

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

Name of the Factory	: 3N Fashion (BD) Ltd.
Address of the Factory	: Plot #2924, 2925, 2939, 2940, Daxinkhan Bazar, Daxinkhan, Dhaka-1230, Bangladesh
Present Status of the Factory	: Not in operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 19 May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 19 May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 19 May, 2015
BGMEA Membership No.	: 5771

### **BASIC INFORMATION:**

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC Beam Column and flat plate slab.
iii. Floor System	: RCC Beam and flat plate slab.
iv. Floor Area	: 136000 square feet
v. No. of Stories	: 6 stories
vi. Construction Year	: 2001
vii. Foundation Type	: Isolated column footing
viii. Design Drawings	: Available: Approval plan, soil test report, structural design drawing (improper), machine layout plan. Not Available: architectural drawing, floor loading plan and construction material test report
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: 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)	: N/A
Mid Term (6-weeks)	: 1. Factory Engineer to review design, loads and columns stresses in the area identified above. 2. Carry out ongoing maintenance works.
Long Term (6-months)	: 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

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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>• N/A</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>• Factory Manager or Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</li> <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>• Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9m 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>• Each extinguisher can cover 550sft area. Factory needs to install more extinguishers according to factory area</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 floor machine layout showing means of escape with proper dimension.</li> <li>• Factory need to have a valid fire license with covering full occupied area &amp; clearly mention the coverage area in the license.</li> <li>• Factory needs to have a proper pre-plan for fire department.</li> <li>• All the exit doors of staircase enclosure need to be replaced by side swinging fire fated doors so that the staircase remains free from smoke as well as the</li> <li>• lockable doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Provide handrail on both sides of stairways.</li> <li>• Walls of such opening shall have at least 2 hour fire resistance rating Or close the opening with 2 hr rated construction.</li> <li>• Illuminated emergency light needs to be covered in floor, exits and aisles. The intensity of illumination by means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated</li> </ul>

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	<p>with escape lighting to a level of not less than 2.5 lux at floor level.</p> <ul style="list-style-type: none"> <li>• Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of failure of power supply.</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> <li>• Factory needs to install manual as well as automatic fire alarm system with control panel for centralized automatic fire detection and alarm system in the command station at the entrance lobby of the factory premises.</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>• Both of the final exit route need to provide protected paths of travel(2 hours fire rated construction with 1.5 hours fire rated opening) from the stair entrance (2 hours rated enclosure with 1 hours rated automatic opening/doors) at each floor level) till to reach safe refuse area.</li> <li>• Accessories store need to be separated with 2 hours rated construction &amp; 1.5 hours rated door.</li> <li>• Generator room need to be fire separated by 2 hr fire rated enclosure and 1.5 hrs rated opening.</li> <li>• Boiler room need to be fire separated by 2 hr fire rated enclosure and 1.5 hrs rated opening.</li> <li>• Sub-station room need to have 1 hour fire rated encloser and 45 min fire rated composite door.</li> <li>• All the exits connecting to the staircase-1 and 2 need to be protected with fire and smoke resistant enclosures and opening (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>• Factory needs to install control panel for centralized automatic fire detection and alarm system in the command station at the entrance lobby of the factory premises.</li> <li>• Install proper standpipe system having at least 100 mm dia of standpipe. First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid Fire Fighting</li> </ul>

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	<p>Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility shall be provided.</p> <ul style="list-style-type: none"> <li>• Install standard standpipe and hose system as well as fire pump system to ensure required hose pressure at the highest and most remote part of the building.</li> <li>• Factory need to installed Siamese connection after installation of stand pipe system, hose system and fire pump.</li> <li>• Install dedicated fire pump with backup power system &amp; sufficient capacity for achieve required pressure in the remote place of the factory. Required for adequate pressure of hose.</li> <li>• Water reservoir need to design of required discharge quantity for fire-fighting.</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 cause of burning sign on busbar and insulation damage of cable 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>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure all panel boards are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to earthing pit.</li> <li>• Replace wooden boxes and bases with metal clad construction enclosure for mounting the cutout and switch controls.</li> <li>• Remove all unused cables from panel boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug.</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</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>• Ensure appropriate number and type of safety signage and fire-fighting equipment at substation and generator room. Also ensure graded rubber mats are provided in front of all distribution boards.</li> <li>• Provide Instruction board for first aid and artificial respiration in the substation room and generator room.</li> <li>• Ensure substations room has adequate illumination level as per standard.</li> <li>• Install breather and fill the transformer breather with fresh Silica gel and oil cup with fresh Oil</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</li> <li>• Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and busbar.</li> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate support or mechanical guards for rotating part of electrical equipment where necessary.</li> <li>• Provide adequate and noncombustible covers on cable channel.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Connect all metal in the building to the building earthing system.</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 to ensure that the equipment is in good working condition.</li> <li>• Ensure substation room has minimum area as per NTPA Table-4.3.</li> <li>• Ensure the substation room has adequate fire separation from the production area.</li> <li>• Ensure all high tension cables are laid following standard cable laying techniques.</li> <li>• Ensure the generator room has adequate fire separation from production area.</li> </ul>

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	<ul style="list-style-type: none"><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 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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