Name of the Factory	:	Afco Abedin Garments Ltd.
Address of the Factory	:	House # 72 (6th Floor), Block #L, New Airport Road, Banani, Dhaka, Bangladesh.
Present Status of the Factory	:	Under Operation.
Structural Assessment Conducted by	:	VEC
Date of Structural Inspection	:	24th June, 2015
Fire Assessment Conducted by	:	VEC
Date of Fire Inspection	:	24th June, 2015
Electrical Assessment Conducted by	:	VEC
Date of Electrical Inspection	:	24th June, 2015
BGMEA Membership No.	:	73

BASIC INFORMATION:

The assessed factory building is an "eight storied" RCC beam-column frame structure. "Afco Abedin Garments Ltd." is being operated in 6th floor of this building. The following general information were 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 is 64000 sft. and operational floor area is 8000 sft.
v.	No. of Stories	:	8 Storey.
vi.	Construction Year	:	1993-1994.
vii.	Foundation Type	:	Isolated column footing foundation.
viii.	Design Drawings	:	Available- Structural design drawing (without column layout plan), soil test report, approval drawing, and machine layout plan. Not available- architectural design drawing, as built structural drawing, material test report and floor load plan.
ix.	Soil Investigation Report	:	Available.
x.	Construction Materials	:	Stone aggregate in column.
xi.	Generator	:	At ground floor of building.

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) :

- Factory Engineer to review design, loads and columns stresses in area identified above. Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns].
- Building Engineer to review the adequacy of the steel roof structure and telecommunication tower to ensure that it is designed to resist code specified live and wind loads.

Long Term (6-months) :

- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Building Engineer need to survey this factory and prepare as built structural drawing and floor load plan.

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 needs to conduct fire drill quarterly (4 times a year) under the fire safety plan and needs to kept the written record of such drills 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 (accessories and finish goods store at 6th floor) 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 from the ceiling to the top of the storage stack. • All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Factory needs to prepare 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 needs to provide handrail on both sides of all

	the stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape route). • Factory need to install sufficient capacities standby generator and connected to supply power for staircase and corridor Lighting, fire lifts, standby fire pump, pressurization fans and blowers, smoke extraction and damper systems in case of failure of normal electricity supply and must having the minimum capacity to serve for 1 hour with the NTPA requirements. • Factory need to install suitable public address system having communication to all floors as well as facilities to receive messages from all floors.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Fire department pre-plan needs to be developed. • Factory needs to maintain minimum width of exit 0.9 m and height 2 m. • Final exit route-1(Stair-1 route) need to be protected by 4 hours rated construction and lobby with 2 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from generator room at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area. • Final exit route-2(Stair-2 route) need to be protected by 4 hours rated construction and lobby with 2 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from another factories working area and generator room (another factories) located at ground floor by 4 hours rated construction and lobby with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area. • Accessories store needs to be protected by 2 hours rated construction with 1.5 hours rated opening or doors from the sewing section of 6th floor of the building. • Boiler: Factory need to protect the boiler room from the cutting section of 6th floor of the building by 4 hours rated construction with 2 hours fire rated door/opening • Generator: Factory need protect the generator room from the final exit-1 and final exit-2 located at ground floor of the building by 4 hours rated construction with 2 hours fire

	rated door/opening having direct access from outside. • Stair-1 need to be protected with fire and smoke proof lobby (4 hours rated enclosure with 2 hour rated door)and provide a protected route from all though the stairway to the final exits also remove or protect the generator room by 4 hours rated construction with 2 hours rated doors/opening which is beside the stairs discharged level. Stair-2 need to be protected by closing all opening with 4 hours rated construction within 3m (both side) of the stair and fitted 2 hours rated doors/opening at each floor level entrance except ground floor. • Factory need to install fire lift with backup power including having 1 hour fire rated & auto closing fire door in 2 hours fire rated lift core with backup power & having minimum capacity of 545 kgs. • All the stairs need to be protected with a 4 hours fire resistant and smoke proof lobby (4 hours rated enclosure and 2 hour rated door) at each floor entrance and provide the protected route from all though the stairway to the final exits. • 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. • Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory needs to install proper standpipe system with having at least 100 mm dia of riser. • Factory need to ensure the minimum pressure for standpipes supplying a 50mm 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 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 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. • Factory needs to establish command station on the entrance lobby and equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. It needs to be manned with properly trained personnel having responsibility of maintenance and operating firefighting facilities within the building.

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• 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. • 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*	• Provide two separate and distinct connections of earthing for each generator. • 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. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • 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 panel boards. • Provide Instruction board for first aid and artificial respiration in the generator room. • Ensure in the generator room has adequate illumination level as per standard. • 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 and busbar. • Replace wooden bases with metal clad construction for mounting the switch controls and circuit breakers. • 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. • Ensure the lightning protection ground terminals are bonded to the building or structure grounding. • 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 panel boards on an annual basis. • Ensure overhead service connections to the building are led via adequate size and type of service masts. • Ensure the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • 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. • Provide adequate mechanical guards for electrical equipment. • Use non-combustible material to make cable channel and provide adequate covers on cable channel. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Calculate the number of vertical shaft required for high rise building (over six- story or 20m) based upon the floor area, and install accordingly. In addition ensure size of provided vertical shaft is not less than 200 mm × 400mm for every 1500 m^2 floor areas and shaft has enough provision for inspection and maintenance. • Install lightning protection system on the building.