

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

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Name of the Factory	: Zs Knit Fabrics Ltd.
Address of the Factory	: Mouchak Chabagan, Fatik Market, Kaliakoir, Gazipur
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 16 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 16 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 16 June, 2015
BGMEA Membership No.	: 5009

### **BASIC INFORMATION:**

The pre-engineered shed building is made of RCC column, Steel rafter, purlin and roof is covered by industrial sheet . The following information was noted:

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|-------------------------------|---|
| i. Building Usage Type        | : Garment Factory.  |
| ii. Structural System         | : RCC column, steel rafter and purlin frame.                              |
| iii. Floor System             | : Roofing frame is steel rafter and purlin covered with industrial sheet. |
| iv. Floor Area                | : 6000 sq. ft.  |
| v. No. of Stories             | : Single storied.   |
| vi. Construction Year         | : 2006-2008   |
| vii. Foundation Type          | : Unknown   |
| viii. Design Drawings         | : Not Available   |
| ix. Soil Investigation Report | : Not Available   |
| x. Construction Materials     | : Bricks, steel joist, steel angle bar and industrial sheet.              |
| xi. Generator                 | : 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) | : N/A   |
| Mid Term (6-weeks)     | : 1. Design should be checked by the Building Engineer to verify the lateral stability of the shed and confirm the requirement of any bracing in the long direction   |
| Long Term (6-months)   | : 1. Install horizontal bracing at the roof system if required.<br>Structural engineer to check connection between top of columns and steel roof shed.<br>2. 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. |

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

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>Factory needs to remove all temporary obstruction from escape route for emergency and safe evacuation.</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>All the firefighting equipment's need to be tested regularly with proper documents.</p> <p>Factory needs to have sufficient number and width (0.9 m) of marked aisles at all floors (production) of the building and shed.</p> <p>A lighting system in storage area needs to be installed with protective covers and conduits.</p> <p>Factory needs to install fire protection arrangement in kitchen area with fixed temperature type detectors and portable fire extinguishers.</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>Factory needs to ensure adequate numbers of exit signs which need to be visible from any positions at every floor of the building.</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.</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>Provide handrail on both sides of stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, etits&amp; stairs.(escape route).</p> <p>Emergency back-up power needs to be connected for all critical fire safety system and not less than 30 minutes in case of failure of power supply.</p>
<p>Long Term</p>	<p>Factory needs to have a proper pre-plan for fire department. Child care room is needed to be separated from other</p>

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

<p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>occupancies with 3 hours fire rated construction with 3 hours fire rated door.</p> <p>Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors. Boiler room need to be separated by 4 hours rated construction and 2 hours rated opening with finishing section.</p> <p>(a) Generator room needs to have a 4 hours fire resistance wall and entry also needs to have 2 hours fire rated door. (b) Boiler room needs to have a 4 hours fire resistance wall and entry also needs to have 2 hours fire rated door and same as for substation and chemical room also.</p> <p>Stair-1 need to be protected with fire and smoke resistant enclosures and opening (1.0 hour rated enclosure and 0.45 hour rated door) at entrance of each floor level and provide a protected route from all though the stairway to the final exits. Factory needs to close all the opening within 3m of stair-2 by 1 hors fire rated construction.</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 install proper standpipe system with having at least 75 mm dia of riser.</p> <p>Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</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 have dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</p>
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## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.
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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>	N/A
<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 panel door of distribution boards 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>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 graded rubber mats are provided in front of all panel 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 from the earth bus-bar of distribution boards 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>Ensure all electrical cables are sized according to capacity of</p>

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

	<p>circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical equipment.</p> <p>Use noncombustible material to make channel and provide adequate covers on cable channel.</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.</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 switchgear and panel boards on an annual basis.</p> <p>Ensure the generator room has adequate fire separation from the production area.</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> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Install separate distribution boards for lighting and power</p>

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

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	circuits.  Install lightning protection system on the building.
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