

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

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Name of the Factory	: ASR Sweater Ltd( Shed 1)
Address of the Factory	: Mulaied, Maona chowrasta, Sreepur, Gazipur .
Present status of the factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant.
Date of Structural Inspection	: 2015-07-27
Fire Assessment Conducted by	: VERITAS Engineering & Consultant.
Date of Fire Inspection	: 2015-07-27
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant.
Date of Electrical Inspection	: 2015-07-27
BGMEA Membership No.	: 6024

**BASIC INFORMATION:** The present garment factory is a commercial pre- engineered steel shed building with steel column. The following general information was noted:

- i. Building Usage Type : Garment factory.
- ii. Structural System : Steel column –beam portal frame
- iii. Floor System : N/A
- iv. Floor Area : Total floor area 61054 sq. ft.
- v. No. of Stories : Single stored
- vi. Construction Year : 2014-2015
- vii. Foundation Type : Isolated footing (shallow foundation).
- viii. Design Drawings : Available- approval drawing, architectural drawing, soil test report found, as built machine layout plan.  
Not available: as built structural drawing, test report of construction materials.
- ix. Soil Investigation Report : Available.
- x. construction Materials : Brick Aggregated and pre-fabricated steel.
- xi. Generator : At separate structure.

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### 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) : N/A

Mid Term (6-weeks) : N/A

Long Term (6-months) : 1. A qualified structural/Building engineer should be involved to prepare as built structural drawing and all necessary drawings.

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 need to have proper testing plan &amp; record for fire safety equipment.</li> <li>• Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat.</li> <li>• Factory needs to close all the opening in the rated wall of the stair case by 2 hours rated construction/enclosure or 1.5 hours rated doors.</li> <li>• Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum</li> </ul>

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	<p>2.9m 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.</p> <ul style="list-style-type: none"> <li>• All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.</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>• Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</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>• Storage area need to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route).</li> <li>• Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of failure of power supply.</li> </ul>
<p>Long Term <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>• The final exit-7 and final exit-5 escape routes need to have 2 hour rating for walls (enclosure) and 1.5 hour for door openings with the others occupancies till to reach the area of refuge.</li> <li>• The final exit-5 escape routes need to have 4 hour rating for walls (enclosure) and 2 hour for door openings with the others occupancies till to reach the area of refuge.</li> <li>• Child care room is needed to be separated from the by 3 hours fire rated construction with 3 hours fire rated door.</li> <li>• Chemical store need to be protected by 4 hours fire rated construction with 2 hours fire rated door/opening from the accessories store and working floor.</li> <li>• Factory need to develop the safety management of flammable liquids storage according to NTPA guideline.</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> </ul>

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	<ul style="list-style-type: none"> <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>• Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</li> <li>• Factory Need to install 75 mm dia Standpipe and hose system in the factory building.</li> <li>• Install 1 riser per 1000 m of floor area &amp; Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area.</li> <li>• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger aid hose (38mm nominal) may have a minimum pressure of 200 Kpa. For standpipe supplying first hose shall be at least 300 Kpa.</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>• Factory needs to have dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</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/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point, ) of overheating (&gt; ambient+ 40 C) and take proper action.</li> </ul>
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<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 distribution boards (including panel door) are earthed properly.</li> <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> <li>• Ensure inspection of all earthing system 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>• Install appropriate type of safety signage at substation and 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 substation room and 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 avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection.</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>• 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.</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 switchgear and panel boards on an annual basis.</li> </ul>

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	<ul style="list-style-type: none"><li>• Ensure all high tension cables are laid following standard cable laying techniques.</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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