

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Avertex (Pvt) Ltd. |
| Address of the Factory | : Plot 6594-95, South Haliashahar, Bandar, Chittagong. |
| Present Status of the Factory | : Under Construction. |
| Structural Assessment Conducted by | : TUV |
| Date of Structural Inspection | : 24 th July, 2015 |
| Fire Assessment Conducted by | : VEC |
| Date of Fire Inspection | : 28 th July, 2015 |
| Electrical Assessment Conducted by | : VEC |
| Date of Electrical Inspection | : 28 th July, 2015 |
| BGMEA Membership No. | : 3224 |

BASIC INFORMATION:

The assessed factory building is a 4 storied RCC building having beam column frame and beam slab floor system. The following general information were noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC beam-column frame system. |
| iii. Floor System | : RCC beam slab floor system. |
| iv. Floor Area | : Operational floor area of the factory is approx. 44000 sft. |
| v. No. of Stories | : 4- storied. |
| vi. Construction Year | : 1996 |
| vii. Foundation Type | : Pre cast RCC Piles. |
| viii. Design Drawings | : Available (Approval for a 4 - storey commercial building on 9 th October, 1995 from Chittagong Development Authority). |
| ix. Soil Investigation Report | : Available. |
| x. Construction Materials | : Brick Aggregate. |
| xi. Generator | : Situated on south side in an ancillary shed. |

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) | : None. |
| Mid Term (6-weeks) | : <ul style="list-style-type: none">• Factory Engineer to review design, loads and columns stresses in area identified above.• Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for D1 column or 100mm dia. cores from 4 columns. |
| Long Term (6-months) | : <ul style="list-style-type: none">• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.• As-built architectural and engineering drawing to be prepared for the vertical extension and submitted for approval by appropriate authority. As part of this process building engineer |

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will be required to make a number of check on the as built structural.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

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| <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"> • None. |
| <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"> • Factory need to have proper testing plan & record of fire safety equipment. • Lights in storage area needed to be installed with protective covers and conduits. • 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. • 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>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"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • 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. • Factory needs to provide handrail on both sides of all the stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape route). • 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>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6</i></p> | <ul style="list-style-type: none"> • Factory needs to have a proper pre-plan for fire service & civil department. • Child care room is needed to be separated from the fabric store of 1st floor of the building by 3 hours fire |

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| <p>months)</p> | <p>rated construction with 3 hours fire rated door.</p> <ul style="list-style-type: none"> • Storage area needs to be protected with 2 hours rated construction and 1.5 hours rated opening or doors with working or production area. • Boiler room needs to be fire separated with iron and finishing section and finished goods storage area by 4 hours rated construction and 2 hours rated opening. • All the exits connecting to the staircase-1, 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. • 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. • 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 centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory needs to install proper standpipe system with having at least 100 mm dia of riser. • 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. • Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection. • Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr/min x 75 min = 142500 liters water storage tank. |
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(B): Recommendations for Electrical Safety corrective actions:

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| <p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities</i></p> | <ul style="list-style-type: none"> • Ensure there is no break in the neutral wire in the form of a fuse unit throughout the wiring installation. |
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| <p><i>have been rectified):</i></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> | <ul style="list-style-type: none"> • Ensure all panel boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • 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. • Provide provision for inspection of all earthing system and ensure inspection is being completed and 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"> • Post safety signage in the generator room. Also ensure graded rubber mats are provided in front of all panel boards. • Provide Instruction board for first aid and artificial respiration in the generator room. • Provide two separate and distinct connections of earthing for the generator. • Ensure the panel boards are installed in compliant locations in terms of height. • Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake. • Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's/ MCCB's. • Replace wooden Base are used for mounting the lighting boards and switch control elements. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate mechanical guards for all electrical equipment's where necessary. • Ensure cable joints are made in respect of conductivity, |

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| | <p>insulation and mechanical strength.</p> <ul style="list-style-type: none"> • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • Connect all metal in the building to the building earthing system. • Ensure Lighting fixtures are supported from the structure properly. |
| <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"> • Update an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical panel boards on an annual basis. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • 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. • Provide dedicated & adequate size of neutral with proper identification for each circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Provide adequate covers on cable channel. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building. |