

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Total Fashion
Address of the Factory	: House #8, Uddipan, Road #11, Sector #6, Uttara, Dhaka 1230, Bangladesh. Dhaka Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 13 Apr 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 15-Apr-2014

BASIC INFORMATION:

The present garment factory comprises of six building. Main factory building is of five story & rest five are of single story. It is with beam-column frame system. The following general information were noted:

i. Building Usage Type purpose.	: All buildings (RCC & Steel) are in use for garments
ii. Structural System	: Garments Building (Moment Resisting Frame System). There is RCC beam-column regular frame & Spread foundation. Steel Shed :(Moment Resisting Frame System) with steel beam-column gable frame (BNBC Table 6.1.2) foundation type is unknown.
iii. Floor System	: Regular beam Supported slab.
iv. Floor Area	: Garment building: 62,478 sft Dyeing shed: 24,000 sft Four ancillary structures area are approximately 3000, 3500, 4000, 5000 sft.
v. No. of Stories	: Garments Building: 5 storied Dyeing Shed: 1 story All ancillary structures are one storied.
vi. Construction Year	: Garment building: first phase 2008-2010 second phase - 2014-ongoing Dyeing shed: 2007-2008
vii. Foundation Type	: Garments Building: Spread foundation. Steel Shed: foundation type is unknown.
viii. Design Drawings	: Available
ix. Soil investigation Report	: Available
x. Construction Materials	: Reinforced Concrete
xi. Generator	: Outside the building.

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.

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The recommendations for Structural Safety corrective actions are:

Immediate : Na

Short Term (3 weeks):

- i. 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.
- ii. 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. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Once developed, these load plans shall be posted clearly on all floors of the buildings.
- ii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- iii. Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- iv. Provide Certificates of Occupancy for review.
- v. Factory owner must follow the construction practices and safety requirements of Section 9 of the Alliance Standard.
- vi. 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.

Long Term : NA.

The recommendations for Fire Safety corrective actions:

Immediate (3 to 6 Days)	Remove all stored materials in the stairwells at the noted locations. Means of egress must be full free and clear from impediments, obstructions, and stored materials immediately.
Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Remove all combustibles stored underneath the cutting tables at the noted locations.
Mid Term (6 Weeks)	Occupancy certificate (mention occupancy type) for each building. Make aisles marking with proper direction and provide minimum clear width of 36 inch. Keep aisles free of obstruction.

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	<p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</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>Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities with record keeping .These fire drills need to be conducted under the direction of a Fire Safety Director.</p> <p>Post 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>Stair designation signs are provided at each floor entrance from the stair to the floor in English and Bengali. Signs indicate the name of the stair and the floor level. Signs are posted adjacent to the door.</p> <p>Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense.</p>
Long Term (6 Months)	<p>Provide 1 hr fire protective opening assemblies in 1 hr rated exit enclosure. Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosure. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr.</p> <p>Fire-resistance rating. Exits connecting four or more stories shall be enclosed with a minimum 2-hr fire-resistance rating. Exits shall be enclosed with the same fire-resistance rating as the floor penetrated but will not need to exceed 2 hr. Increase door width to 0.8m or greater by demolishing wall adjacent to the door. If this door is not required to satisfy the requirement of total exit width (based on occupant load) and maximum travel distance, eliminate this door.</p> <p>Installed fire rated door at required location as per Alliance standard part4 section 4.6, penetration section 4.7</p> <p>Provide a dedicated fire pump for the facility, pump design should also account for two additional stories under construction. All new installations and design requirements outlined in BNBC Part 4 Chapter 4 for water supplies shall be replaced by the requirements of NFPA 20 (fire pumps), NFPA 22 (water tanks), and NFPA 24 (underground water mains). The Owner shall contact the Alliance prior to conducting the final acceptance testing of the fire pump installation to allow the Alliance to witness this test. A final</p>

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	<p>inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance prior to start of work. System design should also account for the two additional stories currently under construction.</p> <p>All doors on these stairs needs to be 1.5 hour rated. Provide fire-resistive rated construction barriers at exit enclosures in accordance with Alliance Standards Part 4 Section 4.5 : Separation. 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>Increase the landing width to make it equal to the width of the stair following the requirements of Alliance Standard Part 6 Section 6.9 and Section 6.5.</p> <p>Shaft enclosure shall be have minimum fire-resistance rating of 2 hr when connecting four stories or more.</p> <p>Install handrails on both sides of the stair in accordance with Alliance Standard,Part-6,Section-6.9.2.4, 6.12.1.1 and 6.12.1.2.</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>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees in accordance with Alliance Standard, Part-13, Section-13.3.</p> <p>Store chemicals and all flammable materials in approved enclosure in a safe manner.</p> <p>Implement training program with proper documentation in accordance with the Alliance Safety Training Curriculum</p>
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	<p>on fire safety.</p> <p>Provide fire department connections as required by Alliance standard. According to Alliance Standard, Part-5, Section-5.5.4, fire department (Siamese) inlet connections shall be provided 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>Repair and replace damaged piping at the noted locations. Repairs and replacements must comply with NFPA 14 and NFPA 25.</p> <p>Both the floors are needed to be 2 hours fire separated with 1.5 hrs fire resistant doors. Provide fire-resistive rated construction barriers between combustible and production area in accordance with Alliance Standards, Part-4, Section-4.5:</p> <p>Separation .Provide 2hr fire barrier in Generator room, 1hr in boiler room. Consult a qualified fire protection engineer to design the required rated construction barrier. In process goods must be kept in accordance with Alliance Standard, Part-3, Section-3.4.2.1.6.</p> <p>Provide an automatic fire alarm and detection system per NFPA 72 as required by the Alliance Standard and arrange for direct connection of the system to a central station monitoring service or the Fire Service and Civil Defence per Alliance Standard Part 5 Section 5.7.5 Monitoring. 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>Materials should be stored in good manner that comply with Alliance standard. Also during construction of main building of 3rd and 4th floor, proper precaution must be taken in consideration.</p> <p>Develop a testing and maintenance program that ensures the operation of all exist 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.</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</p>
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	<p>travel.</p> <p>Occupant loads must be posted as per Alliance Standards Part 6, Section 6.4.4: Posting of Occupant Load.</p> <p>Fire extinguishers shall be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7 as demanded in Alliance Standard Part 13 Section 13.10.3.</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 or, since battery back up is used, these lights are required to be tested on a monthly basis.</p> <p>According to Alliance Standard, Part-13, Section-13.1 and 13.1.1, 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>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25.</p> <p>Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. 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.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in accordance with Alliance Standard, Part-6, Section-6.9.3.1.</p> <p>Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out the cause of overheating and take proper action and consider replacement of conductors and equipment.</p> <p>Remove all combustible materials within the substation room.</p>
Short Term (3 Weeks)	<p>Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide two separate points earthing (grounding) provided for generator.</p> <p>Ensure electrical connections at equipment are properly secured.</p>
Mid Term (6 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>Provide uninterruptable power supply (UPS) where necessary.</p> <p>Provide clearance of at least 1 m (39 in) in front of distribution boards.</p> <p>As per BNBC section 2.11.5.4 ensure clear and permanent identification marks are painted in all distribution boards, switchboards, sub main boards and switches.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Switchboards and/or distribution boards.</p> <p>Provide adequate supports for electrical wiring and conduit.</p> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm² or greater.</p>
Long Term	NA