

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Tex Tech Co. Ltd.
Address of the Factory	: Safwan Tower, Sharifpur, Khanpara, Gazipur, Dhaka.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 3-Jan-2015
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 3-Jan-2015
BGMEA Membership No	:4228

BASIC INFORMATION:

The present garment factory is a seven story factory building with beam-column frame system. The following general information was noted:

i. Building Usage Type	: Building-1 & 2 are 4-storied R.C.C. Factory building.
ii. Structural System	: Concrete frame structure.
iii. Floor System	: Beam supported Slab
iv. Floor Area	: 132,900 sft.
v. No. of Stories	: The both main buildings are 4-storied.
vi. Foundation Type	: Isolated Footing
vii. Construction Year	: 2010-2014
viii. Design Drawings	: Available
ix. Soil Investigation Report	: Not Available
x. Construction Materials	: Reinforced Concrete
xi. Generator	: Ground Floor

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

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.

Mid Term (6 Weeks):

- i. Prior to any further vertical extension of the main buildings, conduct destructive core testing under the guidance of a qualified structural engineer to validate the in-situ concrete compressive strength of structural elements.
- ii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.

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- iii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- iv. Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.
- v. 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
- vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.

Long Term :

- i. Provide Certificates of Occupancy for review.
- ii. Have a qualified structure engineer identify the locations where a expansion joint is needed and then have a remediation plan developed.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Remove dirt, debris, and improperly stored materials from the 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>Pour transformer oil so that it can visible and upto the mid level of the oil indicator.</p> <p>Revise the connections in the panels to eliminate multi-looping of wiring.</p> <p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system. The required marking can be by color code, the words "emergency system," or any other method that identifies the box or enclosure as a component of the emergency system.</p> <p>Connect all metal and metal part of building to earth by earth continuity conductor.</p> <p>Provide two earthing connections at each generator frame at two different points.</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>Install emergency power source immediately to run life safety loads like fire alarm, fire pump, elevators, emergency lighting, exit signage, etc.</p> <p>Lay the service cable in-accordance to the requirements of underground service cable connection.</p> <p>Install circuit breaker and respective cable according to</p>

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	<p>their ratings.</p> <p>Separate neutral cable Connect to each load.</p> <p>Identify each phase cable by colour code as well as neutral and earth cable too.</p>
Long Term (6 Months)	<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> <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 NFPA70B or a comparable standard.</p>

The recommendations for Fire Safety corrective actions are:

Immediate	NA
Short Term (3 Weeks)	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Alliance Standards Part 6 Section 6.8 Doors and Gates.</p> <p>Means of egress must be dry and clean and free from impediments, obstructions, and stored materials. Also cover all the manholes with required materials.</p> <p>Provide minimum 1 hr fire-resistive rated swinging door for hazardous separation (Fabric store area and boiler area).</p> <p>Also consult a qualified fire protection engineer to design the required rated construction barriers/ doors.</p>
Mid Term (6 Weeks)	<p>Make aisles marking with proper direction and with minimum 36 in. width. Keep aisles free of obstruction and higher occupancy loads will require a greater width to accommodate the increased load (Alliance Standard Part 6 Section 6.5 Egress Width).</p> <p>Remove all storage from exit stairs and maintain them clean and free from impediments, obstructions, and stored materials.</p>

