

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: STERLING STYLES LIMITED
Address of the Factory	: Baron, Earpur Union, Ashulia, Savar, Dhaka
Present Status of the Factory	: Under operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 31-May-2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 26-May-2014.
BGMEA Membership No	: 4330

BASIC INFORMATION:

There is one building in the factory premises. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC Moment resisting frame structure.
- iii. Floor System : Beam Supported slab.
- iv. Floor Area : 306840 sft
- v. No. of Stories : Seven storied.
- vi. Construction Year : 2007(1st phase) , 2014(2nd phase)
- vii. Foundation Type : isolated footing
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC stone 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.

Mid Term (6 Weeks) :

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- i. Have a qualified structural engineer provide further analysis and testing of the noted settlement and crack issues. If required, a remediation plan shall also be provided by the qualified structural engineer.
- ii. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- iii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate this RCC water tank.
- iv. Have a qualified structural engineer confirm that capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- v. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under surge loading.
- vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- ix. 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.
- 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. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- xii. Under guidance from a qualified structural engineer arrange geotechnical investigation at close vicinity of the structure and make the report available for review.
- xiii. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.

Long Term (6 Months)

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- i. Have the exterior façade repaired to ensure prevention of dampness.
 - ii. Apply for issuance of the Certificates of Occupancy and pursue the matter to obtain the same.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure the generator room is clean and free of dirt, debris, and improperly stored materials.</p> <p>Ensure switchboards and distribution boards are free of dirt.</p> <p>Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room.</p> <p>Find out the cause of overheating and consider replacement of cable or equipment.</p>
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<p>Short Term (3 Weeks)</p>	<p>Ensure proper ventilation for generator room.</p> <p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>Provide shielding or additional insulation for exposed wiring within 36 inches to external heat sources.</p> <p>Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Provide additional light fixtures at substation room to increase illumination levels provided in the BNBC.</p> <p>Ensure generator room is properly illuminated with adequate number of lighting equipment.</p> <p>Provide covers for cables & electrical equipment where necessary.</p> <p>Install appropriate type and number of firefighting equipment according to fire class of the materials inside the generator room.</p>
<p>Mid Term (6 Weeks)</p>	<p>Provide earthing of equipment at required locations and connect to required number of electrodes.</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Ensure emergency power switchboards, distribution boards, and circuits are permanently marked so they will be readily identified as a component of an emergency circuit or system.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical wiring and cables are sized according to capacity of circuit breakers.</p> <p>Ensure all switchboards and distribution boards are in compliant locations.</p> <p>Remove multi looping of cables at circuit breakers within switchboards.</p> <p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p> <p>Complete an analysis/test on transformers to identify harmful substances. If it contains harmful substances, replace the transformer oil.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Provide covers to conceal all live internal components of switchboards and distribution boards.</p> <p>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions.</p> <p>Install security measures to ensure access to the substation is restricted.</p>

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	<p>Provide two separate earthing (grounding) points for the generator.</p> <p>Install phase separators between terminal connections at the noted locations.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power.</p> <p>Ensure inspection, maintenance, and testing procedures of the emergency generator are being completed and documented.</p>
Long Term (6 Months)	<p>Consult with an expert fire protection engineer to make sure the generator room is fire rated as per Alliance standard section 3.4.2.1.3 & 3.4.2.1.4.</p> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Ensure switchboards and distribution boards 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.</p> <p>Consult with a professional electrical engineer to design & install a lightning protection system, including risk index calculation and to make sure the system is secured against lightning.</p> <p>Provide grounding (earthing) for switchboards and distribution boards.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and distribution boards.</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>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 NFPA 70B or a comparable standard.</p> <p>Develop and implement an electrical safety program. Include key topics such as lock-out/tag-out procedures, personal protective equipment requirements, etc. Keep records of completed training available on site.</p>

