

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Stitch well Designs Inc
Address of the Factory	: 430/1/A Tejgaon I/A Tejgaon Dhaka Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 4 Mar 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 16-Apr-2014

BASIC INFORMATION:

The present garment factory comprises of two multi storied buildings. They are of eight & six storied building with beam-column frame system. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RC frame structure.
- iii. Floor System : 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. Beam-Column up to 3rd floor and Flat Plate at 4th floor and next two floors were concrete over metal deck building #2.
- iv. Floor Area : 9000 sft per floor in building #1 and 5000 sft per floor in building #2.
- v. No. of Stories : Building #1: Eight storied, Building #2: six storied
- vi. Construction Year : Building #1: 1998-2008 Building #2 was purchased with a two storied building in 1988, then both building started construction in 1988 and completed in 2008 phase wise.
- vii. Foundation Type : Individual footing with cast in situ pile in building #1. Individual footing (7ft x 7ft). Later wooden piles were used to strengthen the soil bearing capacity & footing became (9ft x 9ft) in building #2.
- viii. Design Drawings : Available
- ix. Soil investigation Report : Available
- x. Construction Materials : Reinforced Concrete.
- xi. Generator : At Ground floor East side.

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RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both 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. Designate a representative as the Factory Load Manager.
- ii. Develop a program to ensure that all live loads for which a floor or roof has been designed for will not be exceeded.

Mid Term (6 weeks):

- i. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- ii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- iii. At the entrance extra roof should be provided which should be designed by qualified structural engineer for the safety for masonry fall during earthquake and other kind of fall.
- iv. 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.
- v. Engage a qualified structural engineer to confirm structural performance of the structure.
- vi. Have a qualified structural engineer provide further evaluation of the jacketed columns by finding rebar details in those columns and then assess those columns effect on the building.
- vii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures.
- viii. Provide Certificates of Occupancy for review.
- ix. 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.

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- x. 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

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>
<p>Short Term (3 Weeks)</p>	<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>
<p>Mid Term (6 Weeks)</p>	<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>

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Long Term (6 Months)	<p>Provide fire-resistive rated construction barriers at exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr fire resistance rating.</p> <p>Install Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices spaced appropriately based on occupancy type in the factory main building and ancillary shed building. Reference NFPA 72.</p> <p>Install fire extinguishers for the Fabric store. Also install fire extinguishers at appropriate locations and heights based on hazard type per BNBC Part 4 and NFPA 10. Extinguishers shall be placed so that maximum travel distance to the nearest unit shall not exceed 30 m (100 ft.).</p> <p>Set up a Fire alarm and detection system central station monitoring service or direct connection to the Fire Service and Civil Defense. Assign a person at the facility to contact the fire department in the event of fire alarm activation.</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.</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 fire-resistance rated, which in this case is 2-hour.</p> <p>Provide re-entry to floor levels from the stairwells in accordance with Allainace Standard Section 6.8.3.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Minimum 1-hr fire-rated wall and door for boiler room and minimum 1-hr fire rated door for fabrics store room.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers in accordance with NFPA 10.</p> <p>Install appropriate means of illumination at the noted locations. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2 cd/m², may also be used.</p> <p>Provide an emergency power source for illuminated exit signs, either by battery back-up or by connecting to the emergency power system.</p> <p>Install continuous illuminated exit sign at all exit points. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5</p>
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	<p>lux. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2 cd/sq.-m may also be used.</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 out the required duties.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B</p> <p>Providing handrails on the other side of each stairway.</p> <p>Separation of boiler rooms from the production floors with properly rated fire doors & protection of penetrations</p> <p>Need required number of people (trained and certified) in firefighting, first aid, and rescue training by the appropriate authority accordance with the Alliance Safety Training Curriculum.</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>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>Install required fire rated door assemblies at all exits. Provide required fire-resistive rated opening protection (Door, Window, Hatch Cover etc.) at openings and penetrations through fire rated walls and/or assemblies. Consult a qualified fire protection engineer to design the required rated opening protection.</p> <p>A fire pump shall be provided for the building in accordance with the Alliance document Section 5.5 and NFPA 20. The water supply will also need to be upgraded to serve the required fire pump and standpipe systems. All new installations and design requirements outlined in BNBC Part 4 Chapter 4 for water supplies shall be replaced by the requirements of NFPA 20 (fire pumps), NFPA 22 (water tanks), and NFPA 24(underground water mains).The Owner shall contact the Alliance prior to conducting the final acceptance testing of the fire pump installation to allow the Alliance to witness this test. A final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance.</p>
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	<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 fully 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>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure the generator room clean and free of dirt, debris, and improperly stored materials.</p> <p>Find out the cause of overheating and signs of burning and take proper action.</p> <p>Ensure distribution boards free of dirt.</p> <p>Remove all dirt, debris, lint, and improperly stored materials from the substation room.</p>
Short Term (3 Weeks)	<p>Ensure Signage indicating the prohibition of light fixtures without protective covers is installed at required locations</p> <p>Ensure Lighting fixtures are supported from the structure and seismic bracing is installed as required.</p>
Mid Term (6 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>Provide clearance of at least 1 m (39 in) in front of distribution board.</p> <p>Provide mechanical guards for electrical equipment where necessary.</p> <p>As per BNBC section 2.11.5.4 ensure clear and permanent identification marks are painted in all distribution boards.</p>
Long Term (6 Months)	<p>Ensure the generator room properly rated.</p>