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	<p>Provide 2 hr fire-resistive rated construction barriers and 1.5 hrs rated door at lift core. Consult a qualified fire protection engineer to design the required rated construction barriers (as per Alliance Standards Part 4 Section 4.5.7.1 through 4.5.7).</p> <p>Provide the occupant load signage for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space as per Alliance Standards Part 6 Section 6.4.4.</p> <p>Install fire department connections where required and in compliance with the Alliance Standard Part 5 Section 5.5.4. Connections shall match the Fire Service and Civil Defense hose thread standard. It will allow fire department pumper vehicles to draw water from ground -level or underground water storage tanks. Also provide a provision to feed water from civil defense vehicle in the stand pipe system.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees.</p> <p>Post emergency egress maps at the entrance to each exit stair or main point of egress on other three staircases.</p> <p>Remove the combustibles materials from the noted location and keep it free from stored combustible or materials.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in English and Bengali (Alliance Standard Part 6 Section 6.9 Stairs).</p> <p>Collect occupancy certificate for each of the building in the factory premises (mention occupancy type).</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>Establish a written housekeeping policy and enforced it as per Alliance standard.</p> <p>Collect a valid Boiler License as per Boiler Act, 1923.</p>
Long Term (6 Months)	<p>Provide minimum 2 hrs fire resistive rated construction wall to separate the transformer area, egress way, and seal all the penetration with existing resistive rated construction and provide minimum 2 hrs fire rated door to separate the substation room.</p> <p>Seal all the penetrations with existing or 2 hrs fire resistive rated construction or materials to separate all the mentioned area.</p> <p>Provide minimum 2 hrs fire resistive rated construction wall to protect the openings, seal all the penetrations with existing resistive rated construction and provide minimum 2 hrs fire resistive rated door. As a result it will separate the egress corridor and parking area.</p>

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	<p>Provide minimum 1 hr fire resistive rated construction wall and minimum 1 hr fire resistive rated door to separate the corridor.</p> <p>Also consult a qualified fire protection engineer to design the required rated construction barriers and door.</p> <p>Modify or newly install the Standpipe System to meet the requirements of the required Standpipe System Class as per NFPA-14 (install class-III standpipe hose connection). Consult a qualified fire protection engineer before modify or installing a new system.</p> <p>Provide minimum 2 hrs. fire-resistive rated construction barriers and 1.5 hrs. fire rated doors to protect all the exit enclosures for both the building and ancillary building. Also consult a qualified fire protection engineer to design the required rated construction barriers/ doors as per Alliance Standards.</p> <p>Install dedicated fire pump according to Alliance Standard and NFPA 20. Also install a stored water supply (tank) per NFPA 22 of adequate capacity to support demands (Alliance standards: 5.5.1).</p> <p>Provide pull stations or call point at each egress points, smoke detectors, visual and audible devices spaced appropriately based on occupancy type throughout the building. Reference NFPA 72.</p> <p>Arrange more training program for fire safety awareness as per Alliance standard part 13 and take feedback from the worker for their better understanding. 25 % of worker should be trained for firefighting, first aid, rescue etc. Also make a documentation for Alliance review.</p> <p>Provide side-hinged swinging type doors in all means of egress that open outward (Alliance Standards Part 6 Section 6.8 Doors and Gates).</p> <p>Provide minimum 1.5 hrs fire rated doors comply with the Alliance standard.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers. Program must comply with the requirements of NFPA 10 (Alliance standard: 13.10.3).</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.</p> <p>Install an automatic fire alarm and detection system in accordance with Alliance Standard so that it will cover the entire floor area (detectors properly spaced in accordance with NFPA 72 and in all separate rooms). Set up a fire alarm and detection system central station monitoring service (central control panel) or direct connection to the Fire Service and Civil Defense. Until this service can be established, have the alarms annunciate at a constantly</p>
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	<p>attended location and assign a person at that location to contact the fire department in the event of fire alarm activation?</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 (Alliance Standard Part 10 Section 10.12 Illumination of Exit Signs and Means Of Escape).</p> <p>Provide an emergency power source, either by battery back or by connecting to the emergency power system, for illuminated exit signs.</p> <p>Provided handrails on both sides of each stairway. Also install intermediate handrails on the front staircase. Mount handrails height in between 30 inch to 44 inch as per Alliance Standard Part 6 Section 6.9 Stairs and 6.12 Handrails and Guards.</p> <p>Develop a testing and maintenance program that ensures the operation of all exists signs is verified at least once per year. If battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 min once per year (Alliance Standards Part 10 Section 10.12 Illumination of Exit Signs and Means Of Escape Lighting).</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>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Install signage for the standpipe system at required locations and on required components as per NFPA 14</p> <p>Provide appropriate illumination levels and contrasting graphics on each of the exit signs.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense (Alliance Standards Part 13 Section 13.1 Fire Safety Director).</p> <p>Established and develop a hot work permit program comply with the NFPA 51B.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25 (Reference NFPA 25 Chapter 6 Standpipe and Hose Systems Table 6.1.1.2)</p>
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