Name of the Factory	:	TOHA KNIT FASHION LTD.
Address of the Factory	:	A/7, BSCIC I/A, Shasangoan, Fatullah, Narayanganj
Present Status of the Factory	:	Under operation.
Structural Assessment Conducted by	:	VEC
Date of Structural Inspection	:	12 July, 2015
Fire Assessment Conducted by	:	VEC
Date of Fire Inspection	:	12 July, 2015
Electrical Assessment Conducted by	:	VEC
Date of Electrical Inspection	:	12 July, 2015
BGMEA & BKMEA Membership No.	:	5886 & 1387

BASIC INFORMATION:

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i.	Building Usage Type	:	Garment Factory.
ii.	Structural System	:	RCC beam column system.
iii.	Floor System	:	RCC Beam slab.
iv.	Floor Area	:	15,200 sft
v.	No. of Stories	:	G + 4 Storied
vi.	Construction Year	:	1999-2000
vii.	Foundation Type	:	Pile foundation
viii.	Design Drawings	:	Available-Approval drawing, Structural design drawing (without column schedule), Soil test report, Machine lay-out plan, Not Available: As-built structural drawing, Floor Load Plan, Material Test Report
ix.	Soil Investigation Report	:	Available
x.	Construction Materials	:	Stone aggregates in all columns & brick aggregates in beams and slabs
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)	:	N/A
Mid Term (6-weeks)	:	1. Factory Engineer to review design, loads and columns stresses in the area identified above. 2. 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]. 3. Remedial action to be undertaken to prevent the seepage of water from pipes and other sources.

Long Term (6-months) : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

2. Engage a qualified structural engineer to prepare structural drawing, 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.

3. Proper slope and water proofing materials should be applied on roof top.

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 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. • 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. • Factory needs to ensure (a) minimum of 2.3 m2 of space per occupant; (b) Reduce the occupants from the 4th floor of the building or shift occupants from 4th floor of the building to another floors. • 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. • 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 have as built drawing with proper dimensions showing all the means of escape. • 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). • 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. • Factory need to be protected final exit -2 with generator & compre room at ground floor by 4hours rated construction with 2 hours rat door/opening, also need to have a protected escape route till to rea refuse area. • Storage area need to be protected with 2 hours rated construction & hours rated opening or doors. • Boiler & generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door of the building. • All the stairs need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hour rated door)and provide a 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 75mm diameter 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 Siamese connection to the standpipe system located outside the building and accessible for 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.

(B): Recommendations for Electrical 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 (a week) and should be a regular activity*	• Provide two separate and distinct connections of earthing for the generator. • Ensure all Panel boards (including panel door) are earthed properly. • Install circuit breaker and socket in proper way to ensure safe installation • Ensure all electrical cable properly terminated at its point of termination. • 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. • 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)*	• Post safety signage in the generator room and ensure graded rubber mats are provided in front of all electrical panel boards. • Provide Instruction board for first aid and artificial respiration in the generator room. • Provide dedicated & adequate size of earthing with

	proper identification for each circuit. • Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's/ MCCB's. • Replace wooden channel with metal clad construction for installation of circuit breaker and socket. • 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. • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • 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℃-40℃)} 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 a building are 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. • Ensure the generator room has adequate fire separation from the production area. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Ensure all 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 support or mechanical guards for electrical equipment where necessary. • Provide adequate covers on cable channel. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Provide individual fuse for each 15/20A socket outlet. • Install lightning protection system on the building.