

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

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Name of the Factory	: RIHAM FABRICS LTD.
Address of the Factory	: Plot# A-57, BISCIS I/E, FIDC Road, Kalurghat, Chittagong, Bangladesh.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 29 August, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 29 August, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 29 August, 2015
BKMEA Membership No.	: 1399

### **BASIC INFORMATION:**

The building is a single storied RCC beam column frame structure. 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	: 3440 Sft(all floor)
v. No. of Stories	: 01 storied
vi. Construction Year	: 2002-2003
vii. Foundation Type	: Could not be verified since no structural design
viii. Design Drawings	: Not Available
ix. Soil Investigation Report	: Not Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: Separate structure.

### **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. Sections of plaster finish to be removed to investigate if cracks penetrate the building structure. 2. Building Engineer to review further if cracks are found to penetrate into building structure. 3. Develop set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings.
Long Term (6-months)	: 1. Continue to monitor for cracking on an on-going basis.

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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>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.</p> <p>Factory need to have proper testing plan &amp; record of fire safety equipment.</p> <p>Factory needs to have sufficient number and width (0.9 m) of marked aisles.</p> <p>Factory needs to have sufficient total width of marked aisles (5 mm per occupant).</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>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.</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 prepare as built drawing with floor machine layout showing means of escape with proper dimension. Fire license needs to be updated for full occupied area.</p> <p>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>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>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route).</p> <p>Emergency back-up power needs to be connected for critical</p>

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	<p>fire safety system and not less than 30 minutes in case of failure of power supply.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Fire department pre-plan needs to be developed.</p> <p>Final exit route-1(final exit-1) need to be protected from the generator at ground floor by 4 hours rated construction with 2 hours rated door/opening.</p> <p>Final exit route-2(final exit-2) need to be protected from the compressor at ground floor by 4 hours rated construction with 2 hours rated door/opening.</p> <p>Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors.</p> <p>Generator room need to be protected by 4 hours rated construction with 2 hours rated opening / door from final exit-1 compressor need to be protected by 4 hours rated construction with 2 hours rated opening / door from final exit-1 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>Install proper standpipe system having at least 75 mm dia of standpipe. First aid hose system (38 mm nominal) needs to be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility needs to be provided.</p> <p>Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses of fabric with variable nozzle.</p> <p>Install 1 riser per 1000 m2 of floor area &amp; Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area.</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.</p>

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	<p>Factory needs to have dedicated fire pump with backup 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 1900X75 = 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>	<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>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>Discharge the generator exhaust to the exterior of the building in a safe location.</p> <p>Ensure all panel boards (including panel door) are earthed properly.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit.</p> <p>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.</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>Post safety signage in the generator room and 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 the generator.</p> <p>Install switchboards in proper way to ensure safe installation. Provide dedicated &amp; adequate size of earthing with proper identification for each circuit from the earth bus-bar of distribution boards and ensure continuous earth path is back to main building intake.</p>

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	<p>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.</p> <p>Replace wooden base with metal clad construction for mounting the Circuit breaker.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate 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>Connect all metal in the building to the building earthing system.</p> <p>Ensure Lighting fixtures are supported from the structure properly and flexible cords have enough strength to carry the weight.</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. 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 panel boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated &amp; 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 provided as per list.</p>

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	<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 building.</p>
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