

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: WISTERIA TEXTILES LTD.
Address of the Factory	: Bareitar Chala Natun Bazar, Sreepur, Gazipur
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 08 Jun 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 08 Jun 2014
BGMEA Membership No	: 4736

BASIC INFORMATION:

There are 9 buildings in the factory premises out of which three are main buildings and six are ancillary buildings. The buildings are named as: 1) Two story prefab main garments shed, 2) Single story prefab dyeing shed, 3) Single story prefab knitting shed, 4) Single story prefab utility shed, 5) Single story RCC ETP, 6) Single story prayer & dining shed, 7) Single story canteen shed, 8) Single story RCC guard room, 9) Single story kitchen shed.. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : For Shed 01: This two storied steel building has moment resisting frames in one direction but it is not adequately braced in the perpendicular direction. For Shed 02 and 3: These are one storied sheds having moment resisting frames in one direction and adequate bracing in the perpendicular direction. The foundations consist of isolated footings for the columns. The structures are classified as regular.
- iii. Floor System : Shed.
- iv. Floor Area : Total area of all buildings in the factory premises: 136761.00 sft. Building wise breakdown as follows: 1) Two story prefab main garments shed: 60,000.00 sft. (Ground Floor: 30000.00 sft, 1st Floor: 30000.00 sft), 2) Single story prefab dyeing shed: 33000.00 sft, 3) Single story prefab knitting shed: 24400.00 sft, 4) Single story prefab utility shed: 8400.00 sft, 5) Single story RCC ETP: 7600.00 sft, 6) Single story prayer & dining shed: 990.00 sft, 7) Single story canteen shed: 1331.00 sft, 8) Single story RCC guard room: 960.00 sft, 9) Single story kitchen shed: 80.00 sft.
- v. No. of Stories : 1) Single story prefab utility shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 2) Single story RCC ETP: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 3) Single story prayer & dining shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 4) Single story canteen shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 5) Single story RCC guard room: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 6) Single story kitchen shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1.
- vi. Construction Year : Factory personnel informed the date of construction as follows: 1) Two story prefab main garments shed: Finished in 2011, 2) Single story prefab dyeing shed: Finished in 2011, 3) Single story prefab knitting shed: Finished in 2011.
- vii. Foundation Type : Isolated Footing.
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC (brick chips).

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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) :

- i. 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
- ii. 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.
- iii. Engage a qualified structural engineer and assess the building against seismic and wind load conditions and if there is any deficiency, make the remediation accordingly.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under storm surge loading.
- v. Complete further testing on areas of deterioration and have a qualified structural engineer develop a remediation plan.
- vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vii. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- viii. "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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- ix. The IAB Membership number of the Architect needs to be clearly mentioned in the relevant documents."
- x. Have a qualified structural engineer develop Floor Loading Plans for Shed 01 per the requirements of Part 8 Section 8.20.5.3
- xi. Have a qualified structural engineer prepare load plans for shed 01 and post accordingly.
- xii. Provide signage or the appropriate markings at all areas used for storage for shed 01 to indicate the acceptable loading limits detailed in the Load Plan.

Long Term (6 months) :

- 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. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Combustible materials are stored within the substation room.
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>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>Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker , size of panel and permitted no. of CB, maximum permitted load connection capacity, etc.</p> <p>Install phase separators between terminal connections at the noted locations.</p> <p>Multi looping of cables observed at circuit breakers within distribution boards.</p>

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Mid Term (6 Weeks)	<p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm² or greater.</p> <p>Generator room is not rated but physically separated from the main building.</p>
Long Term (6 Months)	<p>Consult with an expert electrical engineer and prepare drawing for lightning protection including risk index and make sure your system is secured against lightning.</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 hasps, locks, slide bolts, or other locking devices at the noted locations in the direction of egress.</p>
Mid Term (6 Weeks)	<p>Post the occupant load for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space.</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 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>Develop an emergency evacuation plan which includes duties and responsibilities of various groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc.</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>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense as per the 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 the event of fire alarm activation. An annunciator shall be located in a constantly attended location (such as a fire control room) to</p>

