

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Sportswear Garments Ltd. |
| Address of the Factory | : 755, Askarabad, Monsurabad, D.T. Road, Chittagong. |
| Present Status of the Factory | : Under operation. |
| Structural Assessment Conducted by | : |
| Date of Structural Inspection | : |
| Fire Assessment Conducted by | : VEC |
| Date of Fire Inspection | : 13 August, 2015 |
| Electrical Assessment Conducted by | : VEC |
| Date of Electrical Inspection | : 13 August, 2015 |
| BGMEA Membership No. | : 1061 |

BASIC INFORMATION:

The factory consist one number of 06 storied reinforced concrete building. The following information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : |
| iii. Floor System | : |
| iv. Floor Area | : |
| v. No. of Stories | : |
| vi. Construction Year | : |
| vii. Foundation Type | : |
| viii. Design Drawings | : |
| ix. Soil Investigation Report | : |
| x. Construction Materials | : |
| xi. Generator | : |

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:

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| Short Term (Immediate) | : |
| Mid Term (6-weeks) | : |
| Long Term (6-months) | : |

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The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety Corrective Actions:

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| <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>Lights in storage area (Fabric store at 3rd floor & finished goods store at 4th floor) are 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 un-lockable 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 wit adequate illuminated emergency lighting in floors, exits& stairs.(escape route).</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><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.</p> <p>Final exit route-2(Stair-2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level</p> |

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| | <p>entrance and need to be protected from generator at ground floor by 4 hours rated construction with 2 hours rated door/opening.</p> <p>Final exit route-4(Stair-4 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and others factories opening(near to stair-2), also need to have the protected route till to reach safe refuse area.</p> <p>Storage area (Fabric store at 3rd floor) need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors from the cutting section of 3rd floor of the factory.</p> <p>Generator: Generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door from (stair-2 route) the final exit route-2 located at ground floor.</p> <p>Boiler: Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the finishing section (Iron section) of 3rd floor of the building.</p> <p>All the stairs (total six numbers of stair) 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 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 dia of riser.</p> <p>Install 1 riser per 1000 m2 of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in the stairways covering the floor area.</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</p> |
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| | <p>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:

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| <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 using appropriate type and size of cables and the earthing cables have continuity up to main earth.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Ensure proper earthing connections at all electrical equipment. Isolate the panel from the electrical service and clean interior components from dust and debris. 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>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>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 ensure each incoming supply to an MCB has a</p> |

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| | <p>dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's.</p> <p>Replace wooden base with metal clad construction for mounting the circuit breakers and fuse.</p> <p>Consult with a qualified electrical engineer and ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical equipment.</p> <p>Ensure cable joints are made through porcelain/PVC connectors with PIB tape wound around joint in respect of conductivity, insulation and mechanical strength.</p> <p>Wiring system passes through elements of building construction such as floors, walls, roofs, ceilings, partitions or cavity barriers, the openings remaining after passage of the wiring system have to seal according to the degree of fire resistance prescribed for the respective element of building construction before penetration.</p> <p>Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building, or metal water pipe etc.</p> <p>Ensure the lightning protection ground terminals are bonded to the building or structure grounding.</p> <p>Make sure cables are not overloaded ,properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, proper cable bending, no insulation damage, single cable at single point etc. to avoid temperature rise. If necessary consult with a qualified engineer and replace cable or equipment.</p> |
| <p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p> | <p>Have a qualified electrical engineer to 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. Also ensure that insulation resistance of power cable and earth pit resistance are "$\geq 5 \text{ M}\Omega$" and "$\leq 1\Omega$" respectively.</p> <p>Inspect panel boards on an annual basis to ensure that the equipment is in good working condition.</p> |

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| | <p>Ensure overhead service connections to a building are led via roof poles or service masts made of GI pipe at least 38 mm in diameter having a bend at the top and installed on the outer wall. Consult with a qualified electrical engineer before completing work.</p> <p>Ensure the generator room has adequate fire separation from the remainder part of the building.</p> <p>Ensure panel 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 Ensure each distribution board is provided with a circuit list indicating current rating of circuit and size of fuse element/ breaker. Also ensure the means of identification (separate color coding, marking tape, tagging, or other approved means) of cable is provided as per circuit list.</p> <p>Use noncombustible material to make channel and provide adequate covers on cable channel.</p> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm². or greater or solder together all strands at the exposed ends or are crimped using suitable sleeve or ferrules for stranded conductors having a nominal cross-sectional area less than 6mm².</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Consult with an expert electrical engineer to review requirements, calculate risk index, prepare drawing etc. to make sure the building is secured against lightning.</p> <p>Also ensure following as per NTPA based on the building size.</p> <ul style="list-style-type: none">i) Air termination network vertical/horizontal conductors are appropriately spacedii) Appropriate numbers of down conductors are installediii) Resistance of earth conductor within limit ($\leq 10\Omega$). |
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