

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

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Name of the Factory	: <b>Utah Fashions Ltd</b>
Address of the Factory	: South Salna, Shalna Bazar, Gazipur, Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 24 Apr 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 24 Apr 2014

### **BASIC INFORMATION:**

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

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: RC beam-column frame system
iii.	Floor System	: Beam Supported slab.
iv.	Floor Area	: 218,200 sq ft
v.	No. of Stories	: 7 stories
vi.	Construction Year	: 2003 to 2005
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Not available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete.
xi.	Generator	: In a separate one storied building.

### **RECOMMENDATIONS FOR CORRECTIVE ACTION:**

The recommendations of corrective action for 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

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.
- 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.

Mid Term: (6 Weeks) :

- i. Engage a qualified structural engineer to provide additional investigation into the observed cracking and provide a remediation plan if required.

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- ii. Have a qualified structural engineer provide further testing and analysis of cracking in slab, columns and walls and provide a remediation plan to correct noted issues.
- iii. Engage a qualified structural engineer to develop the required documents to confirm conformance to building code including detailed design loads. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading. Compliance may be waived if the Factory Owner provides satisfactory evidence of a cyclone operations plan that includes full evacuation of the factory in advance of any approaching cyclone"
- v. 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.
- 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. Design should include all loads and be signed by engineer of record.
- vii. Adequately anchor and brace racking system to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads of the machinery on the 3rd floor. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
- ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- x. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- xi. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan (noted elsewhere).

Long Term : NA

### The recommendations for Fire Safety corrective actions:

<p>Immediate (3 to 6 days)</p>	<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>
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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> <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 design specifications for installed (and new) sprinkler systems and provide evidence compliance of racks and shelves for class of commodity storage.</p> <p>Provide design specifications for installed (and new) sprinkler systems and provide evidence of installation at the heights designated in the design.</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 each floor level including occupiable roofs.</p> <p>Factory will need to install fire rated door assemblies at all exits (1.5 hour rating). Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008,</p>

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or IS 3614. Part II. Doors must remain in closed position or be of self-closing type. 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

Installation of approved standpipe (mentioned elsewhere) and new sprinkler systems will require the installation of rated fire pump(s). Install the fire pumps in accordance with NFPA 20. Consult with a qualified fire engineer to properly design and install pump system.

Install sufficient smoke/heat detectors as per NFPA 72. All separate compartments should have a smoke detector. Consult with fire engineer for assistance to comply with NFPA 72.

Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer. The design of the current system should also be re-evaluated to assure conformance to NFPA 13

Upon installation of compliant standpipe system, fire department (Siamese) inlet connections should be installed to allow fire department pumper equipment to supplement the fire protection systems. 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 Defence hose thread standard. Signage for standpipe system is not in compliance with NFPA 14 Chapter 6 (e.g. no sign on Fire Department connection indicating STANDPIPE in 1 in lettering)

As noted elsewhere, install properly designed and rated fire pump to provide hydraulic pressure per design. Provide electrically supervised devices on the valves controlling the automatic sprinkler systems. Devices are to be supervised by a listed fire alarm system control unit.

During installation of fire rated door assemblies assure that every door in a stair enclosure serving more than 4 stories is provided with re-entry unless it meets the requirements of Alliance Standards Part 6 Section 6.8.3.1.

Designate a specific, secured area for the storage of waste. Waste should be segregated by type and organized. Hazardous waste should be separated from non-hazardous waste. Fire suppression equipment (extinguishers) should be available in the area. Do not permit waste to build up in areas such as elevator lobby. Remove waste in timely manner.

Flammable chemicals should be stored per BNBC Part 3 Section 2.13. Factory should designate a storage area for flammable chemicals that is separated from other occupancies by fire rated construction including fire rated

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	<p>door assembly. Area should have proper spill control and containment, proper ventilation, and fire suppression equipment as per standard.</p> <p>Additionally, fuel should not be stored in areas exposed to direct sunlight. Designate a storage area and cover the area.</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.</p> <p>Any newly installed or revised standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC as cited in 5.4.3. Standalone standpipe systems shall be confirmed to meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection or NFPA 14. This testing should be documented and available for review.</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 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>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 an approved audible device connected to every automatic sprinkler system (existing and newly installed) and activated by water flow equal to the flow of one sprinkler. Activation of the water flow shall activate the fire alarm system.</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)	Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room.
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<p>Short Term (3 Weeks)</p>	<p>Install two distinct earth connections with minimum 35 sqmm cable (green) for generator frame earthing.</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>Provide additional light fixtures to increase illumination levels provided in the BNBC.</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 (1.6.3.7) Part 53 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p>
<p>Mid Term (6 Weeks)</p>	<p>All distribution boards shall be marked "Lighting" or "Power", as the case may be, and also be marked with the voltage and number of phases of the supply. Each shall be provided with a circuit list giving diagram of each circuit which it controls and the current rating for the circuit and size of fuse element.</p> <p>Provide adequate protection so that no damage is caused by the ingress of water. Panels may need to be moved, or windows permanently sealed closed.</p> <p>The overhead service connection shall be led into buildings via roof poles or service masts made of GI pipe having a goose neck bend at the top and installed on the outer wall.</p> <p>Provide capacity information labels for distribution boards.</p>
<p>Long Term (6 Months)</p>	<p>Develop an Insulation Resistance Measurement Program that ensures deterioration of insulation resistance will be identified quickly. Testing should be in compliance with Inter National 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>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> <p>Ensure the generator room properly rated and physically separated from the remainder of the building.</p>