

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

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Name of the Factory	: BONANZATEX LIMITED
Address of the Factory	: Holding # 5, Block # D, Ward #16, Autpara, Chandana Chowrasta, Tangail Road, Gazipur
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Structural Inspection	: 2015-10-21
Fire Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Fire Inspection	: 2015-10-21
Electrical Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Electrical Inspection	: 2015-10-21
BKMEA Membership No.	: 1206

### **BASIC INFORMATION:**

i. Building Usage Type	: Garments Factory.
ii. Structural System	: R.C.C flat-slab structure.
iii. Floor System	: Flat-slab floor system.
iv. Floor Area	: The typical plinth area of 6 storied RCC building is 4188 sft. Total operational area is 25128sft.
v. No. of Stories	: 6-Storey building, No basement.
vi. Construction Year	: 2006
vii. Foundation Type	: Not Identified.
viii. Design Drawings	: Available for a 6 storey industrial building from UNO of Gazipur Shadar, Gazipur on 08th July, 2006.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Brick Aggregated.
xi. Generator	: The generator room is located at the ground floor of the factory Building.

**RECOMMENDATIONS FOR CORRECTIVE ACTION:** No critical or high risk observation was found at the factory which may pose harm to production and workers as well during assessment. Some non- conformity was found at the factory on the day of assessment, for which long term corrective actions have been recommended. There is no need to suspend operation in the factory.

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. As built architectural and engineering drawing to be prepared. As part of this process building engineer will be required to make a number of checks on the structural design.  2. Building engineer to verify strength and stiffness of lateral stability system for lateral loads.
Long Term (6-months)	: N/A

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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"> <li>• The minimum clear width of the pathway should be 0.9 meter</li> <li>• Rearrange the evacuation pathway to ensure the minimum width.</li> <li>• Remove all temporary items from all escape routes, aisles and passageway.</li> <li>• Rearrange the sewing machine table at 2nd floor stair-1, so that travel to stair-1 cover minimum travel distance to follow RMG guideline.</li> <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>• Combustible materials should keep away from electrical source 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,</li> </ul>

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	<p>non-lockable 1.5 hours fire rated doors in all stair way encloses.</p> <ul style="list-style-type: none"> <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 hrs fire rated barrier with 2 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 ground floor generator &amp; boiler room, which located at the adjacent to production area.</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.</li> <li>• Install Manual activation call point at all exit routes</li> <li>• Provide adequate nos. of smoke detectors to cover the whole factory building.</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>• Power backup supply should be provided for fire alarm system.</li> <li>• Visual alarm should be placed at the generator room.</li> <li>• Permit total area in fire license from issuing authority.</li> <li>• Obtain the boiler license from the proper issuing authority.</li> <li>• Obtain the boiler operator license from the proper issuing authority.</li> </ul>
<p>Long Term (The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none"> <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 hrs fire rated barrier with 2 hrs fire rated door for storage area.</li> <li>• Provide 4 hours fire rated barriers with 2 hours fire rated door at ground floor generator &amp; boiler room, which located at the adjacent to production area.</li> <li>• Install automatic detection system with automatic fire alarm.</li> </ul>

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	<ul style="list-style-type: none"> <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> <li>• Provide obstacle free and wide roads for fire-fighting trucks</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>	N/A
<p>Short Term <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> </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>• All unwanted materials should be removed from Generator room.</li> <li>• Provide rubber mats of adequate size in front of all distribution panels.</li> <li>• Install smoke detection and provide firefighting equipment in the generator room.</li> <li>• Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign.</li> <li>• Individual Fuse protection should be provided to every 15A socket.</li> <li>• 1. Remove all the inflammable materials from surrounding of electrical circuitry at DBs. 2. Ensure that all electric circuitry clean of inflammable materials.</li> </ul>

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	<p>3. Conduct periodic maintenance and maintain the records.</p> <ul style="list-style-type: none"> <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>• Provide proper clearance of 0.8 - 1.0 m in front of distribution panels.</li> <li>• Provide cable connections with properly soldered / welded lugs at (DBs). Ensure that all the electrical connections are properly secured with lug.</li> <li>• Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation.</li> <li>• Avoid bunch of cable at MCCB, 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 load, voltage, number of phases.</li> <li>• Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.</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> <li>• Provide separate earthing connection to electrical equipment. 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 DB /. 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</li> </ul>

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	<p>and other outlets to match existing installation.</p> <p>3. As built drawing to be approved by the engineer-in-charge.</p> <ul style="list-style-type: none"><li>• Provide 1.5 hour fire rated door of 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 30m<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>•<ol style="list-style-type: none"><li>1. Design to have proper segregation of different end used loads.</li><li>2. Wiring design to have separate and distinct sub-circuits for power and heating system.</li><li>3. All DBs to be placed conveniently.</li><li>4. Wiring to be neat, tidy and located near ceiling.</li></ol></li><li>•<ol style="list-style-type: none"><li>1. Wooden switchboards Base should be replaced by non-flammable materials.</li><li>2. Prefer switchboards made of non-flammable materials.</li></ol></li><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:<ol style="list-style-type: none"><li>1. Ensure that DB panels / Switchgears to be vermin / damp proof.</li><li>2. Ensure all unused holes / openings in DBs to be blocked properly.</li></ol></li><li>•<ol style="list-style-type: none"><li>1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.</li><li>2. Ensure that connections between conductors / equipment provided to durable electrical continuity and adequate mechanical strength and protection.</li><li>3. The continuous earth connection is provided back to the main intake supply earth.</li></ol></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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