

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Y.B. Garments Ltd |
| Address of the Factory | : C.D.A Plot No. C-49, Sagarika Road, Pahartaly, Chittagong, Bangladesh. |
| Present Status of the Factory | : Under Operation |
| Structural assessment conducted by | : Alliance |
| Date of Structural Inspection | : 18 th May 2014 |
| Fire & Electrical assessment conducted by | : Alliance |
| Date of Fire & Electrical Inspection | : 03 rd May 2014 |
| BGMEA Membership No | :2414 |

BASIC INFORMATION:

The present garment factory is comprises of a 1 Main Buildings & 1 Ancillary Building. The following general information was noted:

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| i. | Building Usage Type | : Garments Factory. |
| ii. | Structural System | : Moment Resisting Frame with monolithic beam slab. |
| iii. | Floor System | : Beam slab type in RCC Building. |
| iv. | Floor Area | : 67855 sft. |
| v. | No. of Stories | : 6 |
| vi. | Construction Year | : 2005-2006 |
| vii. | Foundation Type | : Spread Foundation. |
| viii. | Design Drawings | : Not Available. |
| ix. | Soil investigation Report | : Not Available |
| x. | Construction Materials | : MCAC. |
| xi. | Generator | : Ground Floor. |

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for Structural, Fire and Electrical Safety comprises of Short Term, Mid Term and Long Term basis are as follows:

The recommendations for Structural Safety corrective actions are:

Immediate : NA

Short Term: (3 Weeks) :

- i. Develop a program to ensure that all live loads for which a floor or roof has been designed for will not be exceeded. The designated Load Manager shall oversee this program and ensure it is enforced.

Mid Term (6 Weeks) :

- i. Under guidance from a qualified structural engineer arrange an urgent detail engineering assessment of the structure to be carried out immediately. Concrete compressive strength should be evaluated via coring and necessary remediation should be completed urgently. No storage shall be allowed until remediation is complete.
- ii. 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.

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- iii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind & storm surge loading.
- v. Conduct a detailed structural assessment under the guidance of a qualified structural engineer and carry out remedial action as necessary.
- vi. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vii. 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
- viii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
- ix. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- x. Under guidance from a qualified structural engineer arrange geotechnical investigation at close vicinity of the structure and make the report available for review.
- xi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- xii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xiii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3

Long Term (6 months) :

- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- ii. Remove blockages from the expansion joint.
- iii. Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer. Or provide 2% slope on the exposed surface to prevent accumulation of water.

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The recommendations for Electrical Safety corrective actions are:

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| Immediate | Find out the cause of overheating, overloading, or signs of burning and take proper action. |
| 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 cover, made of non-combustible material (preferably metal checkered plate) on all cable trenches.</p> <p>Provide shielding/additional insulation for wiring exposed to external heat sources.</p> <p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p> |
| Mid Term (6 Weeks) | <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes.</p> <p>Consult a qualified electrical engineer to determine the required ventilation rates & ensure proper ventilation for generator room.</p> <p>Install switchboards and distribution boards in compliant locations so that operation is not hindered due to limited access.</p> <p>Remove multi looping of cables at circuit breakers within distribution boards.</p> <p>Provide dedicated neutral for each circuit.</p> <p>Lighting and socket circuits must be separated at the noted locations. Have a qualified electrician separate the lighting and socket circuits.</p> <p>Have a qualified electrical engineer develop an as-built diagram detailing key components and capacity of the electrical system.</p> |
| Long Term (6 Months) | <p>Complete Thermographic scans at least on a three year cycle. Thermographic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA70B or a comparable standard.</p> <p>Ensure appropriate size for generator room in order to properly access the generator to perform routine maintenance activities.</p> <p>Ensure lightning protection ground terminals are bonded to the building or structure grounding.</p> |

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The recommendations for Fire Safety corrective actions are:

