

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

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Name of the Factory	: <b>Zuma Fashion Limited Extension</b>
Address of the Factory	: South Panishail, Kashimpur, Joydebpur, Gazipur Joydebpur, Gazipur Dhaka Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 17-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 04-May-15
BGMEA Membership No	: 4830

### **BASIC INFORMATION:**

There are 05 Main buildings in the factory premises out of which 02 is main production building. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: 1) Four story RCC main production building, 2) Single story trussed roof knitting production shed, 3) Single story generator Shed-1, 4) Single story generator Shed-2, 5) Single story Prayer Shed.
iii.	Floor System	: flat slab and steel truss frame.
iv.	Floor Area	: 116354.65 sft
v.	No. of Stories	: Main building: 1) Four story RCC main production building, 2) Single story trussed roof knitting production shed, Ancillary building: 3) Single story generator Shed-1, 4) Single story generator Shed-2, 5) Single story Prayer Shed.
vi.	Construction Year	: Four story RCC building: : Construction completed in 2012;
vii.	Foundation Type	: Pile foundation (4-storied building)& Unknown
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Partially Available
x.	Construction Materials	: RCC brick chips and steel frame
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.

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Mid Term (6 Weeks)

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- i. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with the Alliance Standards Part 8 Sections 8.19 and 8.20.
  - ii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
  - iii. Engage a qualified structural engineer and assess the building against seismic and wind load conditions. If there is any deficiency, remediate accordingly.
  - iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind and storm surge loading.
  - v. Complete further testing on the areas of deterioration in order to understand the level of corrosion and the weakening of the members. Have a qualified structural engineer develop a remediation plan.
  - vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and the Alliance Standards.
  - vii. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
  - viii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standards.
  - ix. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
  - x. Ensure that at least one individual, the Factory Load Manager, is located onsite full time at the factory and is trained in calculating operational load characteristics of the specific factory.
  - xi. Have a qualified structural engineer develop floor loading plans according to the requirements of Part 8 Section 8.20.5.3
  - xii. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of all buildings.
  - xiii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
  - xiv. "Provide a geotechnical report for the PEB shed with the identity of the geotechnical engineer. Find full credentials of the original geotechnical engineer (including the IEB number) for the building 1. A new geotechnical report is only required if the credential information cannot be obtained."

Long Term (6 Months)

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- i. Provide a protective coating for the structural elements that are constructed with MCAC and that are exposed to rainfall or other sources of water. Have protective coating approved

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- by the Alliance or a qualified structural engineer. Alternatively, provide a 2% slope on the exposed surface to prevent accumulation of water.
- ii. Apply for and obtain a certificate of occupancy as soon as possible from the proper authority.

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

Immediate (3 to 6 Days)	Find out the cause of the overheating and take proper action and consider replacement of conductors and equipment.
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>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions.</p> <p>Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker, size of panel and permitted no. of CB, maximum permitted load connection capacity, etc.</p> <p>Install phase separators between terminal connections at the noted locations.</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>Need to remove looping of wiring/cables at circuit breakers.</p> <p>Provide protective cable guards for all cable runs from MDB to LT panels.</p>
Long Term (6 Months)	<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>Ensure appropriate size for generator room in order to properly access the generator to perform routine maintenance activities</p>

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

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Immediate (3 to 6 Days)	
Short Term (3 Weeks)	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.
Mid Term (6 Weeks)	<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 the Alliance Standards, Part-13, Section-13.3.</p> <p>Implement a training program with the proper documentation. The program should be 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 the 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 to be provided for a minimum of 90 minutes once per year.</p> <p>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>Once a standpipe system is installed at required locations designed by a qualified fire protection engineer, provide signage in compliance with NFPA for the new system.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense</p> <p>Install signage adjacent to each stair door indicating the stairways name and the floor level at the noted locations.</p> <p>Apply to RAJUK for issuance occupancy certificates and pursue the matter to expedite the process.</p>
Long Term (6 Months)	<p>Provide a fire-resistive rated assembly between the exterior exit stairs and the building up to 10 ft beyond the end of the stair to achieve the required separation. The rated assembly should be approved and/or designed by a qualified fire protection engineer.</p> <p>Provide fire rated opening protection at all windows and other openings on all the fire rated walls across the entire premises. If these openings are not required, close these.</p> <p>Provide 2 hour fire-resistive rated construction barriers at the exit enclosures. Fit doors that open in the direction of egress, side-swinging, self-closing, non-lockable, certified 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>Pull stations at egress points throughout entire building must be spaced appropriately based on the occupancy type in accordance with NFPA 72.</p>

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	<p>Provide 1.5 hour fire protective opening assemblies in 2 hour rated exit enclosures at the main building.</p> <p>Replace all collapsible, sliding, roll-down gates and shutters in the means of egresses with side-hinged swinging type doors of the proper width and rating.</p> <p>Get at least 25 percent of the occupant i.e, 250 person out of 1000 occupant trained and certified in fire fighting, first aid, and rescue training by the proper authority.</p> <p>Provide 2 hour fire separation for the generator room, 1 hr fire separation for the store following Table 4.4.1 of the Alliance Standards or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Provide fire department connection as required by Alliance standard.</p> <p>Install illuminated exit signs at the entrances to the 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>Install emergency lighting for all paths of egress in accordance with Alliance Standard Section 6.7. 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 side of each stairway. Provide intermediate handrails when the stair width exceeds 2.2m (87 inch). Provide handrails of a height between the range 865 mm (34 in.) and 965 mm (38 in.).</p> <p>Once a standpipe system is installed at required locations designed by a qualified fire protection engineer, provide an inspection, testing and maintenance program in compliance with NFPA for the new system.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address the process of requesting permits and the approval authorities, the necessary checks prior to the approval, standby fire watch and fire fighting equipment, sounding of alarm procedures, the duration and expiry of the permit, and the reapproval procedures, etc.</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>
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