

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

Name of the Factory	: Aditto Fashion Ltd.
Address of the Factory	: 228/7, Dighirchala, Chandana, National University, Gazipur, Dhaka-1700
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 30 May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 30 May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 30 May, 2015
BGMEA Membership No.	: 5880

### **BASIC INFORMATION:**

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Flat Slab system.
iii. Floor System	: RCC slab structure.
iv. Floor Area	: 15500 sq. ft. (All floor)
v. No. of Stories	: 6 storied
vi. Construction Year	: 2008
vii. Foundation Type	: Unknown
viii. Design Drawings	: Available documents: Approval plan, permitted machine layout plan, soil test report Not available: as built structural drawing, architectural drawing, material test report and floor load plan
ix. Soil Investigation Report	: Available
x. Construction Materials	: Stone aggregate.
xi. Generator	: Outside of the building.

### **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. Factory engineer to review design loads and column stress in area identified above. 2. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
Long Term (6-months)	: 1. Update calculations showing the structural adequacy of the building structure taking into account the factory design imposed loading and the as built structure.

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2. Additional loading to main production building to be identified and incorporated in building assessment.

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 Manager or Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</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>Combustibles are to be managed with good housekeeping.</p> <p>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>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Needs to have as built drawing with proper dimensions showing means of escape.</p> <p>Factory needs to have a proper pre-plan for fire department.</p> <p>All the exit doors of staircase enclosure need to be replaced by SIDE SWINGING FIRE FATED doors so that the staircase remains free from smoke as well as the lockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Provide handrail on both sides of stairways.</p> <p>Illuminated emergency light needs to be covered in all floors, exits, staircases and aisles of all the factory buildings or sheds.</p> <p>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 lighting to a level of not less than 2.5 lux at floor level.</p> <p>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.</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.</p>

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<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 maintain minimum width of exit 0.9 m and height 2 m.</p> <p>Child care room is needed to be separated from other occupancies with 3 hours fire rated construction with 2 hours fire rated door.</p> <p>Final exit-1&amp;2 both need to be separated by 2 hour fire rate enclose construction and 1.5 hour fire rated composite door.</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 needs to be fire separated with 2 hours fire rated enclosure and 1.5 hour rated opening.</p> <p>Boiler room needs to be fire separated with 2 hours fire rated enclosure and 1.5 hour rated opening.</p> <p>All the exits connecting to the staircase need to be protected with fire and smoke resistant enclosures and 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. 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>Automatic Fire Detection (AFD) and alarm system needs to be installed in all types of buildings. Install proper standpipe system having at least 100 mm dia of standpipe.</p> <p>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 needs to install separate standpipes in each exit stairway with minimum 38 mm diameter of hose with variable nozzle.</p> <p>Install standard standpipe, hose and fire pump system to ensure required hose pressure.</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> <p>Factory needs to install dedicated fire pump with sufficient capacity and backup power.</p> <p>Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least <math>1900 \times 75 = 142500</math> 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>Isolate/make safe all unused cables first and then remove from distribution boards. If necessary make sure 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>Provide two separate and distinct connections of earthing for each generator.</p> <p>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Ensure proper earthing connections at all electrical equipment.</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 adequate and 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 dedicated &amp; adequate size of earthing with proper identification for each circuit.</p> <p>Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's.</p> <p>Replace wooden base with metal clad construction for mounting the lighting board.</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>Provide emergency power connection for life safety load (fire alarm) temporarily within 6 weeks and find out a permanent solution within 6 months.</p> <p>Connect all metal in the building to the building earthing system.</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.</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.</p> <p>Ensure overhead service connections to the building are led via proper mechanical supports and adequate size and type of service masts.</p> <p>Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</p>

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	<p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Install circuit breakers in proper way using metal enclosure to ensure safe installation.</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 obtained as per list.</p> <p>Use noncombustible material to make cable channel and provide adequate covers on cable channel.</p> <p>Provide proper cable terminator/conductor for stranded conductors.</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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