

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

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Name of the Factory	: <b>TRZ Garments Industry Ltd.</b>
Address of the Factory	: Gacha Road, In front of Gacha Techn,Gacha, Gazipur Sadar,Dhaka,Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 18-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 18-June-14
BGMEA Membership No	: 2982

### **BASIC INFORMATION:**

There is 01 main production building in the factory premises and 2 are ancillary buildings. The buildings are named as: 1) Basement+5 storied RCC building, The following general information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: The building is flat slab with drop panel and edge beams. Foundation is mat foundation.
iii.	Floor System	: RCC flat slab with drop panel structure
iv.	Floor Area	: 257900 sft.
v.	No. of Stories	: Main Building: Basement+5 storied RCC building
vi.	Construction Year	: 2007-2011
vii.	Foundation Type	: Mat foundation
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available.
x.	Construction Materials	: Reinforced Concrete
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 : N/A

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 loading limits as described on the Floor Loading Plans.

Mid Term (6 Weeks) :

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- i. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and have it posted in all required location.
- 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. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- iv. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate these water tanks. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
- v. Engage a qualified structural engineer to to confirm satisfactory structural performance of the buildings under seismic and wind loads.
- vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading and storm surge.
- vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. 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.
- ix. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- x. Provide supporting credible documents to establish the load bearing capacity as mentioned in the submitted load plans.
- xi. Have a qualified structural engineer verify existing load plans, including the information required in Section 8.20 of the Alliance Standard, and have it posted in all required locations.
- xii. Have a qualified structural engineer verify the existing load plan for each floor and have the floors marked for designating storage area as per the load plan.

Long Term (6 Months) :

- i. 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)	Find out the cause of overheating, overloading, or signs of burning and take proper action. Consider replacement of equipment immediately if necessary.
Short Term (3 Weeks)	Ensure proper identification of emergency power switchboards, distribution boards, and circuits  .Provide two separate points of earthing (grounding) by distinct connections for each generator.

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Mid Term (6 Weeks)	<p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and/or distribution boards.</p> <p>Install distribution boards in compliant locations so that operation is not hampered due to inaccessible height.</p> <p>Remove multi looping and bunch of cables at circuit breakers within distribution boards.</p>
Long Term (6 Months)	<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>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 &amp; Rotating Equipment and NFPA70B or a comparable standard.</p> <p>Establish an inspection testing, and maintenance program for the Uninterruptable Power Supply (UPS) and associated components. The program must based on the following:</p> <ol style="list-style-type: none"> <li>(1) Manufacturer's recommendations</li> <li>(2) Manufacturer's instruction manuals</li> <li>(3) Minimum Requirements of NFPA 111 Chapter 8</li> <li>(4) Minimum Requirements of NFPA 70B Chapter 28</li> </ol>

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

Immediate (3 to 6 Days)	None
Short Term (3 Weeks)	<p>Remove all hasps, locks, slide bolts, or other locking devices at all fire rated doors.</p> <p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p>

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<p>Mid Term (6 Weeks)</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>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 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>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees. The evacuation plan shall include provisions to assist physically disabled persons. A list of all employees with physical disabilities shall be kept by the Fire Service Director.</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 Part 4 Appendix A.</p> <p>Provide an automatic fire alarm and detection system per NFPA 72 and arrange for direct connection of the system to a central station monitoring service or the Fire Service and Civil Defence. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up, 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 alert this person.</p> <p>Complete Fire Department pre-planning activities with the local Fire Service and Civil Defence.</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 proper authority for issuance of occupancy certificates and pursue the matter's expedition.</p>
<p>Long Term (6 Months)</p>	<p>Protect the openings of shaft enclosure by providing rated opening protectives.</p> <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>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</p>

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	<p>rated frames with latching panic hardware.</p> <p>Get at least 25 percent of workers trained and certified in fire fighting, first aid and rescue by the proper authority.</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 standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures swinging in the direction of egress.. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Install a pump dedicated for fire fighting or fire protection following the requirements of NFPA 20. 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. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 24 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. This pump is to be connected to an alternative power source such as a generator. The generator is to be connected with an ATS (automatic 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 shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Install fire department connections where required and in compliance with the Standards to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet 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 Defence hose thread standard.</p> <p>Provide fire-resistant rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Consult a structural engineer to assess the condition of the structures. Repair the leakage of the slab following</p>
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	<p>instructions of the expert.</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. Egress lighting shall be provided with emergency power or supplemented with battery powered lights that provide a minimum of 10 lux for not less than 30 mins in the event of failure of normal lighting.</p> <p>Install fire extinguishers at locations and heights in accordance with BNBC Part 4 and NFPA 10.</p> <p>Select fire extinguishers based on potential fire class and hazards following NFPA 10 Chapter 5.</p> <p>Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7.</p> <p>Install handrails on both sides of the stair in accordance with Alliance Standards.</p> <p>Provide handrail on both sides of the ramp.</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. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m<sup>2</sup> (500 ft<sup>2</sup>). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.).</p> <p>Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address process of request and approval authorities, necessary checks prior approval, standby fire watch and fire fighting equipment, sounding of alarm procedure, duration and expiry of permit and reapproval procedure, etc.</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. The duties of the Fire Safety Director shall include the following:</p> <ol style="list-style-type: none"><li>(1) Establish internal and external rally points and communicate to all employees in the building.</li><li>(2) Fire department pre-planning. (3) Conduct safety inspections as outlined in Alliance standard 13.9.</li><li>(4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance standard 13.10."</li></ol>
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