

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

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Name of the Factory	: SPARK KNIT COMPOSITE LTD.
Address of the Factory	: Plot No. 13, Holding No. 249, Zorune, Joydevpur, Konabari, Gazipur.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 21 <sup>st</sup> June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 21 <sup>st</sup> June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 21 <sup>st</sup> June, 2015
BKMEA Membership No.	: 1979

### **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	: Non-engineered truss corrugated iron roof structure supported by the RCC and steel circular column.
iii. Floor System	: RCC Beam slab.
iv. Floor Area	: N/A
v. No. of Stories	: 8400 sq. ft.
vi. Construction Year	: single
vii. Foundation Type	: 2009-10
viii. Design Drawings	: Isolated column footing
ix. Soil Investigation Report	: Structural design drawing has been found, Not Available – approval drawing, soil test report, architectural design documents, as built machine layout plan
x. Construction Materials	: Steel column, RCC column (brick chips), CI sheet.
xi. Generator	: Out of production 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 structural Engineer and verify the stability of the roof truss 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. 2. Building engineer need to prepare approval drawing and soil test report.

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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>	<ul style="list-style-type: none"> <li>• Factory needs to conduct fire drill quarterly (4 times a year) under the fire safety plan and needs to hept the written record of such drills for at least 3 years for the inspection of fire brigade whenever called for.</li> <li>• Factory need to have proper testing plan &amp; record of fire safety equipment.</li> <li>• 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.</li> </ul>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li>• Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</li> <li>• 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.</li> <li>• All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of vacuation without the use of a key.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route).</li> <li>• 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.</li> </ul>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li>• Fire department pre-plan needs to be developed.</li> <li>• North-west escape route-2 and north-middle escape route-3 need to protect from generator room (4 hour fire rated construction with 2 hour fire rated opening) and provide protected paths of travel till to reach safe refuse area.</li> <li>• Generator: <ul style="list-style-type: none"> <li>Generator room need to be protected yb 4 hours rated construction with 2 hours rated opening / door from the final exit route-1 located at ground floor.</li> </ul> </li> <li>• Boiler: <ul style="list-style-type: none"> <li>Boiler room need to be protected with 4 hours rated construction with 2 hours rated opening / door from</li> </ul> </li> </ul>

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	<p>knitting section at ground floor of the building.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</li> <li>• Factory needs to install proper standpipe system with having at least 75 mm dia of riser.</li> <li>• 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.</li> <li>• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection eactory needs to have dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</li> <li>• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr/min x 75 min = 142500 liters water storage tank.</li> </ul>
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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>	<ul style="list-style-type: none"> <li>• Isolate/make safe all unused cables first and then remove from panel boards. If necessary make sure cables are properly terminated at its point of termination using appropriate size and type of lug.</li> </ul>
<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>	<ul style="list-style-type: none"> <li>• Ensure all panel boards (including panel door) are earthed properly.</li> <li>• Ensure over current protection device (circuit breaker/fuse) for each circuit/branch circuit.</li> <li>• Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</li> <li>• Provide provision for inspection of all earthing system and ensure inspection is being completed and</li> </ul>

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	documented.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <li>• Fix appropriate number and type of safety signage at generator room and provide graded rubber mats in front of all panel boards.</li> <li>• Provide Instruction board for first aid and artificial respiration in the generator room.</li> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure panel boards have a minimum clearance of 1 m (39 in) in front.</li> <li>• 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 factory intake.</li> <li>• Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance.</li> <li>• Connect all metal of the factory to the factory earthing/grounding system such as metal rebar in concrete, metal frame of shed, or metal water pipe etc.</li> <li>• Ensure Lighting fixtures are supported from the structure properly and if flexible cords are used to support light fixture then make sure it has enough strength to carry the weight.</li> <li>• 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+( 20C-40C)} and take proper action.</li> </ul>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <li>• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</li> <li>• Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</li> </ul>

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	<ul style="list-style-type: none"><li>• Inspect electrical panel boards on an annual basis to ensure that the equipment is in good working condition.</li><li>• Ensure the generator room has adequate fire separation from the production area/main factory.</li><li>• Ensure panel boards have no opening and all live internal components are concealed properly.</li><li>• Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</li><li>• Replace wooden base with metal clad construction for installation of circuit breaker.</li><li>• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</li><li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Install lightning protection system on the factory.</li></ul>
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