

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

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Name of the Factory	: ADIB FASHIONS LTD.
Address of the Factory	: Kutubiyail,Sastapur,Katherpul,Fatullah,Narayanganj.
Present status of the factory	: Under Operation.
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-06-28
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-06-28
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-06-28
BKMEA Membership No.	: 1942

**BASIC INFORMATION:** The building is a 4 storied RCC building. The following general information were noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC Beam Slab Frame.
- iii. Floor System : RCC Beam Slab.
- iv. Floor Area : Total floor area is 19,000 sq. ft. Ground floor area is around 5300 sft, 1st to 2nd floor area is about 5600 sft., 3rd floor area is about 2500 sft.
- v. No. of Stories : 4 storied RCC building.
- vi. Construction Year : 2007
- vii. Foundation Type : Unknown
- viii. Design Drawings : Available: Approval drawing, soil test report, machine layout plan  
Not available: Structural drawing, architectural drawing, floor load plan, and materials test report.
- ix. Soil Investigation Report : Available.
- x. construction Materials : Bricks
- xi. Generator : Ancillary 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:**

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|------------------------|---|
| Short Term (Immediate) | : N/A   |
| Mid Term (6-weeks)     | : 1. Factory Engineer to review design, loads and columns stresses in area identified above.<br><br>Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns]. |

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Long Term (6-months)

: 1. Engage a qualified structural engineer to prepare structural drawing, as built drawing and prepare calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.

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>• Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</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>• All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.</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 prepare as built drawing with floor machine layout showing means of escape with proper dimension.</li> <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 exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Factory needs to provide handrail on both sides of all the stairways.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route).</li> <li>• Factory needs to have emergency backup power for critical fire safety system with sufficient capacity &amp; arrangement according to NTPA Guideline.</li> </ul>

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<p>Long Term</p> <p>(The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none"><li>• Fire department pre-plan needs to be developed.</li><li>• Factory needs to maintain minimum width of exit 0.9 m and height 2 m as per the requirement of NTPA guideline.</li><li>• Final exit route-1 and 3 (Stair-1 and 3) escape routes need to be protected ( 2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor working area, also need to be protected escape route till to reach safe refuse area.</li><li>• Accessories storage area need to be protected from finishing section at 1st floor with 2 hours rated construction and 1.5 hours rated opening or doors.</li><li>• Boiler room needs to be fire separated from finishing section located at 1st floor with 4 hours fire rated enclosure and 2 hour rated opening or doors.</li><li>• All the exits connecting to the staircases need to be protected with fire and smoke resistant enclosures and opening i.e. 2 hours rated enclosure and 1.5 hour rated door and provide a protected route from all though the stairway to the final exits.</li><li>• Factory need to install centralized and automatic fire detection &amp; alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</li><li>• The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.</li><li>• Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</li><li>• Factory needs to install proper standpipe system with having at least 75 mm dia of riser.</li><li>• Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses</li><li>• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa and standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</li><li>• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</li></ul>
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	<ul style="list-style-type: none"> <li>• Factory needs to have dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory.</li> <li>• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr x 75 min=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+40C) and take proper action.</li> </ul>
<p>Short Term (Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)</p>	<ul style="list-style-type: none"> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure all panel boards (including panel door) are earthed properly.</li> <li>• Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</li> <li>• Ensure proper earthing connections at all electrical equipment.</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</i></p>	<ul style="list-style-type: none"> <li>• Post appropriate number and type of safety signage at generator room and provide graded rubber mats in front of all panel boards.</li> <li>• Provide Instruction board for first aid and artificial respiration in the generator room.</li> <li>• Ensure in the generator room, all working place, exit light and</li> </ul>

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<p><i>indicated must be carried out within a period of 6 weeks)</i></p>	<p>escape light have adequate illumination level as per standard.</p> <ul style="list-style-type: none"> <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 on incoming and outgoing side of MCB's/MCCB's and busbar.</li> <li>• Replace wooden boxes and panels with metal clad construction for mounting the switch controls.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Provide emergency power connection for life safety loads (emergency lighting, exit signage, etc.) temporarily within 6 weeks and find out a permanent solution within 6 months.</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+( 20-40C)} and take proper action.</li> </ul>
<p>Long Term <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 to ensure that the equipment is in good working condition.</li> <li>• Ensure overhead service connections to the building are led via adequate size and type of service masts.</li> <li>• Ensure the generator room has adequate fire separation from the main building.</li> <li>• Ensure the generator room has adequate fire separation from the main building.</li> </ul>

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	<ul style="list-style-type: none"><li>• Ensure panel 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 and noncombustible covers on cable channel.</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>• Install lightning protection system on the building.</li></ul>
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