

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Apparel Stitch Ltd
Address of the Factory	: 430/1/A Tejgaon I/A, Tejgaon ,Dhaka.
Present Status of the Factory	: Under Operation
Structural Assessment conducted by	: Alliance
Date of Structural Inspection	: 04 Mar 2014
Fire & Electrical Assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 16 Apr 2014

BASIC INFORMATION:

The Present Garment Factory is comprises of a 2 Main Buildings & no Ancillary Buildings. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RC frame structure: Beam-Column up to 2nd floor and Flat Plate from 3rd floor to 7th floor and galvanized iron shed in a portion of the floor in building #1. RC frame structure: Beam-Column up to 3rd floor and Flat Plate at 4th floor and next two floors were concrete over metal deck in building #2.
- iii. Floor System : Beam Slab/Flat Slab type in RCC Building.
- iv. Floor Area : 1, 10,000 Sft.
- v. No. of Stories : B-1:8 Storied & B-1:6 Storied.
- vi. Construction Year : 1998-2008
- vii. Foundation Type : Unknown.
- viii. Design Drawings : Not Available.
- ix. Soil investigation Report : Not 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 : N/A.
- Short Term (3 Weeks) :
- i. Engage a qualified structural engineer to confirm structural performance of the structure.
 - ii. Some doubts about safety - so assessment of concrete strength should be advised to reassess FoS within two months. Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure.
 - iii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.

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- iv. 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.
- v. Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- vi. Engage a qualified structural engineer to develop the required documents such as proper as built drawing to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20.
- vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading for building #2.
- viii. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20.
- ix. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- 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. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3 for both buildings.
- xii. So it is recommended to perform another geotechnical report under guidance from a qualified structural engineer at close vicinity of the structure for clarity with previous assessment and make the report available for review.

Long Term (6 months) :

- i. Apply for issuance of Certificate of Occupancy and pursue the matter.
- ii. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- iii. Repair the exterior façade system to prevent water intrusion.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Remove combustible materials from the substation room.
Short Term (3 Weeks)	<p>Have a qualified electrical engineer develop as-built electrical drawings providing detailed key components of the electrical system.</p> <p>Need to maintain color code for all cables. For phase conductors use red, yellow and blue, for neutral conductors use black and for grounding cables use green dotted yellow.</p> <p>Need to joint cable through porcelain/PVC connectors with PIB tape wound around joint.</p>

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	<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>
Mid Term (6 Weeks)	<p>Need to separate the multiple and looping cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements.</p> <p>Ensure switchboards and/or distribution boards are 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 following NFPA 70 section 408.54.</p> <p>Provide dedicated neutral for every circuit.</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>
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 & Rotating Equipment and NFPA70B or a comparable standard.</p>

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p>
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>
Mid Term (6 Weeks)	<p>Install an automatic fire alarm and detection system for the facility. System shall comply with the Alliance Standard and NFPA 72. Consult a qualified fire protection engineer and/or authorized fire alarm company to design and install the system.</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>Create a Fire Safety Director position and fill the position</p>

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	<p>with an individual that has had sufficient training to be able to carry the required duties. Conduct fire drills on a quarterly 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>Implement training program with proper documentation in accordance with the Alliance Safety Training Curriculum on fire safety.</p> <p>Develop a testing and maintenance program that ensures the operation of all egress lighting 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>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 or, since battery back up is used, these lights are required to be tested on a monthly basis.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defence in accordance with Alliance Standard, Part-13, Section-13.1.1(2).</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level in English and Bengali at the noted locations in accordance with Alliance Standard, Part-6, Section-6.9.3.1.</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 must comply with NFPA 14 Chapter 6.</p> <p>Install a new automatic fire alarm and detection system. Once installed, arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defence as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time, 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>Apply to RAJUK for approval of horizontal extension of ground floor to 5th floor.</p> <p>Apply to RAJUK for issuance of occupancy certificate and pursue the matter to expedite.</p>
Long Term (6 Months)	<p>Provide fire-resistive rated construction barriers for shafts in accordance with Alliance Standard Section 4.5.7. Protect the openings of shaft enclosure by providing rated opening protectives. Consult a qualified fire protection engineer to design the required rated construction barrier and opening</p>

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	<p>protectives.</p> <p>Replace all collapsible, sliding, roll-down gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating in accordance with Alliance Standard, Part-6, Section-6.8.1.</p> <p>Provide proper aisles width and marking (clear width minimum 36 in.) and keep aisles free of storage.</p> <p>Provide rated exit passageway (i.e., protected path of egress from the exit enclosure to the public way). The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated.</p> <p>Design and install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer in accordance with NFPA 13. All sprinkler installations shall be submitted for review by the Alliance prior to commencement of installation. Suggested schedule: Start Design - 08 Aug,2014, Complete Design - 31 Oct, 2014, Begin Installation - 23 Jan, 2015.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work.</p> <p>Provide fire-resistive rated construction barriers between floors following Section 4.4 and Table 4.4.1 of Alliance Standard or Table 3.3.1 (page 10383) and Table 4.1.1 (page 10409) from BNBC Part 4. Consult a qualified fire protection engineer to design the rated construction barriers.</p> <p>Provide fire-resistive rated construction barriers at exit enclosures in accordance with Alliance Standards Part 4 Section 4.5: Separation. Provide 1.5 hr rated fire doors at exits of each floor. Repair holes in exit enclosures to maintain fire resistance rating. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Install a dedicated fire pump for the facility in accordance with NFPA 20 to supply the demands of the connected fire protection systems along with a stored source of water sufficient to meet the demands in accordance with NFPA 22. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. This pump is to be connected to alternative power source like generator. And the generator is to be connected with ATS (auto starter).</p> <p>Provide fire-resistive rated 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 penetration systems.</p> <p>Provide training and certification for at least 25 workers in</p>
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	<p>fire fighting, first aid and rescue training by the proper authority.</p> <p>Provide an exit passageway with protective opening assemblies as per Alliance Standard Part 6 Section 6.14 Exit Enclosures.</p> <p>Provide fire-resistive rated assemblies at the required exit access corridors. The rated assembly should be approved and/or designed by a qualified fire protection engineer in accordance with Alliance Standard, Part-6, Section- 6.3.1.1.</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.). Devices should be part of 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>Establish an inspection, testing, and maintenance program for all fire extinguishers and prepare proper documentation. Program must comply with NFPA 10.</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. 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> <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 Standard. Connections shall match the Fire Service and Civil Defence hose thread standard.</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 re-entry to floor levels from the stairwells in accordance with Alliance Standard Section 6.8.3.</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>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>Develop a hot work permit program. The program must</p>
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	<p>comply with the requirements of NFPA 51B.</p> <p>Once standpipe system is installed, 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> <p>Install a pump dedicated for fire fighting or fire protection following the requirements of NFPA 20 as mentioned in Alliance Standard Section 5.5.1. Then establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.</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.</p>
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