

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Shinest Embroidery & Printing
Address of the Factory	: 217/1-A, Beribadh, Mohammadpur, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 17 May 2015
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 17 May 2015

BASIC INFORMATION:

The present garment factory is comprises of a 1 Main Building 1 Ancillary Building. The following general information was noted:

i.	Building Usage Type	: Embroidery & Printing Factory.
ii.	Structural System	: Only ground floor of the building is a beam-column moment resisting frame system but another 8-storied is a flat plate system with peripheral beam.
iii.	Floor System	: RCC slab
iv.	Floor Area	: 89,650 SF.
v.	No. of Stories	: Main building: 9 stories: Ground Floor + 8, Ancillary building (Generator building): Single story tin shed.
vi.	Construction Year	: 2011-2014
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Not 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. The compressive strength of concrete should be verified via core testing conducted under the guidance of a qualified structural engineer.
- ii. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the additions.
- iii. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- iv. Have a qualified structural engineer prepare credible as-built documents based on the
- v. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vi. As detailed elsewhere via the FoS question, destructive test or core test can be done to investigate material strength to confirm structural element performance with the involvement of a qualified structural engineer.
- vii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- viii. 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.
- ix. 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 (6 months)

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- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- ii. Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer.
- iii. Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustible materials from Generator Room. Provide covers made of non-combustible materials throughout the length of cable trays.
Short Term (3 Weeks)	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

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	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide at least 1m (39in) clearance in front of panel boards for maintenance purpose.</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>Provide proper support and protection for the cables in Generator Room using metallic cable tray with cover.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBC for required number of electrodes.</p> <p>Provide identification/tagging indicating the equipment/machines' name (i.e. Sewing machine line-1 or Lighting line-2) and type of conductor (i.e. L1, L2, L3, N, PE) for every cable at its termination point or maintain the color-code at its termination point (providing colored cable-sleeves) for identification of conductor-type (i.e. Red/Yellow/blue for phase cable, Black for neutral cable, Green for earthing cable). Labeling-cable-tie/Marker-tie can be used for cable identification.</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>Electrical Panel board should not be installed in non-compliant locations.</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> <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>

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables in accordance with Alliance Standard Section 13.7.2.
Short Term (3 Weeks)	Smoking is prohibited in garment factory buildings or similar uses. Post "No Smoking" signs in English and Bengali at all building entrances. If the Owner designates a smoking area outside the building, information on the location of these areas shall be posted on the "No Smoking" signs.
Mid Term (6 Weeks)	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

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	<p>alarm company to design and install the system.</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 Defense as per Alliance Standard Section 5.7.5. Until that time, a person trained to contact the Fire Service and Civil Defense in the event of fire alarm activation shall be provided. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person.</p> <p>Post emergency evacuation maps at the entrance to each stair or main point of egress.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is verified at least once per year. If battery-operated signs are used, these signs shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 min once per year.</p> <p>Post the occupant load for all assembly and production floor areas in a conspicuous space near the main exit or exit access doorway for the space in accordance with Alliance Standard Section 6.4.4.</p> <p>Develop a testing and maintenance program that ensures the emergency power for 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 30 min once per year.</p> <p>Collect all applicable permits and licenses and kept up to date including waiver certificate from BEREC.</p> <p>Complete Fire Department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance Standard Section 13.1.1(2).</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level in both English and Bengali.</p> <p>Apply to appropriate authority in an expeditious manner for issuance of the Certificates of Occupancy for each building and ancillary structure according to building use.</p>
Long Term (6 Months)	<p>Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated door assemblies (door and frame) with latching panic hardware.</p> <p>Provide fire-resistive rated opening or 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 opening protectives or penetration systems.</p> <p>Install automatic fire sprinkler systems throughout the facility. Manufacturing areas and storage less than 12 feet high is classified Ordinary Hazard (Group 2). Sprinkler systems should be designed to deliver 0.20 gpm/ft² over the most remote 1500 square feet. 250 gpm hose allowance. 90 minute water supply duration. The owner plans to install rack storage systems in the warehouse. This may include solid shelf storage of Class III or IV commodities up to 20</p>

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	<p>feet high. Install a system of open racks to eliminate the need for in-rack sprinklers. Install an ESFR sprinkler system designed to deliver 98 gpm at the 12 most remote sprinklers. 250 gpm hose allowance. 60 minute water duration. All sprinkler installations shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Modify or install standpipe system at required locations. Standpipe system must comply with NFPA 14. The hydraulic calculations should be submitted and reviewed by Alliance prior to start of work. All standpipe system installation activities shall be submitted for reviewed by the Alliance prior to commencement of installation in accordance with Section 5.4.3.2.</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. 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 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. The pump is to be connected to an alternative power source such as a generator. The generator is to be configured with an ATS (auto starter).</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 or modifications shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Sections 4.5 and 4.6. Consult a qualified fire protection engineer to design the required rated construction barrier and opening protection.</p> <p>Provide training and certification for the required number of people (25% of total workers) in fire fighting, first aid, and rescue training by an appropriate authority in accordance with the Alliance Safety Training Curriculum.</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>Provide Fire Department (Siamese) connections in accordance with Alliance Standard Section 5.5.4. Connections shall match the Fire Service and Civil Defense hose thread standard.</p> <p>Maintain a minimum ceiling height of 2.3 m (7 ft 6 in) with projection from the ceiling not less than 2.03 m (6 ft 8 in) along the means of egress.</p> <p>Provide a uniform slope/ramp for the walking surface. Slope should</p>
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	<p>not exceed 1 in 20 in the direction of travel. Any changes in elevation (protrusions or lips) must not exceed 1/4 in.</p> <p>Provide handrails on both sides of each stairway. Mount new handrail at a height consistent with existing height (between 30 in. and 44 in).</p> <p>Provide a new ramps with a running slope not greater than 1 in 12 (8 percent). Provided handrails on both sides of the ramp.</p> <p>Provide continuously illuminated exit signs per Alliance Standard Section 6.11. Signs shall be placed at all required exits and along egress paths, especially where there is a change in direction for the path of travel.</p> <p>Provide parapet in every occupied roofs with a minimum height of 1067 mm (42 in.).</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>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>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>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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