

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Ashiana Garments Ind Ltd.
Address of the Factory	: 2/1 East Rampura, D.I.T. Road, Rampura, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 10-July-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 10-July-14
BGMEA Membership No	: 2692

BASIC INFORMATION:

There is only one 12 storied building in this factory. The following general information was noted:

i.	Building Usage Type	: Mixed use Factory
ii.	Structural System	: RCC frame structure with in filled masonry
iii.	Floor System	: RCC Structure with beam and column
iv.	Floor Area	: 54000 SF
v.	No. of Stories	: 12 story main RCC building
vi.	Construction Year	: 1994 up to 5th floor & Rest 2009
vii.	Foundation Type	: Mat 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 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) :

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- i. "Based on the findings of the Review Panel investigation, the following recommendations are provided and should be implemented:
 1. Operations in the building can be continued. However, the live load during the operations shall not exceed 1 kN/m² (20 psf) and no storage loads (above 20 psf) shall be allowed except on the ground floor.
 2. All interior brick walls within the building shall be rearranged immediately in order to reduce the dead loads within the building.
 3. 33 KVA generator located on the first (elevated) floor of the building shall be immediately relocated to the ground floor.
 4. A Detailed Engineering Assessment (DEA) shall be started immediately and completed within 6 weeks under the supervision of a certified professional structural engineer.
 5. Depending on the findings of the DEA, permanent remedial measures should be undertaken for the safety of the building."
- ii. 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.
- iii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- iv. 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. Otherwise remove the tanks from roof of the building.
- v. "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.
- vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. "Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition."
- ix. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- xi. 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.
- xii. 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) :

- i. Provide Certificates of Occupancy for review.
- ii. Retrofitting as per DEA report

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Install lights with approved protective covers.
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Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>All switchboards and/or distribution boards should be metal enclosed with a dead front construction.</p> <p>Ensure proper ventilation for generator room.</p> <p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system. The required marking can be by color code, the words “emergency system,” or any other method that identifies the box or enclosure as a component of the emergency system.</p> <p>Clear identification/markings must be available at LT, MDB and DB MCB/MCCB. Clear and permanent identification marks are required to be painted on all distribution boards, switchboards, sub main boards and switches as necessary. Each board shall be provided with a circuit list describing each circuit and what it controls as well as the current rating for the circuit and size of fuse element.</p> <p>Provide two separate groundings points for the generator frame.</p> <p>Clean all switchboards and/or distribution boards from dust, dirt and debris.</p> <p>Electrical connections should be standard with durable electrical continuity.</p> <p>Provide junction boxes and other electrical devices with covers.</p> <p>Provide mechanical guards for electrical equipment and wiring where necessary.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and distribution boards.</p> <p>Electrical insulation mats should be Provided in front of all distribution boards and/ or Switchboards.</p> <p>Ensure meters and other electrical devices installed on the main electrical equipment are operational.</p>
Long Term (6 Months)	<p>Develop and implement an electrical safety program. Include key topics such as lock out/tag out procedures, personal protective equipment requirements, etc. Keep records of completed safety training available on site.</p> <p>Need to separate the multiple and looping cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements.</p> <p>Rating of circuit breaker should be standard with current carrying capacity of cable/wire.</p>

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	<p>Provide earthing of equipment at required locations and connect to required number of electrodes.</p> <p>Connect all metal in the building to the building earthing/grounding system.</p> <p>Install a lightning protection system.</p> <p>Have a qualified electrical engineer develop as-built electrical drawings providing detailing key components of the electrical system.</p> <p>Install switchboards and/or distribution boards in compliant locations.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</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 Safety 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>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 & Rotating Equipment and NFPA70B or a comparable standard.</p> <p>Provide grounding (earthing) for distribution boards as per BNBC section 2.8.1.</p> <p>Install the generator in an appropriately sized room.</p> <p>Cables should be connected with lugs and switch boards or distribution boards free from un-terminated cable. Cables shall be connected to terminals only by soldered or welded lugs, unless the terminal are of such form that it is possible to securely clamp them without cutting away the cable strands.</p> <p>Reconnect with proper size of cable sockets. Cables shall be connected to terminals only by soldered or welded lugs, unless the terminals are of such form that it is possible to securely clamp them without cutting away the cable strands.</p> <p>Cable joints should be through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Neutral cable should be same with phase cable and dedicated neutral should be provided for each load.</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</p>
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	<p>actions.</p> <p>All phase conductors, neutral and earthing cables should follow the colour code.</p> <p>Install phase separators between terminal connections at the noted locations.</p> <p>Inspection, maintenance, and testing procedures of the emergency generator Should be completed and documented.</p> <p>The routine maintenance and operational testing program shall be based on all of the following: (1) Manufacturer's recommendations (2) Instruction manuals (3) Minimum requirements of NFPA 110 Chapter 8 (4) The authority having jurisdiction.</p>
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Storage areas underneath the cutting tables should be clear.
Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices from all means of egress doors.
Mid Term (6 Weeks)	<p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25. Any newly installed standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC Section 5.4.3</p> <p>Provide proper aisles marking (clear width minimum 36 in.) and keep aisles free of storage. The path of egress travel along a means of egress shall not be interrupted by any obstruction. The capacity of the means of egress shall not be reduced along the path of travel</p>
Long Term (6 Months)	<p>Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Section 6.3.1.2. . Consult a qualified fire protection engineer to design the required rated construction barriers</p> <p>Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections 3.4 and 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier.</p>

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	<p>Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. Devices should be part of an automatic fire alarm and detection system for the facility. This includes electrical supervision of all valves controlling fire protection systems (sprinklers, fire pumps, water supplies, etc.). All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. Standpipe system must comply with the requirements of NFPA 14.</p> <p>Install automatic fire sprinkler systems throughout the facility. Manufacturing areas and storage less than 12 feet high is classified Ordinary Hazard (Group 2). Sprinkler systems should be designed to deliver 0.20 gpm/ft² over the most remote 1500 square feet. 250 gpm hose allowance. 90 minute water supply duration. The owner plans to install rack storage systems in the warehouse. This may include solid shelf storage of Class III or IV commodities up to 20 feet high. Install a system of open racks to eliminate the need for in-rack sprinklers. Install an ESFR sprinkler system designed to deliver 98 gpm at the 12 most remote sprinklers. 250 gpm hose allowance. 60 minute water duration. All sprinkler installations shall be submitted for review by the Alliance prior to commencement of installation</p>
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