

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

Name of the Factory	: Blessings Knit Inds. Ltd.
Address of the Factory	: 2/2, Bara Dewra, Fakir Market, Tongi, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 17 <sup>th</sup> May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 17 <sup>th</sup> May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 17 <sup>th</sup> May, 2015
BGMEA Membership No.	: 4974.

### **BASIC INFORMATION:**

The assessed factory building was a 2 Storey RCC building. The structural system of the building at GF is RCC beam column frame and beam slab floor system and 1<sup>st</sup> floor is flat plate system. Blessings Knit Inds. Ltd. occupies the entire building. The following general information were noted:

i. Building Usage Type	: Garment factory.
ii. Structural System	: RCC beam column frame and flat plate system.
iii. Floor System	: RCC beam slab and flat plate slab floor system.
iv. Floor Area	: Total area of the building is 3734 sft.
v. No. of Stories	: 2 Storey.
vi. Construction Year	: 2008-2010 (One phases).
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Only approval drawing available Not Available: Structural drawing, Architectural design drawing, material test report soil test report.
ix. Soil Investigation Report	: Unavailable.
x. Construction Materials	: Brick aggregate.
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)	: None.
Mid Term (6-weeks)	: None.
Long Term (6-months)	: <ul style="list-style-type: none"><li>• Protective coating should be applied on the exposed rebar and steel frame to protect them from corrosion.</li><li>• Continue to monitor for corrosion on an on-going basis.</li><li>• Structural engineer to prepare full set of structural drawing, as built drawing and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.</li></ul>

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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>	<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>• Ensure adequate numbers of fire drills under the Fire Safety Plan.</li> <li>• All the firefighting equipment need to be tested with proper documents.</li> <li>• Factory needs to have sufficient number &amp; width (0.9 m) of marked aisles</li> <li>• Factory needs to minimize or shift to other floor of worker at 1<sup>st</sup> floor.</li> <li>• Lights in storage area need to be installed with protective covers and conduits.</li> <li>• Combustibles are to be managed with good housekeeping. 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 exit.</li> <li>• Ensure adequate exit signs in all floors so that it is visible from all positions</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>• Factory needs to have as built drawing with proper dimensions showing all the means of escape.</li> <li>• Factory needs to have fire license with full area coverage of the factory.</li> <li>• Factory safety Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</li> <li>• All the exit doors need to be install side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key</li> <li>• Factory needs to maintain minimum width of exit 0.9 m</li> </ul>

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	<p>and height 2 m.</p> <ul style="list-style-type: none"> <li>• Both of the stairs have handrail on both sides.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route).</li> <li>• Ensure adequate illuminated emergency lighting with backup power in all floors, exit &amp; stair.</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>• Factory needs to have a proper pre-plan for fire department.</li> <li>• Factory needs to ensure fire protected route from stair-1 to final exit -1 safely outside of the building.</li> <li>• Storage area needs to be protected with 2 hours rated construction &amp; 1.5 hours rated opening or doors.</li> <li>• Generator and boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside.</li> <li>• All the exits connecting to the staircase-1 need to be protected with fire and smoke resistant enclosures and opening (1.5 hours rated enclosure and 1 hour rated door)and provide a protected route from all though the stairway to the final exits.</li> <li>• Factory needs to installed with centralized aticautom detection system with proper sitting arrangement according to NTPA guideline.</li> <li>• Automatic fire detection (AFD) and alarm system needs to be installed in all types of buildings.</li> <li>• Factory needs to install control panel for detection and alarm system at required location.</li> <li>• Install proper standpipe system having at least 75 mm dia of standpipe. First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid</li> <li>• Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50mm or larger hose connection facility shall be provided.</li> <li>• Factory needs to install 1 riser per 1000 m<sup>2</sup> of floor area and 38 mm diameter of hoses with variable nozzle.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Factory needs to install standard standpipe, hose and fire pump system to ensure required hose pressure.</li> <li>• Factory needs to install Siamese connection after installation of stand pipe system, hose system and fire pump.</li> <li>• Factory needs to install dedicated fire pump with sufficient capacity and backup power.</li> <li>• Factory needs 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> </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> </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>• Provide two separate and distinct connections of earthing for the generator.</li> <li>• Ensure all distribution boards (including panel door) are earthed properly.</li> <li>• Remove all unused cables from distribution boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug.</li> <li>• Provide shielding for wiring exposed to external heat sources to protect cable.</li> <li>• Ensure overcurrent protection device (circuit breaker/fuse) for each circuit and branch circuit.</li> <li>• Clean interior components from dust and debris and 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 documented.</li> </ul>
<p>Mid Term</p> <p><i>(The remedial works indicated must be</i></p>	<ul style="list-style-type: none"> <li>• Ensure appropriate number and type of safety signage and fire-fighting equipment at generator room and</li> </ul>

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<p><i>carried out within a period of 6 weeks)</i></p>	<p>graded rubber mats at required location.</p> <ul style="list-style-type: none"> <li>• Provide Instruction board for first aid and artificial respiration in the generator room.</li> <li>• Ensure generator room has adequate illumination level as per standard.</li> <li>• Ensure distribution board has a minimum clearance of 1 m (39 in) in front.</li> <li>• Install circuit breakers in proper way to ensure secure operation.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake.</li> <li>• Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's.</li> <li>• Replace wooden base with metal clad construction enclosures for mounting the circuit breakers and switch boards.</li> <li>• Ensure all electrical 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>• Use non-combustible material to make cable channels and provide adequate covers on cable channel.</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>• Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</li> <li>• Inspect electrical panel boards on an annual basis.</li> <li>• Ensure the generator room has adequate fire separation</li> </ul>

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	<p>from the main building.</p> <ul style="list-style-type: none"><li>• Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</li><li>• Ensure distribution boards have no opening and all live internal components are concealed properly.</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 is provided as per list.</li><li>• Provide adequate mechanical guards for electrical equipment where necessary.</li><li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li><li>• Install separate distribution boards for lighting and power circuits.</li><li>• Provide individual fuse or miniature MCB for each 15/20A socket outlet.</li><li>• Install lightning protection system on the building.</li></ul>
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