

## **Summary of Preliminary Assessment on Structural, Fire and Electrical Safety**

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Name of the Factory	: VERDON APPARELS LTD.
Address of the Factory	: Dewanbari, North Kashipur, Fatullah, Narayanganj-1400
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 11 May, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 11 May, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 11 May, 2015
BKMEA Membership No.	: 1993

### **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:

Building Usage Type	: Knit garments factory.
i. Structural System	: Three storied RCC beam column frame and flat slab structure building.
ii. Floor System	: Beam Slab and flat slab.
iii. Floor Area	: Total floor area is 23000 sq. ft. approximate and 16000 sq. ft used by assessed factory.
iv. No. of Stories	: Three storey
v. Construction Year	: Not Identified
vi. Foundation Type	: Not Identified
vii. Design Drawings	: Available (approval for five storied residential building from Rajdhani Unnayan Karttripakkha (RAJUK), Dhaka in 20th August, 2006 but as-built drawings not available)
viii. Soil Investigation Report	: Not Available
ix. Construction Materials	: Brick Chips (Identified by removing plaster).
x. Generator	: At ancillary shed, outside of the 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. As- As-built architectural and structural drawings to be prepared for factory building. As part of this process the building engineer will be required to make a number of checks on the as-built construction.

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2. The frame structure needs to be checked by building engineer. The lateral system is required to ensure the stability of structure.
3. Exposed reinforcement need to be covered by lean graded concrete following the guidance of Building Engineer.

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"> <li>• Remove all temporary items from all escape routes, aisles and passageway.</li> <li>• Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - 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.</li> <li>• Provide back-up power supply with IPS or battery for emergency lighting</li> <li>• Place the extinguisher near the path of exit travel &amp; easily accessible</li> <li>• The first aid hose and standpipe performance should be checked periodically and properly tagged.</li> <li>• Provide additional firefighting equipment like sand &amp; water buckets near exit or easily accessible area for first phase fire fighting.</li> <li>• 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.</li> <li>• Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan &amp; should kept record properly.</li> </ul>
<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"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• Doors in stair should be outward opening, side-swing, self closing, non-lockable 0.75 hours fire rated doors in all stair way</li> </ul>

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	<p>encloses.</p> <ul style="list-style-type: none"> <li>• Provide 1 hour fire rated construction at unprotected opening window, which is adjacent to external staircase.</li> <li>• Provide 1.5 hours fire rated door at Warehouse at GF for separation for other operational area.</li> <li>• Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at 1st floor boiler room, which located at the adjacent to ironing section</li> <li>• Produce design and plan for automatic detection system with automatic fire alarm.</li> <li>• Prepare proper design and plan for dedicated fire pump with alternate backup power supply.</li> <li>• Replace existing 1 inch hose pipe replace with 1.5 inch hose pipe to meet the requirement of RMG guideline.</li> <li>• Prepare plan and design for dedicated water storage tank for firefighting operation.</li> <li>• Visual alarm should be placed at the generator room.</li> <li>• Obtain fire license from issuing authority</li> <li>• Implement to a single fire safety management system with approvals from all tenants in the factory building.</li> </ul>
<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"> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated doors at 1st floor boiler room, which located at the adjacent to ironing section</li> <li>• Install automatic detection system with automatic fire alarm.</li> <li>• Install dedicated fire pump with alternate backup power supply.</li> <li>• Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline.</li> <li>• Stand pipe supplying first aid hose should have minimum pressure of 200 KPa.</li> <li>• Provide dedicated storage tank for firefighting operation.</li> </ul>

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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>	<ul style="list-style-type: none"> <li>• Over current protection devices (Circuit breakers) should be installed at all distribution panels.</li> </ul>
<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"> <li>• Re-locate oil tanks away from control panels in generator room.</li> <li>• All strands cables at exposed ends should be properly soldered / crimped and insulated.</li> <li>• Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.</li> </ul>
<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"> <li>• 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.</li> <li>• 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.</li> <li>• All unwanted materials should be removed from Generator room.</li> <li>• Provide rubber mats of adequate in front of all distribution panels.</li> <li>• Install smoke or heat detection and provide firefighting equipment in the substation and generator room.</li> <li>• Provide and maintain clear and legible identifications numbers &amp; names on all incoming and outgoing circuits of MDB panel.</li> <li>• 1. Provide and maintain at least 10 lux illumination at floor level for exit signage. 2. Provide alternate / emergency backup for illuminating the exit signs for at least 30 minutes.</li> <li>• Provide suitable &amp; non-flammable protected supports and shades for hanged light fittings/ fixtures.</li> <li>• 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.</li> <li>• Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards.</li> <li>• Provide cable connections with properly soldered / welded lugs at DBs. Ensure that all the electrical connections are properly secured with lugs and glands.</li> <li>• Select conductors with adequate sizing without exceeding</li> </ul>

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	<p>permissible thermal limits for insulation.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases.</li> <li>• Seal the cable penetrations through walls adequately with fire resistive elements.</li> <li>• 1. Provide sufficient and separate earthing for MDB panels in substation room 2. Provide adequate number of earth electrodes.</li> <li>• 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.</li> <li>• Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.</li> <li>• 1. All stranded conductors &gt; 6mm<sup>2</sup> to be provided with cable sockets. 2. All stranded conductors &lt; 6 mm<sup>2</sup>, at exposed end should be soldered / crimped.</li> <li>• Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.</li> </ul>
<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"> <li>• Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 25m<sup>2</sup>.</li> <li>• Provide and maintain proper clearance in all sides of generator for ease of maintenance.</li> <li>• Provide calibrated Ammeters / Voltmeters at distribution boards (MDB).</li> <li>• 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.</li> <li>• Provide and maintain easy access and proper height of switchboard / panel boards (&lt; 2m from floor level).</li> <li>• Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).</li> <li>• Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes.</li> <li>• Seal the cable entry-exit points of (MDB/DB/SDB) s with non-flammable materials. In addition:             <ol style="list-style-type: none"> <li>1. Ensure that MDB / DB panels / Switchgears to be vermin / damp proof.</li> <li>2. Ensure all unused holes / openings in DBs to be</li> </ol> </li> </ul>

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