

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

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Name of the Factory	: <b>Asif Apparels Ltd.</b>
Address of the Factory	: Plot #1381, Kashimpur Rd. Konabari, Gazipur, Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 12 Jul 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 12 Jul 2014

### **BASIC INFORMATION:**

The present garment factory is a seven storied. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: 7 storied frame structure and 7 storied flat plate structure are joined.
iii.	Floor System	: Beam slab in phase-1 and flat plate system in phase-2.
iv.	Floor Area	: 117604 sft.
v.	No. of Stories	: 7 storied
vi.	Construction Year	: 2000
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Not Available for phase-1 and available for phase-2
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete (brick chips).
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 : 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.
- 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 load limits as described on the Floor Load Plans.

Mid Term (6 Weeks) :

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

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- i. Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure.
- ii. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- iii. 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
- 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 confirm that capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- vi. Engage a qualified structural engineer and assess the building against seismic and wind load conditions and if there are any deficiency, make the remediation accordingly.
- vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading and storm surge.
- viii. Engage a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- ix. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- x. Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer.
- xi. Engage a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- xii. Complete the recommended repairs from the previous assessment.
- xiii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- xiv. Conducted detailed structural assessment by qualified structural engineer and carry out remedial action as necessary.
- xv. Engage 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.
- xvi. Engage a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- xvii. Engage 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.

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

- xviii. Engage a qualified structural engineer prepare a load plan for each floor and have the floors marked for designating storage area as per the developed load plan
- xix. Engage a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- xx. Repair the exterior façade system to prevent water intrusion.
- xxi. Provide Certificates of Occupancy for review.

Long Term (6 months) : Necessary remediation after DEA.

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

Immediate	NA
Short Term (3 Weeks)	<p>Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p> <p>Kitchen with gas burner (J1) is not allowed with occupancy of childcare center (B2). Relocate either childcare center or kitchen to another safe location.</p>
Mid Term (6 Weeks)	<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 to be tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Provide an automatic fire alarm and detection system as per NFPA 72 and arrange for direct connection of the system to a central station monitoring service or the Fire Service and Civil Defense. 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 (such as a fire control room) to alert this person.</p> <p>Post the occupant load for every assembly and production floor in the 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 exit 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</p>

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

	<p>once per year.</p> <p>Develop an emergency evacuation plan which includes duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc. and 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>Impart training in accordance with Alliance Safety Training Curriculum and keep record with proper documentation.</p> <p>Conduct fire drills 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>Once a standpipe system is installed at required locations designed by a qualified fire protection engineer, provide signage in compliance with NFPA 14 for the new system.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Renew the trade license as soon as possible. Also pursue to expedite the process of obtaining a BERC waiver certificate and electrician license.</p> <p>Apply to LGED for issuance of occupancy certificates and pursue the matter's expedition.</p>
<p>Long Term (6 Months)</p>	<p>Install dedicated fire pump 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. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance.</p> <p>Train and certify at least 25 percent of workers in fire fighting, first aid and rescue.</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>Replace all collapsible, sliding, glass doors and steel leaf swing doors in means of egresses with side-hinged swinging type doors of proper width and rating.</p>

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

	<p>Occupied roofs shall be provided with the minimum number of required exits.</p> <p>Provide 2 exits or stairs on occupied roof of main building to meet the minimum number of emergency exits required.</p> <p>Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosure. Exits connecting four or more stories shall be enclosed with a minimum 2-hr fire-resistance rating.</p> <p>Install class III standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Provide opening protective at all windows and other openings on all the fire rated walls throughout the entire premises. Close these openings if they are not required.</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>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>Provide 2 hr fire-resistant 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.</p> <p>The unprotected penetrations shall be sealed.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7.</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>Provided parapets or guards for all occupied roofs with a minimum height of 1067 mm (42 in).</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.</p> <p>Provide handrails on both sides of each stairway. Provide handrails at a height between the range of 865 mm (34 in)</p>
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## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>and 965 mm (38 in).</p> <p>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, re-entry 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.</p> <p>Install fire department connections where required and in compliance with the Standard. 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.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer and institute an inspection, testing and maintenance program for the system.</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/m<sup>2</sup> may also be used.</p> <p>Install a pump dedicated to fire fighting or fire protection following the requirements of NFPA 20. Then establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.</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 from authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedure, etc.</p> <p>Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to carry</p>
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## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>out the required duties.</p> <p>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.</li> <li>(3) Conduct safety inspections.</li> <li>(4) Ensure all testing of fire protection equipment is conducted.</li> </ol>
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### The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out cause of overheating and take proper action including replacing cable or equipment where necessary.</p> <p>Disconnect the panel from the electrical service and clean interior components of all dust and debris. Seal all openings within the enclosure to prevent dust and debris from entering.</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>Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building, or metal water pipe.</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 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>Provide adequate cover on cable trench.</p>
Mid Term (6 Weeks)	<p>Ensure switchboards or distribution boards are metal enclosed with a dead front construction.</p> <p>Remove multi looping and bunch of cables at circuit breakers within distribution boards.</p> <p>Provide adequate fire rating, protection for substation room and make it separated from rest of the building.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical wiring/cables are sized according to capacity of circuit breakers.</p> <p>Ensure over current protection device (circuit breaker) for each and every loads.</p> <p>Provide clearance of at least 1 m (39 in) in front of</p>

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

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	<p>switchboards and distribution boards.</p> <p>Provide dedicated neutral for each circuit.</p> <p>Ensure all electrical wiring/cable properly terminated at its point of termination.</p> <p>Ensure devices installed on the main electrical equipment are operational.</p>
Long Term (6 Months)	<p>Consult with an expert electrical engineer and prepare drawing for lightning protection system including risk index and make sure the system is secured against lightning.</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.</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>