

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Voyager Apparels Ltd
Address of the Factory	: 8, Malibagh chowdhurypara, Ramna, Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 08-Apr-2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 16-Apr-2014

BASIC INFORMATION:

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

i.	Building Usage Type	: Factory building
ii.	Structural System	: RCC frame (beam-Column frame)
iii.	Floor System	: RCC Beam supported slab
iv.	Floor Area	: Total approximate building area=44557 sft;
v.	No. of Stories	: Five stories (G+4)
vi.	Construction Year	: No record available
vii.	Foundation Type	: Pile foundation
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete
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. Reduce overload at the stores. Have a structural engineer confirm the floor load plan based on the strength of the structure and display it as per standard.
- 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.
- iii. Redistribute floor loads to comply with the Floor Loading Plans.
- iv. 2% slope of roof needs to be ensured in order to prevent water ponding, otherwise, water seal to be provided.

Mid Term (6 Weeks):

- i. Remove the water tanks. If the design report proves that these point loads are accommodated in the design then they can be retained.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

- ii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading. This should be reflected in the design report.
- iii. A qualified structural engineer should be involved for maintenance by correcting the identified issues. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- iv. Need to submit as-built document and design report.
- v. Need to prepare as built drawing including design report and submit for review. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vi. Organization needs to apply for occupancy certificate from approval authority
- vii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures. This testing should include core testing.

Long Term

: NA.

The recommendations for Fire Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Storage areas under cutting tables at 4th floor of the main building were found with combustibles. Remove all combustibles stored underneath the cutting tables at the noted locations.</p> <p>The day care is located at 1st floor of main building and direct access to an exit enclosure is not provided. According to Alliance Standard, Part-3, Section 3.4.2.1.1, 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.</p>
<p>Short Term (3 Weeks)</p>	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. According to section 6.8.2.2 doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Mid Term (6 Weeks)	<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>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 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>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>Occupancy certificates are not available. Apply to RAJUK for issuance of occupancy certificates and pursue the matter to expedite.</p>
Long Term (6 Months)	<p>The ground floor is partially occupied by Voyager Apparels Ltd. and the remaining area is occupied by various shops without required number of fire extinguishers and fire rated separation barrier. Provide adequate number of fire extinguisher and proper fire separation at ground floor.</p> <p>Provide side-swinging, self-closing, non-lockable certified 1.5 hr fire rated doors in 2 hr rated exit enclosures that</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

swing in the direction of egress. Exits shall be enclosed with the same fire-resistance rating as the floor penetrated but will not need to exceed 2 hr.

Install openings and penetrations through rated walls and/or assemblies in accordance with Alliance Standards Part 4 Section 4.6: Opening protectives and Section 4.7: Penetrations.

Provide 2 hr fire-resistive rated construction barriers with 1.5 hr fire rated doors at exit enclosures in accordance with Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barriers.

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 and review to be completed prior to start of work.

Cable duct from DB box entered through RCC slab at Ground floor and opening around cable duct were not sealed by proper fire rated materials. Provide fire-resistive rated construction barriers between floors in accordance with Alliance standard, Part 4, Section-4.4.1 and BNBC, Part-4, Table-4.1.1. Consult a qualified fire protection engineer to design the rated construction barriers.

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.

Aisles must be always free and per Alliance Standard Part-6, Section-6.5.1 aisles shall be provided with a minimum unobstructed clear-width of 0.9 m (36 in.).

Install a pump dedicated for fire fighting 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.

Provide 2 hr fire rated barriers with 1.5 hr fire rated certified door at generator room and 1 hr fire rated barriers with 45 minutes fire rated certified door at boiler room in accordance with Alliance Standards, Part-4, Section -4.5: Separation. Consult a qualified fire protection engineer to design the required rated construction barrier.

No fire department connections provided in the factory building. 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

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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.

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.

Parapet or guard was not constructed on roof. Construct parapet wall per Alliance Standard, Part-6, Section-6.12.2.4.

Change in level of walking surface exceeds 101.4 mm (4 inch) in elevation, slope of the walking surface in some locations is greater than 1 in 8, which is the maximum allowable slope and provided with cement concrete finish. Repave the surface to make the slope less than or equal to 1 in 12. Provide handrail on both sides of the sloped walking surface. Widen the path to 1.1m or more.

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.

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.

Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25.

Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.

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.

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 (¼ in.).

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure the generator room clean and free of improperly stored materials.</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>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>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p>
Mid Term (6 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</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>Provide means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment. Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBC for required number of electrodes</p>
Long Term (6 Months)	<p>Provide adequate fire rating/ protection for substation room and make it separated from rest of the building.</p> <p>Ensure the generator room properly rated and physically separated from the remainder of the building.</p> <p>Ensure overcurrent protection device (circuit breaker) for each and every loads.</p>