

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

Name of the Factory	: VALIANT GARMENTS LTD
Address of the Factory	: 572, Strand Road, Chittagong, Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 03-Jun-2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 01-Jun-2014
BGMEA Membership No	:364

### **BASIC INFORMATION:**

There three main buildings. The following general information was noted:

- i. Building Usage Type : Garments Factory
- ii. Structural System : Intermediate moment resisting frame structures with monolithic slab beam system
- iii. Floor System : RCC
- iv. Floor Area : 83,191 sft
- v. No. of Stories : Three 04 storied RCC building
- vi. Construction Year : No record available
- vii. Foundation Type : Pile foundation for Building-1 and for rest two buildings are unknown
- viii. Design Drawings : Available but not proper
- ix. Soil investigation Report : Available but not proper
- x. Construction Materials : RCC
- 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 over see this program and ensure it is enforced."
- ii. 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. The Factory Load Manager shall serve as an ongoing resource to RMG vendors and be responsible to ensure that the factory operational loads

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do not at any time exceed the factory floor load limits as described on the Floor Load Plans.

Mid Term (6 Weeks)

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- i. Engage a qualified structural engineer to conduct DEA to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.2.
- ii. Have a qualified structural engineer provide further testing and analysis of cracks in column.
- iii. 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.
- iv. Properly brace and anchor all the racks to resist earthquake forces to comply with the BNBC and Alliance Standard.
- v. Have a qualified structural engineer develop Floor Loading Plans for all the three buildings as per the requirements of Part 8 Section 8.20.5.3
- vi. Have a qualified structural engineer prepare load plans for all the three buildings including the information required in Section 8.20 of the Alliance Standard.
- vii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- viii. Under guidance from a qualified structural engineer, address all areas of needed maintenance.

Long Term (6 Months)

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- i. Factories should apply for Certificate of Occupancy to proper authority.
- ii. Provide a protective coating to 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 expose surface to prevent accumulation of water.
- iii. Remove blockage from expansion joint.

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

Immediate (3 to 6 Days)	Find out the cause of the overheating and take proper action, including replacing cable or equipment where necessary.
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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>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>Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker, size of panel and permitted no. of CB, maximum permitted load connection capacity, etc.</p>
Mid Term (6 Weeks)	<p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm<sup>2</sup> or greater.</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>Install phase separators between terminal connections at the noted locations.</p>
Long Term (6 Months)	<p>Develop an Insulation Resistance Measurement Program that ensures deterioration of insulation resistance will be identified quickly. Testing should be in compliance with International Electrical Testing Association (NETA). All transformers, switchgears etc. shall be subject to an insulation resistance measurement test to ground after installation but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches etc. and between each phase and earth.</p> <p>Have a qualified electrical engineer design a lightning protection system, according to the BNBC requirements. Have a licensed electrician install the designed system.</p>

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

Immediate	NA
Short Term (3 Weeks)	<p>Remove the egress obstructions and keep means of egress continuously free and clear of all obstructions and impediments to ensure full instant use of the exits in the case of fire or other emergency. Remove all locks or other devices installed on a means of egress component that would prevent any occupant from having safe egress from the building or structure.</p> <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</p>

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	<p>noted locations.</p> <p>Apply to CDA for the issuance of Certificates of Occupancy, and pursue the matter to expedite the process.</p>
Mid Term (6 Weeks)	<p>Install a NFPA-compliant Class III standpipe system at required locations throughout all three buildings, designed by a qualified fire protection engineer. All standpipe system installations and hydraulic calculations shall be submitted for review by the Alliance prior to commencement of installation. 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>Ensure that occupant loads are posted 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 a testing and maintenance program that ensures that the operation of all exit lights is verified at least once per year. If battery-operated lights are used, these lights should be tested on a monthly basis. Functional testing of battery powered lights should be conducted for a minimum of 90 minutes once per year</p> <p>Install signage adjacent to each stairway door indicating the stair name and the floor level at the noted locations.</p> <p>Apply to the electricity license issuing board for an electrician's license and to the Bangladesh Energy Regulatory Commission for a BERC waiver certificate.</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 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1 hr fire-resistance rating. Exits connecting four or more stories shall be enclosed with a minimum 2 hr fire-resistance rating. Exits shall be enclosed with the same fire-resistance rating as the floor penetrated but will not need to exceed 2 hr.</p> <p>Replace all collapsible doors, sliding doors, roll-down gates, and shutters in means of egresses with side-hinged swinging type doors of a proper width and rating.</p> <p>Provide fire-resistive rated opening or 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 protectives or penetration systems.</p> <p>Provide fire-resistive rated construction barriers between floors following Table 4.4.1 of the Alliance Standard. In addition, protect the penetrations in fire resistive rated assemblies with a listed through-penetration fire stop system, tested in accordance with ASTM E814.</p> <p>Provide 2 hr fire-resistive rated construction barriers at all exit enclosures. Fit outward opening, side-swinging, self-closing, non-lockable fire doors of a 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required</p>

