

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ULTRA DESIGN & FASHION LTD.
Address of the Factory	: South Pahartoli, fatehbad, Hathazari, Chittagong.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-09-03
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-09-03
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-09-03
BGMEA Membership No.	: 4993
BKMEA Membership No.	: 1664

BASIC INFORMATION: The present garments factory is a six storied industrial building with beam-column frame structure. The following general information was noted:

i. Building Usage Type	: Garment factory
ii. Structural System	: RCC frame system.
iii. Floor System	: RCC Beam slab.
iv. Floor Area	: 10500 sft.
v. No. of Stories	: Six storied.
vi. Construction Year	: 2008-09.
vii. Foundation Type	: Isolated column footing.
viii. Design Drawings	: Available: Soil test report, structural design drawing (without Column layout) and machine layout Plan. Not Available: approval plan, test report of materials, floor load Plan and architectural design drawing
ix. Soil investigation Report	: Available
x. construction Materials	: Brick aggregate. (column)
xi. Generator	: Separate Structure.

RECOMMENDATIONS FOR CORRECTIVE ACTION: Corrective action for structure are,

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Building Engineer to review the adequacy of the roof structure. Design should be checked by the building engineer to verify the lateral stability of the shed and confirm its ability to withstand all wind loading pressure, suction and uplift forces.
Long Term (6-months)	: 1. Structural engineer to prepare full set of as built structural drawing, floor load plan 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.

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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>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"> • Factory need to have proper testing plan & record of fire safety equipment. • Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. • Lights in storage area are needed to be installed with protective covers and conduits. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct need to be at least 2.9 m and when used as a storage facility there needs to have 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. • Provide handrail on both sides of stairways. • 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. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape route).
<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"> • Factory needs to have a proper pre-plan for fire department. • Final exit route-1 (stair-1 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor escape route till to reach safe refuse area. • Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors. • Generator room need to be protected by 4 hours rated construction with

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	<p>2 hours rated opening / door.</p> <ul style="list-style-type: none">• Boiler room need to be protected with 4 hours rated construction with 2 hours rated opening / door.• All the exits connecting to the staircases need to be protected with 2 hours fire rated constructions/enclosures and 1.5 hour rated doors.• 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.• Install proper standpipe system having at least 100 mm diameter of standpipe.• Install 1 riser per 1000 m² of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area.• Factory need to ensure the minimum pressure for standpipes supplying a 50 mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38 mm 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 \times 75 = 142500 liters water storage tank.
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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"> • 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+ 400C) and take proper action. • Find out the cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary.
<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"> • Ensure all panel boards (including panel door) are earthed properly. • 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. • Ensure over current protection device (circuit breaker/fuse) for each circuit/branch circuit. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Ensure inspection is being completed and documented for all earthing system.
<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 and install appropriate number and type of fire-fighting equipment in generator room and substation room. Also ensure graded rubber mats are provided in front of all panel boards. • Provide Instruction boards for first aid and artificial respiration in the substation room and generator room. • Ensure in the substations room and generator room, all working place have adequate illumination level as per standard. • Provide two separate and distinct connections of earthing for the generator. • 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. • Ensure all electrical cables are sized according to capacity of circuit breakers.

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	<ul style="list-style-type: none"> • Provide adequate support or mechanical guards for electrical equipment and wiring where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the building earthing system. • 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+(200C-400C)} and take proper action.
<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"> • Develop 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. • Ensure all high tension cables are laid following standard cable laying techniques. • Ensure the generator room has adequate fire separation from the production area/main building. • Provide adequate means of ventilation for the substation room based on the installed equipment considering fire barriers. • Ensure all 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.