

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: SPACIO APPAREL'S LTD.
Address of the Factory	: 120/131, South Kattali, Sagorika Road, Chittagong.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 21 st March, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 21 st March, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 21 st March, 2015
BKMEA Membership No.	: 1907

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 : Beam Slab Frame R.C.C structure.
- iii. Floor System : Beam slab.
- iv. Floor Area : The typical plinth area of 5 storied RCC building is 3116 sft. Total operational area is 12464sft.
- v. No. of Stories : 5 Storeys
- vi. Construction Year : 1996-2013.
- vii. Foundation Type : Cast in situ pile considered as per soil test report.
- viii. Design Drawings : Available (Approval from Chittagong Development Authority (CDA) on 25th July, 2006 for 5 storey residential use).
- ix. Soil Investigation Report : Available.
- x. Construction Materials : Brick aggregate.
- xi. Generator : North-west corner side of 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) | : N/A |
| Mid Term (6-weeks) | : N/A |
| Long Term (6-months) | : 1. The frame needs to be checked by building engineer. The lateral system is required to ensure the stability of structure. Carry out any remedial actions as directed by the Building Engineer. |

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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"> • Remove all temporary items from all escape routes, aisles and passageway. • Direct route of access to required exits should be provided through stairway which are maintained free of obstructions. • Direct route of access to required exits should be provided through stairway which are maintained free of combustibles. • Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - Illuminated exit sign should be posted above the exit door, - It should be clearly visible at all time, - Provide directional signs wherever necessary. - All exit doors should be clearly marked for easy identification. -Signage should be uniform. • Provide fire extinguisher at 4th floor and to keep the record for re filling & properly tagged. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly.
<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"> • Replace all existing exit doors on evacuation routes, exit doors with side hinged type door, which swing outward and in the direction of travel. Swinging of the door should not constrict the width of the corridor / passage below 0.9 meter. • Remove all locking device from all egress door. All exit doors should be open-able from the side they serve without the use of a key. • Exit door should have minimum clear width 0.9 meter. • Provide handrails on both side of each stairway with height of 0.9m measured from the nose of stair to the top of the handrail. • Doors in stair should be outward opening, side-swing, self closing, non-lockable 1.5 hours fire rated doors in all stair way encloses.(Also require fire rated door at the floor occupied by other tenants) • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at generator shed, which located at the adjacent to production building. • The egress paths should be illuminated with emergency lighting with power back-up supply & illumination should be a

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	<p>minimum of 10 lux for all corridors & exit doors. Aisles should be provided with a minimum 2 lux.</p> <ul style="list-style-type: none"> • The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. • Produce design and plan for automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants) • Prepare proper design and plan for dedicated fire pump with alternate backup power supply. • Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline. • Implement to a single fire safety management system with approvals from all tenants in the factory building
<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"> • Provide 4 hours fire rated barriers with 2 hours fire rated door at generator shed, which located at the adjacent to production building. • Install automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants) • Install dedicated fire pump with alternate backup power supply. • Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline. • Provide dedicated storage tank for firefighting operation

(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"> • Over current protection devices (Circuit breakers) should be installed at all distribution panels.
<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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated. • Provide weather proof casing for switchboards exposed to weather (located outside the building). • Relocate switchboards away from gas stoves / sinks / washing area / laundry (> 2.5 m). • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground

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<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"> • 1. Provide updated SLD matching the existing installation at the factory. 2. SLD to indicate exact positions of all points of switch boxes and other outlets. 3. SLD to be approved by the engineer-in-charge. • 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. 2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. 3. As built drawing to be approved by the engineer-in-charge. • All unwanted materials should be removed from Generator room. • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. • Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of MDB panels. • 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign. 2. The source of illumination should be providing not less than 50 lux. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. • The electrical panels to be of metal case and should be marked with “Danger 415 Volts” and identified with proper phase marking and danger signage. • Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards. • Provide cable connections with properly soldered / welded lugs at (MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. • Avoid looping and bunch of cable at MCCB/MCB or bus bar terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. • Provide cable joints of porcelain / PVC connectors with PIB
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	<p>tape wound around before placing the cable in the box.</p> <ul style="list-style-type: none"> • Seal the cable penetrations through walls adequately with fire resistive elements. • 1. Replace all flexible cables/wires with fixed wiring; avoid use of flexible wires/cords for fixed machines. 2. Flexible cords may only be used for the connections of portable equipments. • Provide separate earthing connection to electrical equipments. Ensure that earth potential provided for all parts of equipment / installation (other than live parts) and that continuous earth connection is provided back to the main intake supply earth. • Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.
<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"> • Provide 4 hour fire rated walls with 2 hour's fire rated door for generator room on ground level. • Relocate generator set in substation building / adjacent to substation room. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 40m², or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • 1. Design to have proper segregation of different end used loads. 2. Wiring design to have separate and distinct sub-circuits for power and heating system. 3. All DBs to be placed conveniently. 4. Wiring to be neat, tidy and located near ceiling. • Review capacity of standby generator on basis of loads for essential lighting. • 1. Wooden switchboards boards should be replaced by non-flammable materials. • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes. • Seal the cable entry-exit points of (MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that (MDB/DB/SDB)'s panels / Switchgears to be vermin / damp proof. 2. Ensure all unused holes / openings in DBs to be blocked properly. • 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 2. Ensure that connections between conductors / equipments provided to durable electrical continuity and adequate mechanical strength and protection. 3. The continuous earth connection is provided back to the main intake supply

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	<p>earth.</p> <ul style="list-style-type: none">• Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.
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