

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Spartan Fashions Ltd.
Address of the Factory	: 15, Bangobandhu road, Ashulia, Savar, Dhaka-1340
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 17 June, 2015.
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 17 June, 2015.
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 17 June, 2015.
BGMEA Membership No.	: 5734

BASIC INFORMATION:

The present garment factory is a 4 storied industrial building with dual system - flat plate and beam column frame structure. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Dual system (Flat plate and RCC beam column frame).
iii. Floor System	: Flat plate, Beam slab system.
iv. Floor Area	: Floor area is 14692 sft (Spartan Fashion Ltd.) Total floor area 20,020 sft
v. No. of Stories	: 04 stories
vi. Construction Year	: Building was built in two phases Up to 2nd floor (2009-13) and 3rd floor (2014-15)
vii. Foundation Type	: Isolated column footing.
viii. Design Drawings	: Available: Approval drawing , structural design drawing, architectural design drawing, soil test report, machine layout plan Not available -floor load plan and test report of construction materials
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: Separate structure (attached to the factory building).

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)	: N/A
Long Term (6-months)	: 1. Remedial action to be undertaken to prevent the seepage of water from pipes and provide adequate drainage. 2. Provide protective coating to cover the exposed rebar from corrosion.

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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>Factory need to have proper testing plan & record of fire safety equipment.</p> <p>Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. Lights in storage area (Bonded warehouse at 2nd floor) 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>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 unlockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits& stairs.(route Escape).</p> <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>Fire department pre-plan needs to be developed. Minimum width of door shall be at least 0.9 m & height shall</p>

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<p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>be 2 m.</p> <p>The final exit-1 need to be protected by 2 hours fire rated construction with 1.5 hours fire rated door at each floor level entrance including ground floor, also need to be protected from generator room by 4 hours rated construction with 2 hours rated doors/opening to reach safe refuse area.</p> <p>Childcare needs to be separated from other occupancies (finishing section) with 3 hours rated construction and 3 hours rated opening or door.</p> <p>Bonded ware house needs to be protected by 2 hours rated construction with 1.5 hours rated opening or doors from the finishing section of 2nd floor of the building.</p> <p>Fabric store needs to be protected by 2 hours fire rated construction with 1.5 hours fire rated door from the cutting section of ground floor.</p> <p>Boiler room needs to be separated with finishing section by 4hr fire rated construction and 2 hrs rated opening/doors.</p> <p>The final exits-1 need to be protected from generator room by 4 hours rated construction with 2 hours rated doors/opening till to reach safe refuse area.</p> <p>Stair-1 needs to be protected by fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hour rated door) and provide the protected route from all though the stairway to the final exits.</p> <p>Stair-2 need to be protected by closing all opening with 2 hours rated construction within 3m (both side) of the stair and fitted 1.5 hours rated doors/opening at each floor level entrance except 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</p>
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	<p>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 & 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>	<p>Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary.</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 generator exhaust to the exterior of the building in a safe location.</p> <p>Ensure panel door of distribution boards 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>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</i></p>	<p>Install appropriate number and type of fire-fighting equipment at generator room.</p>

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<p><i>carried out within a period of 6 weeks)</i></p>	<p>Also ensure graded rubber mats are provided in front of all distribution boards.</p> <p>Provide Instruction board for first aid and artificial respiration generator room.</p> <p>Provide two separate and distinct connections of earthing for each generator.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar 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 circuit breakers.</p> <p>Use noncombustible material to make cable channel 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>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.</p> <p>Ensure overhead service connections to the building are led via adequate size and type of service masts.</p>

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	<p>Ensure the generator room has adequate fire separation from the production main building.</p> <p>Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</p> <p>Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Install panel boards in proper way or proper place to ensure safe installation.</p> <p>Provide dedicated & adequate size of neutral with proper identification for each applicable 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 circuits.</p> <p>Install lightning protection system on the building.</p>
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