

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

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| Name of the Factory                       | : <b>AMEEN FABRICS LIMITED</b>                             |
| Address of the Factory                    | : HOUSE #, FLAT W, GRAND AVENUE, B, DHAKA-1205, Bangladesh |
| Present Status of the Factory             | : <b>Under Operation</b>                                   |
| Structural assessment conducted by        | : Alliance   |
| Date of Structural Inspection             | : 19 Mar 2014  |
| Fire & Electrical assessment conducted by | : Alliance   |
| Date of Fire & Electrical Inspection      | : 19 Mar 2014  |

### **BASIC INFORMATION:**

The present garment factory comprises of 4(Four) separate buildings. Main building is of 3 (Three) story & rest three buildings are of single story. All are RC frame buildings. The following general information were noted:

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|-------|---------------------------|---|
| i.    | Building Usage Type       | : Garment Factory Buildings   |
| ii.   | Structural System         | : RC frame (beam-column framing)  |
| iii.  | Floor System              | : RC Beams supported slabs  |
| iv.   | Floor Area                | :(Main building) 53000 sq ft<br>(Ancillary building) 10000 sq ft  |
| v.    | No. of Stories            | : ( Main building) Building #1 - 3 story R.C.C. main factory building, Number of level-3, Occupied Level-3. Building #2 – 1 story ancillary shed, level-1, Occupied Level-1. Building #3 – 1 story R.C.C building, Number of level-1, Occupied Level-1. Building #4 – 1 story R.C.C building using as Generator room, Number of Level-1, Occupied Level-1. (Ancillary building) 3 (One for substation room/ building, Generator room/ building, One shed for weaving machine) |
| vi.   | Construction Year         | : 1992  |
| vii.  | Foundation Type           | : Individual Footing  |
| viii. | Design Drawings           | : Not found   |
| ix.   | Soil investigation Report | : Newly Prepared  |
| x.    | Construction Materials    | : Reinforced Concrete   |
| xi.   | Generator                 | : (Ground Floor)  |

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

The recommendations of corrective action for both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

#### **The recommendations for Structural Safety corrective actions are:**

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| Immediate             | : NA   |
| Short Term (3 Weeks): | : Develop a program to ensure that all live loads for which a floor or roof has been designed for will not be exceeded and appoint a factory load manager. |
| Mid Term (6 Weeks):   |  |
|                       | i. Ensure structural integrity following alliance standard through detail investigation with help of NDT/SDT by QSEC.                                      |

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- ii. Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.
- iii. Have a qualified structural engineer prepare load plans including the information required in Section 8.20.5.3 of the Alliance Standard and posted in each floor desalinated areas as per standard.
- iv. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- v. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- vi. Provide Certificates of Occupancy for review.
- vii. Repair the exterior façade system to prevent water intrusion.
- viii. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- ix. Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies.
- x. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20

Long Term

: NA

### The recommendations for Fire Safety corrective actions are:

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| Immediate (3 to 6 Days) | <p>Remove all stored materials in the stairwells at the noted locations.</p> <p>Means of egress must be full free and clear from impediments, obstructions, and stored materials immediately.</p> |
| Short Term (3 Weeks)    | <p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations.</p> <p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p>         |

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| <p>Mid Term (6 Weeks)</p>   | <p>Occupancy certificate (mention occupancy type) for each building.</p> <p>Make aisles marking with proper direction and provide minimum clear width of 36 inch. Keep aisles free of obstruction.</p> <p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year. If battery operated signs are used, these lights are tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Develop a testing and maintenance program that ensures the operation of all exits signs is verified at least once per year. If battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 min once per year.</p> <p>Post occupant loads for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Stair designation signs are provided at each floor entrance from the stair to the floor in English and Bengali. Signs indicate the name of the stair and the floor level. Signs are posted adjacent to the door.</p> <p>Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense.</p> |
| <p>Long Term (6 Months)</p> | <p>Install minimum 1 hour fire rated doors for all openings connected with the exit en-closers or stair cases.</p> <p>Provide fire-resistive rated construction barriers at exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr fire resistance rating.</p> <p>Install Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices spaced appropriately based on occupancy type in the factory main building and ancillary shed building. Reference NFPA 72.</p> <p>Install fire extinguishers for the Fabric store. Also install fire extinguishers at appropriate locations and heights based on hazard type per BNBC Part 4 and NFPA 10. Extinguishers shall be placed so that maximum travel distance to the nearest unit shall not exceed 30 m (100 ft.).</p> <p>Set up a Fire alarm and detection system central station monitoring service or direct connection to the Fire Service and Civil Defense. Assign a person at the facility to contact</p>   |

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|  | <p>the fire department in the event of fire alarm activation.</p> <p>Provide side-hinged swinging type doors for all means of egress.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Minimum 1-hr fire-rated wall and door for boiler room and minimum 1-hr fire rated door for fabrics store room.</p> <p>Fire department (Siamese) inlet connections shall be provided to allow fire department pump equipment to supplement the fire protection systems. Fire department outlet connections provided to allow fire department pumper vehicles to draw water from ground -level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers in accordance with NFPA 10.</p> <p>Install appropriate means of illumination at the noted locations. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2 cd/m<sup>2</sup>, may also be used.</p> <p>Provide an emergency power source for illuminated exit signs, either by battery back-up or by connecting to the emergency power system.</p> <p>Install continuous illuminated exit sign at all exit points. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2 cd/sq.-m may also be used.</p> <p>Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry out the required duties.</p> <p>Need required number of people (trained and certified) in fire fighting, first aid, and rescue training by the appropriate authority accordance with the Alliance Safety Training Curriculum.</p> <p>Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall, ceiling, supply and return air ventilation systems. Promptly reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and rescheduling. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m<sup>2</sup> (500 ft<sup>2</sup>). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.)</p> |
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### The recommendations for Electrical Safety corrective actions are:

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| Immediate (3 to 6 Days) | Disconnect the panel from the electrical service and clean interior components of all dust and debris. Seal all openings within the enclosure to prevent dust and debris from entering.  |
| Short Term (3 Weeks)    | <p>Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBC for required number of electrodes. [Alliance Standard Part 10 Section 10.13.7.1 Inspection of Substation Installations.]</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Need to provide earthing connections at all electrical equipments.</p> <p>There shall be a distance of minimum 1 m (39 inch) clear in front of each panel board for maintenance works. Alliance standard 10.7.1.10</p> |
| Mid Term (6 Weeks)      | <p>Need to provide uninterruptable power supply (UPS) for emergency operation.</p> <p>Have a qualified electrical engineer develop as-built electrical drawings providing detailing key components of the electrical system.</p> <p>Clear &amp; Permanent identification marks are printed in all DBs as necessary. BNBC- Part 8 section 2.11.5.4</p> <p>Separate branch circuit should be provided for the installations which need to be separately controlled. The minimum size of the cable should be 1.45 times greater than the respective circuit breaker's rating (considering temperature factor, distance factor, grouping factor etc).</p>  |
| Long Term (6 Months)    | Need to install lightning Arrestor system for the building.  |