

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

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Name of the Factory	: <b>Silver Composite Mills</b>
Address of the Factory	: B.K. Bari, Taltoli, Monipur, Mirzapur Bazar, Gazipur, Dhaka, Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 27 Jun 2015
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 27 Jun 2015

### **BASIC INFORMATION:**

The present garment factory is comprises of a 1 Main Building 4 Ancillary Buildings. The following general information was noted:

i. Building Usage Type	: Garments Factory.
ii. Structural System	: 01. Main building: Beam-column moment resisting frame system; 02. Ancillary building-1 (Residence & Medical building): Beam-column moment resisting frame system; 03. Ancillary building-2 (Canteen shed): Brick infill wall with steel pipe column and steel truss roofing; 04. Ancillary building-3 (Wastage Godown shed): Brick infill wall with steel pipe column and steel truss roofing; 05. Ancillary building-4 (Generator & pump house): Brick infill wall with steel pipe column and steel truss roofing.
iii. Floor System	: RCC Beam slab
iv. Floor Area	: 297,055 SF.
v. No. of Stories	: Main building: 6 stories (G.F + 5), Ancillary building-1 (Residence & Medical building): 4 stories (G.F + 4); Ancillary building-2 (Canteen shed): Single story; Ancillary building-3 (Wastage Godown shed): Single story; Ancillary building-4 (Generator & pump house): Single story.
vi. Construction Year	: 2013-2014
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.

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- 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.

### Mid Term (6 Weeks)

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- i. The in-situ concrete compressive strength in the Main Production Building should be verified via core testing conducted under the guidance of a qualified structural engineer.
- ii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- iii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads (plastic water tanks). If provisions have not been made, have a qualified structural engineer develop a remediation plan.
- iv. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- v. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- vi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- vii. 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. Remove deteriorated expansion joint material and provide new appropriate material at the expansion joint. Have a qualified structure engineer identify the location of the expansion joint and then have a remediation plan developed.
- iv. Provide Certificates of Occupancy for review.

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

Immediate (3 to 6 Days)	Remove the all flammable material kept near the panel.
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>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide uninterrupted power supply (UPS) for powering the life safety loads.</p> <p>Provide permanent identification mentioning name of panels (i.e. SDB-1/1st Floor) on a durable material sheet posted on panels' door.</p> <p>Install two distinct earth connections of minimum 35 sq mm for generator frame earthing.</p> <p>Disconnect the panel from the electrical service and clean interior components of all dust and debris. Seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide electrical graded rubber mats with the specifications of 650 V-protection and required area (accommodating at least two person or depending on the panels' length).</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>All distribution boards shall be installed a suitable height for ensuring easy operation and maintenance of panels. Top end of the panel should be at 6 feet at maximum.</p> <p>Provide dedicated neutral for every single phase circuit with identification using an approved means. Joints are not allowed to provide neutral connection to another load. Use a dedicated neutral cable (of same size as respective phase cable) from the neutral bus bar to the load without any joint throughout its length.</p> <p>Provide identification/tagging mentioning 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>Use PVC connector with PIB tape wound around with a junction box with every cable joints.</p>

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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 &amp; 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>
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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 in accordance with Alliance Standard Section 13.7.2.
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>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 emergency evacuation maps at the entrance to each stair or main point of egress.</p> <p>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. All other requirements for fire drills shall be conducted in accordance with BNBC Part 4 Appendix A.</p> <p>Implement training programs and document in accordance with the Alliance Safety Training Curriculum.</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 90 min once per year.</p> <p>Collect all applicable permits and licenses and keep them up to date, including boiler license and waiver certificate from BEREC.</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> <p>Complete Fire Department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance</p>

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	Standard Section 13.1.1(2).
Long Term (6 Months)	<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 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 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>Modify or install standpipe system at required locations for the Main Building and Ancillary Building-1. 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 or modify the fire pump 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 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 re-entry to floor levels from the stairwells in accordance with Alliance Standard Section 6.8.3.</p> <p>Provide parapets or guards with a minimum height of 1067 mm (42 in.) for all occupiable roof areas in accordance with Alliance Standard Section 6.12.</p>

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	<p>Establish an inspection, testing, and maintenance program for all fire extinguishers and prepare proper documentation. Program must comply with NFPA 10.</p> <p>Modify the hangers, bracing, and restraint of sprinkler piping to meet the requirements of NFPA 13 chapter 9. Consult a qualified fire protection engineer to design the proper piping supports.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>Establish an inspection, maintenance and testing program for the sprinkler system. Program needs to comply with the requirements of NFPA 25.</p> <p>Provide identification signs with permanently marked water proof metal or rigid plastic for the required components of sprinkler system as per NFPA 13.</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> <p>Establish an inspection, testing, and maintenance program for the fire pump. Program must comply with NFPA 25.</p>
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