

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

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Name of the Factory	: Rio Fashion Wear Ltd.
Address of the Factory	: Industrial Plot No. 3, Milk Vita Road, Section-7, Mirpur, Dhaka, Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 03-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 20-Apr-14

### **BASIC INFORMATION:**

There are two buildings in the premises out of which one is main production building and one is ancillary building. The buildings are named as: 1) Thirteen storied main production building with one basement, 2) One storied generator tin shed. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: RCC flat plate structural system with infilled masonry walls.
iii.	Floor System	: RCC flat plate structural system
iv.	Floor Area	: 95970 sft
v.	No. of Stories	: 1) Thirteen story main production building with Single Basement: Stories above grade: 13, Stories below grade: 1, Occupied levels: 14, 2) One story generator tin shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1.
vi.	Construction Year	: 1) Thirteen storied main production building with one basement: Started in 2001 and finished in 2004, 2) One storied generator tin shed: Started in 2003 and finished in 2004.
vii.	Foundation Type	: Mat Foundation
viii.	Design Drawings	: Structural Design drawings are partially available, but Architectural drawings are not available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete
xi.	Generator	: Ground Floor in Generator Shed

### **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

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vendors and be responsible to ensure that the factory operational loads do not at any time exceed the factory floor loading limits as described on the Floor Loading Plans.

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 Alliance Standard Part 8 Section 8.19 and 8.20
- ii. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
- iii. Have 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.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the building under wind loading.
- v. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- vi. Full set of credible Structural drawings are required as per BNBC Section 1.9 or as-built documents in accordance with Section 8.20, Version 1.0 (alliance) is required. Design report is required to assess the wind load capacity of this building.
- vii. Under guidance of a qualified structural engineer, address all areas needed maintenance and undertake corrective issues.
- viii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- x. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and make sure floor load plans are posted as per standard.
- xi. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.

Long Term (6 Months)

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- i. 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. Or provide 2% slope on the exposed surface to prevent accumulation of water.
- ii. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same.

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

Immediate (3 to 6 Days)	Find out the cause of overheating, overloading, or signs of burning and take proper action.  Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room.
Short Term (3 Weeks)	
Mid Term (6 Weeks)	Ensure the generator room properly rated and physically separated from the remainder of the building.

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	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide Shielding/ additional insulation for wiring exposed to external heat sources.</p> <p>Complete action items identified from previous thermographic inspection report.</p> <p>Provide adequate grounding (earthing) for transformer.</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.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Ensure Signage indicating the prohibition of light fixtures without protective covers is installed at required locations.</p> <p>Ensure meters and other electrical devices installed on the main electrical equipment are operational.</p> <p>Provide electrical insulation mats in front of distribution boards.</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>Develop and implement and document 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>Consult with an expert engineer to have details design and drawing of lightning protection system and ensure your building is secured.</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. 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 switchboards and/or distribution boards provided with physical means to prevent the installation of more over current devices than that number for which the panel board was designed, rated, and listed following NFPA 70 section 408.54.</p>

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	<p>Conduct an oil analysis and replace transformers with harmful substances to reduce health hazards.</p> <p>Ensure appropriate size for generator room in order to properly access the generator to perform routine maintenance activities.</p> <p>Ensure all electrical wiring/cable properly terminated at its point of termination.</p> <p>Provide dedicated neutral for each circuit.</p> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm<sup>2</sup> or greater.</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power.</p> <p>Install phase separators between terminal connections at the noted locations.</p>
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### The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	
Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the noted locations.
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.</p> <p>Establish and maintain inspection, testing and maintenance procedure for the standpipe system following the requirements of NFPA 25.</p> <p>Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all occupied buildings.</p> <p>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>
Long Term (6 Months)	All doors leading to the exit enclosure need to be 1.5 hour rated. Fit side-swinging, self-closing, non-lockable fire doors that swing in the direction of egress of 1.5 hr rating at north-west enclosure. Obtain certificate for the installed fire doors at south-east enclosure or replace those with certified fire doors. Consult a qualified fire protection engineer to

	<p>design the required rated construction barriers.</p> <p>Install a NFPA 14-compliant standpipe system at required locations designed by a qualified fire protection engineer. All standpipe system installations and hydraulic calculations shall be reviewed by the Alliance prior to commencement of installation. All installation and design requirements outlined in BNBC Part 4 Chapter 4 for combined standpipe and automatic sprinkler systems shall be replaced by the requirements of NFPA 14 with a minimum pressure of 450 kPa (65 psi) at the hydraulically most remote hose connection. Standalone standpipe systems shall meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection. 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.</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer. The hydraulic design of the sprinkler system must be pre-approved by CoE of Alliance. All installation and design requirements outlined in BNBC Part 4 Chapter 4 shall be replaced by the requirements of NFPA 13. Pipe schedules shall not be used to size pipe. All systems shall be hydraulically calculated to meet the required NFPA design requirements. Installation of new automatic sprinkler systems shall be required to provide shop drawings and hydraulic calculations. The test and performance report of the installed system must be submitted to Alliance for review. Final inspection and testing shall be witnessed by the Alliance.</p> <p>Install 1 hour fire separation walls with 45 minute fire rated doors for spot removing rooms in the 4th floor of the main building. Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of the Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Bring existing pump to meet current standards or install a pump dedicated for fire fighting or fire protection following NFPA requirements. 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</p>
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	<p>with NFPA 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 an alternative power source like a generator. And the generator is to be connected with ATS (auto starter).</p>
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