

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

Name of the Factory	: Atn Fashion Ltd. (Shed)
Address of the Factory	: Sarabo, Kashimpur, GazipurSadar, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 3 <sup>rd</sup> April, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 3 <sup>rd</sup> April, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 3 <sup>rd</sup> April, 2015
BGMEA Membership No.	: 5329.

### **BASIC INFORMATION:**

There are two buildings in the factory premises. Building 1 is a 3 storied dual system (RCC beam column frame and flat plate system) structure. Building 2 is a one storied Pre-Engineered steel shed. This summarised report only for Building-2. Building 2 is a one storied pre-Engineered steel shed. 50% of the shed is with I-Section steel beam column and about 50% area is Pre-engineered shed with steel beam over RCC column. This full Shed (100000 sft) is used for industrial purpose. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Steel beam with steel column and RCC column frame system.
iii. Floor System	: Pre-engineered shed.
iv. Floor Area	: Total floor area for Shed is 10000 sft.
v. No. of Stories	: Single storey.
vi. Construction Year	: Unknown.
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Unavailable.
ix. Soil Investigation Report	: Unavailable.
x. Construction Materials	: Brick aggregate and steel joist.
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>• Structural engineer to prepare full set of as built structural and architectural drawing.</li></ul>
Long Term (6-months)	: <ul style="list-style-type: none"><li>• Provide protective coating to cover the exposed joints from corrosion.</li><li>• Carry out ongoing maintenance works.</li></ul>

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

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### (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>• Factory needs to have sufficient total width of aisles (5 mm per occupant) at every floor.</li> <li>• Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 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.</li> <li>• Factory need to ensure adequate number of exit sign as it is visible from any the following position and comply with :condition             <ul style="list-style-type: none"> <li>a) The color and design of lettering, arrows and other symbols on exit signs shall be in high contrast with their background. (b) 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/ m2 respectively.</li> </ul> </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>• Factory needs to have valid fire license covering 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 equipment.</li> <li>• All the exit doors of staircase enclosure need to be</li> </ul>

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	<p>replaced by side swinging fire rated doors so that the staircase remains free from smoke as well as the lockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <ul style="list-style-type: none"> <li>• Provide handrail on both sides of all stairways.</li> </ul> <p>(a) Illuminated emergency light needs to be covered in floor, exits and aisles. (b) 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>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>• Factory needs to rearrange the floor layout or need to provide more exits to fulfill the minimum requirements.</li> <li>• For building-1 East-middle main exit-1 need to fire separated with knitting section and dining room and North-west Exit-3 need to fire separated with knitting section, also for shed West side Exit-4 need to fire separated with dying operation by 2 hr rated construction &amp; 1.5 hr rated door. But North middle-Exit-2 near to road &amp; safe discharge.</li> <li>• Storage area need to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Generator, substation &amp; transformer room needs to be fire separated with 4hr fire rated enclosure and 2hrs rated opening having direct access from outside.</li> </ul> <p>Boiler room needs to be separated with 4 hours fire rated enclosure and 2hours rated door/opening</p> <ul style="list-style-type: none"> <li>• All the stairs need to be protected with fire and smoke resistant enclosures &amp; opening (1.5 hours rated enclosure and 1 hour rated door)and provide a protected route from all though 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 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 and automatic fire detection and alarm system at required location.</li> <li>• Factory need to install proper standpipe system having</li> </ul>

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	<p>at least 75 mm diameter of standpipe.</p> <ul style="list-style-type: none"> <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>• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 kPa and standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 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> <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>• 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 all distribution boards (including panel door) are earthed properly.</li> <li>• Ensure distribution boards are clean and all openings are sealed.</li> <li>• Replace wooden bases with metal clad construction for mounting the circuit breakers and switch controls.</li> <li>• Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</li> <li>• Ensure all distribution boards (including panel door) are earthed properly.</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>• Post safety signage and install appropriate number and type of firefighting equipment in substation and generator rooms. Also ensure graded rubber mats are provided in front of all distribution boards.</li> <li>• Provide Instruction board for first aid and artificial</li> </ul>

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	<p>respiration in the substation room and generator rooms.</p> <ul style="list-style-type: none"> <li>• Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil.</li> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure distribution boards have a minimum clearance of 1 m (39 in) in front.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</li> <li>• Remove looping and bunch of cables within distribution boards.</li> <li>• Consult with a qualified electrical engineer and ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Use noncombustible material to make channel and provide adequate covers on cable channels.</li> <li>• Ensure cable joints in respect of conductivity, insulation and mechanical strength.</li> <li>• Ensure all electrical cable properly terminated at its point of termination using appropriate size and type of lug where necessary.</li> <li>• Provide emergency power connection for life safety loads (fire alarm, fire pump, emergency lighting, exit signage, etc.) temporarily within 6 weeks and find out a permanent solution within 6 months.</li> <li>• Ensure overcurrent protection device (circuit breaker) for each circuit/branch circuit</li> <li>• Ensure Lighting fixtures are supported from the structure properly.</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.</li> <li>• Establish a periodical Insulation and earth Resistance Measurement Program.</li> <li>• Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition.</li> </ul>

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	<ul style="list-style-type: none"><li>• Ensure the substation and generator rooms have adequate fire separation from the production area/main building.</li><li>• Install security measures to ensure access to the substation is restricted.</li><li>• Ensure the generator room has adequate fire separation from the production area/main building.</li><li>• Provide adequate means of ventilation for the generator room based on the installed equipment and ensure that ventilation does not impact on fire barriers, e.g. fire dampers.</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 circuit.</li><li>• Ensure each distribution board is provided with a circuit list and all cables are identified accordingly.</li><li>• Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</li><li>• Provide cable sockets and suitable ferrules for stranded conductors 6mm<sup>2</sup> or above and below 6mm<sup>2</sup> respectively.</li><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Install proper lightning protection system on the building.</li></ul>
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