplished within 6 months.
- The consultants recommended storing of any type of cartons, boxes, finishing materials and fabrics in such a manner so that intensity of loading does not exceed 60 psf (3 kN/m<sup>2</sup>).
- No horizontal or vertical extension shall be made without detailed investigation.

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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"> <li>• Factory safety Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</li> <li>• All the firefighting equipment need to be tested with proper documents.</li> <li>• Factory needs to have sufficient number &amp; width (0.9 m) of marked aisles at all floors of the building.</li> <li>• Lights in storage area need to be installed with protective covers and conduits</li> <li>• Combustibles are to be managed with yarn store. Storage facilities with no air-conditioning duct shall be minimum 2.9 m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack.</li> <li>• Ensure illuminated exit signs in floors so that it is visible from all positions.</li> </ul>
<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"> <li>• Factory needs to have as built drawing with proper dimensions showing all the means of escape</li> <li>• Provide handrail on both sides of stairways.</li> <li>• Need to install intermediate handrail at stair-02.</li> </ul>
<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"> <li>• Factory needs to have a proper pre-plan for fire department.</li> <li>• All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.</li> </ul>

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	<ul style="list-style-type: none"><li>• Storage area needs to be protected with 2 hour rated construction &amp; 1.5 hour rated opening or doors.</li><li>• Generator room needs to be fire separated with hour fire rated enclosure and hour rated opening having direct access from outside.</li><li>• All the exits connecting to the staircase-1 &amp; 2 need to be protected with fire and smoke resistant enclosures and opening (2 hour rated enclosure and 1.5 hour rated door) and provide a protected route from all through the stairway to the final exits.</li><li>• Factory need to install centralized and automatic fire detection &amp; alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</li><li>• The factory needs to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.</li><li>• Factory needs to install control panel board for detection and alarm system at required location.</li><li>• Install proper standpipe system having at least mm dia of standpipe. First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility shall be provided.</li><li>• Provide the required flow of 1900 liter/min and minimum pressure of 200 kPa for supplying first aid hose (38 mm nominal) OR Hydraulically design the standpipe and hose system to get the required pressure.</li><li>• Factory needs to install Siamese connection after installation of stand pipe system, hose system and fire pump.</li><li>• Install dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory. Required for adequate pressure of hose.</li><li>• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment.</li></ul>
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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>	<ul style="list-style-type: none"> <li>• Find out the cause (improper cable selection, improper termination, rusted connection, heat source etc.) of insulation damage and take proper action including replacing cable where necessary.</li> <li>• 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 (&gt; ambient+ 400C) and take proper action.</li> </ul>
<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"> <li>• Ensure all switchboards and distribution boards (including panel door) are earthed properly.</li> <li>• Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</li> <li>• Ensure proper earthing connections at all electrical equipment.</li> <li>• Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</li> <li>• Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</li> </ul>
<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"> <li>• Fix appropriate type of safety signage at generator room and provide graded rubber mats in front of all distribution boards.</li> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Provide Instruction boards for first aid and artificial respiration in the generator room.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</li> <li>• Rewire to avoid the use of multiple cables on outgoing side of MCB's/ MCCB's. and busbar</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate support or mechanical guards for electrical equipment where necessary. Provide adequate covers on cable channel.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Ensure discrimination is achieved between circuit breakers used for protection of main circuit and the sub-circuits derived therefrom.</li> <li>• Connect all metal in the building to the building earthing system.</li> <li>• 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+( 200C-400C)} and take proper action..</li> </ul>
<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"> <li>• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</li> <li>• Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</li> <li>• Inspect electrical panel boards on an annual basis to ensure that the equipment is in good working condition.</li> <li>• Ensure overhead service connections are led into the building via adequate size and type of service masts.</li> <li>• Ensure the generator room has adequate fire separation from the production area.</li> <li>• Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</li> <li>• Ensure panel boards have no opening and all live internal components are concealed properly.</li> <li>• Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</li> <li>• Ensure each distribution board is provided with a circuit list and means of identification is obtained as per list.</li> <li>• Provide proper cable terminator/conductor for stranded conductors.</li> <li>• Install separate distribution boards for lighting and power circuits.</li> <li>• Install lightning protection system on the building.</li> </ul>