

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

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| Name of the Factory                        | : <b>Beautiful Jackets Ltd.</b>                                    |
| Address of the Factory                     | : Fatema Complex, Fordnagar, Singair, Manikgonj, Dhaka, Bangladesh |
| Present Status of the Factory              | : <b>Under Operation</b>   |
| Structural assessment conducted by         | : Alliance   |
| Date of Structural Inspection              | : 13 Mar 2014  |
| Fire & Electrical assessment conducted by: | Alliance   |
| Date of Fire & Electrical Inspection       | : 13 Mar 2014  |

### **BASIC INFORMATION:**

The present garment factory comprises of 5(Five) separate buildings. Main building is of 5 (Five) story & rest four buildings are of single story. All are RC frame building. 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 Beam supported slabs   |
| iv.   | Floor Area                | : (Main building) 5600 sft,<br>(Ancillary building) Temporary Sample section = 5023 sft,<br>Temporary warehouse= 10055 sft, Office Building= 1248<br>Proposed ware house (under construction)   |
| v.    | No. of Stories            | : (Main building) Building#1-Main Factory Building (level =5, H= 54ft.), Building#2-Temporary Sample section(level=1, H= 10 ft.), Building#3-Temporary warehouse (level=1, H= 10 ft.), Building#4-Office Building(level=1, H=10 ft.) , Building#5-Proposed ware house (level=1) (Ancillary building) Temporary Ware House(level=1, H=10'), Temporary Sample Section(level=1, H=10'), Office building(level=1, H=10'), |
| vi.   | . Construction Year       | : Year of 1991 (Accurate date not found)  |
| vii.  | Foundation Type           | : Pile Foundation   |
| viii. | Design Drawings           | : Not Available   |
| ix.   | Soil investigation Report | : Available   |
| 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:**

Immediate : NA

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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.
- 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. Company Plan of Action: Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3 Mid Term (Timeline for Implementation to be mention by Inspecting Agency i.e Accord/Alliance/BUET ): List of Actions or Activities insert here.
- iv. 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.
- v. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- vi. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- vii. Provide Certificates of Occupancy for review.
- viii. Repair the exterior façade system to prevent water intrusion.
- ix. 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.
- x. Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies. Structural engineer shall also provide remediation documents if
- xi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Submit plans to QAF 6 weeks from date of assessment report. Install bracing 12 weeks from approval of plans.
- xii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 including core cutting and testing is suggested to ensure concrete strength and take appropriate remedial measures. But it is important to note that the destructive core testing is only technically required if the circumstances stated in Alliance Standard section 7.2.2.1.1 are met, but that the testing is advised nonetheless.
- xiii. 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) | Remove all combustibles stored underneath the cutting tables at the noted locations. |
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| <p>Short Term (3 Weeks)</p> | <p>Remove all temporary obstructions from all escape routes, aisles and passageways.</p> <p>Ensure minimum width of corridors, passageways and aisles.</p> <p>Ensure easy access to portable extinguishers and monitor and maintain the same at required interval as per guidelines.</p> <p>Provide proper directional sign and exit sign in Bangla and English as per guidelines</p> <p>Provide aisles marking with proper direction and with minimum 36 inch width. Keep aisles free of obstruction.</p> <p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p>   |
| <p>Mid Term (6 Weeks)</p>   | <p>Produce proper drawing and plans to create horizontal and vertical fire-rated separation for stairways of appropriate specifications, grills, storage and assembly areas, offices, work areas. Also design to ensure proper separation of high risk areas (e.g., generator, boiler, transformer and substation rooms) as per guidelines.</p> <p>Remove all collapsible gates/roller shutters. Produce design drawings to demonstrate how stairways are to be made of adequate dimensions and appropriate specifications and to be converted into fire-rated enclosures equipped with fire-rated side swinging doors of required dimensions opening in the direction of travel at each floor.</p> <p>Develop a testing and maintenance program that ensures the operations of all exist signs are 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>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations. 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 fire department pre-planning activities with the local Fire Service and Civil Defense</p> <p>Provide design to install proper fire detection and alarm system.</p> |
| <p>Long Term (6 Months)</p> | <p>Install horizontal and vertical fire- rated separation for stairways, grills, storage and assembly areas, offices, work areas.</p>   |

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|  | <p>Ensure proper fire separation of high risk areas (e.g., generator, boiler, transformer and substation rooms) as per approved design.</p> <p>Install fire rated enclosure and doors at exit to the stairs to prevent smoke and fire propagation as per approved design<br/>Provide fire rated enclosure, install self closing fire rated door as per guidelines.</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 the fire department in the event of fire alarm activation.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Provide 2 hr. rated fire barrier for generator room and remove all combustibile material from the ceiling. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install fire department connections where required and in compliance with the Standard. Connections shall match the Fire Service and Civil Defense hose thread standard. It will allow fire department pumper vehicles to draw water from ground -level or underground water storage tanks.</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/m<sup>2</sup>, 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>Install a fire pump system according to NFPA 20 with minimum pressure of 450 kPa (65 psi) at the hydraulically most remote hose connection.</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>Find out the cause of overheating, overloading, or signs of burning and take proper action.</p> <p>Relocate the cutting machine in front of SDB-2 to provide a minimum of 1m clearance.</p> |
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| <p>Short Term (3 Weeks)</p> | <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>Circuit breaker's rating always should be less than the current carrying capacity of cable connected. Ref. BNBC-2006 Art.2.7.6.4.</p> <p>Multi looping of wiring/cables should be removed at circuitbreakers within switchboards and/or distribution boards.</p> <p>Connect all metal in the building to the building earthing/grounding system.</p> |
| <p>Mid Term (6 Weeks)</p>   | <p>Have a qualified electrical engineer develop as-built electrical drawings providing detailing key components of the electrical system.</p> <p>All cable trenches should be provided with adequate cover by non combustible materials.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Enclosures for sub-distribution boards shall be dust-proof and vermin proof using sheet steel fabrication of a minimum thickness of 20 SWG. Enclosures exposed to the natural elements shall be weatherproof.</p>        |
| <p>Long Term (6 Months)</p> | <p>Ensure appropriate size for generator room properly access and 1m clearance is provided at all the sides of generator to perform safe operation and routine maintenance activities. The Generator room size should be as described in BNBC 2006 table : 8.2.9</p> <p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements.<br/>Have a licensed electrician install the designed system.</p>   |