

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

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Name of the Factory	: Arrow Sports Wear Ltd.
Address of the Factory	: Tea Garden Road, Vannara, Mouchak, Kaliakoir Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 28 <sup>th</sup> February, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 28 <sup>th</sup> February, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 28 <sup>th</sup> February, 2015
BGMEA Membership No.	: 2456.

### **BASIC INFORMATION:**

The assessed factory building was a single storied pre-fabricated shed. The structural system of the building is RCC beam column frame at periphery and 4” diameter steel hollow pipes as central column with steel truss roof shed. The building is used for industrial purpose; Arrow Sports Wear Ltd. operates in the entire shed. The following information was noted:

i. Building Usage Type	: Garments Factory.
ii. Structural System	: Pre-fabricated shed with RCC column & steel hollow pipes
iii. Floor System	: N/A (as it is single storied Pre-fabricated shed)
iv. Floor Area	: Total floor area 12480 sft.
v. No. of Stories	: Single storey.
vi. Construction Year	: 2008.
vii. Foundation Type	: Isolated column footing foundation.
viii. Design Drawings	: Not available: Structural drawing, architectural drawing, as built machine layout plan, material test report and floor load plan, Approval plan.
ix. Soil Investigation Report	: Available(Report name didn't match with the factory name but others data was matched)
x. Construction Materials	: Brick aggregate and steel truss.
xi. Generator	: Not available.

### **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 in the long direction.</li><li>• Structural engineer to prepare full set of structural drawing, as built drawing and prepare calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.</li></ul>
Long Term (6-months)	:

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- Install horizontal bracing at the roof system if required.
- Develop set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation 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>• 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>• Combustibles are to be managed with good housekeeping. 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 adequate exit signs in all 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 proper dimensions showing means of escape.</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 doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Illuminated emergency light needs to be covered in floor, exits and aisles. The intensity of illumination by means of escape lighting needs to be equal or more than</li> </ul>

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	<p>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> <ul style="list-style-type: none"> <li>• Emergency back-up power needs to be connected for (a) exit sign, (b) fire alarm and detection system, (c) emergency lighting, (d) automatic fire detection and alarms systems.</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>• The final exit-2 escape routes need to protected by 2 hours fire rated construction with 1.5 hours fire rated doors from the storage area (bonded ware house at GF) and continue till to reach the area of refuge.</li> <li>• Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors.</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 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 detection and alarm system at required location.</li> <li>• Install proper standpipe system having at least 75 mm diameter of standpipe. First aid hose system (38 mm nominal) shall be provided. In addition 50 mm or larger hose connection facility shall be provided.</li> <li>• Factory needs to install 1 riser per 1000 m<sup>2</sup> of floor area and 38 mm diameter of hoses with variable nozzle.</li> <li>• Install standard standpipe and hose system as well as fire pump system to ensure required hose pressure at the highest and most remote part of the building.</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> <li>• Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900ltr 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>• N/A</li> </ul>
<p>Short Term</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>	<ul style="list-style-type: none"> <li>• Ensure panel door of distribution boards 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</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>• Ensure graded rubber mats are provided in front of all panel boards.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Connect all metal in the building to the building earthing system.</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>• Ensure distribution boards have no opening and all live internal components are concealed properly.</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 and install lightning protection system on the building.</li> </ul>