

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

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Name of the Factory	: <b>Versatile Attire Ltd.</b>
Address of the Factory	: Raj fulbaria, Savar, Dhaka Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 29 Apr 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 16-Apr-2014

### **BASIC INFORMATION:**

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

- i. Building Usage Type : Garments Factory
- ii. Structural System : RCC beam slab building
- iii. Floor System : Beam slab
- iv. Floor Area : approximately 28,000 square feet
- v. No. of Stories : Three (3)
- vi. Construction Year : 1985
- vii. Foundation Type : Individual column footing.
- viii. Design Drawings : Available
- ix. Soil investigation Report : Available
- x. Construction Materials : Brick aggregate with 40 grade rebar.
- xi. Generator : Besides the building in isolated shade.

### **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) | : Designate a representative as the Factory Load Manager. The Factory Owner shall ensure that at least one individual, the Factory Load Manager who is located onsite full time at the factory, is trained in calculating operational load characteristics of the specific factory. |
| Mid Term (6 Weeks)   |   |
|                      | i. Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure.  |

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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 develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- iv. Have a qualified structural engineer confirm that capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- v. 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.
- vi. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- vii. Provide signage or appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- viii. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.

Long Term: (6 Months) :

- i. Necessary remediation after completion of DEA.
- ii. Remove deteriorated expansion joint material and provide new approved material at the expansion joint. Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.

### The recommendations for Fire Safety corrective actions:

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>
Mid Term (6 Weeks)	<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>

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	<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>Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities with record keeping .These fire drills need to be conducted under the direction of a Fire Safety Director.</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>
Long Term (6 Months)	<p>Provide fire-resistive rated opening and penetration protection for rated walls and assemblies in accordance with Alliance Standard Sections 4.6 and 4.7. Consult a qualified fire protection engineer to design the required opening protective and penetration systems. If these openings are not required, then enclose them with fire rates construction.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation according to 5.4.3.2.</p> <p>Install outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers. Alternatively, close the door since there is another way to enter production area. Install outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers. Alternatively, close the door since there is another way to enter production area.</p> <p>Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. This includes electrical supervision of all valves controlling fire protection systems (sprinklers, fire pumps, water supplies, etc.). Devices should be part of an automatic fire alarm and detection system for the facility. All fire alarm installations</p>

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	<p>shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Install a dedicated fire pump for the facility in accordance with NFPA 20 to supply the demands of the connected fire protection systems along with a stored source of water sufficient to meet the demands in accordance with NFPA 22. Fire pump installation is to be tested for final acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance as per clause 5.5.5. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 24 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance.</p> <p>Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated doors assemblies (door and frame) with latching panic hardware.</p> <p>Install a complete standpipe and automatic fire detection system in accordance with Alliance Standard which will increase the allowed travel distance to 60 m. Otherwise, provide another exit to satisfy maximum travel distance requirement of 45 m.</p> <p>Get at least 25 percent worker trained and certified in firefighting, first aid and rescue training by the proper authority.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 3.2.1 of BNBC (part 3). Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide Fire Department (Siamese) connections in accordance with Alliance Standard Section 5.5.4. Connections shall match the Fire Service and Civil Defence hose thread standard.</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 handrails on both side of each stairway. Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.).</p> <p>Install emergency lighting for all paths of egress in accordance with Alliance Standard Section 6.7. Illumination shall be a minimum of 10 lux for all corridors, exit doors,</p>
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	<p>and stairways. Aisles shall be provided with a minimum 2.5 lux.</p> <p>Provide a uniform slope/ramp for the walking surface. Slope should not exceed 1 in 20 in the direction of travel. Any changes in elevation (protrusions or lips) must not exceed 1/4 in.</p> <p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time that monitoring can be set up, arrange a monitoring system using own central detection system and personnel. 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>Fire extinguishers shall be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7 in accordance with Alliance Standard Part 13 Section 13.10.3.</p> <p>Develop an emergency evacuation plan which includes duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc. and all components required by the Alliance Standards and communicate the plan to all employees.</p> <p>Install a compliant standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. Then install identification signs at required locations and on required equipment. Signage must comply with NFPA 14 Chapter 6.</p> <p>Install class III standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. Then institute an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25 Chapter 6 Table 6.1.1.2.</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/m<sup>2</sup> may also be used.</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</p>
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	<p>reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and rescheduling.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p>
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### The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out the cause of burning, overheating and take proper action.</p> <p>Remove all dirt, debris, and improperly stored materials from the substation room.</p> <p>Distribution boards free of dirt and debris.</p>
Short Term (3 Weeks)	<p>Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures</p> <p>Install security measures to ensure access to the substation is restricted.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide additional light fixtures to increase illumination levels provided in the BNBC.</p>
Mid Term (6 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>As per BNBC section 2.11.5.4 ensure clear and permanent identification marks are painted in all distribution boards, switchboards, sub main boards and switches</p> <p>Provide covers or blanks to conceal all live internal components of distribution boards.</p> <p>Ensure proper ventilation for generator room.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc) for Switchboards and/or distribution boards.</p> <p>Provide means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p>
Long Term (6 Months)	<p>Ensure the generator room properly rated and physically separated from the remainder of the building.</p>