

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Antim Knitting Dyeing and Finishing
Address of the Factory	: Barda, Rupshi, Narayangonj, Rupgonj, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 2-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 28-May-14
BGMEA Membership No	: 2837
BKMEA Membership No	: 374

BASIC INFORMATION:

There are 4 of buildings in the factory premises out of which two are main production buildings and two are ancillary buildings. The buildings are named as: 1) Seven story RCC main production building and prefab shed on roof, 2) Single story prefab production shed, 3) Single story prefab generator shed, 4) Single story prefab ETP shed. The following general information was noted:

i.	Building Usage Type	: Garment Factory
ii.	Structural System	: Main building is RCC moment resisting structure and others are steel building
iii.	Floor System	: Main building is beam column and slab system and others are steel building
iv.	Floor Area	: 324401 sq. ft
v.	No. of Stories	: Seven story RCC main building and others are PEB single storied.
vi.	Construction Year	: 2011
vii.	Foundation Type	: Pile foundation(main building)
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available.
x.	Construction Materials	: Reinforced Concrete & steel
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

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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. Have 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.
 - ii. Complete further testing on areas of deterioration and have a qualified structural engineer develop a remediation plan. Also renovate the tin shed in all areas.
 - iii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
 - iv. Have a qualified structural engineer prepare the design report.
 - v. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
 - vii. 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.
 - viii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standards.
 - ix. Have a qualified structural engineer complete further analysis of the structure and prepare the design report.
 - 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. Have a qualified structural engineer prepare a Load Plan for each floor and have the floors marked for designating storage area as per the developed Load Plan.
 - xiii. 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.

The recommendations for Electrical Safety corrective actions are:

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<p>Immediate (3 to 6 Days)</p>	<p>Remove all combustible materials within the substation room. Implement a housekeeping program to keep the room clear.</p> <p>Investigate the causes overheating and burning and repair and replace as required.</p>
<p>Short Term (3 Weeks)</p>	
<p>Mid Term (6 Weeks)</p>	<p>Install metal enclosed distribution boards with dead front construction.</p> <p>Install proper identification of emergency power switchboards, distribution boards and circuits.</p> <p>Install approved covers on cable trench.</p> <p>Install shielding and additional insulation for wiring exposed to external heat sources.</p> <p>Install two separate points of earthing (grounding) for generator.</p> <p>Install clear and permanent identification marks in all distribution boards, switchboards, sub main boards and switches per BNBC section 2.11.5.4 e</p> <p>Install mechanical guards for electrical equipment where required.</p> <p>Properly secure electrical connections at equipment, fixtures, etc.</p> <p>Install covers or blanks to conceal all live internal components of distribution boards.</p> <p>Install approved supports for electrical wiring and conduit. Clean distribution boards periodically to keep them continually free of dirt and debris.</p> <p>Install electrical insulation mats in front of substation and distribution boards.</p> <p>Repair or replace meters and other electrical devices installed on the main electrical equipment.</p> <p>Install signage prohibiting light fixtures without protective covers where required.</p> <p>Post the required safety signage within the substation room. Install means of identification with separate color coding, marking tape, tagging or other approved means.</p> <p>Install capacity information labels (maximum current rating, no of circuit breakers etc.) for distribution boards.</p>

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Long Term (6 Months)	<p>Connect all metal in the building to the building grounding system including re-bar, steel structure, and metal water pipe.</p> <p>Contract a qualified electrical engineer to develop 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 including lock-out tag-out procedures, personal protective equipment requirements etc. Reference NFPA 70e for example program requirements.</p> <p>Install over current protection device (circuit breaker) for each and every load.</p> <p>Contract a qualified electrical engineer and install electrical cables sized according to the capacity of circuit breakers. Remove multiple wires landing at single circuit breakers within distribution boards. Install one circuit breaker per circuit.</p> <p>Bond lightning protection ground terminals to the building or structure grounding properly and contract a qualified electrician to perform the work.</p> <p>Install dedicated neutral for each circuit. Provide switchboards and distribution boards 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>Install cable sockets for stranded conductors having a nominal cross-sectional area 6mm² or greater. Solder together all strands at the exposed ends of conductors below 6 mm² without cable sockets, or crimp using approved sleeves or ferrules.</p> <p>Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Complete thermographic scans at least on a three year cycle. Thermographic scans shall 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 shall 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</p>
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	<p>breakers, switches etc. and between each phase and earth. Contract a professional electrical engineer to verify air termination network vertical and horizontal conductor spacing and prepare drawings for lightning protection, including risk index. Install modifications and additions as required.</p> <p>Contract a professional electrical engineer to design the appropriate number of down conductors according to BNBC based on the building size. Install modifications and additions as required.</p> <p>Remove foreign utilities from the cable shaft or install a dedicated cable shaft. Wiring and cables shall be arranged in the shaft for ease of inspection and maintenance. Install cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Properly terminate all electrical wiring/cable at its point of termination.</p> <p>Complete and document inspection, maintenance, and testing procedures of the UPS</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)	Keep the doors lock free in the direction of egress under any conditions. All hasps, locks, slide bolts and other locking devices shall be removed where provided.
Mid Term (6 Weeks)	<p>Post emergency egress map at the entrances to each exit stair or main point of egress.</p> <p>Post the occupant load for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Develop a testing and maintenance program that ensures the operation of all means of egress lights are verified at least once per year. If battery-operated lights are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lights shall be performed for a minimum 90 min once per year.</p> <p>Conduct fire drill on a quarterly basis as outlined in BNBC Part 4 Appendix A.</p> <p>Collect all applicable permits and licenses and keep up to date</p>

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	including boiler license and waiver certificate from BERC.
Long Term (6 Months)	<p>Provide required fire rated doors in all exits. Fire door shall be of the side hinged, swinging, self-closing type and shall swing in the direction of egress. New doors shall have a minimum clear width of 1.0 m (39 in.). Consult a qualified fire protection engineer to design the fire rated door.</p> <p>Consult a qualified fire protection engineer to design the fire alarm system with the pull stations at egress points, centralized and addressable smoke detectors all through the building, and visual and audible devices spaced appropriately based on occupancy type. Reference NFPA 72.</p>