

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

---

Name of the Factory	: ACE Apparel Ltd.
Address of the Factory	: Sataish Gazipura, Dag-744(P), Tongi, Gazipur, Bangladesh
Present status of the factory	: Under Operation.
Structural Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Structural Inspection	: 2015-06-11
Fire Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Fire Inspection	: 2015-06-11
Electrical Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Electrical Inspection	: 2015-06-11
BKMEA Membership No.	: 1719

**BASIC INFORMATION:** The present garment factory is Dual system (RCC beam column and flat plate system). The following general information was noted:

i. Building Usage Type	: Garment factory.
ii. Structural System	: RCC beam -column frame and flat plate system.
iii. Floor System	: pre-engineered steel frame roof structure on RCC beam Column structure
iv. Floor Area	: Floor area is (4750sft x 6) = 28500 sft for main factory Building.
v. No. of Stories	: 6- storied
vi. Construction Year	: 2011.
vii. Foundation Type	: Isolated footing.
viii. Design Drawings	: Available document: Approval plan, structural drawing, Architectural drawing, soil test report, and machine layout Plan, Not available: material test report and floor loading plan Have not been found.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Brick Chips (Column, Beam & slab)
xi. Generator	: Ground floor.

### **RECOMMENDATIONS FOR CORRECTIVE ACTION:**

Short Term (Immediate)	: None
Mid Term (6-weeks)	: 1. Factory Engineer to review design, loads and columns stresses in area identified above.  2. Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns].

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

- Long Term (6-months) : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Remedial action to be undertaken to prevent the seepage of water from pipes and other sources.
3. Proper slope should be maintained on the roof top.

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>• All the firefighting equipment need to be tested with proper documents.</li> <li>• Lights in storage area need to be installed with protective covers and conduits.</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> </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 prepare as built drawing (Including machine layout) 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 un-lockable doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Provide suitable handrail on both sides of stairways.</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>

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

<p>Long Term</p> <p>(The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none"> <li>• Factory needs to have a proper pre-plan for fire department.</li> <li>• Final exit route-1(Stair-1 route) need to be protected by 2 hours rated construction with 4 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from compressor room at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area.</li> <li>• Storage area need to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Boiler room needs to be separated with 4 hours fire rated enclosure and 2 hours rated door/opening.</li> <li>• All the stairs need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hour rated door) and provide the protected route from all though the stairway to the final exits.</li> <li>• Factory needs 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 for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</li> <li>• Factory needs to install proper standpipe system with having at least 100 mm dia of riser.</li> <li>• Factory needs 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 to achieve required pressure in the remote place of the factory.</li> </ul>
--	---

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

	<ul style="list-style-type: none"> <li>Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least <math>1900 \times 75 = 142500</math> liters water storage tank.</li> </ul>
--	--

### **(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 <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>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</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>Ensure graded rubber mats are provided in front of all distribution boards.</li> <li>Fill the transformer breather oil cup with fresh Oil.</li> <li>Provide two separate and distinct connections of earthing for the generator.</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 bus-bar.</li> </ul>

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

	<ul style="list-style-type: none"> <li>• Avoid the use of multiple cables on outgoing side of MCB's. Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate support or mechanical guards for electrical wiring where necessary.</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> </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> <li>• Ensure substation room has minimum area as per NTPA Table-4.3 respectively.</li> <li>• Ensure the substation room has adequate fire separation from the production building.</li> <li>• Ensure all high tension cables are laid following standard cable laying techniques.</li> <li>• Ensure the generator room has adequate fire separation from the production building.</li> <li>• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.</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 means of identification is provided as per list.</li> <li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li> </ul>

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

---

	<ul style="list-style-type: none"><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Install lightning protection system on the building.</li></ul>
--	--