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| Immediate | NA |
| Short Term (3 Weeks) | <p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions. Doors may be provided with locking hardware from the ingress side provided that a panic bar is installed on any door with an occupant load exceeding 49 persons. Re-entry provisions must be met.</p> <p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p> |
| Mid Term (6 Weeks) | <p>Remove existing aisle markings and draw new markings to fulfill the minimum aisle width requirement. Relocate the machines accordingly if necessary.</p> <p>Provide fire rated exit passageway i.e. protected path of egress from the exit enclosure to the public way. The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated. Post the occupant load for every assembly and production floor in the facility in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Post the occupant load for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees. The evacuation plan shall include provisions to assist physically disabled persons, duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims. A list of all employees with physical disabilities shall be kept by the Fire Service Director.</p> <p>Install illuminated exit signs at entrances to exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of the path of travel.</p> <p>Provide an emergency power source, either by battery backup or by connecting to the emergency power system, for compliantly illuminated exit signs.</p> <p>Inspect, test, and maintain fire extinguishers in accordance with NFPA requirements.</p> <p>Apply to Chittagong Development Authority (CDA) for issuance of occupancy certificate and pursue the matter to</p> |

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| | <p>expedite</p> <p>Fire drills shall be conducted under the direction of a Fire Safety Director. All other requirements for fire drills shall be conducted in accordance with BNBC requirements.</p> <p>Install required identification signs at the noted locations.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Apply for waiver certificate from BERC. Apply to Biddyt Paridaptor for electrician license.</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 m² (500 ft²). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.).</p> |
| <p>Long Term (6 Months)</p> | <p>Install fire rated doors and windows or fill in unprotected openings with fire resistive rated assemblies. Train and certify at least 25 percent of workers in fire fighting, first aid and rescue.</p> <p>Reconfigure doors at exit points so that there is a landing on both sides of the exit door, with door swinging in the direction of exit travel. Revise the door location and extend 2-hour rating to the new door location.</p> <p>Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosures.</p> <p>Install fire rated doors and windows or fill in unprotected openings with fire resistive rated assemblies. Replace all collapsible, sliding, glass doors and steel leaf swing doors in means of egresses with side-hinged swinging type doors of proper width and rating.</p> <p>Fire pump installation is to be tested for acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance. Acceptance testing of the installation shall be in accordance with NFPA testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance.</p> <p>Replace all collapsible, sliding, roll-down gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating.</p> <p>Train and certify at least 25 percent of workers in firefighting, first aid and rescue training by the proper authority.</p> <p>Install fire department connections where required and in compliance with the Standard. Fire department outlet connections shall be provided to allow fire department</p> |

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| | <p>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>Install NFPA-compliant class III standpipe system at required locations designed by a qualified fire protection engineer. All standpipe system installations and hydraulic calculations shall be reviewed by the Alliance prior to commencement of installation. Standalone standpipe systems shall meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection. Testing of the installation shall be conducted in accordance with NFPA acceptance testing requirements. Documentation of all testing shall be submitted for review by the Alliance. Final inspection and testing of the installation shall be witnessed by the Alliance.</p> <p>Provide rated exit passageway i.e. protected path of egress from the exit enclosure to the public way. The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated.</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 signs must be tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry unless it meets the following requirements. Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, reentry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors. When the discharge floor is determined to be a required re-entry floor using the above requirements, re-entry does not have to be provided back into the building on this level.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Arrange for direct connection of the fire alarm system to a central station monitoring service or directly connected to the Fire Service and Civil Defense as per Alliance Standard. Until that time that monitoring 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 (such as a fire control room) to alert this person.</p> <p>Impart training in accordance with Alliance Safety Training Curriculum and keep record with proper documentation.</p> |
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| | <p>Provide handrails on both side of each stairway. Provide intermediate handrail when the stair width exceeds 2.2m (87 inch). Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.).</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. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2cd/m², may also be used. The means of egress paths shall be illuminated at all times the building is occupied. Illumination shall be a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum 2.5 lux.</p> <p>Develop a testing and maintenance program that ensures the operation of all exit signs is verified at least once per year. If battery-operated signs are used, these signs 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>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p> <p>Develop a NFPA-compliant hot-work permit program. In general, this program should address the process of request and approval of authorities, necessary checks prior to approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedure, etc.</p> <p>Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.</p> <p>Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2cd/m² 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 the required duties.</p> <p>The duties of the Fire Safety Director shall include the following:</p> <ol style="list-style-type: none">(1) Establish internal and external rally points and communicate to all employees in the building.(2) Fire department pre-planning.(3) Conduct safety inspections as outlined in Alliance Standard.(4) Ensure all testing of fire protection equipment is |
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| | <p>conducted in accordance with Alliance Standard.</p> <p>Establish required inspection, maintenance, and testing program for the standpipe and hose system.</p> |
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