

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

Name of the Factory	: Bando Apparels Ltd.
Address of the Factory	: Plot#-01, House#-01, Turag Housing, Muhammadpur, Dhaka-1229, Bangladesh
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 29 <sup>th</sup> January, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 29 <sup>th</sup> January, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 29 <sup>th</sup> January, 2015
BGMEA Membership No.	: 5573.

### **BASIC INFORMATION:**

The assessed factory building was an 8 Storey RCC building. The structural system of the building is RCC beam column frame and beam slab floor system. The entire building is used for several RMG industries (Bando Apparels Ltd. ,NOFS garments ltd, Apparel today ltd. , Chantik Apparels and Romo fashions). The Bando Apparels Ltd. is located on the ground floor, 1<sup>st</sup> floor, and 4th floor of the building. The following general information were noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame system.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Total floor area is 54443 sft.
v. No. of Stories	: 8 Storey.
vi. Construction Year	: Building was built in one phases.(2008-2010)
vii. Foundation Type	: Isolated Footing foundation.
viii. Design Drawings	: Available: structural drawing, architectural drawings and soil test report. Not available: As built machine layout plan and material test report.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick Aggregated.
xi. Generator	: At 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:

Short Term (Immediate)	:	<ul style="list-style-type: none"><li>• North -West corner of the building should not be used for storage purpose; therefore the storage loading should be removed as soon as possible.</li><li>• A Detail Engineering Assessment of Factory to be commenced.</li><li>• Reduce Loadings on all floors to 2.0 KN/m<sup>2</sup></li></ul>
Mid Term (6-weeks)	:	

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- Detail Engineering Assessment to be completed
- Create controlled loading plans for all floors, designating where storage can be placed and cannot be placed.
- Roof drainage system to be installed and concrete slab to be waterproofed at locations where the slabs have been damped.

Long Term (6-months)

:

- Continue to implement load plan.
- Continue to implement load plan and manage floor loading.
- Continue to monitor for dampness on an ongoing basis.

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>• Fire manager/Director need to have safety training from proper authority &amp; worker of the factory should as far as possible be trained for use fire extinguisher.</li> <li>• All the firefighting equipment's need to test with proper documents.</li> <li>• Lights in storage area need to be installed with protective covers and conduits.</li> <li>• Storage facilities with no air-conditioning duct shall be minimum 2.9 m and when used as a storage facility there shall be a minimum clearance of one-third the floor height from the ceiling to the top of the storage stack.</li> <li>• Ensure adequate illuminated emergency lighting in floors, exits &amp; staircases.</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 the lockable exit doors need to be replaced by fire rated an opening system so that the doors can be opened easily in the direction of evacuation.</li> <li>• Provide handrail on both sides of stairways.</li> <li>• Install suitable public address system having communication to all floors as well as facilities to receive messages from all floors.</li> </ul>

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<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>• Factory needs to have a proper pre-plan for fire department.</li><li>• Fabric &amp; wastage store fire separation wall need to be constructed up to ceiling &amp; fire door need to fitted at opening.</li><li>• Generator &amp; Transformer room need to separate by 4hrs rated wall &amp; 2 hr rated opening with the others occupancies.</li></ul> <p>Boiler room need to separate by 4hrs rated wall &amp; 2hr rated opening Plan with the working floor (Cutting Section).</p> <ul style="list-style-type: none"><li>• Stair case enclosure (all walls) &amp; opening need to be smoke protected and fire rated with fire door.</li><li>• Final exit for stair-2 needs to be separated with generator room by 2hrs rated construction &amp; 1.5hrs rated door or replace the generator room 3m away from the exit access.</li><li>• Exit leading to stair shall have 2 hr rated enclosure with lobby and 1.5 hr rated opening/Fire door.</li><li>• Factory need to close the high window of bonded ware house with 2 hr rated construction and 1.5 hr rated opening or All openings in floors shall be protected by vertical enclosures extending above and below such openings. Walls of such opening enclosure shall have at least 2 hour fire resistance rating.</li><li>• Factory needs to install fire lift with having minimum capacity of 545 kg&amp; the lift core should have 2 hr rated enclosure &amp; 1hr rated auto closing fire door.</li><li>• Factory need to have 2hr fire separated lobby near exit leading to staircase for 7 storied building.</li><li>• Basement staircase shall be encased and placed near the outer edge of the basement with materials of 2 hour fire resistance. Communication with the basement in case of emergency shall be maintained through a lobby provided with a fire resisting self-closing door of 1 hour fire resistance.</li><li>• Install automatic detection system with proper sitting arrangement.</li></ul>
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	<ul style="list-style-type: none"> <li>• Install control panel board at required location.</li> <li>• Install proper standpipe system having at least 100mm diameter of standpipe.</li> <li>• Ensure Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</li> <li>• Install dedicated fire pump system with backup power system.</li> <li>• Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900ltr x 75min=142500 liters water storage tank.</li> <li>• Factory shall have a command station on the entrance lobby with suitable public address system having communication to all floors as well as facilities to receive messages from all floors.</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>• Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point, ) of overheating {&gt;(ambient+40<sup>0</sup>C)} and take proper action.</li> <li>• Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) of burning sign and take proper action including replacing cable or equipment where necessary.</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>• Ensure all switchboards and distribution boards are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to main earth pit.</li> <li>• Provide additional insulation for wiring exposed to external heat sources to protect cable/conduit.</li> <li>• Ensure proper earthing connections at all electrical equipment.</li> <li>• Seal all openings within the enclosure to prevent dust and debris from entering.</li> <li>• Provide provision for inspection of all earthing system and ensure inspection is being completed and</li> </ul>

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	documented.
<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>• Install appropriate number and type of safety signage and fire-fighting equipment, graded rubber mats at required location.</li> <li>• Ensure substations room has adequate illumination level as per standard.</li> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</li> <li>• Rewire to ensure             <ul style="list-style-type: none"> <li>i) Single cable at single point to avoid loose connection.</li> <li>ii) Separate circuit/ branch circuit at switch-gear for separate controlling of each circuit/branch circuit.</li> </ul> </li> <li>• Ensure all electrical wiring/cables are sized according to capacity of circuit breakers.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Seal the openings remaining after passage of the wiring system from floor to floor according to the degree of fire resistance.</li> <li>• Connect all metal in the building to the building earthing system.</li> <li>• Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point, ) of overheating {( ambient+ 20<sup>0</sup>C-40<sup>0</sup>C)} and take proper action.</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>• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</li> <li>• Ensure the generator room has adequate fire separation from the production area.</li> <li>• Ensure distribution boards have no opening and all live internal components are concealed properly.</li> <li>• Ensure switchboards and distribution boards are</li> </ul>

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	<p>installed in compliant locations in terms of height, access and surrounding weather.</p> <ul style="list-style-type: none"><li>• Install boards in proper way or proper place to ensure secure operation.</li><li>• Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</li><li>• Ensure each distribution board is provided with a circuit list and means of identification on cable is as per circuit list.</li><li>• Provide proper cable terminator for stranded cable.</li><li>• Provide cable adequate size of cable shaft for cable rising.</li><li>• Install lightning protection system on the building.</li></ul>
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