Name of the Factory	: Avant Garments Ltd. (Building-1)
Address of the Factory	: Shirirchala, Maona Vobanipur, Gazipur Sadar, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 31st March, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 31st March, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 31st March, 2015
BGMEA Membership No.	: 5729

BASIC INFORMATION:

There are two buildings in the factory premises. The Avant Garments Ltd. occupies all floor area of these buildings. Building 1 is a 3 storied RCC beam column frame structure with Pre-engineered shed and an additional RCC structure room at roof top (Covered 90% of total roof area) and a single storey non engineering shed adjacent to the ground floor. The following general information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC beam column frame structure.
iii.	Floor System	: RCC beam slab floor system.
iv.	Floor Area	: Total floor area 5,075 sft.
v.	No. of Stories	: 3 stories + PEB Shed & additional RCC structure.
vi.	Construction Year	: 1997-1998.
vii.	Foundation Type	: Isolated column footing foundation.
viii.	Design Drawings	: Available: Approval plan, structural execution drawing, machine layout plan Not available- Architectural drawing, material test report and floor load plan.
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Brick aggregate in column.
xi.	Generator	: Separate shed.

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) :

- Building engineer to prepare full set of as built drawing and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.
- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

Long Term (6-months) :

- Provide protective coating to cover the exposed rebar from corrosion.

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*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• Factory needs to have sufficient number & width (0.9m) of marked aisles at 3rd floor of the building -1. • Factory needs to have sufficient total width of marked aisles (5 mm per occupant) at 3rd floor of the building -1. • Lights in storage area needed to be installed with protective covers and conduits. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9 m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack. • Ensure adequate exit signs in all floors so that it is visible from all positions.
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. • Fire license need to be updated for full occupied area. • Factory Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time. • All the firefighting equipment's need to test with proper documents. • All the exit doors need to be replaced by side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key. • Provide handrail on both sides of stairways. • Illuminated emergency light needs to be covered in floor, exits and aisles. The intensity of illumination by

	means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated with escape lighting to a level of not less than 2.5 lux at floor level.
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 department. • Factory needs to maintain minimum width of exit 0.9 m & height 2 m. • Factory needs to ensure fire protected route from stair-1 to final exit -1 safely outside of the building -2. • Storage area need to be protected with 2 hour rated construction & 1.5 hour rated opening or doors. • Generator room needs to be fire separated with 4 hour fire rated enclosure and 2 hour rated opening having direct access from outside. • Boiler room is to have a 4 hour fire resistance construction and 2 hour rated opening. • All the exits connecting to the staircase-1, 2 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. • Factory needs to provide 3 hour rated construction between dining and sample room. • 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. • The factory needs to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building. • Factory needs to be installed with control panel for automatic smoke detection & fire alarm system according to NTPA Guideline. • Install proper standpipe system having at least 75 mm dia of standpipe. • First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to

	Fire Aid Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility shall be provided. • Factory needs to install 1 riser per 1000 m2 of floor area & 38 mm dia of hoses with variable nozzle. • 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. • To be installed with Factory needs Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection. • 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 needs 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 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 distribution boards (including panel door) are earthed properly. • Remove all unused cables from distribution boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug. • Ensure overcurrent protection device (circuit breaker) for each circuit. • Ensure inspection of all earthing system is being completed and documented.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 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. • Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil. • Ensure distribution boards have a minimum clearance of 1 m (39 in) in front. • Provide dedicated & adequate size of earthing with proper identification for each circuit 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. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Make cable trench dust free and provide adequate covers on it. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • 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.
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 switchgear and panel boards on an annual basis. • Ensure the substation room has adequate fire separation from the main building. • Ensure underground cables for electrical distribution in the premises are encased in • GI or PVC pipes and laid in earth trenches of sufficient

	depth as per mentioned standard. • Ensure all high tension cables are laid following standard cable laying techniques. • Ensure the generator room has adequate fire separation from the main building. • Provide two separate and distinct connections of earthing for the generator. • Ensure distribution boards have no opening and all live internal components are concealed properly. • 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 proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building.