Name of the Factory	:	Azim Garments Ltd.
Address of the Factory	:	2/1, Haji Dilgani Market (3rd & 4th Floor), Bashbari Road, Katasur, Mohammadpur, Dhaka, Bangladesh.
Present Status of the Factory	:	Under Operation.
Structural Assessment Conducted by	:	BUET
Date of Structural Inspection	:	28th October, 2013
Fire Assessment Conducted by	:	VEC
Date of Fire Inspection	:	21st April, 2015
Electrical Assessment Conducted by	:	VEC
Date of Electrical Inspection	:	21st April, 2015
BGMEA Membership No.	:	634

BASIC INFORMATION:

The factory building is a 5 (Five) storied Reinforced Concrete (RC) building having beam column framing system. The following information was noted:

i.	Building Usage Type	:	Garment factory and commercial building
ii.	Structural System	:	RCC beam column frame system.
iii.	Floor System	:	RCC column supported slab
iv.	Floor Area	:	Approximately 8,000 sft per floor
v.	No. of Stories	:	5 Storey.
vi.	Construction Year	:	In phase. (GF to 2nd floor in 1985 and 3rd to 4th floor in 2004)
vii.	Foundation Type	:	Shallow foundation (as reported)
viii.	Design Drawings	:	Available. (Have approval from RAJUK but layout of the building in as build condition was not matched with approval plan.)
ix.	Soil Investigation Report	:	Available.
x.	Construction Materials	:	Reinforced Concrete
xi.	Generator	:	At 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) :

- The building is already a five storied building and substantially differs from submitted plan.
- Detail Engineering Assessment (DEA) is required to be commenced immediately and completed within 6 weeks from 20th April, 2014. If DEA is not done with in this period, the factory building will be closed by the office of inspector general of factories and establishment.

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. • Factory need to have proper testing plan & record of fire safety equipment. • 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 2.9m 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. • Kitchen area needs to be equipped with fixed temperature type detectors and portable fire extinguishers. • (a) The color and design of lettering, arrows and other symbols on exit signs shall be in high contrast with their background. (b) The source of illumination, contrast, intensity and luminance needs to be at least 50 lux, 0.5, 5.0 foot-candles and 0.2 cd/m2 respectively.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Factory needs to have as built drawing with floor machine layout showing means of escape with proper dimension. • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. • 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. • Factory need to provide handrail on both sides of each stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape

	route) • Factory need to emergency backup power for critical fire safety system (signage, fire alarm & detection system, emergency lighting, AFD and Alarm systems etc.)
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. • Single escape is permitted for 30 persons and less than two story building. But the building is 5-storied reinforced concrete buildings. So minimum two numbers of stair required. Which is not complying the RMG guide line • Final exit route-1 need to be protected(2 hours rated construction with 1.5 hours rated door) at each floor level entrance & ground floors working floor, also need to have a 2 hours rated protected(From the market) escape route till to reach safe refuse area • Final exit route-2 need to be protected(2 hours rated construction with 1.5 hours rated door) at each floor level entrance & ground floors working floor, also need to be protected by 4 hours fire rated construction with 2 hours fire rated doors/opening and continue this protected route till to reach safe refuse area • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator and boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside. • The entire exits connecting to the staircases (2 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. • Factory needs to install with centralized automatic detection system with proper sitting arrangement according to NTPA guideline. • The factory with shall be equipped with manually operated electrical fire alarm system and automatic fire alarm system. Manually operated electrical alarm system shall be installed in a building with single or multiple call boxes located on each floor. • Factory needs to be installed with control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Install proper standpipe system having at least 75 mm diameter 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 hose connection facility shall be provided. • Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 kPa and standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 kPa. • Factory needs to be installed with 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 cause of burning sign and insulation damage and take proper action including replacing cable or equipment 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 are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to main earth. • Install switchboards in proper way and proper place to ensure safe installation. • 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/fuse) for each circuit/branch circuit. • Clean interior components from dust and debris and 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)*	• Fix appropriate number and type of safety signage at generator room and grade rubber mats in front of all panel boards. • Provide Instruction board for first aid and artificial respiration in the generator room. • Provide two separate and distinct connections of earthing for 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. • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's. • Replace wooden boxes and bases with metal clad construction for mounting the lighting boards, switch controls and circuit breaker. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Ensure discrimination is achieved between circuit breakers used for protection of main circuit and the sub-circuits derived therefrom. • 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*	• Develop an electrical layout diagram and an as-built single line diagram detailing key components and

carried out within a period of 6 months)	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 to ensure that the equipment is in good working condition. • Ensure panel 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. • Use non-combustible material to make channel and provide adequate covers on it. • Ensure exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support. • 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.