

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory : **Mam Garments Ltd.**

Address of the Factory : Plot 17-18, Road 4, Section 7, (4th Floor), Mirpur,
Dhaka, Bangladesh.

Present Status of the Factory : **Closed**

Structural assessment conducted by : Alliance

Date of Structural Inspection : 12 March 2014

Fire & Electrical assessment conducted by: Alliance

Date of Fire & Electrical Inspection : 12 March 2014

BASIC INFORMATION:

The present garment factory is a six storied building with beam-column frame system. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RC frame Building
- iii. Floor System : RC beam supported
- iv. Floor Area : Total floor area is 37,149 sft.
- v. No. of Stories : 6 storied and a roof top shed.
- vi. Construction Year : Unknown.
- vii. Foundation Type : Individual Footings.
- viii. Design Drawings : Not available
- ix. Soil investigation Report : Available
- x. Construction Materials : Brick aggregate with 40 grade rebar.
- 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:

Immediate (3 to 6 Days):

- i. Proper 'Propping' at the affected beams on ground floor is to be done immediately to remove all 1st floor dead and live loads from ground floor columns.
- ii. Two floors (preferably one from upper floors and one from intermediate floors) shall be totally vacated immediately and kept completely empty.
- iii. All loads as well as establishments from the roof must be removed immediately.
- iv. All water tanks at the roof except RCC water tank must be removed immediately.
- v. All storage loads (finished products and raw materials) above ground floor are to be removed immediately.

Short Term (3 Weeks) : None

Mid Term (6 Weeks) : DEA has to be completed.

Long Term (6 Months) : Necessary remediation after completion of DEA.

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The recommendations for Fire Safety corrective actions are:

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| <p>Immediate (3 to 6 Days)</p> | <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> |
| <p>Short Term (3 Weeks)</p> | <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> |
| <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 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>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. 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> |

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| | <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 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>Establish an inspection, testing, and maintenance program for all fire extinguishers in accordance with NFPA 10.</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>Installation of an automatic sprinkler system throughout the building.</p> <p>Providing handrails on the other side of each stairway.</p> <p>Separation of boiler rooms from the production floors with properly rated fire doors & protection of penetrations</p> <p>Need required number of people (trained and certified) in firefighting, first aid, and rescue training by the appropriate authority accordance with the Alliance Safety Training Curriculum.</p> <p>Install automatic fire detection and alarm system throughout the factory. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defense can be set up, a person shall be assigned to contact the fire department in the event of fire alarm activation. An annunciator shall be located in a constantly attended location to alert this person.</p> <p>Installation of an electrically driven fire pump to replace the non-compliant fire pump</p> <p>Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall,</p> |
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| | <p>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 m² (500 ft²). 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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| <p>Immediate (3 to 6 Days)</p> | <p>Survey all electrical panels to ensure the panels are free of dust and debris. Disconnect the panel from the electrical service and clean interior components of all dust and debris.</p> <p>Seal all openings within the enclosure to prevent dust and debris from entering.</p> |
| <p>Short Term (3 Weeks)</p> | <p>Install two distinct earth connections of minimum 35 sqmm for the generator frame.</p> <p>Install a sign that provides details on electrical shock first aid procedures. Signage should also include instructions on artificial respiration.</p> <p>All metal casings or metallic coverings containing or protecting any electrical supply-line or apparatus shall be connected to the earthing system.</p> <p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system. The required marking can be by color code, the words “emergency system,” or any other method that identifies the box or enclosure as a component of the emergency system. The required marking can be by color code, the words “emergency system,” or any other method that identifies the box or enclosure as a component of the emergency system. Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions.</p> |
| <p>Mid Term (6 Weeks)</p> | <p>Install phase separators between terminal connections. Verify phase separators are installed at all remaining locations.</p> <p>Place firefighting equipment inside the generator room. Install the changeover switch outside the main distribution panel (install on wall beside the panel) to reduce the harmful effect of sparking during its operation. The changeover switch shall not be operated in on-load condition, otherwise sparking might happen inside the changeover switch.</p> <p>Survey all distribution boards and switchboards to identify any additional areas. Provide earthing connection to panel-</p> |

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| | <p>enclosures/switchboards/distribution board as per BNBC Table 8.2.11.</p> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Survey all switchboards and distribution boards in order to identify all instances of multi looping and multiple terminations at a single termination point. Install individual cable from bus-bar & protective device (MCCB/MCB) for every branch circuits (load).</p> <p>Provide individual neutral connections with cables sized the same as the respective phase cables for all single-phase loads.</p> |
| Long Term (6 Months) | <p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements.</p> <p>Provide sufficient space around the generator in order to safely operate and maintain the equipment. Increase room size if possible in order to provide proper (minimum 1 meter) clearance around the generator.</p> <p>Coordinate with a qualified fire protection engineer to determine the required fire resistance separation and rated door assembly required to comply with the Standard.</p> |