

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Your Fashion Sweater Ltd.
Address of the Factory	: Gilarchala, Gorgaria Master bari, Sreepur, Gazipur, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 22 April 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 01 April 2014

BASIC INFORMATION:

The present garment factory is a Five storied RCC main production building with one basement. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RC flat plate in old part and RC beam-column frame System in new part of the building.
- iii. Floor System : Beam Supported Slab in new part and flat plate on old part.
- iv. Floor Area : 117604 sft.
- v. No. of Stories : 5 storied + single basement.
- vi. Construction Year : Old part: 2005-2011, New part: 2013.
- vii. Foundation Type : Unknown
- viii. Design Drawings : Not Available
- ix. Soil investigation Report : Available
- x. Construction Materials : Reinforced Concrete (brick chips).
- xi. Generator : Ground Floor (separate shed)

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. Engage a qualified structural engineer to provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- ii. Develop engineered plans to brace all non-structural elements (storage rack) to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- iii. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the old part of the building under wind loading.
- v. Engage a qualified structural engineer to develop the required documents for old part of the building 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 assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures. This assessment should include destructive core testing to verify the concrete compressive strength of columns.
- vii. Have a qualified structural engineer prepare credible as-built documents of old building based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- viii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures. This assessment should include destructive core testing to verify the concrete compressive strength of columns.
- ix. Provide Certificates of Occupancy for review
- x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- xi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- xii. 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

: NA

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The recommendations for Fire Safety corrective actions are:

Immediate	NA
Short Term (3 Weeks)	<p>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.</p> <p>Store chemicals and all flammable materials in approved enclosure in a safe manner.</p>
Mid Term (6 Weeks)	<p>Post the occupant load for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space as per Alliance standard part 6 section 6.4.4.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees in accordance with Alliance Standard, Part-13, Section-13.3.</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>Develop a testing and maintenance program that ensures the operation of all exist lights is verified at least once per year. If battery-operated lights are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lights shall be provided for a minimum 90 min once per year.</p> <p>Assign a person to contact the fire department in the event of fire alarm activation until central station or direction fire service connection is set up. Locate an annunciator to alert this person in a constantly attended location.</p> <p>Implement training program with proper documentation in accordance with the Alliance Safety Training Curriculum on fire safety as per Alliance standard part13.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in accordance with Alliance Standard, Part-6, Section-6.9.3.1.</p> <p>Apply to Biddut license prodan board for issuance of electrician license.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance Standard, Part-13, Section-13.1.1(2).</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. Install required identification signs at the noted locations. Signage</p>

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	<p>must comply with NFPA 14 Chapter 6.</p> <p>Apply to authority for issuance of occupancy certificate and pursue the matter to expedite.</p>
<p>Long Term (6 Months)</p>	<p>Provide an automatic fire alarm and detection system per the Alliance Standard. Pull stations at egress points, smoke detectors throughout the facility, and visual and audible notification devices must be spaced appropriately and directly connected to the fire alarm system for automatic activation based on occupancy type in accordance with NFPA 72.</p> <p>Install dedicated fire pump following the requirements of NFPA 20 as mentioned in Alliance Standard Section 5.5.1. 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>Install standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Provide opening protective at all windows and other openings on all the fire rated wall across the entire premises as per Alliance standard part 4, section 4.6.</p> <p>Increase the landing width to make it equal to the width of the stair following the requirements of Alliance Standard Part 6 Section 6.9 and Section 6.5.</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>Provide fire-resistive rated assemblies at the required exit access corridors. The rated assembly should be approved and designed by a qualified fire protection engineer.</p> <p>Exit access corridors serving an occupant load exceeding 30 are to be separated by walls having a fire resistance rating of 1 hr in accordance with 4.5 unless provided with automatic sprinkler protection throughout the story or building. Window and Glass Block Assemblies are to be tested fire rating following NFPA 257.</p> <p>Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosure as per Alliance standard part 4 section 4.6. Required shaft enclosures shall have a minimum fire resistance rating of 2 hr when connecting four stories or more and a minimum fire-resistance rating of 1 hr when connecting three stories or less. Fit outward opening, side swinging, self-closing, non-lockable fire doors of required rating in all stairwell enclosures according to alliance standard part 4, section 4.6.</p>

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	<p>Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install handrails on both sides of the stair in accordance with Alliance Standard,Part-6,Section-6.9.2.4, 6.12.1.1 and 6.12.1.2.</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 a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum 2.5 lux.</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.</p> <p>Repair or replace damaged piping at the noted locations, if required. Repairs and replacements must comply with NFPA 14 and NFPA 25.</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>Provide guard rail of minimum 1067 mm (42 in.) height on both sides as per Alliance Standard Part 6 Section 6.3.7.</p> <p>According to Alliance Standard,Part-13,Section-13.6, 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 m² (500 ft²). 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. In general, this program should address process of request and approval authorities, necessary checks prior approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re approval procedure etc.</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 establish 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>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure switchboards and distribution boards free of dirt and debris.</p> <p>Find out cause of overheating and take proper action including replacing cable or equipment where necessary.</p>
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>Provide two separate points earthing (grounding) provided for generator.</p> <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>Ensure Equipment and safety signage is posted within the room.</p>
Mid Term (6 Weeks)	<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 a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Remove multi looping of wiring/cables at circuit breakers within distribution boards.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Switchboards and/or distribution boards.</p> <p>Provide mechanical guards for electrical equipment where necessary.</p> <p>Led telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</p>
Long Term (6 Months)	<p>Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Consult with an expert electrical engineer and make sure lightning protection ground terminals are bonded to the building or structure grounding.</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 & Rotating Equipment and NFPA70B or a comparable standard.</p>