

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

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Name of the Factory	: <b>Arunima Sportswear Ltd.</b>
Address of the Factory	: Zirabo Bazar, Dewan Idris, Pukurpar, Ashulia, Savar, Dhaka, Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 7-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 22-April-14
BGMEA Membership No	: 3894

### **BASIC INFORMATION:**

There are 9 buildings in the factory premises out of which one is main production building and eight are ancillary buildings. The buildings are named as: 1) Nine story RCC main production building (partially shed on 8th floor), 2) Three story RCC Building with Single basement, 3) Single story generator shed-1, 4) Single story generator shed-2, 5) Single story pump shed, 6) Single story fire command shed, 7) Single story wear house shed, 8) Single story child care shed, 9) Single story boiler shed. The following general information was noted:

i. Building Usage Type	: Garments Factory
ii. Structural System	: RCC frame structure with in filled masonry
iii. Floor System	: RCC Structure with beam and column
iv. Floor Area	: 218879 SF
v. No. of Stories	: Nine story main RCC building & others are single storied
vi. Construction Year	: 2006-2013
vii. Foundation Type	: Isolated & combined footing foundation
viii. Design Drawings	: Available.
ix. Soil investigation Report	: Available.
x. Construction Materials	: Reinforced Concrete
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

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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.

- iii. Engage Conduct destructive core testing to validate the in-situ concrete compressive strength of the structural elements.

Mid Term (6 Weeks)

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- i. "Engage a qualified structural engineer to confirm structural performance of the structure due to presence of the slender column."
- ii. Have a qualified structural engineer provide further testing and analysis of d cracking on walls and provide a remediation plan to correct noted issues.
- iii. Engage a qualified structural engineer to prepare the required documents to confirm structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20
- iv. Have a qualified structural engineer prepare credible designs and documents along with design report based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- v. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vii. 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.
- viii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- ix. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- x. Have a qualified structural engineer prepare a load plan for each floor and have the floors marked for designated storage area as per Section 8.20 of the Alliance Standard.
- xi. Have the full identity of the Geotechnical engineer mentioned in the Geotechnical report.

Long Term (6 Months)

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- i. 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)	<p>Find out the cause of overheating, overloading or signs of burning and take proper action to stop occurrences. Replace damaged devices, conductors, and equipment.</p> <p>Remove all combustible materials within the substation room.</p> <p>Provide protective covers for light fixtures installed in storage areas or in any area where required by the Inspector of the Factories Rules (1.5.3.5), Part 53.</p>
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	<p>Ensure the generator room is clean and free of dirt and debris.</p> <p>Clean substation room of dirt, lint, water, oil and debris.</p>
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Ensure all switchboards and distribution boards have metal enclosure with dead front construction.</p> <p>Provide adequate cover on cable trench.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards and circuits.</p> <p>Provide clearance of at least 1 m (39 in) in front of distribution boards.</p> <p>Provide clear and permanent identification for all distribution boards, switchboards, sub main boards and switches.</p> <p>Ensure electrical connections at equipment, fixtures, etc. are properly secured.</p> <p>Install security measures to ensure access to the substation is restricted.</p> <p>Provide means of ventilation for the substation room. Consult a qualified engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Provide adequate supports for electrical wiring and conduit.</p> <p>Ensure Signage indicating the prohibition of light fixtures without protective covers is installed at required locations.</p> <p>Install appropriate type and number of firefighting equipment inside the generator room.</p> <p>Provide required equipment and safety signage posted within the room.</p> <p>Provide electrical insulation mats in front of distribution boards.</p>
Long Term (6 Months)	<p>Develop and implement an electrical safety program and maintain documentation. Include key topics such as lock-out, tag-out procedures, personal protective equipment requirements, etc.</p> <p>Ensure overcurrent protection device (circuit breaker) for each and every load.</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> <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized and installed according to capacity of circuit breakers.</p> <p>Remove multi looping of cables at circuit breakers within</p>

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	<p>distribution boards.</p> <p>Complete an oil test on applicable transformer. If harmful substances are found in report, then replace the existing transformer with a new transformer that is documented to be without harmful substances.</p> <p>Ensure tagging and/or numbering identification on cables.</p> <p>Provide capacity information labels (maximum current rating, number of circuit breakers, etc.) for distribution boards.</p> <p>Ensure switchboards and 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> <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>Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition and maintain documentation.</p> <p>Complete thermographic scans at least on a three year cycle and maintain documentation. 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> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm<sup>2</sup> or greater. Solder or crimp stranded conductors having a cross sectional area less than 6mm<sup>2</sup> as required.</p> <p>Ensure cable joints are through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Consult with an expert electrical engineer and provide appropriately spaced conductors.</p> <p>Consult with an expert electrical engineer and provide the appropriate number of down conductors for this building system.</p> <p>Provide dedicated neutral for each circuit.</p> <p>Ensure inspection, maintenance, and testing procedures of the emergency generator being completed and documented.</p> <p>Establish an inspection testing and maintenance program for the Uninterruptible Power Supply (UPS), Instant Power Supply (IPS) and associated components; and maintain documentation. The program must be based on the following:</p> <p>(1) Manufacturer's recommendations</p>
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	<p>(2) Manufacturer's instruction manuals</p> <p>(3) Minimum Requirements of NFPA 111 Chapter 8</p> <p>(4) Minimum Requirements of NFPA 70B Chapter 28</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power. Maintain documentation.</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 existing gates and doors in the means of egress including all locking devices. Install doors with approved panic hardware that cannot be locked in the direction of egress under any conditions.
Mid Term (6 Weeks)	<p>Establish an inspection, testing, and maintenance program for the standpipe system. Program must comply with NFPA 25.</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>Automatic sprinklers will increase the capacity of the stairs to 579. Limit the occupancy of each floor to 579 or add another exit stair to the building to increase the number of allowable occupants per floor to 630.</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>
Long Term (6 Months)	<p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit outward opening, side-swinging, self-closing and latching, 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>Install a fire alarm system per NFPA 72. Install strobes and horns for complete notification. Install pull stations at all entrances to exit stairs.</p>

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	<p>Automatic area smoke detectors are required throughout G2 buildings per Section 5.7.3.6, except where automatic sprinklers are installed throughout.</p> <p>Install a Class I standpipe system in the building with fire department valves at the floor landings in each stair. The standpipe shall be part of the combined standpipe/sprinkler system supply.</p> <p>Automatic sprinklers will increase the capacity of the stairs to 579. Limit the occupancy of each floor to 579 or add another exit stair to the building to increase the number of allowable occupants per floor to 630.</p> <p>Install listed firestop systems at every penetration through fire rated walls and floors. Install fire doors in doorways through rated walls. Provide 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>Install a listed, approved fire pump to supply the demand of sprinkler and standpipe system, per NFPA 20.</p>
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