

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

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Name of the Factory	: Smart Knit Inds. Ltd.
Address of the Factory	: Aitola, Bhulta, Rupganj, Narayanganj, Bangladesh
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 07-October-2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 07-October-2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 07-October-2015
BGMEA Membership No.	: 5299

### **BASIC INFORMATION:**

The present garment factory is a three-storied RCC beam column frame structure. 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	: 29,000 sq. ft.
v. No. of Stories	: Three stories.
vi. Construction Year	: Year of construction is 2006 to 2007
vii. Foundation Type	: Could not be verified.
viii. Design Drawings	: N/A
ix. Soil Investigation Report	: Not Available
x. Construction Materials	: Brick aggregate.
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. Structural engineer to prepare as built structural drawing, soil test report, floor load plan 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)	: N/A

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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>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 &amp; record for fire safety equipment.</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>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>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 &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 unlockable fire rated 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 emergency lighting in floors, exits &amp; stairs.)Escape route(.</p>

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	<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>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 have a proper pre-plan for fire department</p> <p>Final exit route-1 (stair-1) need to be protected (1 hours rated construction with 0.75 hours rated door at each floor level) also protect (4 hours rated construction with 2 hours rated door from the sub-station room) entrance till to reach safe refuse area.</p> <p>Final exit route-2 )Stair-2 escape route(need to protect by 2 hours rated construction with 45 minutes fire rated doors at each floor level entrance</p> <p>Final exit route-1 (stair-1) need to be protected (1 hours rated construction with 0.75 hours rated door at each floor level) also protect (4 hours rated construction with 2 hours rated door from the sub-station room) entrance till to reach safe refuse area.</p> <p>Final exit route-2 )Stair-2 escape route(need to protect by 2 hours rated construction with 45 minutes fire rated doors at each floor level entrance</p> <p>Final exit route-1 (stair-1) need to be protected (1 hours rated construction with 0.75 hours rated door at each floor level) also protect (4 hours rated construction with 2 hours rated door from the sub-station room) entrance till to reach safe refuse area.</p> <p>Final exit route-2 )Stair-2 escape route(need to protect by 2 hours rated construction with 45 minutes fire rated doors at each floor level entrance</p> <p>Final exit route-1 (stair-1) need to be protected (1 hours rated construction with 0.75 hours rated door at each floor level) also protect (4 hours rated construction with 2 hours rated door from the sub-station room) entrance till to reach safe refuse area. Factory needs to install proper standpipe system with having at least 75 mm dia of riser.</p> <p>Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses</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</p>

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	<p>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> <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>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>Provide two separate and distinct connections of earthing for the generator.</p> <p>Ensure all panel 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. 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>Post safety signage and install appropriate number and type of fire-fighting equipment in generator room and ensure graded rubber mats are provided in front of all distribution boards.</p> <p>Provide Instruction boards for first aid and artificial respiration in the substation room and 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/MCCB has a</p>

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	<p>dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's/MCCB's.</p> <p>Replace wooden bases with metal clad construction for mounting the circuit breakers.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</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.</p> <p>Inspect electrical panel boards on an annual basis.</p> <p>Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</p> <p>Ensure all 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 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</p>

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	circuits.  Install lightning protection system on the building.
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