

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Universal Apparels Ltd.
Address of the Factory	: Ka-76, Joarshara Bazaar, Vatara, Dhaka-1229, Bangladesh
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 22 nd January 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 22 nd January 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 22 nd January 2015
BGMEA Membership No.	: 5732

BASIC INFORMATION:

The assessed factory building is 7 storied RCC beam column frame structure with additional one single storied Pre-Engineered Building (PEB) shed which covers 70% of roof top. The entire building is used for several RMG industries. The Universal Apparels Ltd. is located on the 6th floor and 50% of roof shed of the building. The frame system of the building is beam-slab system. The following information was noted:

- i. Building Usage Type : Garment factory.
- ii. Structural System : RCC beam column frame system.
- iii. Floor System : Beam slab.
- iv. Floor Area : 17717.16 sq. ft. (8858.58 sq. ft. at each floor)
- v. No. of Stories : 7 Storey
- vi. Construction Year : Unknown.
- vii. Foundation Type : Unavailable.
- viii. Design Drawings : Unavailable.
- ix. Soil Investigation Report : Unavailable.
- x. Construction Materials : Brick aggregate (Identified by removing Plaster).
- xi. Generator : Available at 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) | : | <ul style="list-style-type: none">• Area of North West corner should not to be used for storage so that the overstress of the column might be less.• Detail Engineering Assessment (DEA) should be commenced. |
| Mid Term (6-weeks) | : | <ul style="list-style-type: none">• Factory Engineer to review design, loads and columns stresses in area identified above. |
| Long Term (6-months) | : | <ul style="list-style-type: none">• Continue to implement load plan and manage floor loading. |

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- Continue to monitor for cracking on an ongoing basis.

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>	<ul style="list-style-type: none"> • Remove all empty cartons & fabrics from the escape routes.
<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"> • Ensure adequate numbers of fire drills under the Fire Safety Plan. • Install automatic fixed type heat detector and portable fire extinguisher at kitchen area. • Lights in storage area need to be installed with protective cover and fire rated conduit. • The passage gaps of pipes, cables, etc. shall be suitably sealed to the degree of fire resistance of the respective element before penetration as well as being externally sealed. • Ensure exit signs in floors so that it is visible from all positions. • 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"> • Needs to have as built drawing with proper dimensions showing means of escape. • Fire license needs to be renewed. • Factory Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time. • The factory shall have a trained officer who shall be responsible for the proper maintenance updated records of all fire-fighting equipment. • Provide continuous guards and handrails on both sides of the stairs. • Ensure adequate illuminated emergency lighting in floors, exits & staircases.

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	<ul style="list-style-type: none"> • Ensure emergency backup power for critical fire safety system. • Install 1 riser per 1000 sqm of floor area. 38 mm dia of hoses with variable nozzle need to be installed. • Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment. • Install suitable public address system at ground floor having communication to all floors as well as facilities to receive messages from all floors.
<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 service & civil department. • 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. • Final exit route of stair-1 need to protected from the substation room by 2 hours rated construction with 1.5 hours rated door at ground floor level, also need to have a protected route from the each floor exit/entry (with 2 hours rated enclosure & 1.5 hours rated door)to till reach safe area. <p>Final exit route of stair-2 need to protected from the Generator room by 2 hours rated construction with 1.5 hours rated door at ground floor level, also need to have a protected route from the each floor exit/entry (with 2 hours rated enclosure & 1.5 hours rated door)to till reach safe area.</p> <ul style="list-style-type: none"> • Child care needs to be separated from fabric & carton store in ground floor. Exit excess will be directly to final exit. Separation wall needs to be 3 hours fire rated and also fire doors will be 3 hours fire rated. • Generator and transformer room needs to be fire separated with 4hours fire rated enclosure and 2 hours rated opening. <p>Boiler room shall be situated on the periphery of the factory building and shall have a 4 hours fire resistance wall & 2 hours rated opening.</p> <ul style="list-style-type: none"> • 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 needs to provide 3 hours rated construction between wastage store and prayer room. • Walls enclosing the lift core shall have a fire resistance rating of 2 hours and lift car doors shall have a fire

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	resistance rating of at least 1 hour.
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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 of overheating (Temperature differences greater than 40°C) and take proper actions (cables are not overloaded ,properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, proper cable bending, no insulation damage, single cable at single point etc.)
<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"> Provide emergency power connection for life safety loads (fire alarm, fire pump, emergency lighting, exit signage, etc.). Ensure proper earthing connections at all electrical equipment. Ensure distribution boards are clean and all openings are sealed properly. Provide provision for inspection of 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 graded rubber mats are provided in front of all distribution boards. Provide Instruction board for first aid and artificial respiration in substation room and generator room. Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil. Provide two separate and distinct connections of earthing for each generator Ensure all distribution boards (including Panel door) are earthed properly using appropriate type and size of cable. Provide dedicated & adequate size of earthing with proper identification for each circuit within distribution board. Rewire to <ol style="list-style-type: none"> i). Ensure each incoming supply to an MCB has a dedicated supply from earth busbar. ii). Avoid the use of multiple cables on outgoing side of MCB's.

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	<ul style="list-style-type: none"> • Replace wooden boxes and panels with metal clad construction for mounting the lighting boards and switch controls. • Ensure electrical wiring/cables are sized according to capacity of circuit breakers. • Provide adequate covers on cable trenches for all HT line within substation room. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Ensure all electrical wiring/cable properly terminated at its point of termination using appropriate size and type of lug where necessary. • Seal the openings remaining after passage of the wiring system from floor to floor according to the degree of fire resistance. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe. • Ensure the lightning protection ground terminals are bonded to the building or structure grounding. • Find out the cause of overheating (Temperature differences of 21°C to 40°C) and take proper actions (cables are properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, no insulation damage, single cable at single point etc.)
<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 switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition. • Ensure the substation room fire separation from the

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	<p>production area/main building</p> <ul style="list-style-type: none">• Ensure all high tension cables are laid following standard cable laying techniques.• Ensure the generator room has fire separation from the production area/main building.• Ensure distribution 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 indicating current rating of circuit and size of fuse element/ breaker and cables are identified accordingly.• Provide proper cable terminator/connector for stranded conductor.• Run cables in a designated route with mechanical protection and fire sealing of floor slab and wall penetrations• Provide stand by power supply by a self-contained generator set/a generator to operate lift without disruption.• Install separate distribution boards for lighting and power circuits.• Confirm the adequacy of the lightning protection system installed on the building.
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