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	<p>alert this person.</p> <p>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>Apply to Bidyut Paridaptor for electrician license. Apply to DC office for Acid and chemical license.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Apply to Gazipur City Corporation for issuance of occupancy certificate and expedite the matter.</p> <p>Install a centralized automatic fire alarm and smoke detection system with control panel following the requirement of NFPA 72 throughout all new and existing buildings and structures.</p>
<p>Long Term (6 Months)</p>	<p>Install a centralized automatic fire alarm and smoke detection system with control panel following the requirement of NFPA 72 throughout all new and existing buildings and structures.</p> <p>Replace all collapsible, sliding, and roll-down gates and shutters in means of egress with side-hinged swinging type doors of proper width and rating.</p> <p>Get at least 25 percent worker (414 of 1655) trained and certified in fire fighting, first aid and rescue training by the proper authority.</p> <p>Provide fire resistance rated opening protectives at all windows and other openings and penetrations on all the fire rated walls across the entire premises. Close these openings if they are not required.</p> <p>Provide 1 hr fire-resistive rated construction barriers at exit enclosures. Fit side-swinging, self-closing, non-lockable fire doors of 1 hr rating in all stairwell enclosures that swing in the direction of egress. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Provide an automatic fire alarm and detection system per the Alliance Standard. Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices must be spaced appropriately based on occupancy type in accordance with NFPA 72.</p> <p>Install fire department connections where required and in compliance with the Standard. Fire department outlet</p>

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	<p>connections shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard.</p> <p>Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standards. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide handrails on both sides of all three stairways. Southeast and southwest stairs have widths of 2.44 m. These stairs require handrails on both sides along with intermediate handrails.</p> <p>Inspect, test, and maintain fire extinguishers in accordance with NFPA 10 requirements. Provide and maintain proper documentation.</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.</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>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>The duties of the Fire Safety Director shall include the following:</p> <ol style="list-style-type: none">(1) Establish internal and external rally points and communicate to all employees in the building.(2) Fire department pre-planning.(3) Conduct safety inspections as outlined in Alliance Standard.(4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard. <p>Develop a NFPA 51B-compliant hot-work permit program. In general, this program should address the process of request and approval of authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedure, duration and expiry of permit</p>
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	<p>and re-approval procedure, etc.</p> <p>Install signage adjacent to each stair door indicating the stair name at the noted locations in both Bengali and English.</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>Protect all egress stairs with a shaft enclosure including fire-rated construction. Provide 1 hour fire-resistive rated construction barriers at exit enclosures. Fit outward-opening, side-swinging, self-closing, non-lockable fire doors of a 1 hour rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Provide opening protectives at all windows and other openings on all fire rated walls across the entire premises. Close these openings if they are not required.</p> <p>Replace all non-compliant doors and frames in the means of egress with doors that are listed, approved, automatic-closing, side-swinging, fire rated doors in compatible fire rated frames with latching panic hardware.</p> <p>Provide 1 hour fire protective opening assemblies in 1 hour rated exit enclosures.</p> <p>Provide fire-resistive rated assemblies at the required exit access corridors. The rated assembly should be approved and designed by a qualified fire protection engineer. Exit access corridors serving an occupant load exceeding 30 are to be separated by walls having a fire resistance rating of 1 hour in accordance with 4.5 unless provided with automatic sprinkler protection throughout the story or building.</p> <p>Provide fire-resistive rated construction barriers between the broad loom section and the corridor following Table 4.4.1 of the Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide opening protectives at all windows and other openings on all fire rated walls across the entire premises as per Alliance Standards.</p> <p>Provide fire department (Siamese) inlet connections to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet connections</p>
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	<p>shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard.</p> <p>Develop an emergency evacuation plan which includes the duties and responsibilities of various people/groups, interfacing between groups and the fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc.</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>Reconstruct the ramp with a slope of 1 in 12 and provide handrails on both sides of the ramp.</p> <p>Inspect, test, and maintain fire extinguishers in accordance with NFPA requirements.</p> <p>Provide handrails on both sides of each stairway. Provide an intermediate handrail when the stair width exceeds 2.2 m (87 inches). Provide handrails of a height between the range of 865 mm (34 in.) and 965 mm (38 in.) as per the Alliance Standard.</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>The duties of the Fire Safety Director shall include the following:</p> <ol style="list-style-type: none">(1) Establish internal and external rally points and communicate them to all employees in the building.(2) Fire department pre-planning.(3) Conduct safety inspections as outlined in Alliance Standard.(4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard. <p>Develop a hot-work permit program. In general, this program should address the process of request and approval of authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedures, duration and expiry of permit and reapproval procedures, etc.</p>
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