

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

Name of the Factory	: Coit (Pvt.) Ltd.
Address of the Factory	: Chamurkhan, Uttarkhan, Uttara, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 9 <sup>th</sup> May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 9 <sup>th</sup> May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 9 <sup>th</sup> May, 2015
BGMEA Membership No.	: 6009

### **BASIC INFORMATION:**

The present garment factory is using the full building which is RCC beam column frame system. The following general information was noted:

- i. Building Usage Type : Garments factory.
- ii. Structural System : RCC Beam-Column Frame system.
- iii. Floor System : RCC beam slab floor system.
- iv. Floor Area : Production area is 10,208 sft.(approx.)
- v. No. of Stories : 2 Storey.
- vi. Construction Year : 2015.
- vii. Foundation Type : Isolated column footing foundation.
- viii. Design Drawings : Available: Approval plan, Structural design drawing, and machine layout plan.  
Not Available: Architectural design drawing, material test.
- ix. Soil Investigation Report : Available.
- x. Construction Materials : Brick aggregate. (Identified by removing plaster)
- xi. Generator : At 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:

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|------------------------|--|
| Short Term (Immediate) | : None.  |
| Mid Term (6-weeks)     | : <ul style="list-style-type: none"><li>• Building Engineer to survey as constructed building and prepare as built layout accordingly.</li></ul>                                   |
| Long Term (6-months)   | : <ul style="list-style-type: none"><li>• Building engineer should investigate the leakage pipe and repair it. Also proper sloping should be maintained on the roof top.</li></ul> |

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

**(A): Recommendations for Fire Safety corrective actions:**

Immediate <i>(the factory should not continue to be</i>	<ul style="list-style-type: none"><li>• None.</li></ul>
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## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

<p><i>occupied until these non-conformities have been rectified):</i></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>	<ul style="list-style-type: none"> <li>• Ensure adequate numbers of fire drills under the Fire Safety Plan.</li> <li>• All the firefighting equipment need to be tested with proper documents.</li> <li>• Factory needs to have sufficient number &amp; width (0.9m) of marked aisles at all floors of the building.</li> <li>• 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.</li> <li>• Factory need to ensure adequate number of exit signs so that it is visible from any positions and comply with the followings:             <ul style="list-style-type: none"> <li>(a) The color and design of lettering, arrows and other symbols on exit signs shall be in high contrast with their background.</li> <li>(b) 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.</li> </ul> </li> </ul>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li>• Factory need to have As Built Drawing with proper dimension at present situation in every floor showing means of escape.</li> <li>• Factory needs to have valid fire license mentioning full coverage area.</li> <li>• Factory manager or director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</li> <li>• All the exit doors need to be replaced by side swinging so that un-lockable fire rated doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Provide handrail on both sides of stairways.</li> <li>• Illuminated emergency light needs to be covered in floor, exits and aisles. The intensity of illumination by means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated with escape</li> </ul>

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

	<p>lighting to a level of not less than 2.5 lux at floor level.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li>• Factory needs to have a proper pre-plan for fire department.</li> <li>• Both of stair and escape routes need to have 1 hour rating for walls (enclosure) and 45min for door openings of stairs connecting 1st floors only. Also protect ground floor from stair-01 with 1 hour rated lobby with 1.5 hours fire rated door till to reach safe refuse area.</li> <li>• Storage area need to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Boiler room needs to have a 4 hours fire resistance wall and entry also need to have 2 hours fire rated door.</li> <li>• Generator room and substation room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside.</li> <li>• The entire exits connecting to the staircases(2 numbers staircase) need to be protected with fire and smoke resistant enclosures and opening (1 hour rated enclosure and 0.75 hour rated door)and provide a protected route from all through the stairway to the final exits.</li> <li>• Factory need to Install centralized automatic fire and smoke detection system throughout the building to full occupied area according to NTPA Guideline.</li> <li>• 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</li> <li>• Factory needs to install control panel for centralized and automatic fire detection and alarm system at required location.</li> <li>• Install proper standpipe system having at least 75 mm diameter of standpipe. First aid hose system (38 mm nominal) shall 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 shall be</li> </ul>

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

	<p>provided.</p> <ul style="list-style-type: none"> <li>• Factory needs to install 1 riser per 1000 m<sup>2</sup> of floor area and 38 mm diameter of hoses with variable nozzle.</li> <li>• 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.</li> <li>• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection</li> <li>• 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.</li> <li>• Factory needs 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.</li> </ul>
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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>	<ul style="list-style-type: none"> <li>• None.</li> </ul>
<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>	<ul style="list-style-type: none"> <li>• Discharge the generator exhaust to the exterior of the building in a safe location.</li> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure all distribution boards (including panel door) are earthed properly.</li> <li>• 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.</li> <li>• Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</li> <li>• Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</li> </ul>

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

<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li>• Install appropriate number and type of safety signage and fire-fighting equipment at generator room. Also ensure graded rubber mats are provided in front of all panel boards.</li> <li>• Ensure in the generator room have adequate illumination level as per standard.</li> <li>• Provide Instruction board for first aid and artificial respiration in the generator room.</li> <li>• Provide dedicated &amp; 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.</li> <li>• Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and busbar.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance.</li> <li>• Provide emergency power connection for life safety loads temporarily within 6 weeks and find out a permanent solution within 6 months.</li> <li>• Connect all metal in the building to the building earthing system.</li> </ul>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li>• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</li> <li>• Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</li> <li>• Inspect electrical switchgear and panel boards on an annual basis.</li> <li>• Ensure overhead service connections into the building are led via adequate size and type of service masts.</li> </ul>

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

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	<ul style="list-style-type: none"><li>• Ensure the generator room has adequate fire separation from the main building</li><li>• Provide adequate means of ventilation for the generator room based on the installed equipment and ensure that ventilation does not impact on fire barriers.</li><li>• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.</li><li>• Ensure panel boards have no opening and all live internal components are concealed properly.</li><li>• Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</li><li>• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</li><li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Install lightning protection system on the building.</li></ul>
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