Name of the Factory	: D.A. Knit & Fashion Wear.
Address of the Factory	: Tanvir Shopping Complex, DEPZ Road, Ashulia, Savar, Dhaka, Bangladesh.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: BUET
Date of Structural Inspection	: 17 January, 2013
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 23 May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 23 May, 2015
BGMEA Membership No.	: 4504

BASIC INFORMATION:

The factory building is a five storied RCC building with beam column system. The following information was noted:

i.	Building Usage Type	: Mostly Garment Factory.
ii.	Structural System	: RCC beam column system.
iii.	Floor System	: RCC Beam slab.
iv.	Floor Area	: 800 sft per floor (Approx.)
v.	No. of Stories	: Five
vi.	Construction Year	: 2010
vii.	Foundation Type	: Individual footing
viii.	Design Drawings	: Available but without date and has sever inconsistencies.
ix.	Soil Investigation Report	: Available
x.	Construction Materials	: Brick aggregate.
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) : As built Architechtural and structural drawings of the different structural elements, foundation detais to be prepared for the building. As part of this process building engineer will be required to make a number of checks on the as-built construction.

The factory owner has been instructed to prepare and submit a load plan for vetting. Once it is submitted by the factory owner, it will be duly vetted. The factory owner should arrange displaying the approved load plan for each floor on the wall in a visible loaction and shall adhere to it.

The consultants strongly recommed storing any type of cartoon boxes, finished products and fabrics in such a manner so that intensity of loading should not exceed 40 psf (2.0 kN/m2)

Mid Term (6-weeks)	:	Due to high stress in some columns, a Detailed Engineering Assessment (DEA) is required to be commenced and completed within 6 weeks from issue this report. Coring with 4 nos. 4 in. cores (3 in. when taken from column) for the building and scanning of rebars in the GF. Structural analysis to ascertain safety of the structure and recommending remedial measures if required.
Long Term (6-months)	:	None

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*	Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for. All the firefighting equipment's need to test with proper documents. Factory needs to have sufficient number & width (0.9m) of marked aisles at 1st and 2nd floor of the building. Factory needs to have sufficient total width of marked aisles (5mm per occupant) every floor of the building. Lights in accessories storage area need 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 2.9m and when used as a storage facility there shall be a minimum clearance of one third the floor height.

Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	Needs to have as built drawing with floor machine layout showing means of escape with proper dimension. Factory needs to have a proper pre-plan for fire department. Factory Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time. All the exit doors of staircase enclosure need to be replaced by side swinging fire rated doors so that the staircase remains free from smoke as well as the lockable doors can be opened easily in the direction of evacuation without the use of a key. Factory needs to have provided both side handrails on stair. Walls of such opening shall have at least 2 hour fire resistance rating Or close the opening with 2 hr rated construction. Ensure illuminated emergency light in floors, exit & stair. Ensure emergency backup power for critical fire safety system in floors, exit & stair. Ensure adequate exit signs in all floors so that it is visible from all positions.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	Factory needs to maintain minimum width of exit 0.9 m and height 2m. • Generator room needs to have 4 hour fire resistance wall and 2 hours fire resistance composite door. • Store room needs to have 2 hour rated fire resistance wall and 1.5 hour rated fire resistance composite door. Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. □ Generator room needs to have 4 hour fire resistance wall and 2 hours fire resistance composite door. □ Boiler room needs to have 4 hour fire resistance wall and 2 hours fire resistance composite door. Staircases need to have 2 hour fire resistance enclose wall and 1.5 hours fire resistance composite door. 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 need 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. Install automatic fire and smoke detection system throughout the building to cover every portion in the building. Need to Install 75 mm dia Standpipe and hose system in the factory building. Provide the required flow of 1900 liter/min and minimum pressure of 200 kPa for supplying first aid hose (38 mm nominal) **OR** Hydraulically design the standpipe and hose system to get the required pressure. Ensure Siamese connection for existing standpipe & hose system. Install dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. Required for adequate pressure of hose. Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr x 75 min=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*):	None
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	Discharge the generator exhaust to the exterior of the building in a safe location. Also ensure exhaust has been taken out through any other side except south. Ensure all distribution boards (including panel door) are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to main earth /earthing pit. Isolate/make safe all unused cables first and then remove from distribution boards. If necessary make sure cables are properly terminated at its point of termination using appropriate size and

	type of lug. Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. Isolate the panel from the electrical service and clean interior components from dust and debris. Seal all openings within the enclosure to prevent dust and debris from entering. 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 generator 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 generator room. Ensure in the generator room have adequate illumination level as per standard. Provide two separate and distinct connections of earthing for each generator. 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 i) Ensure each incoming supply to an MCB has a dedicated supply from busbar.ii) Avoid the use of multiple cables on outgoing side of MCB's and Bus-bar. Replace wooden base with metal clad construction for mounting the socket outlet. Consult with a qualified electrical engineer and ensure all electrical wiring/cables are sized according to capacity of circuit breakers. Ensure cable joints are made through porcelain/PVC connectors with PIB tape wound around joint in respect of conductivity, insulation and mechanical strength. 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 etc.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	Have a qualified electrical engineer to 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. Also ensure that insulation resistance of power cable and earth pit resistance are ">=5 MΩ"and "<=1Ω" respectively. Inspect electrical switchgear and panel boards on an annual basis

	to ensure that the equipment is in good working condition Ensure overhead service connections to a building are achieved with covered conductor and led via roof poles or service masts made of GI pipe at least 38 mm in diameter having a bend at the top and installed on the outer wall. Consult with a qualified electrical engineer before completing work. Ensure the generator room has adequate fire separation from the production area/main building. Provide adequate means of ventilation for the generator room based on the installed equipment and ensure that ventilation does not impact on fire barriers, e.g. fire dampers. 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 indicating current rating of circuit and size of fuse element/ breaker. Also ensure the means of identification (separate color coding, marking tape, tagging, or other approved means) of cable is provided as per circuit list. Provide adequate covers on cable trenches/channel. Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm². or greater or solder together all strands at the exposed ends or are crimped using suitable sleeve or ferrules for stranded conductors having a nominal cross-sectional area less than 6mm². Install separate distribution boards for lighting and power circuits. Consult with an expert electrical engineer to review requirements, calculate risk index, prepare drawing etc. to make sure the building is secured against lightning.Also ensure following as per NTPA based on the building size.i) Air termination network vertical/horizontal conductors are appropriately spacedii) Appropriate numbers of down conductors are installed iii) Resistance of earth conductor within limit (<=10Ω).