

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Trouser World (Pvt) Ltd.
Address of the Factory	: 640, Kunia (Targach), PO - National University, Joydebpur.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 3-May-2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 3-May-2014

BASIC INFORMATION:

The present garment factory is a six story Garment Factory building with beam-column frame system and Flat Plate at newer portion .The following general information was noted:

i.	Building Usage Type	: Factory building
ii.	Structural System	: 4 Storied with occupied roof-beam Slab, 6 Storied -Flat slab
iii.	Floor System	: Beam slab & Flat Slab
iv.	Floor Area	: Total approximate building area= 95793sft
v.	No. of Stories	: Six stories (G+5).
vi.	Construction Year	: Completed in 2009
vii.	Foundation Type	: Spread Foundation
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Brick aggregate with 40 grades rebar
xi.	Generator	: Main building (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. Designate a factory manager.
- ii. Prepare programs for floor load plans.

Mid Term (6 Weeks) : Arrange Detail Engineering Assessment of the structure. This assessment should include destructive core testing to validate the in-situ concrete compressive strength within structural elements. This assessment should also be based on the as-built sizes of structural elements.

Long Term (6 Months):

- i. Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies. Structural engineer shall also provide remediation documents if required.
- ii. Engage a qualified structural engineer to confirm the causes of distress and suggest appropriate remedial measure.

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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Keep means of egress continuously free and clear of all obstructions or impediments to full instant use in the case of fire or other emergency.</p> <p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p> <p>Daycare occupancies which are accessory to other occupancies shall be located on the ground floor with a maximum travel distance of 9 m (30 ft). If located on a higher floor, direct access to an exit enclosure shall be provided as per Alliance standard part3 section 3.4.2.1.1</p>
Short Term (3 Weeks)	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations.</p>
Mid Term (6 Weeks)	<p>Fire drills are to be conducted 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 Part 4 Appendix A.</p> <p>Fire Department pre-planning has not been completed yet. Complete fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance Standard, Part-13, Section-13.1.1(2).</p> <p>Central fire alarm and detector control panel is not available at the premises. As per section 5.7.5, until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defense 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 to alert this person.</p> <p>Occupant loads were not posted in any assembly and production floor as demanded in Alliance Standard Part 6 Section 6.4.4. 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 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>Implement training program with proper documentation in accordance with the Alliance Safety Training Curriculum on fire safety.</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</p>

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	<p>powered signs is provided for a minimum 90 min once per year or, since battery backup is used, these lights are required to be tested on a monthly basis.</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>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p> <p>Install required identification signs at the noted locations. Signage must comply with NFPA 14.</p> <p>No occupancy certificate available for the building in the factory premises. Apply to LGED for issuance of occupancy certificate and pursue the matter to expedite.</p> <p>All applicable licenses found but Electrical License & Plumbing layout is not available. Apply to Bidyut Prodan board for electrician license.</p>
<p>Long Term (6 Months)</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 and directly connected to the fire alarm system for automatic activation based on occupancy type in accordance with NFPA 72.</p> <p>Remove existing aisles marking and draw new marking fulfilling the minimum aisle width requirement. Relocate the machines accordingly if necessary.</p> <p>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. Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosure.</p> <p>Provide rated exit passageway i.e. protected path of egress from the exit enclosure to the public way. The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated.</p> <p>Close all windows and other openings on all the fire rated wall across the entire premises. Protect the penetrations of fire resistive rated assemblies with a listed through penetration fire stop system tested in accordance with ASTM E814.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation</p>

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according to 5.4.3.2. 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 as per clause 5.4.3.3.

Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers.

Portable fire extinguisher shall be installed throughout all new and existing facilities in accordance with BNBC Part 4 Section 4.10 and NFPA 10. And maximum distance of extinguisher from one to another unit should not exceed 100 ft.

Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7 as demanded in Alliance Standard Part 13 Section 13.10.3.

Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry unless it meets the following requirements. Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, reentry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors. When the discharge floor is determined to be a required re-entry floor using the above requirements, re-entry does not have to be provided back into the building on this level.

Install a pump dedicated for firefighting or fire protection following the requirements of NFPA 20 as mentioned in Alliance Standard Section 5.5.1. 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 as per clause 5.5.5. 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 alternative power source like generator. And the generator is to be connected with ATS (auto starter).

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.

Provide parapets or guards for occupied roof with a minimum height of 1067 mm (42 in.) as required in Alliance Standard Part 6 Section 6.12.2.4.

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Provide handrails on both side of each stairway. Provide intermediate handrail when the stair width exceeds 2.2m (87 inch). Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.).

Install fire department connections where required and in compliance with the standard as per Alliance Standard Part 5 Section 5.5.4 which states that 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 Defense hose thread standard.

Provide fire-resistive rated construction barriers between hazard types. Different occupancies need fire-resistive rated construction barrier according to Alliance Standard Part 4 Section 4.5 and BNBC Table 3.2.1 (pg-10352). Consult a qualified fire protection engineer to design the required rated construction barrier.

According to Alliance Standard, Part-9, Section-9.1.7, 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 firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedure etc.

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:

- (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 13.9.
- (4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance standard 13.10.

According to Alliance Standard,Part-13,Section-13.6, 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 m² (500 ft²). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (in.).

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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure the generator room clean and free of dirt, debris, and improperly stored materials.</p> <p>Find out the cause of overheating, overloading, or signs of burning and take proper action.</p> <p>Remove all dirt, debris, lint and improperly stored materials from the substation room.</p> <p>Ensure Signage indicating the prohibition of light fixtures without protective covers is installed at required locations.</p>
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>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>
Mid Term (6 Weeks)	<p>Provide means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Distribution boards.</p> <p>Ensure meters and other electrical devices are operational.</p> <p>Provide grounding (earthing) for Switchboards and/or distribution boards as per BNBC section 2.8.1.</p>
Long Term (6 Months)	<p>Ensure the generator room properly rated and physically separated from the remainder of the building.</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>Consult with a qualified Electrical Engineer and ensure electrical wiring/cables are sized according to capacity of circuit breakers.</p>