

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Union Knitting & Dyeing Ltd.
Address of the Factory	: 42 & 44, Baro Rangamatia, Zirabo, Savar, Dhaka
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 1 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 1 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 1 June, 2015
BGMEA Membership No.	: 3422

BASIC INFORMATION:

The factory building is a one storied non engineered roof truss Corrugated Iron (CI) shed. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Non engineered roof truss Corrugated Iron (CI) shed.
iii. Floor System	: N/A (as it is single storied Pre-fabricated shed).
iv. Floor Area	: 23500 sft
v. No. of Stories	: Single
vi. Construction Year	: 2007
vii. Foundation Type	: Isolated column footing foundation (as per drawing)
viii. Design Drawings	: Available documents: Approval plan, structural drawing and architectural drawing, machine layout plan. Not Available: Material test report.
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)	: N/A
Mid Term (6-weeks)	: 1. Verify the lateral stability of the shed and confirm the requirement of any bracing in the long direction. 2. Install bracing if required
Long Term (6-months)	: N/A

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

(A): Recommendations for Fire Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>N/A</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity)</i></p>	<p>All the firefighting equipment's need to test with proper documents.</p> <p>Lights in storage area needed to be installed with protective covers and conduits.</p> <p>Kitchen area need to be equiped with fire extinguisher & only fixed temperature type detector.</p> <p>Walls of such opening shall have at least 2 hour fire resistance rating Or close the opening with 2hr rated construction.</p> <p>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.</p> <p>Factory needs to ensure adequate numbers of exit signs which need to be visible from any positions and comply with the following conditions:</p> <p>(a) The color and design of lettering, arrows and other symbols on exit signs needs to be in high contrast with their background; (b) Words on the signs needs to be at least 150 mm with a stroke of not less 20 mm; (c) 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.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Factory needs to have as built drawing with floor machine layout showing means of escape with proper dimension.</p> <p>All the exit doors need to be replaced by side swinging so that doors can be opened easily in the direction of evacuation without the use of a key</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be</i></p>	<p>Factory needs to have a proper pre-plan for fire service & civil department.</p>

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carried out within a period of 6 months)

Escape routes of final exit-3 need to provide protected paths of travel (2 hours fire rated construction with 1.5 hours fire rated opening) till to reach safe refuse area or replace the generator 3m away from the exit access.

Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors.

Generator room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside.

Factory need to Install centralized automatic fire and smoke detection system throughout the building to full occupied area according to 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 of the shed.

Factory needs to install control panel for centralized and automatic fire detection and alarm system at required location.

Install proper standpipe system having at least 75 mm diameter of standpipe. First aid hose system (38 mm nominal) needs to be provided.

Factory needs to install 1 riser per 1000 m2 of floor area and 38 mm diameter of hoses with variable nozzle.

Install standard standpipe and hose system as well as fire pump system to ensure required hose pressure at the highest and most remote part of the building.

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 1900liter x 75min=142500 liters water storage tank.

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(B): Recommendations for Electrical Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>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.</p> <p>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°C) and take proper action.</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p>	<p>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.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Ensure graded rubber mats are provided in front of all distribution boards.</p> <p>Provide Instruction board for first aid and artificial respiration in the generator room.</p> <p>Provide two separate and distinct connections of earthing for each generator.</p> <p>Ensure distribution boards are installed in compliant locations in terms of height and access.</p> <p>Ensure distribution board has a minimum clearance of 1 m (39 in) in front.</p> <p>Install circuit breaker in proper way using metal enclosure. Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake.</p> <p>Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's.</p> <p>Replace wooden bases with metal clad construction and use</p>

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	<p>metal enclosure for installation of circuit breakers.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Connect all metal in the shed to the shed earthing/grounding system such as metal rebar in concrete, metal frame of shed, cable channel or metal water pipe etc.</p> <p>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°C-40°C)} and take proper action.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>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.</p> <p>Inspect electrical panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Ensure the generator room has adequate fire separation from the production area.</p> <p>Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated & adequate size of neutral with proper identification for each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is obtained as per list.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the shed confirming its requirements and adequacy.</p>