

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Denim Export Processing Ltd.
Address of the Factory	: Nanduin, Masterbari, Gazipur Sadar, Gazipur.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 31 May, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 31 May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 31 May, 2015
BGMEA Membership No.	: 4626

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	: Plastic pipe factory.
ii. Structural System	: RCC beam column system.
iii. Floor System	: RCC Beam slab.
iv. Floor Area	: 11650 sft for tin shed and 2800 sft for single storie
v. No. of Stories	: Single Storied
vi. Construction Year	: 2008-09
vii. Foundation Type	: Unknown
viii. Design Drawings	: Not Available
ix. Soil Investigation Report	: Not 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)	: None
Mid Term (6-weeks)	: 1. 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.
Long Term (6-months)	: 1. Provide protective coating to cover the exposed rebar from corrosion.

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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>	<p>Remove all the fabric cloth and relocate the steel materials from exit portion so that exit access, aisles and exit discharge remains unobstructed.</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>Ensure adequate numbers of fire drills under the Fire Safety Plan.</p> <p>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.</p> <p>Factory need to have proper testing plan & record for fire safety equipment.</p> <p>Factory needs to have sufficient number and width (0.9 m) of marked aisles at ground floor and shed of the building.</p> <p>Lights in storage area needed to be installed with protective covers and conduits.</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>Ensure adequate exit signs in all floors so that it is visible from all positions.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Needs to have as built drawing with proper dimensions showing means of escape.</p> <p>Fire license needs to be updated for full occupied area Factory Manager or Director needs to arrange fire safety training for the workers of the factory from proper authority time to time.</p> <p>All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the</p>

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	<p>direction of evacuation without the use of a key.</p> <p>Illuminated emergency light needs to be covered in all floors, exits, staircases and aisles of all the factory buildings or sheds. The intensity of illumination by means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated with escape lighting to a level of not less than 2.5 lux at floor level.</p> <p>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.</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 department.</p> <p>The final exit-2 escape routes need to be protected by 2 hours fire rated construction with 1.5 hours fire rated doors/opening from the storage area(materials store) of ground floor and have the protected route till to reach safe refuse area.</p> <p>Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors. Generator room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside.</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. Factory needs to install control panel for detection and alarm system at required location.</p> <p>Install proper standpipe system having at least 75 mm diameter of standpipe. First aid hose system (38 mm nominal) shall be provided. In addition 50 mm or larger hose connection facility shall be provided Factory needs to install 1 riser per 1000 m² of floor area and 38 mm diameter of hoses with variable nozzle.</p> <p>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. Factory need to installed Siamese connection after installation of stand pipe and hose system and fire</p>

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	<p>pump.</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 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.</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>N/A</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>Ensure proper earthing connections at all electrical equipment. 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><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Install appropriate number and type of safety signage and fire-fighting equipment at generator rooms. Also ensure graded rubber mats are provided in front of all distribution boards. Provide Instruction board for first aid and artificial respiration in the generator rooms.</p> <p>Provide two separate and distinct connections of earthing for each generator.</p> <p>Ensure distribution boards are installed in compliant locations in terms of height.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous earth path is back to</p>

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	<p>main building intake 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.</p> <p>Replace wooden base with metal enclosure for mounting the circuit breaker and cutout.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide mechanical guards for electrical equipment where necessary.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Ensure discrimination is achieved between circuit breakers used for protection of main circuit and the sub-circuits derived therefrom.</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.</p> <p>Inspect electrical panel boards on an annual basis. Ensure the generator rooms have adequate fire separation from the production area.</p> <p>Replace distribution boards with metal enclosed body. Ensure distribution 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</p>

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	<p>means of identification is provided as per list.</p> <p>Ensure exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</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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