

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Aziz Garments Ltd.
Address of the Factory	: 921, K.B Dovash lane, Goshaldanga, Chittagong
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 10 October, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 10 October, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 10 October, 2015
BGMEA Membership No.	: 2791

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 : RCC beam column system.
- iii. Floor System : RCC Beam slab.
- iv. Floor Area : 8000 sft per floor
- v. No. of Stories : 4 storied+ One Non-Engineering shed
- vi. Construction Year : 1995-96
- vii. Foundation Type : Unknown
- viii. Design Drawings : Not Available
- ix. Soil Investigation Report : Not Available
- x. Construction Materials : Brick aggregate.
- xi. Generator : In separate shed.

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) | : 1. Areas overstressed should not to be used for storage
2. A Detail Engineering Assessment of Factory to be commenced. |
| Mid Term (6-weeks) | : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Detail Engineering Assessment to be completed
3. Structural engineer to prepare full set of structural drawing, as built drawing and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure. |
| Long Term (6-months) | : 1. Continue to implement load plan
2. Continue to monitor for dampness on an on-going basis.
3. Repair/change the roof sheet under supervision by qualified |

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engineer.

4. Appropriate corrective measures must be taken and a building maintenance plan needs to be established and implemented to prevent 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 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 & record of fire safety equipment.</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. Factory needs to have sufficient total width of marked aisles (5mm per occupant) at all the production building.</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. 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>Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. Factory needs to have valid fire license covering the full occupied area.</p> <p>Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. All the exit doors need to be replaced by side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Factory need to provide handrail on both sides of both stairways.</p> <p>Factory needs to be installed with adequate illuminated</p>

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	<p>emergency lighting in floors, exits & stairs.)Escape route) 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>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>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. Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. Boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside.</p> <p>All the exits connecting to the staircase-1, 2 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 needs to install with centralized & automatic detection system with proper sitting arrangement according to 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 be installed with control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install proper standpipe system having at least 75 mm diameter of riser.</p> <p>Factory needs to install 1 hose per 1000 m2 and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle.</p> <p>Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa and standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa. 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 have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in</p>

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	the remote place of the factory.
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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>Ensure there is no break in the neutral wire in the form of a fuse unit throughout the wiring installation.</p> <p>Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection) of burning sign and insulation damage and take proper action including replacing cable or equipment where necessary.</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 the generator.</p> <p>Ensure all distribution boards (including panel door) are earthed properly.</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>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch 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>Install earthing pit for the factory with adequate provision for inspection of the earthing system.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Install appropriate number and type of safety signage and fire-fighting equipment at generator room and ensure graded rubber mats are required location.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake.</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 boxes and panels with metal clad construction for mounting circuit breaker and fuse. Ensure all electrical cables are sized according to capacity of circuit breakers. Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</p>

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	<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 panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Ensure overhead service connections to a building are achieved with service masts made of GI pipe at least 38 mm in diameter. 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. Replace distribution board with metal enclosed body.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated & adequate size of neutral with proper identification for each applicable 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.</p> <p>Ensure surface/exposed wirings are run either horizontally or vertically with proper mechanical support.</p> <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>