

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Ashraf Garments (Pvt.) Ltd.
Address of the Factory	: House# 79 (3rd Floor), Block #D, New Airport Road, Banani, Chairman Bari, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-05-23
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-05-23
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-05-23
BGMEA Membership No.	: 9

BASIC INFORMATION:

The present garment factory is a roof truss shed supported with RCC column. The following general information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC beam-column
- iii. Floor System : Beam slab system
- iv. Floor Area : Ashraf Garments (Pvt.) Ltd. used 14000 sft floor out of the 56000 sft floor of the building.
- v. No. of Stories : 8 storied RCC building.
- vi. Construction Year : Building was built in three phases.
Constructed in year Ground floor to 2nd floor 1988, 3rd floor to 4th floor 1991 and 5th floor to 7th floor 1994.
- vii. Foundation Type : Isolated column footing
- viii. Design Drawings : Available- Approval drawing, Structural design drawing, Architectural drawing, soil test report.
Not Available - Floor load plan, Materials test reports, as built Drawing.
- ix. Soil Investigation Report : Available
- x. construction Materials : Brick Chips
- xi. Generator : At ground floor of the building.

RECOMMENDATIONS FOR CORRECTIVE ACTION: The following general information was noted:

- Short Term (Immediate) : 1. Factory Engineer to review design, loads and columns stresses in the area identified above.
2. A Detail Engineering Assessment of Factory to be commenced.
- Mid Term (6-week) : 1. Detail Engineering Assessment to be completed.
2. Building Engineer to be appointed to review the design of the roof slab under the R.C.C water tank to ensure that the structure as-built is adequate to carry the applied loads.
- Long Term (6-months) : 1. Continue to implement load plan.
2. Building Engineer to survey and prepare as-built drawings for additional structure as part of DEA

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3. Continue to monitor for cracking on an on-going basis.
4. Prepare controlled loading plans for all floors designating where storage can be placed and cannot be placed and Carry out remedial work if required.

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"> • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. • Factory need to have proper testing plan & record of fire safety equipment. • Ensure minimum width of aisles as follows: <ul style="list-style-type: none"> (a) Seats on both sides of the aisle 1 m (b) Seats on one side of the aisle 0.9 m • Factory needs to have sufficient total width of marked aisles (5mm per occupant) at all the floor of the production building. • 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.
<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 (Including machine layout) with proper dimensions showing means of escape. • Factory need to have valid fire license with full occupied area by the factory. • All the exit doors of staircase enclosure need to be replaced by side swinging fire rated doors with self-closing mechanisms so that the staircase remains free from smoke and it needs to be opened in the direction of travel as well as the lockable doors can be opened easily in the direction of evacuation without the use of a key.

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	<ul style="list-style-type: none"> • Provide suitable handrail on both sides of stairways. • 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. • 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. • Ensure adequate exit signs in all floors so that it is visible from all positions. • Install suitable public address system having communication to all floors as well as facilities to receive messages from all floors.
<p>Long Term (The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none"> • Factory needs to have a proper pre-plan for fire service & civil department. • Factory needs to reduce the occupant load from the respective floors or need to increase the stair width as 8 mm per person. • Final exit-1 (South-west) need to be protected 3 hours fire rated construction with 3 hours fire rated opening and final exit-02 (north-west) escape routes need to protect from the generator room 4 hours fire rated construction with 2 hours fire rated opening and provide protected path till to reach safe refuse area. • Storage area need to be protected with cutting section with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator and boiler room needs to be fire separated with 4 hour fire rated enclosure and 2 hour rated opening having direct access from outside. • Stair case need to be protected with lobby 4 hour fire rated enclosure, also having 2 hour rated opening or door and provide a protected route from all though the stairway to the final exits. • Ensure 3 hour fire rated walls and doors between office & sewing section. • Install fire lift with backup power including have 1hr fire rated & auto closing fire door in 2 hr fire rated lift core with backup power & having minimum capacity of 545 kgs. • Install fire rated enclosure and doors of appropriate dimensions with a lobby at exits leading to the stairs to prevent smoke and fire propagation.

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	<ul style="list-style-type: none">• 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.• Install automatic fire and smoke detection system throughout the building to cover every portion in that building.• Need to Install 100mm diameter standpipe and hose system in the factory building.• Factory needs to install 1 riser per 1000 m² of floor area and 38 mm diameter of fabric hoses with variable nozzle.• Provide the required flow of 1900 liter/min and minimum pressure of 200 kPa for supplying first aid hose (38 mm nominal) OR Hydraulically design the standpipe and hose system to get the required pressure• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.• Install dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. Required for adequate pressure of hose.• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr x 75 min=142500 liters water storage tank.• Factory needs to establish command station on the entrance lobby and equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. It needs to be manned with properly trained personnel having responsibility of maintenance and operating firefighting facilities within the building.
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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
<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"> Provide two separate and distinct connections of earthing for the generator. Ensure all panel boards are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to earthing pit. 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 overcurrent 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. 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"> Ensure appropriate safety signage, fire-fighting equipment are at generator room and graded rubber mats in front of all panel boards. Ensure in the generator room has adequate illumination level as per standard. 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 main building intake. Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and busbar. Replace wooden boxes and bases with metal clad construction for mounting the circuit breakers, energy meters and sockets. Ensure all electrical cables are sized according to capacity of circuit breakers. Provide adequate and noncombustible covers on cable channels. Ensure cable joints are made in respect of conductivity, insulation and

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	<p>mechanical strength.</p> <ul style="list-style-type: none"> • 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 to ensure that the equipment is in good working condition. • Ensure the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the substation room based on the installed equipment considering fire barriers. • 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 support or mechanical guards for electrical equipment and wiring where necessary. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Provide readily accessible single point of disconnect for each main electrical service feed. • Install lightning protection system on the building.