

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Tsr Apparels Ltd. |
| Address of the Factory | : House-42, road-2, block-E, ward-6, Turag, Dhaka |
| Present Status of the Factory | : Under operation. |
| Structural Assessment Conducted by | : VEC |
| Date of Structural Inspection | : 25 June, 2015 |
| Fire Assessment Conducted by | : VEC |
| Date of Fire Inspection | : 25 June, 2015 |
| Electrical Assessment Conducted by | : VEC |
| Date of Electrical Inspection | : 25 June, 2015 |
| BGMEA Membership No. | : 5468 |

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:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC beam-column frame and flat plate system. |
| iii. Floor System | : RCC Beam and flat plate slab system. |
| iv. Floor Area | : 36,800sq. ft |
| v. No. of Stories | : 4stories |
| vi. Construction Year | : 2006-2012 |
| vii. Foundation Type | : Isolated footing |
| viii. Design Drawings | : Available: Approval plan, structural and architectural design drawing, as built machine layout plan. Not Available: Materials test report and floor load plan |
| 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:

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| Short Term (Immediate) | : |
| Mid Term (6-weeks) | : 1. Building Engineer to survey as constructed building and prepare constructed layout and elevation accordingly |
| Long Term (6-months) | : 1. Engineer to inspect whether waterproofing material is applied or where it can be maintained. For both durability and serviceability, waterproofing on the roof slab is recommended. Moreover the roof slab drainage system and leakage of pipes should be investigated. 2. Update calculations showing the structural adequacy of the building structure taking into account the factory design imposed loading and the as built structure. |

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3. Prepare controlled loading plans for all floors designating where storage can be placed and cannot be placed

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> | <ul style="list-style-type: none"> N/A |
| <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"> Lights in storage area needed to be installed with protective covers and conduits. 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. 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>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"> Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. 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. Factory need to have provided handrails in between two adjacent floors in stairs as per NTPA Guideline. Factory needs to provide handrail on both sides of all the stairways. Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(escape route). 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>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"> Factory needs to have a proper pre-plan for fire department. 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 bonded warehouse (2 hours rated construction with 1.5 hours rated door) and from the generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need |

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| | <p>to have the protected escape route till to reach safe refuse area.</p> <ul style="list-style-type: none">• 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 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.• Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors.• Generator: Generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door from stair-1 and 2 as well as from the final exit route-1 and 2 located at ground floor.• Boiler: Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the working floor (Finishing section) of ground floor of the building.• 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 theprotected route from all though the stairway to the final exits.• Factory needs to provide 3 hours rated construction between dining room and cutting section and also sewing section, inspection room and prayer room• 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.• 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.• Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.• eactorp needs to install proper standpipe system with having at least 100 mm dia of riser.• 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 both of the stairways covering the floor area.• 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 |
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| | <p>(38mm nominal) may have a minimum pressure of 200 Kpa.</p> <ul style="list-style-type: none"> • Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection. • Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank. |
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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> | <ul style="list-style-type: none"> • 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> | <ul style="list-style-type: none"> • Discharge the generator exhaust to the exterior of the generator room in a safe location. • Ensure panel (including panel door) are earthed properly. • Ensure inspection of earthing is being completed and 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"> • Provide Instruction board for first aid and artificial respiration in the generator room. • Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake. • Rewire to avoid the use of multiple cables on outgoing side of MCB's. • Replace wooden base with metal clad construction for mounting fuses. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the building earthing system. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable |

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| | joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(20°C-40°C)} and take proper action |
| <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"> • Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical panel boards on an annual basis. • Ensure the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Ensure distribution boards are installed in compliant locations in terms of height, access. • Provide dedicated & adequate size of neutral with proper identification for each applicable circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building confirming its requirements and adequacy. |