

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

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Name of the Factory	: Virtual Bottoms Limited.
Address of the Factory	: Plot S.A. -179,RS-1356 (GFL),Jamgara,Ashulia,Savar.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 15-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 15-June-14
BGMEA Membership No	: 5540

### **BASIC INFORMATION:**

There is one building in the factory premises. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC moment resisting frame structure .
- iii. Floor System : Beam- slab.
- iv. Floor Area : 67,388 sft
- v. No. of Stories : Four storied.
- vi. Construction Year : 2012
- vii. Foundation Type : Unknown
- viii. Design Drawings : Not Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC brick chips.
- xi. Generator : Unknown

### **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. Engage a qualified structural engineer to provide additional investigation into beam cracking and provide a remediation plan if required.

Mid Term (6 Weeks) :

- i. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with the Alliance Standard Part 8 Sections 8.19 and 8.20
- ii. Follow recommendations of NTC Review Panel.
- iii. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- iv. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.

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- v. Have a qualified structural engineer provide further testing and analysis of cracking in columns and provide a remediation plan to correct noted issues.
- vi. Develop engineered plans to brace racking systems to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- vii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.

Long Term (6 Months) : NA

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

Immediate	NA
Short Term (3 Weeks)	<p>Indoor electrical installations that are accessible to unqualified persons shall be made with metal-enclosed equipment. Switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment shall be marked with appropriate caution signs. Entrances to rooms and other guarded locations that contain exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. Caution, warning, danger signs or labels should meet the following requirements: (1) The marking shall adequately warn of the hazard using effective words and/or colors and/or symbols. American National Standards Institute ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for suitable font sizes, words, colors, symbols, and location requirements for labels. (2) Shall be permanently affixed to the equipment or wiring method and shall not be hand written. Exception, portions of labels or markings that are variable, or that could be subject to changes, shall be permitted to be hand written and shall be legible. (3) The label shall be of sufficient durability to withstand the environment involved. ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for the design and durability of safety signs and labels for application to electrical equipment. Provide instruction board for first aid and artificial respiration in substation and generator rooms.</p> <p>Light fixtures without protective covers (otherwise known as naked lights) shall not be allowed in storage areas or in any area where the Inspector of the Factories Rules disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> <p>Install cable trenches for all ground cabling in substation rooms. All cable trenches should have covers of non-flammable material.</p> <p>Install general lighting and emergency lighting in generator room. Generator room should be provided with battery-powered emergency lighting. The emergency lighting charging system and the normal service room lighting shall be supplied</p>

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	<p>from the load side of the transfer switch. General lighting for room should be 32 lux.</p>
Mid Term (6 Weeks)	<p>All cable joints must be properly connected with a porcelain/PVC connector with PIB tape wound around joint.</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>Distribution boards should be properly grounded / earthed.</p> <p>Install phase separators between terminal connections. Verify phase separators are installed at all remaining locations.</p> <p>Label all switchboards and/or distribution boards in the factory with capacity information. The permanent label should identify the maximum voltage present in an item of equipment or within the enclosure.</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 &amp; Rotating Equipment and NFPA70B or a comparable standard.</p> <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>

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

Immediate (3 to 6 Days)	<p>Remove all stored materials from under stairs.</p> <p>Remove all stored materials from underneath cutting tables at the noted locations.</p> <p>Provide proper protection of stairwells. Hanging rebar and construction materials should not be permitted in active path of egress. If stairwell is not complete and ready to accommodate workers, then the floor should not be occupied.</p>
Short Term (3 Weeks)	<p>Remove all locking devices from all doors to exits/means of egress. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p>
Mid Term (6 Weeks)	<p>Upon installation of automatic alarm system and accompanying alarm panel, arrange for direct connection to monitoring service or Fire Service and Civil Defense. If connection is not possible, until that time that it is, a person</p>

