

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

Name of the Factory	: BOGRA FASHION WEAR
Address of the Factory	: House # 68, Block # B, Ward # 9, Jalkuri TC Road, Shiddhirganj, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 11 <sup>th</sup> July, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 11 <sup>th</sup> July, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 11 <sup>th</sup> July, 2015
BKMEA Membership No.	: 1585.

### **BASIC INFORMATION:**

The assessed factory building was a 4 - Storey RCC building. The structural system of the building was beam column frame and beam slab floor system. BOGRA FASHION WEAR operates on partial floor areas of the 1st – 3rd floors (Approx. 50% plinth area on each floor). The factory operates in the building on a rental basis. The following general information were noted:

i. Building Usage Type	: Knit Garment Factory.
ii. Structural System	: RCC beam column frame system.
iii. Floor System	: RCC beam slab system.
iv. Floor Area	: Floor plinth area occupied by factory = 7854 sft. Total area occupied by factory = 23,562 sft.
v. No. of Stories	: 4 Storey.
vi. Construction Year	: The building was constructed in 2 phases. In 1st phase ground floor to 1st floor was constructed in 2005 and in 2nd phase 2nd floor to 3rd floor was constructed in 2011.
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Unavailable.
ix. Soil Investigation Report	: Unavailable.
x. Construction Materials	: Brick aggregate.
xi. Generator	: The generator is located at the ground floor plinth of the building at the south-east corner.

### **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)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none"><li>• As built architectural and engineering drawings to be prepared and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a number of checks on the structural design as described in the following recommendations.</li></ul>
Long Term (6-months)	:

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- Sections of plaster finish to concrete slab to be removed to investigate if cracks penetrate the building structure. Investigation is needed to determine reason of cracks. Carry out any remedial actions as directed by the Building Engineer for crack on slab.

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>	<ul style="list-style-type: none"> <li>• None.</li> </ul>
<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>• Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. <ul style="list-style-type: none"> <li>- Illuminated exit sign should be posted above the exit door,</li> <li>- It should be clearly visible at all time,</li> <li>- Provide directional signs wherever necessary.</li> <li>- All exit doors should be clearly marked for easy identification.</li> <li>- Signage should be uniform</li> </ul> </li> <li>• Factory management should be checked alarm call points, alarm &amp; detection system periodically and maintained the record properly.</li> <li>• Provide fire extinguisher at all floor and to keep the record for re filling &amp; properly tagged.</li> <li>• The first aid hose and standpipe performance should be checked periodically and properly tagged.</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>• Prepare proper plan and design for one more exit in a way not to exceed the maximum travel distance or If the factory design to equip with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building the length of travel should not be exceed 60 meter.</li> <li>• Replace all existing exit doors on evacuation routes,</li> </ul>

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	<p>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.</p> <ul style="list-style-type: none"><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>• The route of emergency exit have to connected other tenants providing stairs for smoth evacuation and to avoid single travel condition</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 1.5 hours fire rated doors in all stair way encloses.(Also require fire rated door at the floor occupied by other tenants).</li><li>• Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor.</li><li>• Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final exit</li><li>• Provide 1.5 hrs fire rated door for storage area.</li><li>• Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 2nd floor boiler which located at the adjacent to finishing section</li><li>• The egress paths should be illuminated with emergency lighting with power back-up supply &amp; illumination should be a minimum of 10 lux for all corridors &amp; exit doors. Aisles should be provided with a minimum 2 lux.</li><li>• The stairway should be illuminated with emergency lighting with power back-up supply &amp; illumination should be a minimum of 10 lux for stairway.</li><li>• 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)</li></ul>
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	<ul style="list-style-type: none"> <li>• Install Manual activation call point at all exit routes.</li> <li>• Prepare proper design and plan for dedicated fire pump with alternate backup power supply.</li> <li>• Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline.</li> <li>• Visual alarm should be placed at the generator room.</li> <li>• Obtain fire license with cover area from issuing authority</li> <li>• Obtain building approval from issuing authority</li> <li>• Implement to a single fire</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>• Implement the plan and design for one more exit or implement with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building.</li> <li>• All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction with 1.5 hrs fire rated door at ground floor for fire separated corridor.</li> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to final exit</li> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated door at 2nd floor boiler, which located at the adjacent to finishing section</li> <li>• Install automatic detection system with automatic fire alarm and control panel. (Also needs to cover the floors occupied by other tenants).</li> <li>• Install dedicated fire pump with alternate backup power supply.</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>

***(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"> <li>• None.</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>• 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>• Provide adequate illumination for generator room.</li> <li>• All unwanted materials should be removed from Generator room.</li> <li>• Provide rubber mats of adequate size in front of all electrical panels.</li> <li>• Install over heat detection, visual alarm and provide firefighting equipment in the generator room.</li> <li>• 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.</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>• 1. Overhead service connections should be covered and meet the requirements mentioned in RMG Guidelines. 2. Provide supports for main service line complete with adequate insulation.</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 cable connections with properly soldered / welded lugs at DB's. Ensure that all the electrical connections are properly secured with lugs.</li> <li>• Avoid bunch of cable at MCCB &amp; bus bar terminal, use</li> </ul>

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	<p>individual circuit and over current device for every incoming and outgoing circuit at the distribution boards.</p> <ul style="list-style-type: none"> <li>• Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases.</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 doors to all DBs. Ensure that all electrical panels provided with proper and separate earth potential.</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>• 1. Provide updated SLD matching the existing installation at the factory.</li> <li>2. SLD to indicate exact positions of all points of switch boxes and other outlets.</li> <li>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.</li> <li>2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation.</li> <li>3. As built drawing to be approved by the engineer-in-charge.</li> <li>• Provide adequate ventilation arrangements for indoor Generator room.</li> <li>• Provide 4 hour fire rated walls all around the generator room on ground level.</li> <li>• Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 50m<sup>2</sup>, or relocate the generator room.</li> <li>• Provide and maintain proper clearance in all sides of generator for ease of maintenance.</li> <li>• 1. Wooden switchboards / panel boards should be</li> </ul>

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	<p>replaced by non-flammable materials.</p> <p>2. Prefer switchboards made of non-flammable materials.</p> <ul style="list-style-type: none"><li>• Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).</li><li>• Seal the cable entry-exit points of DB's with non-flammable materials. In addition: Ensure all unused holes / openings in DBs to be blocked properly.</li><li>• 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.</li></ul> <p>2. Ensure that connections between conductors / equipment provided to durable electrical continuity and adequate mechanical strength and protection.</p> <p>3. The continuous earth connection is provided back to the main intake supply earth.</p> <ul style="list-style-type: none"><li>• Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.a</li></ul>
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