

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: AJ Super Garments Ltd (Woven)
Address of the Factory	: Aj Garden, Goshbagh Zirabo, Savar, Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 23-March-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 23-March-14
BGMEA Membership No	: 4103

BASIC INFORMATION:

There is only one six stories RCC building in the factory. The following general information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC frame structure
- iii. Floor System : RCC Structure with beam & column frame
- iv. Floor Area : 160,800 sft
- v. No. of Stories : Six story RCC building
- vi. Construction Year : 2004-2007
- vii. Foundation Type : Unknown.
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available.
- x. Construction Materials : Reinforced Concrete
- xi. Generator : Ground level

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.

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Mid Term (6 Weeks)

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- i. Factory should engage an expert structural engineer to calculate actual live load for each critical section of the floor, particularly storage area and sewing section. Measured live load should be verified with the designed live load considering factor of safety. If it is overloaded, immediately excess live load from that part should be removed.
- ii. Adequately anchor and brace accessories rack systems to resist earthquake forces to comply with the BNBC and Alliance Standard.
- iii. Engage a qualified structural engineer to confirm and document that appropriate provisions have been made to accommodate concentrated loads in the storage area (although on ground floor, there may be question regarding quality of castings). If appropriate provisions have not been made, have a qualified structural engineer develop a remediation plan.
- iv. to factory 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."
- v. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- vi. As noted elsewhere, have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. For each section of a floor, live load should be posted in the adjacent column, particularly for the critical sections.
- vii. 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. Remove ponded water from rooftop. As noted elsewhere, install roof drainage system and proper roof slope to prevent water from ponding on roof.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Switchboards and/or distribution boards should have clear and permanent unique identification markings (e.g. MDB-01) as per BNBC Part 8 Section 2.11.5.4. All distribution boards shall be marked by use (e.g. "Lighting" or "Power"), as the case may be, and also be marked with the voltage and number of phases of the supply. 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>Cables run on floors must be protected and supported on cable trays or in trenches as per Alliance Standard 10.13 and BNBC Part 8 2.7.4</p>

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	<p>Install proper protective guards to prevent contact with bus bars. Proper guards will be constructed of non-conductive material and sufficient to prevent inadvertent contact with live circuits.</p> <p>Instruction board for first aid and artificial respiration should be installed in substation and generator room.</p> <p>Install signage in all storage areas or other areas of combustibles indicating no use of light fixtures without protective covers as per Alliance Standard 10.15.2. Signs should conform to ANSI Z535 or equivalent international standard regarding safety signs.</p> <p>Install phase separators between terminal connections at south side DB of 3rd Floor. Affirm phase separators are provided on all other factory DB's.</p>
<p>Long Term (6 Months)</p>	<p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity 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. Reference NFPA 70e for example program requirements.</p> <p>As per Alliance standard oil filled transformers for non high-rise buildings shall be separated by a minimum 2 hour fire resistive rated construction.</p> <p>Install a lightning protection system in accordance with BNBC Part 8. A qualified electrical engineer should design the lightning protection system and a licensed electrician/contractor should install the designed system.</p> <p>There should be no multi looping of wiring/cables at circuit breakers within switchboards and/or distribution boards. Remove looping of wiring/cables in distribution boards (Fourth Floor SDB and 2nd Floor North Side DB). Affirm no other multi looping is present in other DBs.</p> <p>No un-terminated wires are permitted in the DB. All cables should be affixed to phase, neutral or Earthing bar with appropriate lugs/sockets. 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 as per BNBC Part 8 2.5.5.4</p> <p>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Inspection should include general conditions and conformance to Bangladesh standards and specs, insulation resistance testing, earth resistance testing, and operational testing under load (clamp on ammeters can be used). All testing should be conducted by competent personnel. Maintain records concerning inspections and follow up actions.</p> <p>All Distribution Board covers in the building should be connected to the building earthing/grounding system such</p>

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	<p>as metal rebar in concrete, metal frame of building, or metal water pipe in accordance with BNBC 2006 Part 8.</p> <p>Indelibly and clearly label all incoming and outgoing circuits of HT and LT panels. Provide circuit diagram and labeling of switches and cables in all DB.</p> <p>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Inspection should include general conditions and conformance to Bangladesh standards and specs, insulation resistance testing, earth resistance testing, and operational testing under load (clamp on ammeters can be used). All testing should be conducted by competent personnel. Maintain records concerning inspections and follow up actions.</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>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>Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Each circuit must be provided with a dedicated neutral.</p>
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all locking devices form all doors to exits / means of egress. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Short Term (3 Weeks)	Remove all locking devices form all doors to exits / means of egress. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Mid Term (6 Weeks)	<p>Revise existing standpipe system to include a rated fire pump evaluated against requirements of NFPA 20 by a qualified fire engineer. All valves controlling fire pumps systems shall be electrically supervised by fire alarm system control unit.</p> <p>Post the occupant load for every assembly and production</p>

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	<p>floor in the facility in a conspicuous space near the main exit or exit access doorway for the space.</p>
<p>Long Term (6 Months)</p>	<p>Factory will need to install fire rated door assemblies at all exits (1.5 hour rating). Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614. Part II. Doors must remain in closed position or be of self-closing type. Doors may be provided with locking hardware from the ingress side provided that a panic bar is installed on any door with an occupant load exceeding 49 persons. For the horizontal exit, door should be self-closing and have two leaves opening in opposite directions. In east stairwell, the building exterior walls within 3050 mm (10 ft) horizontally of the unprotected openings (windows) should be constructed to have a fire-resistance rating of not less than 1 hr and openings within such exterior walls (such as windows) shall be protected by opening protective having a fire protection rating of not less than ¾ hr. Factory can install fire rated windows or seal openings in exterior wall. Unprotected openings in stairwells may be sealed to assure continuous fire rating of exit enclosure.</p> <p>Replace the single-station smoke alarms with automatic smoke detectors tied into an automatic fire alarm system located in accordance with NFPA 72. Configure the fire alarm system to initiate occupant notification upon activation of any smoke detectors in addition to the manual fire alarm stations. Detectors should be placed in accordance with requirements of NFPA.</p> <p>A room housing boilers shall be separated from other occupancies by minimum 1 hour construction. Install appropriate 1-hour fire rated door assembly. Seal and/or protect all openings including windows to maintain the required fire separations. Consult a qualified fire protection engineer to design the required rated construction barrier. Oil filled transformers for non-high-rise buildings shall be separated by a minimum 2 hour fire resistive rated construction. Consult a qualified fire protection engineer to design the required rated construction barrier.</p>