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	<p>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>Post maximum occupant load for all areas near the exits. As noted elsewhere, floor loads must be limited to the available capacity of the exit stairs.</p> <p>Upon installation of compliant standpipe system, include required identification signs at the noted locations. Signage must comply with NFPA 14. (e.g. Hydraulic Design Information Sign, signage for FDC, etc.)</p> <p>Each stair should be designated with a unique identification (e.g. Stairwell 1). Signs should indicate the name of the stair and the floor level. Additionally, stair signs should indicate if there is or is not roof access from the named stair.</p>
<p>Long Term (6 Months)</p>	<p>Provide fire-resistive rated construction barriers for exit enclosures in accordance with Alliance Standard Sections 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install automatic fire alarm system with sufficient smoke/heat detectors as per NFPA 72. Automatic detectors should be tied into the fire alarm system. Alarm system should initiate occupant notification upon activation of detectors in addition to the manual fire alarm stations. All fire alarm installations shall be submitted for review by the Alliance for review prior to commencement of installation.</p> <p>Installation of approved standpipe (mentioned elsewhere) will require the installation of rated fire pump. Install the fire pumps in accordance with NFPA 20. Consult with a qualified fire engineer to properly design and install pump system.</p> <p>Install or revise existing standpipe system at required locations designed by a qualified fire protection engineer. System should include rated fire pump and Class III standpipe hose connections (65 mm) in each stairwell at every floor level to include occupiable roofs.</p> <p>Provide a fire-resistive rated assembly between the exterior exit stairs discharge and the building interior. This will likely require installation of a fire rated door assembly on the bonded warehouse and fire rated window assemblies for the exterior wall next to exterior stairs (or alternatively windows could be filled in with fire rated materials).</p> <p>Revise the path of egress to assure that the path of travel is not reduced. The exterior stair width is currently insufficient and could cause a bottleneck.</p> <p>Remove all sliding or rolling doors at and within the exit stairs and along all portions of the means of egress. Replace with side-hinged swinging type doors in compliance with</p>

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	<p>Standard. As noted elsewhere, exit enclosures require fire rated, side-hinged door assemblies.</p> <p>Provide a protected exit passageway (an exit component that is separated from other interior spaces of a building or structure by fire resistant-rated construction and opening protectives, and provides for a protected path of egress in a horizontal direction to the exit discharge or the public way) that meets the same rating requirement as the exit that is being served (not less than 1 hr fire-resistant rated construction). Alternatively, the installation of sprinklers throughout the level of the exit discharge, or portion of the level of discharge where separated from portions of the floor without sprinklers, by fire barriers with the same fire resistance rating as the exit enclosure may allow for such a design.</p> <p>Route exits directly to the exterior or provide an exit passageway in accordance with Alliance Standard Section 6.15 or an Egress Court in accordance with Alliance Standard Section 6.17.2 for non-compliant arrangements. Consult a qualified fire protection engineer to design and/or approve the required exit passageway or egress court.</p> <p>Remove slider tracks or other impediments to eliminate the trip hazard in path of egress.</p> <p>Install illuminated directional exit signs 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 (e.g. change from interior to exterior stairs on 1st floor).</p> <p>A parapet or guard should be installed with a minimum height of 1067 mm (42in).</p> <p>Repair or replace leaking hoses and piping. Repairs and replacements must comply with NFPA 14 and NFPA 25 as per NFPA 25 Chapter 6 Standpipe and Hose Systems.</p> <p>Upon installation of compliant standpipe system, 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>Handrails shall be provided on both sides of each exit stairway and ramp. New handrails shall have a minimum height of 865 mm (34 in.) and a maximum height of 965 mm (38 in.) as measured from the leading edge of the tread. Handrails with a circular cross section shall have an outside diameter of at least 32 mm and not greater than 51 mm. If the handrail is not circular, it shall have a perimeter dimension of at least 102 mm and not greater than 160 mm with a maximum cross-section dimension of 57 mm. Edges shall have a minimum radius of 0.01 inch (0.25 mm).</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>Establish written corporate and plant policies on</p>
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	<p>housekeeping to ensure scheduled cleaning for floor, wall, ceiling, supply and return air ventilation systems. Promptly reschedule skipped cleanings.</p> <p>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>Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>Upon installation of the required standpipe system, establish an inspection, testing, and maintenance program for the standpipe system. Program must comply with NFPA 25. Any newly installed standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC Section 5.4.3.</p>
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