

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Anowara Dress Makers Ltd
Address of the Factory	: Frank Complex, 280/D, Baizid Bostami, Nasirabad, Industrial Zone, Chittagong.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 17-Sep-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 25-Jan-15
BGMEA Membership No	: 4209

BASIC INFORMATION:

There are two buildings in the factory premises and those are one main factory building and one ancillary building. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : Reinforced concrete moments frames
- iii. Floor System : slabs between beams and beams between column
- iv. Floor Area : 134,800 Sft.
- v. No. of Stories : 6 storied
- vi. Construction Year : 2010-2011
- vii. Foundation Type : Pile 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.
- iii. Under guidance from a qualified structural engineer, conduct destructive core testing to validate the in-situ concrete compressive

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strength of structural elements. Based on the destructive core test report further analysis to be done.

Mid Term (6 Weeks)

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- i. Have a qualified structural engineer provide further testing and analysis of cracking in walls and provide a remediation plan to correct noted issues.
- ii. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- iii. 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.
- iv. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- v. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind and storm surge loadings.
- vi. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19/8.20 of the Alliance Standard. The documents should be prepared for all buildings within the factory complex.
- vii. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
- viii. 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.
- ix. 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.
- x. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- xi. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- xii. 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 the building.
- xiii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xiv. Remove deteriorated expansion joint material and provide new approved material at the expansion joint.
- xv. Have a qualified structure engineer identify the locations where a expansion joint is needed and then have a remediation plan developed.

Long Term (6 Months)

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- i. Provide Certificates of Occupancy for review.

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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Ensure generator room is properly rated.</p> <p>The generators engine exhaust should be appropriately taken out of the building and should preferably be taken out through any other side except South.</p> <p>Provide earthing of all equipment in floor areas.</p> <p>In the case of an unavoidable reason, the substation room may be on the ground floor of the same building, but the room needs to be properly fire rated and there needs to be a minimum 1m clearance around the transformer.</p> <p>Ensure proper ventilation system for the generator room.</p> <p>Provide all panel boards with: capacity information labels with bus bar rating, no. of CB according to size of Box, incoming CB rating, load connect with the CBs, maximum permitted load, etc.</p> <p>Phase conductors are to maintain colour code.</p> <p>Provide generators frame earthing at two points separately with the proper size of conductors.</p> <p>Provide approved cable trenches for haphazard cables properly.</p> <p>Provide supports for electrical wiring and conduit permanently.</p> <p>Provide additional light fixtures to increase illumination levels inside the substation room.</p> <p>Ensure all side have 1m clearance to properly access diesel generator-1 to perform operation and routine maintenance activities.</p> <p>Provide clear & permanent identification for all DBs, Switchboards, Sub-main boards & switches.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Provide appropriate number of fire extinguishers.</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 training available on site.</p> <p>Have a qualified electrical engineer, design a appropriate lightning protection system and installed according to the requirements.</p> <p>Re-route the water lines, so that they are not routed through the substation room.</p> <p>Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Install proper sized wiring according to the breaker capacity.</p> <p>Need to connect single cable in single port by proper size of cable lugs.</p> <p>Install distribution boards in suitable locations for operation and maintenance.</p> <p>Have a qualified electrical engineer to develop as-built earthing layout drawing of the electrical system.</p> <p>Ensure switchboards and distribution boards are 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>Verify the existing load does not exceed the panel rating.</p> <p>Provide changeover switches with interlocking arrangement to prevent simultaneous switching of two different supply sources</p> <p>Bond the lightning protection system ground terminals to the building or structure grounding electrode system.</p> <p>Install air termination network vertical and horizontal conductor at appropriate spacing.</p> <p>Install the appropriate number of down conductors based on the building size.</p> <p>Lighting and socket circuits must be separated at the noted locations. Have a qualified electrician separate the lighting and sockets into separate circuits.</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>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>Complete an oil analysis on applicable transformer at appropriate intervals based on voltage and power.</p>
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations.
Short Term (3 Weeks)	Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Mid Term (6 Weeks)	<p>Develop an emergency evacuation plan which includes duties and responsibilities of various people, 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 An emergency evacuation plan has been developed and communicated to all employees.</p> <p>Post the occupant load for every assembly and production floor in the facility in a conspicuous space near the main</p>

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	exit or exit access doorway for the space.
Long Term (6 Months)	Install an automatic fire detection alarm system throughout the factory in accordance with NFPA 72; including pull stations at each exit and automatic smoke detectors spaced in accordance with NFPA 72.