

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

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Name of the Factory	: <b>Stoffatex Fashions Ltd.</b>
Address of the Factory	: 7/3, Khortoil, Shatais Road, Gazipura, Tongi, Gazipur.
Present Status of the Factory	: <b>Under operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 16-Aug-2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 9-Jun-2014.
BGMEA Membership No	:4694

### **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 Supported slab.
- iv. Floor Area : 79150 sft
- v. No. of Stories : 6 storied RCC + 1 roof shed.
- vi. Construction Year : 2003
- vii. Foundation Type : Isolated footing
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC brick chips.
- 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 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. The Factory Load Manager shall serve as an ongoing resource to RMG vendors and be responsible to ensure that the factory operational loads do not at any time exceed the factory floor load limits as described on the Floor Load Plans.

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Mid Term (6 Weeks)

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- i. We have found FoS for corner column is 1.28 with 20 psf live load. Hence, there is a high concern regarding performance of corner columns. Therefore, need to engage a qualified structural engineer immediately to conduct detail engineering assessment to confirm structural performance of the structure within 4 weeks as per Alliance protocol. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.
- ii. Confirm steel reinforcing configuration (number and size of bars) within columns at lowest level of the building via additional ferro-scanning and destructive testing as described in the Alliance Assessment Protocols section 3.D.
- iii. Engage a qualified structural engineer to confirm structural performance of the structure.
- iv. Engaged a qualified structural engineer complete an analytical evaluation of the structural impact of the addition according to Alliance protocol.
- v. 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
- vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- ix. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of all buildings.
- x. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xi. Under guidance from a qualified structural engineer proper protective measures need to take to keep roof dry.

Long Term (6 Months)

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- i. Depending on the findings of the DEA, permanent remedial measures should be conducted for the safety of the building.
- ii. Provide a protective coating to all structural elements that are constructed with MCAC and exposed to rainfall or other sources of water. Have the protective coating approved by the Alliance or a qualified structural engineer. In the alternative, provide a 2% slope on the exposed surfaces to prevent accumulation of water.
- iii. Apply for issuance of the Certificates of Occupancy and pursue the matter to obtain the same.

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

Immediate (3 to 6 Days)	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.
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Short Term (3 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>Provide shielding or additional insulation for exposed wiring within 36 inches to external heat sources.</p> <p>Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Provide covers for cables &amp; electrical equipment where necessary.</p>
Mid Term (6 Weeks)	<p>Provide earthing of equipment at required locations and connect to required number of electrodes.</p> <p>Provide clearance of at least 1 m (39 in) in front of switchboards and distribution boards.</p> <p>Provide means of ventilation for the generator room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Ensure meters and other electrical devices installed on the main electrical equipment are operational.</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Ensure emergency power switchboards, distribution boards, and circuits are permanently marked so they will be readily identified as a component of an emergency circuit or system.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical wiring and cables are sized according to capacity of circuit breakers.</p> <p>Ensure all switchboards and distribution boards are in compliant locations.</p> <p>Remove multi looping of cables at circuit breakers within switchboards and distribution boards.</p> <p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p> <p>Complete an analysis/test on transformers to identify harmful substances. If it contains harmful substances, replace the transformer oil.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Provide covers to conceal all live internal components of switchboards and distribution boards.</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>Install security measures to ensure access to the substation is restricted.</p>

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	<p>Provide two separate earthing (grounding) points for the generator.</p> <p>Install phase separators between terminal connections at the noted locations.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power.</p> <p>Ensure inspection, maintenance, and testing procedures of the emergency generator are being completed and documented.</p>
<p>Long Term (6 Months)</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> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Consult with an expert fire protection engineer and make sure the generator room is fire rated.</p> <p>Ensure switchboards and distribution boards provided with physical means to prevent the installation of more over current devices than that number for which the panel board was designed, rated, and listed.</p> <p>Provide grounding (earthing) for switchboards and distribution boards.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and distribution boards.</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> <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 NFPA 70B or a comparable standard.</p> <p>Develop and implement an electrical safety program. Include key topics such as lock-out/tag-out procedures, personal protective equipment requirements, etc. Keep records of completed training available on site.</p> <p>Provide adequate grounding (earthing) for transformer.</p>

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

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations as soon as possible.
Short Term (3 Weeks)	Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Mid Term (6 Weeks)	<p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense. Until that time that monitoring can be set up, arrange a monitoring system using 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>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>Provide handrails on both sides of each stairway.</p> <p>Post the 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>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p> <p>Install emergency lighting for all paths of egress in accordance with Alliance Standard Section 6.7. Illumination needs to be a minimum of 10 lux for all corridors, exit doors and stairways. Illumination for aisles needs to be a minimum of 2.5 lux. Egress lighting shall be provided with emergency power or supplemented with battery powered lights that provide a minimum of 10 lux for not less than 30 mins in the event of failure of normal lighting.</p>
Long Term (6 Months)	<p>Provide fire-resistive rated assemblies for exit access corridors in accordance with Alliance Standard Section 6.3.1.1 or provide an automatic sprinkler system throughout the story or building per NFPA 13. Consult a qualified fire protection engineer to design the required rated assembly or sprinkler system.</p> <p>Replace all non-compliant doors and frames in the means of egress with doors that are listed, approved, automatic-closing, side-swinging, fire rated doors in compatible fire rated frames with latching panic hardware.</p> <p>Get at least 25 percent worker trained and certified in fire fighting, first aid and rescue training by the proper authority.</p> <p>Provide fire-resistive rated opening or penetration protection for rated walls and assemblies. Consult a qualified fire protection engineer to design the required opening protectives or penetration systems.</p> <p>Install standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Have a qualified engineer review the pump capacity and ensure hydraulic calculation is done which can be supported by this pump to</p>

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	<p>supply the standpipe connections required for the building. Also, identify all other performance data and ensure conformity to NFPA 14, 20, 22 and 25 standards.</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.). Connect devices to an automatic fire alarm and detection system for the facility. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures swinging in the direction of egress. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Remove non-rated construction from the top of the building or provide fire-resistive rated protective materials for the non-rated construction.</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>Conduct fire drills on a regular basis as outlined in BNBC Part 4 Appendix A for all garment facilities. Fire drills shall be conducted under the direction of a Fire Safety Director.</p> <p>Impart training in accordance with Alliance Safety Training Curriculum and keep record with proper documentation.</p> <p>Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7 as demanded in Alliance Standard Part 13 Section 13.10.3.</p> <p>Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry according to Alliance Standard Part 6 Section 6.8.3.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees. The evacuation plan shall include provisions to assist physically disabled persons. A list of all employees with physical disabilities shall be kept by the Fire Service Director.</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 back up or by connecting to the emergency power system, for compliantly illuminated exit signs.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p>
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