

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Victoria Costumes Ltd.
Address of the Factory	: B-27, BSCIC I/A, Road no_01, Shashangaon, Fatullah, Narayanganj
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 14 May, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 14 May, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 14 May, 2015
BGMEA & BKMEA Membership No.	: 4921 & 1582

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 | : Ground floor – Beam slab frame, 1st to 5th floor - Flat Slab Frame. |
| iii. Floor System | : Ground floor – Beam Slab, 1st to 5th floor - Flat plate floor slab. |
| iv. Floor Area | : Total floor area is 10,940 sq. ft. approx |
| v. No. of Stories | : 6 Storey |
| vi. Construction Year | : 2002-2004 |
| vii. Foundation Type | : Pile Foundation |
| viii. Design Drawings | : Available (Approved on 30th April, 2002 from BSCIC) |
| ix. Soil Investigation Report | : Not 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) | : 1. Factory Management not to use those column supported floors as storage.
2. Factory Engineer to review design, loads and columns stresses in area identified above.
3. Verify in-situ concrete stresses by 100mm dia. cores for A4, D4 & A2 columns.
4. A Detail Engineering Assessment of Factory to be commenced, see attached Scope. |
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| Mid Term (6-weeks) | : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. |
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2. Detail Engineering Assessment to be completed.
3. As-built architectural and structural drawings containing extended construction to be prepared and submitted for approval by appropriate authority. As part of this process the building engineer will be required to make a number of checks on the inconsistencies between the structural design and the as-built construction

Long Term (6-months)

1. Continue to implement load plan.
2. Factory Engineer to review design of slab of all floors to measure the lateral capacity of 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>	<ul style="list-style-type: none"> • The minimum clear width of the pathway should be 0.9 meter • Rearrange the evacuation pathway to ensure the minimum width. • Remove all temporary items from all escape routes, aisles and passageway. • Direct route of access to required exits should be provided through stairway which is maintained free of obstructions. • Provide aisle marking with arrow guiding on all Evacuation pathways. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • The first aid hose and standpipe performance should be checked periodically and properly tagged. • Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase fire fighting. • Combustible materials should keep away from electrical appliances and all the lighting in storage area must have protecting covers and wiring must be in conduits. • 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.

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	<ul style="list-style-type: none"> • 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. • Prepare proper plan & design for staircase. - Minimum clear width should be 0.9 meter. • Prepare proper plan & design for another staircase. - Minimum clear width should be 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. • Prepare proper plan & design for discharge floor exit door. - Minimum clear width should be 0.9 meter. • Provide 1.5 hrs fire rated door at ground floor exit to separate stair-1 and ground floor production area. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at boiler and generator room. • The egress paths should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for all corridors & exit doors. Aisles should be provided with a minimum 2 lux. • 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. • 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. • Power backup supply should be provided for fire alarm system. • Visual alarm should be placed at the generator room.
<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"> • Install staircase as per plan and design. - Minimum clear width should be 0.9 meter. • Install another staircase as per plan and design. - Minimum clear width should be 0.9 meter. • Install discharge floor exit door as per plan and design. - Minimum clear width should be 0.9 meter. • Within 6 Weeks, Prepare proper plan and design for 4 hours

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	<p>fire rated barriers with 2 hours fire rated doors at boiler and generator room.</p> <ul style="list-style-type: none"> • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. • Provide dedicated storage tank for firefighting operation
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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>	<ul style="list-style-type: none"> • Re-locate oil / fuel tanks away from control panels in generator room. • All strands cables at exposed ends should be properly soldered / crimped and insulated. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
<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"> • Necessity and capacity of the electrical substation shall be set by regulations in the Electricity Act or by the relevant electrical utilities. • Provide adequate illumination for substation. • 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. • Individual Fuse protection should be provided to every 15/20 A socket. • 1. All stranded conductors > 6mm² to be provided with cable sockets. 2. All stranded conductors < 6 mm², at exposed end should be soldered / crimped. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials.

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	<p>3. Conduct periodic maintenance and maintain the records.</p> <ul style="list-style-type: none"> • 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 tape wound around before placing the cable in the box. • Seal the cable penetrations through walls adequately with fire resistive elements. • 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"> • 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. • Provide adequate ventilation arrangements for indoor generator. • Provide 4 hour fire rated walls all around the transformer / generator room on ground level.

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	<ul style="list-style-type: none">• 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 30m², or relocate the generator room.• Provide and maintain proper clearance in all sides of generator for ease of maintenance.• Provide calibrated Ammeters / Voltmeters at distribution boards (MDBs).• Review capacity of standby generator on basis of loads for essential lighting / AC / Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small.• Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level).• 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials.• Power cables/ telecommunication cables / antenna cables should be laid separately.• Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).• Seal the cable entry-exit points of (MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that HT / LT 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 earth.• 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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