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	<p>rated construction barriers.</p> <p>Relocate the door from its existing position toward the inside of the floor, or reconfigure the area such that the door does not swing out over the stairs.</p> <p>Remove exit aisle markings, and draw new markings that fulfill the minimum aisle width requirement. Relocate the machines or other obstructions accordingly if necessary.</p> <p>Install a pump dedicated for fire protection following NFPA requirements. The fire pump installation is to be tested for final acceptance in the presence of the 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. This pump is to be connected to an alternative power source like a generator, and the generator is to be connected with an ATS (auto starter).</p> <p>Consult a structural expert to assess the condition of the structure. Repair the cracks and leakage in the slabs, columns, and beams, following the expert's instructions.</p> <p>Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections 3.4 and 4.5. 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 Alliance Standard. Fire department outlet connections shall be 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>Develop an emergency evacuation plan that includes duties and responsibilities of various people/groups, interfacing between groups and the fire brigade, procedures for headcount and identification of trapped victims, procedures for physically disabled people and their rescue, etc. The guidelines are in the BNBC Appendix.</p> <p>Conduct fire drills on a quarterly basis as per BNBC requirements. 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>Impart training in accordance with the Alliance Safety Training Curriculum, and keep record with proper documentation.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers and prepare proper documentation. Program must comply with NFPA 10.</p> <p>Demolish the lintel and wall above lintel. Construct the same again fulfilling the height requirement.</p> <p>Repave the surface to make the slope less than or equal to 1 in 12. Provide a handrail on both sides of the sloped walking surface.</p>
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	<p>Widen the path to 1.1m or greater.</p> <p>Install appropriate means of illumination at the noted locations. The means of egress paths shall be illuminated at all times the building is occupied. Illumination shall be at a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum of 2.5 lux.</p> <p>Provide handrails on both sides of each stairway. Provide handrails at a height between the range of 865 mm (34 in.) and 965 mm (38 in.).</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 illuminated exit signs that are compliant with the Alliance Standard.</p> <p>Develop a testing and maintenance program that ensures that the emergency power for exit signs is tested at least once per year. If battery operated signs are used, these signs should be tested on a monthly basis. Functional testing of battery powered signs should be provided for a minimum of 90 minutes once per year.</p> <p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense. Until the time that monitoring can be set up, arrange a monitoring system using the factory's 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>Establish written corporate and plant policies on housekeeping to ensure scheduled cleanings for floors, walls, ceilings, and 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> <p>Smoking shall be prohibited in any garment factory building, separate storage building, or any building or area where the Inspector of the Factories Rules requires that smoking be prohibited. If an owner creates a designated smoking area outside the buildings, information on the location of these designated areas shall be posted on the signs.</p> <p>Develop a NFPA-compliant hot-work permit program. In general, this program should address the process of request and approval from authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedures, duration and expiry of permit and reapproval procedures, etc.</p> <p>Install a NFPA-compliant standpipe system at required locations designed by a qualified fire protection engineer. Install the required identification signs at the noted locations.</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</p>
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	<p>required duties.</p> <p>The duties of the Fire Safety Director shall include the following: Establish internal and external rally points, and communicate such to all employees in the building. Fire department pre-planning. Conduct safety inspections, as outlined in Alliance Standard. Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard.</p> <p>Install a pump dedicated for fire fighting or fire protection as per NFPA requirements. Then, establish required inspection, maintenance, and testing program for the fire pump.</p>
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