Name of the Factory	: **Defoin**
Address of the Factory	: Plot #55, Block K, Section 2, Rupnagar I/A,Mirpur, Dhaka.
Present Status of the Factory	: **Under Operation**
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 14-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 25-Jun-13 & 29-Jun-14
BKMEA Membership No	: 1283

BASIC INFORMATION:

The present garment factory is comprises of a 1 Main Buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: Reinforced concrete columns monolithic with beams and slabs
iii.	Floor System	: Reinforced concrete columns monolithic with beams and slabs.
iv.	Floor Area	: 48000 Sft.
v.	No. of Stories	: G+7+R+UR.
vi.	Construction Year	: 1995
vii.	Foundation Type	: Unknown.
viii.	Design Drawings	: Not Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RCC (Brick chips).
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 : N/A

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 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.

Mid Term (6 Weeks) :

i. Under guidance from a qualified structural engineer arrange an assessment of the structure. This assessment should include destructive core testing (as per D.5 of Alliance Protocol) to validate the in-situ concrete compressive strength of concrete elements.

ii. Perform testing to obtain concrete compressive strength of beams and slabs or obtain previous testing reports.

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. 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.

v. 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.

vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

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 prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.

ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3

x. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.

xi. 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) :

i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.

ii. 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.

iii. Provide Certificates of Occupancy for review.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Keep areas beneath cutting tables clear of combustibles as all times.
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)	Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum. Post occupant load for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space. Post emergency egress maps at the entrance to each exit stair or main point of egress. Need to develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees. Develop a testing and maintenance program that ensures the operation of all egress lighting is 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 provided for a minimum 90 min once per year. Apply for issuance of the Certificate of Occupancy for the factory building as per building use from approving authority. Stair designation signs need to be provided at each floor entrance from all stairs to the floor in English and Bengali. Signs need to indicate the name of the stair and the floor level. Signs shall be posted adjacent to the door. Need to complete fire department pre-planning activities with the local Fire Service and Civil Defense.
Long Term (6 Months)	Provide fire-resistive rated construction barriers at exit enclosures with fire-rated opening protection (doors, windows, etc.). Fire doors shall be of the side-hinged, swinging type and shall swing in the direction of egress. Doors shall have a minimum clear width of 0.8 m. Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry provision. Consult a qualified fire protection engineer to design the required rated construction barriers with opening protection for exit enclosures. Install automatic fire sprinkler systems throughout the facility. System shall be designed by a qualified fire protection engineer and plans shall be submitted to Alliance for review prior to installation. Modify or install the standpipe System (Class-I) to meet the requirements of Alliance standard Part 5 Section 5.4.

	Consult a qualified fire protection engineer before modify or installing a new system.. Install required fire rated door assemblies at all exits. Provide required fire resistive rated opening protection (Door, Window, Hatch Cover, etc.) at openings and penetrations through fire rated walls and/or assemblies or seal the penetration/opening by proper fire rated sealing materials. Consult a qualified fire protection engineer to design the required rated opening protection and sealing. All collapsible gates, wooden in-swing doors in the means of egress need to be replaced with required fire rated doors. Door shall be opened in the direction of egress, side-hinged swinging, self-closing type as per Alliance Standard Part 6 Section: 6.8. Doors will be free from general locking arrangement. Provide a 2-hour fire-resistive rated assembly with 1.5-hour opening protection in line with the stair and extend 3.05 m (10 ft.) beyond the ends of the stair between the exterior exit stairs and the building to achieve the required separation. Also separate the stair from sawmill by 3-hr fire rated barrier without opening. The rated assembly should be approved and/or designed by a qualified fire protection engineer. Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. This includes electrical supervision of all valves controlling fire protection systems (sprinklers, fire pumps, water supplies, etc.). 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. Install a dedicated fire pump in accordance with NFPA 20 to supply the water demands for the fire protection systems along with a stored source of water to meet the demands per NFPA 22. Fire pump installation is to be tested for final acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance as per clause 5.5.5. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated doors assemblies (door and frame) with latching panic hardware. Need to get required number of people trained and certified in firefighting, first aid, and rescue training by the appropriate authority. Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections

	3.4 and 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier. Install handrails on both sides of the stairs and intermediate handrails when the width of the stair exceeds 2.2 m. A minimum height of 865 mm (34 in.) and a maximum height of 965 mm (38 in.) as measured from the leading edge of the tread needs to be maintained when installing new handrails. The spacing between vertical members shall not exceed 200 mm (8 inch) up to a height of 865 mm (34 inch). Establish an inspection, testing, and maintenance program for all fire extinguishers. Program need to comply with the requirements of NFPA 10 chapter 7. Provide Fire Department (Siamese) connections in accordance with Alliance Standard Section 5.5.4. Connections need to be match the Fire Service and Civil Defense hose thread standard. Also need the ensure reservation of the required amount of water for fire-fighting. Consult a qualified fire protection engineer to design this requirement. Install emergency lighting for all paths of egress in accordance with Alliance Standard Section 6.7. Illumination needs to be a minimum of 10 lux for all corridors, exit doors and stairways. Illumination for aisles needs to be a minimum of 2.5 lux. Egress lighting shall be provided with emergency power or supplemented with battery powered lights that provide a minimum of 10 lux for not less than 30 mins in the event of failure of normal lighting. Provide an emergency power source, either by battery back up or by connecting to the emergency power system, for illuminated exit signs. Install illuminated exit signs with backup power and continuous graphics at entrances to exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of the path of travel. Provide parapet in every occupied roof with same fire rating of outer wall of the building and a minimum height of 1067 mm (42 in.). Install appropriate means of illumination at the noted locations. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2cd/m2, may also be used. Establish an inspection, maintenance and testing program for the standpipe and hose system. Program needs to comply with the requirements of NFPA 25. Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry the required duties. Develop a hot work permit program. The program must

	comply with the requirements of NFPA 51B. Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall, ceiling, supply and return air ventilation systems. Promptly reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and rescheduling.

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Find out the cause of overheating and take proper action.
Short Term (3 Weeks)	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. Develop and implement an electrical safety program. Include key topes such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements. 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.
Mid Term (6 Weeks)	Clear & Permanent identification marks should be printed in all DBs, Switchboards, Sub-distribution boards & switches as necessary.BNBC- Part 8 section 2.11.5.4. Provide electrical insulation mats in front of distribution boards, substation room etc. Install phase separators between terminal connections at the noted locations.
Long Term (6 Months)	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. Have a qualified fire protection engineer provide the required rating of the room and the required remediation procedures to ensure the enclosure is properly rated. Ensure the generator enclosure is sufficiently protected from the ingress of water.