

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Zaara Sara Knit Ind. Ltd.
Address of the Factory	: Kashimpur (Beside Kashimpur High School), Ward-06, Kashimpur, Gazipur, Bangladesh.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 23 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 23 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 23 June, 2015
BGMEA Membership No.	: 5823

BASIC INFORMATION:

The building is a single storied non engineered shed. The structural system of the building is Column (MS Pipe) and steel frame (Roof truss) structure with individual footing foundation. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Non-engineered shed.
iii. Floor System	: N/A.
iv. Floor Area	: 16770 sft for main factory building.
v. No. of Stories	: Single- storied
vi. Construction Year	: 2012-13.
vii. Foundation Type	: Individual Footing
viii. Design Drawings	: Available document: Approval plan, Machine layout plan & soil test report. Not available: Architectural drawing, structural drawing & material test report have not been found.
ix. Soil Investigation Report	: Available
x. Construction Materials	: MS Pipe column and steel frame (Roof truss).
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:

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. Provide horizontal bracing if required. 2. Provide protective coating in MS Angle on roof truss to protect it from corrosion. 3. Develop set of as-built drawings showing structural details,

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loading dimensions, levels, foundations plan, section and elevation drawings of sheds.

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>Remove all temporary obstruction from aisles for easy movement and safe discharge. And also make a new layout plan to change the aisles position.</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>Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</p> <p>Factory need to have proper testing plan & record for fire safety equipment.</p> <p>Factory needs to have marked aisles all working floor according to 0.9m for for one side and 1.0m for both side.</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 2.9m 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 needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</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.</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 be installed with adequate illuminated</p>

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	emergency lighting in floor.(Escape route).stair and exits.
<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-planning need to be developed.</p> <p>Final exit route-3 need to be protected from generator and boiler at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe reuse area.</p> <p>Final exit route-4 need to be protected from fabric store at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have the protected escape route till to reach safe area.</p> <p>Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors.</p> <p>Generator and boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the final exit route-4 as well as from the production area located at ground floor.</p> <p>Factory need to install centralized and automatic fire detection & 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 & fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install standpipe system with having at least 75mm dia of rider.</p> <p>Factory need to be installed by 1riser per 1000sqm of floor area with at least 38mm dia of fabric hose with variable nozzle.</p> <p>Factory needs 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>

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	<p>Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.</p> <p>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.</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>N/A</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>Discharge the generators exhausts to the exterior of the building in a safe location.</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>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 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>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 distribution boards.</p> <p>Provide Instruction board for first aid and artificial respiration in the generator room.</p> <p>Ensure distribution board has a minimum clearance of 1 m (39 in) in front.</p> <p>Provide dedicated & adequate size of earthing with proper</p>

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	<p>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 avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide mechanical guards for electrical wiring where necessary.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Provide emergency power connection for life safety loads (exit signage) temporarily within 6 weeks and find out a permanent solution within 6 months. 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. Ensure the generator room has adequate fire separation from the production area.</p> <p>Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</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 circuit.</p> <p>Ensure each distribution board is provided with a circuit list and</p>

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	<p>means of identification is provided as per list.</p> <p>Provide adequate covers on cable channel.</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>Provide individual fuse with suitable discrimination with backup fuse or miniature MCB for each 15A socket outlet.</p> <p>Install lightning protection system on the building.</p>
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