

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

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Name of the Factory	: Arttex Sweaters Ltd.
Address of the Factory	: Toyabpur, Zirabo, Ashulia, Savar, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 13 <sup>th</sup> April, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 13 <sup>th</sup> April, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 13 <sup>th</sup> April, 2015
BGMEA Membership No.	: 5062

### **BASIC INFORMATION:**

The assessed factory building is one storied roof truss CI (Corrugated Iron) shed over Brick and RCC column. The structural system of the building is RCC and brick column and steel truss roof shed. The following general information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC and masonry column with non-engineered shed.
iii. Floor System	: Roof Shed.
iv. Floor Area	: Total floor area 10,208.25 sft.
v. No. of Stories	: Single Storey.
vi. Construction Year	: 2014.
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Unavailable.
ix. Soil Investigation Report	: Unavailable.
x. Construction Materials	: Brick aggregate in column.
xi. Generator	: At ground floor.

### **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:

Short Term (Immediate)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none"><li>• Design should be checked by the Building Engineer to verify the lateral stability of the shed and confirm the requirement of any bracing between the truss members.</li></ul>
Long Term (6-months)	: <ul style="list-style-type: none"><li>• Install horizontal bracing at the roof system if required.</li><li>• Structural engineer to prepare full set of structural drawing.</li></ul>

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

**(A): Recommendations for Fire Safety corrective actions:**

Immediate <i>(the factory should not continue to be</i>	N/A
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<p><i>occupied until these non-conformities have been rectified):</i></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>• Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</li> <li>• All the firefighting equipment's need to test with proper documents.</li> <li>• Ensure minimum width of aisles as follows: <ul style="list-style-type: none"> <li>(a) Seats on both sides of the aisle 1 m</li> <li>(b) Seats on one side of the aisle 0.9 m</li> </ul> </li> <li>• Lights in storage area needed to be installed with protective covers and conduits.</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>• Needs to have as built drawing with floor machine layout showing means of escape with proper dimension.</li> <li>• Factory needs to have a valid fire license for the full occupied area.</li> <li>• Fire manager/Director need to have safety training from proper authority &amp; worker of the factory should as far as possible be trained for use fire extinguisher.</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> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floor. (Exits and Stair), (Escape route)</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 service &amp; civil department.</li> <li>• Final exit-1 &amp; 2 needs to be fire separated by 2 hour fire rated construction with 1.5 hour rated door or opening from the knitting section and accessories store respectively, also need to provide the protected route till to reach safe refuse area.</li> <li>• Storage areas need to be protected with 2 hour rated</li> </ul>

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	<p>construction &amp; 1.5 hour rated opening or doors.</p> <ul style="list-style-type: none"> <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 need 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>• Install automatic fire and smoke detection system throughout the building to cover every portion in that building.</li> <li>• Install proper standpipe system having at least 75 mm dia of standpipe.</li> <li>• Factory needs to install 1 riser per 1000 m2 of floor area &amp; 38 mm dia of hoses with variable nozzle.</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 be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection</li> <li>• Install dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</li> <li>• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900liter x 75min=142500 liters water storage tank.</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>• Remove all unused cables from distribution boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug.</li> </ul>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan</i></p>	<ul style="list-style-type: none"> <li>• Discharge the generator exhaust to the exterior of the building in a safe location.</li> </ul>

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<p><i>immediately (a week) and should be a regular activity</i></p>	<ul style="list-style-type: none"> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure all 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>• Install earthing pit for the factory with adequate provision for inspection of the earthing system and ensure inspection is being completed and documented.</li> </ul>
<p>Mid Term <i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide Instruction board 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 from the earth busbar of distribution boards and ensure continuous earth path is back to main building intake.</li> <li>• Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate covers on cable channel.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Connect all metal in the building to the building earthing system.</li> <li>• Ensure Lighting fixtures are supported from the structure properly.</li> </ul>

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<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.</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 distribution 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 applicable circuit.</li><li>• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</li><li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Install lightning protection system on the building.</li></ul>
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