

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

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Name of the Factory	: Aliza Fashion Ltd.
Address of the Factory	: East West Industrial Park Ltd, Chaydana, P.O: National University, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 18 <sup>th</sup> March, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 18 <sup>th</sup> March, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 18 <sup>th</sup> March, 2015
BGMEA Membership No.	: 5499.

### **BASIC INFORMATION:**

The assessed factory building was an 8 Storey RCC building. The structural system of the building is RCC beam column frame and beam slab floor system. All floors of the building is occupied by the assessed factory. Another 3 storied ancillary building is also used for boiler, vacuum machine and compressor room for the Aliza Fashion Ltd. The following general information were noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC beam column frame system.
- iii. Floor System : RCC beam slab floor system.
- iv. Floor Area : Total floor area of main building is 115,164 sft.
- v. No. of Stories : 8 Storey.
- vi. Construction Year : 2009-2012 (1<sup>st</sup> Phase : Up to 6<sup>th</sup> floor) and 2014 to continue (2<sup>nd</sup> Phase:7<sup>th</sup> floor)
- vii. Foundation Type : Isolated column footing.
- viii. Design Drawings : Available: Approval plan, structural design drawing, architectural design drawing, and machine layout plan.  
Not available: Material test report and floor load plan.
- ix. Soil Investigation Report : Available.
- x. Construction Materials : Brick aggregate.
- xi. Generator : Separate shed.

### **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) :
- Areas of overstress should not be used as storage.
  - Factory Engineer to review design, loads and columns stresses in the area identified above.
  - A Detail Engineering Assessment of Factory to be commenced.
- Mid Term (6-weeks) :
- Detail Engineering Assessment of Factory to be completed.

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- Leakage water pipes and joints available on roof top should be fixed or replaced.

Long Term (6-months)

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- Continue to implement load plan.
  - To keep the provision for cross ventilation.

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>	<ul style="list-style-type: none"> <li>• None.</li> </ul>
<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 of 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>• 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> </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 have as built drawing with proper dimensions showing all the 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>• Factory needs to provide handrail on both sides of all the stairways.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs. (Escape route).</li> <li>• Factory need to install suitable public address system having communication to all floors as well as facilities</li> </ul>

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	to receive messages from all floors.
<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>• Final exit route-1(Stair-1 route) need to be protected with lobby (4 hours rated construction with 2 hours rated door) at each floor level entrance including ground floor and need to have the protected escape route till to reach safe refuse area.</li> <li>• Final exit route-3(Stair-3 route) need to be protected with lobby (4 hours rated construction with 2 hours rated door) at each floor level entrance including ground floor and need to have the protected escape route till to reach safe refuse area.</li> <li>• Childcare needs to be separated from other occupancies (time section) with 3 hours rated construction and 3 hours rated opening or door.</li> <li>• Storage area (finished goods store) needs to be fire protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors from packing section at ground floor of the factory.</li> <li>• Boiler:</li> <li>• Factory need to protect the boiler room from the final exit-3, located at ground floor of the building by 4 hours rated construction with 2 hours fire rated door/opening.</li> <li>• Generator:</li> <li>• Generator room needs to be fire separated with 4 hours fire rated enclosure with 2 hour rated opening having direct access from outside.</li> <li>• Walls enclosing the lift core shall have a fire resistance rating of 2 hours and lift car doors shall have a fire resistance rating of at least 1 hour.</li> <li>• Factory need to have 4 hours rating for walls (enclosure) and 2 hours for door openings fire separated &amp; smoke proof lobby in the both of the staircase.</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</li> </ul>

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	<p>NTPA Guideline.</p> <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 fire detection and alarm system in the command station at the entrance lobby of the factory premises.</li> <li>• Factory needs to install proper standpipe system with having at least 100 mm dia of riser.</li> <li>• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</li> <li>• Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses</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> <li>• Factory need to install suitable public address system having communication to all floors as well as facilities to receive messages from all floors.</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>
<p>Short Term</p>	<ul style="list-style-type: none"> <li>• Ensure panel door of distribution boards are earthed</li> </ul>

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<p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)</i></p>	<p>properly.</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> <li>• Ensure over current protection device (circuit breaker/fuse) for each circuit/branch circuit.</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 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>• 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 bus bar 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. Avoid the use of multiple cables on outgoing side of MCB's.</li> <li>• Consult with a qualified electrical engineer and ensure all electrical wiring/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>• Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance.</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> <li>• Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple</li> </ul>

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	cables at single point, ) of overheating { ambient+( 20°C-40°C)} and take proper action.
<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</li> <li>• Program and record the related testing data.</li> <li>• Inspect electrical switchgear and panel boards on an annual basis.</li> <li>• Ensure the substation room has adequate fire separation from the production area/main building.</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 adequate support or mechanical guards for electrical equipment.</li> <li>• Use to make channel cable trench and provide adequate covers on cable trenches.</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>