Name of the Factory	:	DENISON ATTIRES LTD
Address of the Factory	:	West Isdair, Police Line Fatullah, Narayanganj, Bangladesh.
Present Status of the Factory	:	Under Operation.
Structural Assessment Conducted by	:	VEC
Date of Structural Inspection	:	23rd April, 2015
Fire Assessment Conducted by	:	VEC
Date of Fire Inspection	:	23rd April, 2015
Electrical Assessment Conducted by	:	VEC
Date of Electrical Inspection	:	23rd April, 2015
BGMEA Membership No.	:	5895
BKMEA Membership No.	:	1479

BASIC INFORMATION:

The assessed factory building is five storied dual system RCC beam column frame structure and flat plate system. This building is approved for six storied. The DENISON ATTIRES LTD is occupied the entire building. Construction work is going on for the six story. The following general information were noted:

i.	Building Usage Type	:	Garment Factory.
ii.	Structural System	:	RCC beam column frame and flat plate system.
iii.	Floor System	:	RCC beam slab and flat plate slab floor system.
iv.	Floor Area	:	Total floor area is 40000 sft.
v.	No. of Stories	:	5 Storey. (4th floor under construction)
vi.	Construction Year	:	2006 to 2014. (Three phase)
vii.	Foundation Type	:	Pile foundation.
viii.	Design Drawings	:	Available- Approval plan, as built structural drawing, as built machine layout plan, architectural drawing. Not Available- Material test report and floor load plan not standard.
ix.	Soil Investigation Report	:	Available.
x.	Construction Materials	:	Brick aggregate. (Identified by removing plaster)
xi.	Generator	:	Ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural and Fire & Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate) : None.

Mid Term (6-weeks) : None.

Long Term (6-months) :

- Building Engineer to review the adequacy of the steel roof structure above the dining area and stairs to ensure that it is designed to resist code specified live and wind loads.
- Continue to monitor for corrosion on an regularly.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• None.
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• Factory need to have proper testing plan & record of fire safety equipment.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Needs to have as built drawing with proper dimensions showing means of escape. • All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key. • Provide continuous guards and handrails on both sides of the stairs.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Factory needs to have a proper pre-plan for fire service & civil department. • Exit-2 needs to be fire separated by two hours rated construction & 1.5 hours fire rated opening with the others occupancies till to reach the area of refuge. • Needs to provide 2 hour fire separated construction and 1.5 hours rated opening in store at ground floor. • Boiler: Factory need to protect the boiler room from the iron section of 2nd floor of the building by 4 hours rated construction with 2 hours fire rated door/opening. Generator: Factory need to protect the generator room from the final exit-2 at north-east portion which is located at ground floor of the building by 4 hours rated construction with 2 hours fire rated door/opening. • The entire exits connecting to the staircases(3 numbers staircase) need to be protected with fire and smoke resistant enclosures and opening (2 hour rated enclosure and 1.5 hour rated door)and provide a protected route

	from all though the stairway to the final exits. • Needs to be fire protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline. • Factory needs to install control panel for detection and alarm system at required location. • The Size of Standpipe should be 75 mm for standpipe and hose system for below 10 stories or building height below 33 m in accordance with the table 3.2 of NTPA guideline or BNBC 2006, Article No. 4.2.3, Page 1043. • Install 1 riser per 1000 m2 of floor area & 38 mm dia of hoses with variable nozzle need to be installed. • Ensure the minimum pressure for standpipes supplying a 50 mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa. • Factory needs to install Siamese connection after installation of stand pipe system, hose system and fire pump. • Factory needs to install dedicated fire pump with sufficient capacity and backup power. • Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900ltr x 75min = 142500 liters water storage tank.

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• Find out cause (improper cable selection, improper termination, rusted connection) of insulation damage and take proper action including replacing cable where necessary. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable

	joints, rusted connection, insulation damage, multiple cables at single point,) of overheating (> ambient+ 40^0C) and take proper action.
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	• Ensure all panel boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Ensure proper earthing connections at all electrical equipment. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Install appropriate number and type of safety signage and fire-fighting equipment at substation room. Also ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction board for first aid and artificial respiration in the substation room and generator room. • Ensure adequate illuminations in substation and generator room. • Provide two separate and distinct connections of earthing for the generator. • Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth bus bar of distribution boards and ensure continuous earth path is back to main building intake. • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and bus bar. • Replace wooden base with metal clad construction form Ensure all electrical cables are sized according to capacity of circuit breakers. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • Connect all metal in the building to the building

	earthing system. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(20^0C-40^0C)}and take proper action.ounting the switch controls.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement • Program and record the related testing data. • Inspect electrical panel boards on an annual basis. • Ensure the substation room has adequate fire separation from the production area. • Install security measures to ensure access to the substation is restricted. • Ensure the generator room has adequate fire separation from the production area. • Ensure panel boards have no opening and all live internal components are concealed properly. • Ensure distribution boards are installed in compliant locations in terms of height. • Provide dedicated & adequate size of neutral with proper identification for each circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Provide adequate covers on cable channels. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits and install lightning protection system on the building.