

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

---

Name of the Factory	: AB Fashion Maker
Address of the Factory	: Digirchala, Chandana Chowrasta, Chandana, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 22 <sup>nd</sup> March, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 22 <sup>nd</sup> March, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 22 <sup>nd</sup> March, 2015
BGMEA Membership No.	: 5832

### **BASIC INFORMATION:**

The assessed building is a four storied factory building. However, 50% of 4th floor (grid 1-4) has been constructed. The structural system of the building is RCC beam column frame structure. Most of the portion of the building is used by AB Fashion Maker. However, 50% of the ground floor is used for varieties shops. The following general information was 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 working area of building = 14000 sft.                      |
| v. No. of Stories             | : 4 Storey + 50 % of 4 <sup>th</sup> floor has been constructed.   |
| vi. Construction Year         | : 2007 - 2008.   |
| vii. Foundation Type          | : Isolated footing foundation (Informed by factory representative) |
| viii. Design Drawings         | : Unavailable.   |
| ix. Soil Investigation Report | : Available.   |
| x. Construction Materials     | : Brick aggregate.   |
| xi. Generator                 | : At ground floor of the building.                                 |

### **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>• Factory Engineer to review design, loads and columns stresses in the area identified above.</li><li>• Building engineer to check, collect information and produce accurate and complete as-built documentation.</li></ul> |
| Long Term (6-months)   | : <ul style="list-style-type: none"><li>• Produce and actively manage a loading plan for all floors within the factory giving consideration to floor capacity and column capacity.</li></ul>  |

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

- Building engineer to verify and produce calculations that columns and slab has sufficient capacity to support additional construction.

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>• Remove all the cartons and relocate the benches from aisles so that exit access, aisles and exit discharge remains unobstructed.</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>• 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>• Factory needs 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>• Lights in storage area needed to be installed with protective covers and conduits.</li> <li>• 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>• 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> <li>• Install adequate number of portable fire extinguishers in all floors.</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 with floor machine layout showing means of escape with proper dimension.</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 extinguisher.</li> </ul>

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

	<ul style="list-style-type: none"> <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> </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 service &amp; civil department.</li> <li>• Increase the width of exit leading to south-east corner stair at least 0.9 m.</li> <li>• Final exit route-1(Stair-1 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor and need to be protected from the generator 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 needs to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Generator and boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside.</li> <li>• Both of the staircase-1, 2 need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hours rated door) and provide the 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 automatic smoke detection &amp; fire alarm system</li> </ul>

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

	<p>according to NTPA Guideline</p> <ul style="list-style-type: none"> <li>• Factory need to install proper standpipe system having at least 75 mm diameter of riser.</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 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 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 install dedicated fire pump with sufficient capacity and backup power.</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>
--	--

### **(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</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 panel doors are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to main earth pit.</li> <li>• Ensure overcurrent 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>• Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</li> </ul>

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

<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>• Provide two separate and distinct connections of adequate earthing for each generator.</li> <li>• Provide Instruction board for first aid and artificial respiration in the generator room.</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>• Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and busbar.</li> <li>• Replace wooden bases with metal clad construction for mounting circuit breakers.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</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>• Make sure cables are not overloaded, properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, proper cable bending, no insulation damage, single cable at single point etc. to avoid temperature rise. If necessary consult with a qualified engineer and replace cable or equipment.</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> </ul>

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

---

	<ul style="list-style-type: none"><li>• Inspect electrical panel boards on an annual basis to ensure that the equipment is in good working condition.</li><li>• Ensure the generator room has adequate fire separation from the production area.</li><li>• Provide adequate means of ventilation for the generator room based on the installed.</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 obtained 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>
--	---