

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

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Name of the Factory	: Tivoli Apparels Ltd.
Address of the Factory	: BSCIC, Tongi, Gazipur.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: Alliance
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 15 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 15 June, 2015
BGMEA Membership No.	: 2389

### **BASIC INFORMATION:**

The factory consist one number 07-storied reinforced concrete building with a basement floor. The following information was noted:

- i. Building Usage Type :
- ii. Structural System :
- iii. Floor System :
- iv. Floor Area :
- v. No. of Stories :
- vi. Construction Year :
- vii. Foundation Type :
- viii. Design Drawings :
- ix. Soil Investigation Report :
- x. Construction Materials :
- xi. Generator :

### **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) | : |
| Mid Term (6-weeks)     | : |
| Long Term (6-months)   | : |

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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 need to have proper testing plan &amp; record of fire safety equipment.</p> <p>Factory needs to seal all the penetration in rated slab(in steel columns root) of each floor bp 2 hours fire rated(Both internal &amp; External)construction or materials.</p> <p>Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9m 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 need to have valid fire license covering the 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 provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs (Escape route). Factory need to have emergency backup power for critical fire safety system with sufficient capacity &amp; arrangement according to NTPA Guideline</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>Factory needs to maintain minimum width of exit 0.9 m and height 2 m. 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 and need to be protected with transformer room at ground floor by 4 hours rated</p>

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	<p>construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</p> <p>Final exit route-2(Stair-2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected with generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</p> <p>Final exit route-3 (Stair-3 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected with fabric store at ground floor with rated lobby by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area. Child care room is needed to be separated from other occupancies with 3 hours fire rated construction with 3 hours fire rated door.</p> <p>Storage (fabric store) area (a) need to be protected from child care with 3 hours rated construction and 3 hours rated opening or doors.</p> <p>(b) needs to be protected from final exit route-1 (stair-1 route) with 4 hours rated construction and 2 hours rated lobby and enclosure.</p> <p>© needs to be protected from generator and transformer with 4 hours rated construction and 2 hours rated opening or doors.</p> <p>Boiler room need to be protected with 4 hours rated construction &amp; 2 hours rated opening / door from the working floor (Finishing section) of 1st floor of the building.</p> <p>Generator room needs to be protected with 4 hours rated construction &amp; 2 hours rated opening / door from the exit route (final exit-2) at ground floor of the building.</p> <p>All the staircase-1, 2 and 3 needs to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hours rated door) and provide the protected route from all though the stairway to the final exits.</p> <p>Factory needs to provide 3 hours rated construction between office and finishing section. For dining &amp; prayer room fire separation follow guideline Article No. 2.2.2 &amp; Table 2.1 of NTPA Stairs connected with basement need to be protected with a 4hours fire resistant and smoke proof lobby (</p>
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	<p>4hours rated enclosure and 2hour rated door).</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 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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### ***(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>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit and 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>Fill the transformer breather oil cup with fresh Oil.</p> <p>Provide two separate and distinct connections of earthing for each generator.</p> <p>Install MCCB in proper way to ensure safe installation.</p> <p>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.</p>

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	<p>Rewire to ensure each incoming supply to an MCB has a dedicated supply from bus bar. Avoid the use of multiple cables on outgoing side of MCB's and bus bars.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</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>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. Inspect electrical switchgear and panel boards on an annual basis.</p> <p>Ensure the substation room has adequate fire separation from the production area.</p> <p>Ensure the generator room has adequate fire separation from the main building.</p> <p>Ensure distribution 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> <p>Provide adequate covers on cable channels. 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>