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The recommendations for Fire Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Remove all combustibles stored underneath the cutting tables at the noted locations as soon as possible.</p> <p>Permanently remove all stored materials for the stairwells. Establish a housekeeping policy to keep all stairwells free.</p> <p>Remove all impediments, obstructions, and stored materials from the means of egress. Keep all elements of the means of egress (exit path, aisles, stairs, corridors, etc.) continuously free and clear of all obstructions in accordance with Alliance Standard Section 6.3.9.</p>
<p>Short Term (3 Weeks)</p>	<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>Mid Term (6 Weeks)</p>	<p>Replace all collapsible gates in means of egresses with side-hinged swinging type fire doors of proper width and rating in accordance with Alliance Standards.</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>Install handrails on both sides of the stairs in accordance with Alliance Standards.</p> <p>Post the 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>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</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 as per the Alliance Standard.</p>
<p>Long Term (6 Months)</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. Window and glass block assemblies are to be tested for fire rating following NFPA requirements.</p> <p>Provide a fire-resistive rated assembly between the exterior exit stairs and the building to achieve the required separation in accordance with the Alliance Standard. The rated assembly should be approved and/or designed by a qualified fire protection engineer.</p> <p>Provide 1.5 hr certified fire rated doors in 2 hr fire rated exit enclosures in the main building.</p> <p>Provide a rated passageway, i.e. a protected path of egress from the exit enclosure to the public way. The rating of the exit passageway is to be equal to the fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated.</p> <p>Train and certify at least 25 percent of workers in firefighting, first aid and rescue by the proper authority.</p>

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	<p>Protect openings in fire resistance rated walls of generator, boiler and substation room in accordance to the Alliance Standard. Close these openings if they are not required. Dining area inside fabric store should be relocated or separated by 1 hr. fire rated wall with 1 hr. fire rated door. Kitchen near fabric store must be relocated.</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer. The hydraulic design of the sprinkler system has to be pre-approved by Code of Alliance. All installation and design requirements outlined in BNBC Part 4 Chapter 4 shall be replaced by the requirements of NFPA 13.</p> <p>Provide storage racks or shelves following Alliance Standards for the existing and required sprinkler system.</p> <p>Provide outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hour rating in all enclosures of main building as per Alliance Standards. Consult a qualified fire protection engineer to design the required rated construction barriers. Remove the kitchen area from the stair.</p> <p>Install NFPA-compliant Class-I standpipe system at required locations designed by a qualified fire protection engineer. All standpipe system installations and hydraulic calculations shall be reviewed by the Alliance prior to commencement of installation. Testing of the installation shall be conducted in accordance with NFPA 14 acceptance testing requirements. Documentation of all testing shall be submitted for review by the Alliance. Final inspection and testing of the installation shall be witnessed by the Alliance.</p> <p>Sprinklers shall be spaced and installed following the requirements of NFPA 13 both for existing and required sprinkler system.</p> <p>Install a pump dedicated for fire protection following NFPA requirements. 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. Acceptance testing of the installation shall be in accordance with NFPA testing requirements.</p> <p>Protect the openings of shaft enclosure by providing rated opening protective. Stair enclosures should be fire rated therefore opening at exit enclosures from production floor should be fire rated.</p> <p>Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry.</p> <p>Relocate the childcare and doctor rooms from fabric store with proper fire separation. Fill in the openings (windows) on the east side of the building in Stair 2 (from the top floor down to ground floor) with minimum 2-hr fire-resistance-rated construction to eliminate the exposure from the adjacent building exposures.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense as per Alliance Standard. Until that time that monitoring can be set up, arrange a monitoring system using factory's own central detection system and personnel. A person shall be assigned to contact the fire department in</p>
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	<p>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>Install handrails on both sides of the stairs in accordance with Alliance Standards.</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 signs must be tested on a monthly basis. Functional testing of battery powered signs must be provided for a minimum 90 min once per year.</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. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2cd/m², may also be used. 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>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 requirements.</p> <p>Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA requirements.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with the Alliance Standard.</p> <p>Hot-work is not going on in the factory, but a hot-work permit program needs to be established. It is required as per Alliance Standards.</p> <p>Obtain a BEREC license from Bangladesh Energy Regulatory Commission.</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.</p> <p>Establish an inspection, maintenance, and testing program for both of the existing and required sprinkler system as per requirements established in NFPA 25.</p> <p>Install identification signage at the required locations for both the existing and required sprinkler system. The basic types of identification signs are as follows: Type A-Control Valve Sign, Type B-Multi-Purpose Text Signs, Type D-Fire Alarm Sign, Type E-Hydraulic Calculation Sign.</p> <p>Establish NFPA-compliant inspection, maintenance, and testing program for the fire pump.</p>
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