

## **Summary of Preliminary Assessment on Structural, Fire and Electrical Safety**

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Name of the Factory	: Usha Sweater Co. Ltd.
Address of the Factory	: Road-10, house-310, East Goran, Dhaka-1219
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 21 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 21 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 21 June, 2015
BGMEA Membership No.	: 2789

### **BASIC INFORMATION:**

The factory building is five storied. The structural system of the building is RCC beam column slab frame structure with individual footing foundation. 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	: Floor area is (4400 sft x 5) = 22000 sft for main factory building.
v. No. of Stories	: 5 Storied
vi. Construction Year	: 1997-98
vii. Foundation Type	: Individual Footing
viii. Design Drawings	: Available document: Approval plan, Architectural drawing, structural drawing, soil test report. Not available: Machine layout plan, floor load plan, material test report have not been found.
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: N/A.

### **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)	: 1. Detail Engineering Assessment (DEA) should be commenced. 2. Live load in tributary areas of corner and edge column should not be exceeded until DEA is completed. 3. Factory Engineer to review design, loads and columns stresses in the area identified above.
Mid Term (6-weeks)	: 1. Detail Engineering Assessment to be completed.
Long Term (6-months)	: 1. Continue to implement load plan. 2. Remedial action to be undertaken to prevent the seepage of water from pipes and other sources.

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3. Provide protective coating to cover the exposed rebar from corrosion.

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>Factory needs to have valid fire license covering the full occupied area.</p> <p>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.</p> <p>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.</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/m<sup>2</sup> respectively. Factory need to arrange sufficient portable extinguisher.</p> <p>Factory needs to prepare as built drawing (Including machine layout) with proper dimensions showing means of escape. Fire manager/Director need to have safety training from proper authority &amp; worker of the factory should as far as possible be trained for use fire extinguisher.</p> <p>Factory need to have proper testing plan &amp; record for fire safety equipment.</p> <p>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.</p> <p>All the stairways need to have handrail on both sides. Factory needs to be installed with adequate illuminated</p>

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	<p>emergency light in the emergency escape route.</p> <p>Factory need to have emergency backup power for critical fire safety system with sufficient capacity &amp; arrangement according to NTPA Guideline</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	N/A
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Factory needs to have a proper pre-plan for fire department Final exit route-1(Stair-1 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor and need to have the protected escape route till to reach safe refuse area.</p> <p>All the stairs need to be protected with fire and smoke resistant enclosures &amp; 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.</p> <p>Factory need to install centralized and automatic fire detection &amp; alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</p> <p>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.</p> <p>Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline</p> <p>Factory needs to install proper standpipe system having at least 100mm dia of riser according to NTPA guideline. Install 1 riser per 1000 m<sup>2</sup> of floor area and 38 mm diameter of fabric hoses with variable nozzle need to be installed.</p> <p>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.</p> <p>Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection Internal access road for maneuver minimum width should be 9 m</p> <p>Factory needs to have dedicated fire pump with backup</p>

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	<p>power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</p> <p>Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 lit/min×75 min = 142500 liters water storage tank.</p>
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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>	N/A
<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 Panel board/ box (including panel door) are earthed properly.</p> <p>Install earthing pit for the factory with adequate provision for inspection of the 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 panel boards.</p> <p>Rewire to avoid the use of multiple cables on incoming and outgoing side of MCB's/MCCB's.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Ensure Lighting fixtures are supported from the structure properly.</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.</p> <p>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</p>

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	<p>the equipment is in good working condition.</p> <p>Ensure panel boards have no opening and all live internal components are concealed properly.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Provide an emergency power generator with adequate capacity for the building.</p> <p>Install lightning protection system on the building.</p>
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