

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Arabi Fashion Ltd.
Address of the Factory	: Bokran, Monipur, Mirzapur, Gazipur Dhaka, Bangladesh Present
Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 3-Feb-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 2-March-14
BGMEA Membership No	: 5951
BKMEA Membership No	: 1425

BASIC INFORMATION:

There is one main building and seven ancillary buildings in the factory. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: The structural system of main production building is RCC Beam-Column frame system
iii.	Floor System	: RCC Structure with beam and column
iv.	Floor Area	: 159,395 SF
v.	No. of Stories	: Six story RCC building
vi.	Construction Year	: 2006
vii.	Foundation Type	: RC spread footing
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

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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. "Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required."
 - ii. Engage a qualified structural engineer to confirm structural performance of the structure.
 - iii. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
 - iv. "Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues."
 - v. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures. This assessment should include destructive core sample testing of concrete compressive strength.
 - vi. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
 - vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
 - viii. 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
 - ix. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads in according to Alliance Standard Part 8 Section 8.13 and 8.14. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
 - x. 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.
 - xi. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
 - xii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
 - xiii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
 - xiv. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
 - xv. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
 - xvi. to RMG 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."

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 surfaces to prevent the accumulation of water.
 - ii. Provide Certificates of Occupancy for review.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Wiring system components including cables and wiring accessories shall be installed or handled only at temperatures within the standard limits.</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>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)	
Mid Term (6 Weeks)	<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.</p> <p>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>Provide covers or blanks to conceal all live internal components of switchboards and/or distribution boards.</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 in all distribution boards, switchboards, sub main boards and switches as necessary. All distribution boards shall be marked "Lighting" or "Power", as the case may be, and also be marked with the voltage and number of phases of the supply.</p> <p>Each shall be provided with a circuit list giving diagram of each circuit which it controls and the current rating for the circuit and size of fuse element.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and distribution boards. A panel board shall be 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. For the purposes of this section, a 2-pole circuit breaker or fusible switch shall be considered for two over current devices; a 3-pole circuit breaker or fusible switch shall be considered for three over current devices.</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</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>boards.</p> <p>Light fixtures without protective covers (otherwise known as naked lights) shall not be allowed in storage areas or in any area where the Inspector of the Factories Rules (1.6.3.7) Part 53 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p>
<p>Long Term (6 Months)</p>	<p>Have a qualified electrical engineer develop as-built electrical drawings providing detailing key components of the electrical system.</p> <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 training on site.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBC for required number of electrodes.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Need to separate the multiple cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements.</p> <p>Provide earthing/grounding system for all metal in the building.</p> <p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system.</p> <p>Provide emergency power for life safety loads.</p> <p>Provide a readily accessible single point of disconnect for each main electrical service feed. Install at an accessible height.</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>Need to maintain color code for all cables. For phase conductors use red, yellow and blue, for neutral conductors use black and for grounding cables use green dotted yellow.</p> <p>Ensure all electrical wiring/cable is properly terminated at its point of termination.</p> <p>Properly secure electrical connections at equipment, fixtures, etc.</p> <p>Need to joint cable through porcelain/PVC connectors with PIB tape wound around joint.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>Provide dedicated neutral for circuit.</p> <p>Provide generator frame earthing (grounding) at two separate points.</p> <p>Provide grounding (earthing) for distribution boards as per BNBC section 2.8.1. Where the panel board is used with nonmetallic raceway or cable or where separate grounding conductors are provided, a terminal bar for the grounding conductors shall be secured inside the cabinet. The terminal bar shall be bonded to the cabinet and panel board frame, if of metal; otherwise it shall be connected to the grounding conductor that is run with the conductors feeding the panel board.</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>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>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> <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)	All locking arrangement in the doors should be removed as per Alliance standard.
Mid Term (6 Weeks)	Post the occupant load for all assembly and production floor areas in a conspicuous space near the main exit or exit access doorway for the space in accordance with Alliance Standard Section 6.4.4.
Long Term (6 Months)	Install side-hinged swinging type door with the necessary

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>fire resistance rating of 1 1/2 hours including door hardware; in reference to the specific position requirements. Position the door so it shall open in the direction of egress without obstructing other paths of egress.</p> <p>Class III standpipe hose connections shall be installed as per Alliance Standard. Engage a qualified & experienced engineer to design the system as per Alliance standard and should take approval from QAF.</p> <p>Install a new automatic fire alarm and detection system in accordance with NFPA 72. Once installed, arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defense as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up, a person trained to contact the Fire Service and Civil Defence in the event of fire alarm activation shall be provided. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person</p> <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. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation</p> <p>Bring current pump up to standard or install a new fire pump in accordance with NFPA 20. Engage a qualified & experienced engineer to design the system as per Alliance standard and should take approval from QAF.</p>
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