

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Adury Knit Composite Ltd
Address of the Factory	: Karardi, Shibpur, Narsingdi, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 10-May-13
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 6-May-14
BKMEA Membership No	: 1186

BASIC INFORMATION:

There are 14 buildings in the factory premises out of which eight are main buildings and six are ancillary buildings. The buildings are named as: 1) Six story RCC building, (Building 01) 2) Five story RCC building, (Building 04) 3) Three story RCC building, (Building 06) 4) Two story Steel building-2, (Building 02) 5) Single story prefab shed-1, 6) Single story prefab shed-2, 7) Single story prefab shed-5, 8) Single story prefab shed-7. 9) Two story RCC building-1, 10) Two story RCC building-3, 11) Four story RCC building-5, 12) Single story prefab shed-3, 13) Single story prefab shed-4, 14) Single story prefab shed-6. The following general information was noted:

- i. Building Usage Type : Shared Factory.
- ii. Structural System : Building-01, Building-03, Building-04, Building-05, Building-06 are RCC framed structure but Building-02 is steel frame structure
- iii. Floor System : RCC Structure & steel building
- iv. Floor Area : 638034 sft.
- v. No. of Stories : 1) Six story RCC building
2) Two story RCC building-1
3) Five story RCC building
4) Three story RCC building
5) Two story steel building-2
6) Four story RCC building
7) Two story RCC building-3
Remaining seven structures are single story shed
- vi. Construction Year : 2005-2009
- vii. Foundation Type : Different type of foundation.
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available.
- x. Construction Materials : Reinforced Concrete & steel
- 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) :

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- i. Conduct destructive core test to validate the in-situ concrete compressive strength of the structural elements of building-01.
- ii. 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.
- iii. 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.
- iv. Conduct Ferro-scanning to confirm the reinforcement and prepare as-built drawing as per construction. Also engage a competent body for detailed analysis.

Mid Term (6 Weeks)

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- i. Qualified structural engineer should be provided for further testing and analysis of distress, settlement, shifting, or cracking in columns or walls.
- ii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading and storm surge.
- iii. 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.
- iv. 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.
- v. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- vi. 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
- 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 to prepare credible as-built documents based on the requirements of part 8, Section 8.19 of the alliance standard.
- ix. Under the guidance from a qualified structural engineer, address all areas of needed maintenance by corresponding the identified issues.
- x. Complete further testing on areas of deterioration in order to understand the level of corrosion and weakening of the member and have a qualified structural engineer develop a remediation plan.
- xi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and have it posted in all required location.
- 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.

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- 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 provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- Long Term (6 Months) :
- i. Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure the generator room clean and free of dirt, debris, and improperly stored materials.</p> <p>Ensure light fixtures without protective covers are not installed in chemical storage areas or in any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p> <p>Find out the cause of overheating, signs of burning and take proper action.</p>
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Provide shielding and additional insulation for wiring exposed to external heat sources.</p> <p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p> <p>Ensure proper identification of emergency power distribution boards and circuits.</p> <p>Provide clearance of at least 1 m (39 in) in front of distribution boards.</p> <p>Provide adequate cover on cable trench.</p> <p>Provide mechanical guards for electrical equipment where necessary.</p> <p>Ensure the air termination network vertical and horizontal conductors are appropriately spaced.</p> <p>Ensure appropriate numbers of down conductors are installed based on the building size.</p>
Long Term (6 Months)	<p>Ensure underground cables for electrical distribution in the premises/garden/compound of the building are encased in GI or PVC pipes and laid in earth trenches of sufficient depth.</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</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>Develop and implement an electrical safety program.</p>

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	<p>Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Keep documentation of completed training on site.</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>Ensure switchboards and/or distribution boards are metal enclosed with a dead front construction.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Remove multi looping of wiring/cables at circuit breakers within switchboards and/or distribution boards.</p> <p>Install switchboards and/or distribution boards in compliant locations so that operation is not hindered due to limited access.</p> <p>Ensure switchboards and/or panel boards are not installed above gas stoves or sinks or within 2.5m of any washing unit in washing rooms or laundries.</p> <p>Ensure switchboards and/or distribution boards 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> <p>Make sure the lightning protection ground terminals are bonded to the building or structure grounding.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Provide dedicated neutral for each circuit.</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)	Develop an emergency evacuation plan which includes duties and responsibilities of various people, interfacing between groups and fire brigade, headcount and

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	<p>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.</p> <p>Post the occupant load for every assembly and production floor in the facility 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 exit signs is verified at least once per year. If battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 minutes once per year.</p>
<p>Long Term (6 Months)</p>	<p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit outward opening, side-swinging, self-closing and latching, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers</p> <p>Install a pump dedicated for fire fighting or fire protection following the requirements of NFPA 20. Fire pump installation is to be tested for final acceptance in the presence of the Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 24 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance</p>