Name of the Factory	: **Dipta Garments Ltd**
Address of the Factory	: Nagarchar, Rajfulbaria, Savar Savar Dhaka Bangladesh
Present Status of the Factory	: **Under Operation**
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 03 Jun 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 29 May 2014

BASIC INFORMATION:

There are eight buildings in the factory premises out of which three are main production buildings and five are ancillary buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: The structural systems of the three main buildings are as follows: Unit-01: 3-story RCC moment-resisting frame structure. Unit-02: 7-story steel braced frame structure. Unit-03: 6-story RCC moment-resisting frame structure.
iii.	Floor System	: RCC and steel building.
iv.	Floor Area	: 153052 sft.
v.	No. of Stories	: Dipta Unit- 1: Three storied main production building (Ground and 1st floor is RCC structure and 2nd floor is prefabricated shed), 2) Dipta Unit- 2: Seven storied Steel structure production building, 3) Dipta Unit- 3: Six storied RCC main production building 4) Single story prefab generator shed, 5) Single story prefab compressor shed, 6) Single story prefab substation shed, 7) Single story prefab wastage r shed, 8) Single story prefab ETP shed.
vi.	Construction Year	: 2001-2008
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete and steel
xi.	Generator	: Single storey Generator shed

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.

Mid Term (6 Weeks) :

i. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
ii. 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
iii. 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.
iv. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
v. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
vi. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
viii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
ix. 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
x. Have a qualified structural engineer develop Floor Load Plans with analytical confirmation.
xi. Have a qualified structural engineer develop Floor Load Plans with analytical confirmation and have it posted in all required location.
xii. 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. 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. Implement proper drainage slope.
ii. Remove deteriorated expansion joint material and provide new approved material at the expansion joint.
iii. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same.

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)	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. Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker , size of panel and permitted no. of CB, maximum permitted load connection capacity, etc. Review previous assessment thermal report and complete identified action items beginning with highest priority items.
Mid Term (6 Weeks)	Provide means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment. Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm2 or greater. Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means
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. Buildings over six-stories or 20m(65 ft) high should have a minimum of one vertical shaft of 200mm x 400mm size for every 1500 square meter floor area.

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)	Smoking shall be prohibited in any garment factory building, separate storage building, or any building or area where the Inspector of the Factories Rules (1.6.3.7) Part 53 requires that smoking be prohibited. If an Owner creates a designated smoking area outside the buildings, information on the location of these designated areas shall be posted on the signs required in 13.5.2 Post the 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.
Mid Term (6 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions. According to section 6.8.2.2 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. The re-entry provisions of section 6.8.3 must be met. Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities. Fire drills shall be conducted under the direction of a Fire Safety Director. All other requirements for fire drills shall be conducted in accordance with BNBC Part 4 Appendix A. Impart training in accordance with Alliance Safety Training Curriculum and keep record with proper documentation. Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year. If battery operated signs are used, these lights are tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 minutes once per year. Develop a testing and maintenance program that ensures the operation of all exist signs and egress lightnings are 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 min once per year. Install a centralized automatic fire alarm and smoke/heat detection system with control panel following the requirement of NFPA 72 throughout all new and existing buildings and structures. Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time that monitoring can be set up, arrange a monitoring system using factory's own central detection system and personnel. A person shall be assigned to contact the fire department in the event of fire alarm activation. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person. Install required identification signs at the noted locations. Signage must comply with NFPA 14 Chapter 6. Acquire all the licenses and permits required from the proper issuing authority. Apply to proper authority for issuance of occupancy

	certificate and pursue the matter to expedite. Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in English and Bengali.
Long Term (6 Months)	Provide a fire-resistive rated assembly between the exterior exit stairs and the building up to 10 ft beyond the end of the staircase to achieve the required separation. The rated assembly should be approved and/or designed by a qualified fire protection engineer. Remove existing aisle marking and draw new marking fulfilling the minimum aisle width requirement. Relocate the machines accordingly if necessary. Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosure. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr fire-resistance rating. Exits connecting four or more stories shall be enclosed with a minimum 2-hr fire-resistance rating. Exits shall be enclosed with the same fire-resistance rating as the floor penetrated but will not need to exceed 2 hr. Provide fire door of required rating to access the corridor. Replace all collapsible, sliding gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating. Install fire rated doors and windows or fill in unprotected openings with fire resistive rated assemblies. Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer. The hydraulic design of the sprinkler system has to be pre-approved by CoE of Alliance. All installation and design requirements outlined in BNBC Part 4 Chapter 4 shall be replaced by the requirements of NFPA 13. Pipe schedules shall not be used to size pipe. All systems shall be hydraulically calculated to meet the required NFPA 13 design requirements. Installation of new automatic sprinkler systems shall be required to provide shop drawings and hydraulic calculations as outlined in NFPA 13. The test and performance report of the installed system has to be submitted to Alliance for review. Final inspection and testing shall be witnessed by Alliance according to clause 5.3 (22 September 2014- Start Design, 15 December 2014 - Design Complete, 09 March 2014 - Begin Construction) Install a standpipe system at required locations designed by a qualified fire protection engineer. Unit-3 required class III stand pipe system and Unit-2 required Class I stand pipe system with sprinkler. The system is to be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation according to 5.4.3.2. Standalone standpipe systems shall meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection or NFPA 14.

	This requirement is as per clause 5.4.3. Testing of the installation shall be conducted in accordance with NFPA 14 acceptance testing requirements. Documentation of all testing shall be submitted for review by the Alliance. Final inspection and testing of the installation shall be witnessed by the Alliance as per clause 5.4.3.3. Provide 2 hr hr fire-resistive rated construction barriers at exit enclosures. Fit doors that swing in the direction of egress, side-swinging, self-closing, 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. 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 presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation. 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. Smoke detection is required throughout the entire factory, unless fully sprinklered. The system should be as per the Alliance Standards. Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices must be spaced appropriately based on occupancy type in accordance with NFPA 72. Provide training 91 more people by the appropriate authority as the required number of trained people is 539 (25% of total employees). Remove existing aisle marking and draw new marking fulfilling the minimum aisle width requirement. Relocate the machines accordingly if necessary. Collect certificate for the fire rating of the elevator doors. If it will not 1.5 hr rated than provide 1.5 hr rated doors for elevator. Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA 10 Chapter 7. Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry unless it meets the following requirements. Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, reentry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors. When the discharge floor is determined to be a required re-entry floor using the above requirements, re-entry does not have to be provided back into the building on this level. Provide an emergency power source, either by battery back

	up or by connecting to the emergency power system, for compliantly illuminated exit signs. Install fire department connections where required and in compliance with the Standard. According to Alliance Standard 5.5.4 fire department outlet connections shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks and fire department inlet connections shall be provided to allow fire department pumper vehicles to supply water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard. Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barrier. Install illuminated exit signs 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 handrails on both side of each stairway. Provide intermediate handrail when the stair width exceeds 2.2m (87 inch). Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25 Chapter 6 Table 6.1.1.2. 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. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m2 (500 ft2). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.). Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. 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. 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. The duties of the Fire Safety Director shall include the following: (1) Establish internal and external rally points and communicate to all employees in the building. (2) Fire department pre-planning. (3) Conduct safety inspections as outlined in Alliance standard 13.9.

	(4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard 13.10. Complete fire department pre-planning activities with the local Fire Service and Civil Defense develop a hot work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address process of request and approval authorities, necessary checks prior approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and reapproved procedure etc.