

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Apparel Crafts Ltd.
Address of the Factory	: 33, Mohakhali C/A, Dhaka 1212
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: BUET
Date of Structural Inspection	: 2013-12-25
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-04-26
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-04-26
BGMEA Membership No.	: 1316

BASIC INFORMATION:

The following general information was noted:

i. Building Usage Type	: Mixed Occupancy. Diagnostics Centre, shops, Garment Factory.
ii. Structural System	: RCC Beam-Column Frame system.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Approximately 4320 sft per floor.
v. No. of Stories	: Five storied.
vi. Construction Year	: 1982-1983.
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Only Approval Drawing Available
ix. Soil Investigation Report	: Available (done in February 1986).
x. Construction Materials	: Reinforced Concrete.
xi. Generator	: In GF

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)	: 1. Other than ground floor, average live loading is to be limited to 60psf (3 kN/m ²) on all floors immediately and maximum intensity of such loading at any place of these floors must not exceed 120 psf (6.0 kN/m ²).
Mid Term (6-weeks)	: N/A
Long Term (6-months)	: 1. Due to Concerns with unavailability of structural documents, a Detail Engineering Assessment (DEA) is required to be commenced immediately and completed in 6 months from issue date of this report. 2. A minimum of 4 number 4 inch diameter cores are to be taken as soon as possible in column locations and tested with results used

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in the DEA report.

3. No further construction is to be carried out on this building until approval of the DEA is given.

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>None.</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 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. • All the firefighting equipment need to be tested with proper documents. • Factory needs to have sufficient number & width (0.9m) of marked aisles at all working floor. Factory need to reduce the people (occupant loads) or need to shift to other floors. • 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 2.9 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. • Factory needs to ensure adequate numbers of exit signs which need to be visible from any positions and comply with the following conditions: <ul style="list-style-type: none"> (a) The color and design of lettering, arrows and other symbols on exit signs needs to be in high contrast with their background; (b) Words on the signs needs to be at least 150 mm with a stroke of not less 20 mm; (c) The source of

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	<p>illumination, contrast, intensity and luminance needs to be at least 50 lux, 0.5, 5.0 foot-candles and 0.2 cd/m respectively.</p> <ul style="list-style-type: none"> Needs to have fire extinguishers having required pressure.
<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 have as built drawing with floor machine layout showing means of escape with proper dimension. 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. 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 need to provide handrail on both sides of each stairways. Illuminated emergency light needs to be covered in floor, exits and aisles. 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.
<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. Factory needs to ensure minimum clear width of stair 0.90 m. Factory needs to ensure fire protected route from stair-01 to final exit-01 with 4 hour rated construction wall and 2 hour rated composite door due to unprotected generator rooms and need to provide the protected route till to reach safe refuse area. Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. Generator and boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated

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	<p>opening having direct access from outside.</p> <ul style="list-style-type: none">• The entire exits connecting to the staircases(3 numbers staircase) need to be protected with fire and smoke resistant enclosures and opening (2 hour 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.• The Size of Standpipe should be 100 mm for standpipe and hose system for below 10 stories or building height below 33 m in accordance with the table 3.2 of NTPA guideline or BNBC 2006, Article No. 4.2.3, Page 1043.• Factory needs to install separate standpipes in each exit stairway with minimum 38 mm diameter of fabric hose with variable nozzle.• Install standard standpipe, hose and fire pump system to ensure required hose 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.• The front road width of the factory is needed to have at least 9 m.• 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 needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900liter x 75min=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"> 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.
<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 distribution boards (including panel door) are earthed properly. Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. Find out cause of burning sign and take proper action including replacing cable or equipment where necessary. Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. Short Term Provide provision for inspection of 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"> Install appropriate safety signage at generator room. 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 room. Ensure in the generator room, have adequate illumination level as per standard. Provide two separate and distinct connections of earthing for each generator. Ensure distribution board has a minimum clearance of 1 m (39 in) in front. Provide dedicated & adequate size of earthing with proper identification. Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar.

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	<ul style="list-style-type: none"> • Avoid the use of multiple cables on outgoing side of MCB's. • Replace wooden bases with metal clad construction for the switch controls. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Provide emergency power connection for life safety loads temporarily within 6 weeks and find out a permanent solution within 6 months. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • 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+(20 C-40 C) } 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 overhead service connections to a building are led via roof poles or service masts made of GI pipe having a bend at the top and installed on the outer wall. • Ensure the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the generator room .

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	<ul style="list-style-type: none">• Ensure 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 obtained as per list.• Use noncombustible material to make channel and provide adequate covers on cable channel.• Ensure surface/exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support.• Provide proper cable terminator/connector for stranded conductors at its point of termination.• Install separate distribution boards for lighting and power circuits. distribution boards have no opening and all live internal• Provide individual fuse with suitable discrimination with backup fuse or miniature MCB for each 15/20A socket outlet.• Install lightning protection system on the building.
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