

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Concord Creations Ltd.
Address of the Factory	: 64, United Commercial Complex, Hossain Market, Tongi, Gazipur, Dhaka.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 15 March, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 15 March, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 15 March, 2015
BGMEA Membership No.	: 5378

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:

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| i. Building Usage Type | : Garment factories, market and bank. |
| ii. Structural System | : RCC beam column system. |
| iii. Floor System | : RCC Beam slab. |
| iv. Floor Area | : Total Building area is 46,200 sq. ft. (Concord Creation Ltd. occupies 11650sq. ft.) |
| v. No. of Stories | : 6 Storied |
| vi. Construction Year | : 1st phase (upto 4th floor) : 2004-2006
2nd phase (5th floor) : 2014 to continue |
| vii. Foundation Type | : Pile Foundation |
| viii. Design Drawings | : Available: Approval plan, structural design drawing, partial architectural design drawing and machine layout plan
Not Available: Material test report and floor load plan |
| 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:

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| Short Term (Immediate) | : 1. Water tank should be emptied and bill board should be removed until DEA is completed.
2. Verify insitu concrete stresses either by cores (100mm diameter) or existing cylinder strength data for all the columns or cores from a minimum of 4 non-critical columns.
3. A Detail Engineering Assessment of Factory to be commenced. |
| Mid Term (6-weeks) | : 1. Building engineer to verify the integrity of additional floor and billboard on entire structure and prepare as built drawings accordingly. |

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2. A Detail Engineering Assessment of Factory to be completed.

Long Term (6-months) : 1. Continue to implement load plan.

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>	<p>Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record with picture of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</p> <p>Factory needs to have proper testing plan and record of fire safety equipment. Lights in storage area need to be installed with protective covers and fire rated conduit.</p> <p>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.</p> <p>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.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</p> <p>Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use of fire extinguisher.</p> <p>All the exit doors need to be replaced by side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route). Factory need to have emergency backup power for critical fire</p>

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	<p>safety system with sufficient capacity & arrangement according to NTPA Guideline.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Factory needs to have a proper pre-plan for fire service & civil department.</p> <p>Final exit route-1(Stair-1 route) need to be protected by 2 hours rated construction with 1.5 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from generator room at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area.</p> <p>Final exit route-2&3 needs to be protected by 2 hours rated construction with 1.5 hours fire rated door/opening at each floor level entrance including ground floor and need to have the protected escape route till to reach safe refuse area.</p> <p>The storage area need to protect with 2 hours rated construction & 1.5 hours rated opening/doors with the working floor located at 3rd floor of the building.</p> <p>Generator room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside.</p> <p>Boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside.</p> <p>All the stairs need to be protected with fire and smoke resistant enclosures(2 hours rated construction & 1.5 hours rated door) & doors with provide a protected route from all though the stairway to the final exits.</p> <p>Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</p> <p>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.</p> <p>Factory needs to be installed with control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install proper standpipe system with having at</p>

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	<p>least 75 mm dia of riser.</p> <p>Install 1 riser per 1000 m² of floor area & 38 mm diameter of hoses with variable nozzle need to be installed.</p> <p>Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</p> <p>Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</p> <p>Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.</p> <p>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.</p>
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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>	<p>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.</p> <p>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+ 40°C) and take proper action.</p>
<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>	<p>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</p>
<p>Mid Term</p>	<p>Install appropriate number and type of fire-fighting equipment at</p>

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<p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>generator room. Also ensure graded rubber mats are provided in front of all panel boards.</p> <p>Provide Instruction board for first aid and artificial respiration in generator room.</p> <p>Ensure generator room has adequate illumination level as per standard.</p> <p>Provide two separate and distinct connections of earthing for the generator.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth bus-bar of distribution boards and ensure continuous earth path is back to main building intake.</p> <p>Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's. Replace wooden bases with metal clad of dead front construction for mounting the switch controls.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Use noncombustible material to make cable channel. Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Connect all metal in the building to the building earthing system.</p> <p>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°C-40°C) } and take proper action.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. Inspect electrical switchgear and panel boards on an annual basis.</p> <p>Ensure the generator room has adequate fire separation from the</p>

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	<p>production building.</p> <p>Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.</p> <p>Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. Ensure panel boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated & adequate size of neutral with proper identification for each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Provide readily accessible single point of disconnect for each main electrical service feed.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the building</p>
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