

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: SHOEB KNIT COMPOSITE LTD.
Address of the Factory	: Lamapara, Kutubpur, Fatullah, Narayanganj, Bangladesh
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 12 October, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 12 October, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 12 October, 2015
BKMEA Membership No.	: 905

BASIC INFORMATION:

The present garment factory is six (06) storied dual system structure. 1st and 2nd floor is RCC flat plate system and rest of the floor is RCC beam column frame structure. There is an additional undocumented roof truss shed found at roof. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Dual system structure.
iii. Floor System	: RCC beam slab and flat plate.
iv. Floor Area	: 3800 sq. ft.
v. No. of Stories	: 6 storied and shed at roof.
vi. Construction Year	: Building was built in 2012-2013
vii. Foundation Type	: Isolated column footing
viii. Design Drawings	: Available –Approval plan, Structural design drawing, Soil test report, machine layout plan. Not Available- Architectural design drawing, Floor load plan, material test report.
ix. Soil Investigation Report	: 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. Building engineer to check the capacity and stability of the lightweight roofs and make any necessary alterations. Confirm its ability to withstand all wind loading pressure, suction and uplift forces.
Long Term (6-months)	: 1. Building Engineer to survey as constructed building and prepare as built structural drawing and floor load plan. Update calculations showing the structural adequacy of the building structure taking

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

into account the factory design imposed loading and the as built structure.

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 keep 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>Lights in storage area need to be installed with protective covers and conduits.</p> <p>Factory needs to close all the opening in the rated wall of the stair case by 2 hours rated construction/enclosure or 1.5 hours rated doors</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.</p> <p>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 Manager or Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</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>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory need to be protected all final exit with market at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route).</p> <p>Factory need to install sufficient capacities standby generator and connected to supply power for staircase and corridor Lighting, fire lifts, standby fire pump, pressurization fans and blowers, smoke extraction and damper systems in case of failure of normal electricity supply and must having the minimum capacity to serve for 1 hour with the NTPA requirements.</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. Factory needs to maintain minimum width of exit 0.9 m and height 2 m.</p> <p>Final exit route-1 (stair-1 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor and need to be protected from the generator 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 refuse area.</p> <p>Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. Boiler & generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door of the building.</p> <p>All the stairs 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.</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</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>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 proper standpipe system with having at least 100 mm diameter 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 (38 mm nominal) may have a minimum pressure of 200 Kpa.</p> <p>Factory needs to be installed with Siamese connection to the standpipe system located outside the building and accessible for fire department connection.</p> <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 1900ltr x 75min=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>	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>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>Provide additional insulation for wiring exposed to external heat source to protect cable.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Ensure proper earthing connections at all electrical equipment.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Ensure inspection of all earthing system 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 type of safety signage at generator room. Also 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 generator room.</p> <p>Provide two separate and distinct connections of earthing for generator.</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 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 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>Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance.</p> <p>Ensure discrimination is achieved between circuit breakers used for protection of main circuit and the sub-circuits derived therefrom.</p> <p>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>Develop an electrical layout diagram and an as-built single line</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>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>Ensure the generator room has adequate fire separation from the main building.</p> <p>Replace back side cover of panel board with metal enclosed body.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Install circuit breaker in proper way using metal enclosure. 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 means of identification is provided as per list.</p> <p>Use noncombustible material to make channel and provide adequate covers on cable trenches/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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