Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	:	ZEAL TEXTILES LTD.
Address of the Factory	:	Shaildubi, Kashimpur, Gazipur. Bangladesh.
Present Status of the Factory	:	Under Operation
Structural Assessment Conducted by	:	VEC
Date of Structural Inspection	:	10th March, 2015.
Fire Assessment Conducted by	:	VEC
Date of Fire Inspection	:	10th March, 2015.
Electrical Assessment Conducted by	:	VEC
Date of Electrical Inspection	:	10th March, 2015.
BKMEA Membership No.	:	1935

BASIC INFORMATION:

The present garment factory is a three storied Industrial building with steel frame with composite floor system. The following information was noted:

i.	Building Usage Type	:	Garment factory.
ii.	Structural System	:	Steel column with composite floor system.
iii.	Floor System	:	RCC slab on steel deck.
iv.	Floor Area	:	53,100 sq. ft. (all floor)
v.	No. of Stories	:	3 storied.
vi.	Construction Year	:	1st phase (2011) and 2nd phase (2012 - 2013).
vii.	Foundation Type	:	Isolated footing foundation.
viii.	Design Drawings	:	Approval plan and partial structural design drawing was available. Full set of structural & architectural drawing, as built machine layout plan, material test report, floor load plan and soil test report was not available.
ix.	Soil Investigation Report	:	Unavailable.
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) : None.

Mid Term (6-weeks) : None.

Long Term (6-months) :

i. Provide protective coating to corroded steel members and joints to prevent from further corrosion.

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

(A): Recommendations for Fire Safety corrective actions:

Immediate	N/A

(*the factory should not continue to be occupied until these non-conformities have been rectified*):	
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 proper testing plan & record for fire safety equipment. Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. Lights in storage area need to be installed with protective covers and conduits. Kitchen area need to be protected with fire extinguisher & Only fixed temperature type detector. 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. 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. 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. 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). Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of failure of power supply.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	Fire department pre-plan needs to be developed. Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. **Boiler:** Boiler room need to be protected by 4 hours rated construction with 2 hours rated opening / door from mezzanine floor stair at ground floor as well as from iron section located at 2nd floor. **Generator:** Generator room need to be protected by 4 hours rated construction with 2 hours rated opening / door from the

	dyeing section located at ground floor. All the stairs need to be protected with fire and smoke resistant enclosures and opening (1 hours rated enclosure and 45minutes rated door) and provide a protected route from all though the stairway to the final exits. Factory needs protect the lift with 2 hours rated enclosure & 1hour rated auto closing fire door. Factory needs 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. Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. Factory needs 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 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 1900 × 75 = 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, heat source etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary.
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. 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)*	Install appropriate number and type of safety signage and fire-fighting equipment at substation and 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 substation room and generator room. Provide two separate and distinct connections of earthing for each generator. Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous earth path is back to main building intake. Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's. Replace wooden channel with metal clad construction for mounting the socket outlet. Ensure all electrical cables are sized according to capacity of circuit breakers. Provide adequate covers on cable channel. Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection. Connect all metal in the building to the building earthing system.
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 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 distribution boards have no opening and all live internal components are concealed properly. Provide dedicated & adequate size of neutral with proper identification for each applicable 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.