

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: A.D. Fashions
Address of the Factory	: Fartex Centre, Bijoy Road, Mogarkhal, Gazipur.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-04-25
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-04-25
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-04-25
BGMEA Membership No.	: 5258

BASIC INFORMATION: The present garment factory is a commercial building with beam-column frame system. The following general information was noted:

- i. Building Usage Type : Factory building.
- ii. Structural System : Flat plate with Peripheral beam.
- iii. Floor System : RCC slab.
- iv. Floor Area : Main Factory Building-38906 sq. ft.
Office Building-2085 sq. ft.
- v. No. of Stories : 3 storied.
- vi. Construction Year : 2000-2001
- vii. Foundation Type : Shallow foundation
- viii. Design Drawings : Not available-Approval drawing, full set of structural drawing, machine layout plan, architectural drawing, test report of construction materials and floor load plan was not found.
- ix. Soil Investigation Report : Available.
- x. construction Materials : Brick chips.
- xi. Generator : Separate structure

RECOMMENDATIONS FOR CORRECTIVE ACTION:

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Factory Engineer to review design, loads and punching stresses in slabs. 2. Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for or 100mm dia. cores from 4 different areas on each slab, remote from columns
Long Term (6-months)	: 1. Continue to implement load management plan. 2. Update calculations showing the structural adequacy of the building structure 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"> • 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. • Factory Manager/Director needs to arrange fire safety training for the workers of the factory from proper authority time to time. • Factory need to have proper testing plan & record for fire safety equipment. • Factory needs to have sufficient number & width (0.9 m) of marked aisles at ground floor of the building. • Factory needs to have sufficient total width of marked aisles (5mm per occupant) of the factory. • Lights in storage area needed to be installed with protective covers and conduits. • Kitchen area need to be equipped with fire extinguisher & only fixed temperature type detector • Ensure adequate illuminated emergency lighting in floors, exits & staircases. • 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. • Ensure illuminated exit signs in floors so that it is visible from all positions.
<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. • Factory needs to have a valid fire license for the full occupied area. • 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 the stairways.

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	<ul style="list-style-type: none"> • Needs to seal the opening and penetration in the mentioned location with fire rated construction materials. • Factory need to have emergency backup power for critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.
<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 department. • Needs to install another stair of minimum 0.9 m width in the office building. • Needs to install another stair complying 8 mm per person width in the office building. • Final exit for stair- & need be to separate with generator room by hr rated construction & hr rated door or relocate the generator m away from the exit access. • Storage area needs to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Boiler : Boiler room shall be situated on the periphery of the factory building and shall have a 4 hour fire resistance wall. Boiler room needs to be separated with 4e hours fire rated enclosure and 2 hours rated door/opening. • Generator: Generator room need to be separated by 4 hr rated wall & 2 hr rated opening with the other occupancies. • Stairs need to be protected with 2 hour fire rated and smoke resistant lobby & enclosure, also having 1.5 hour rated opening or door and provide a protected route from all though the stairway to the final exits. • Ensure 2 hour fire rated walls and doors between office section & kitchen room. • Factory needs to install centralized fire detection system with proper sitting arrangement of detectors shall be considering 900 sft area of each detector. • The factory with shall be equipped with manually operated electrical fire alarm system and automatic fire alarm system. • Manually operated electrical alarm system shall be installed in a building with single or multiple call boxes located on each floor. • Factory needs to install control panel for detection and alarm system at required location. • Factory needs to install 75 mm dia standpipe and hose system in the factory building.

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	<ul style="list-style-type: none"> • Factory needs to install 1 riser per 1000 m² of floor area & 38 mm dia of 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 need to installed Siamese connection after installation of stand pipe system, hose system and fire pump. • Factory needs to install dedicated fire pump with sufficient capacity & backup power. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 x 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>	N/A
<p>Short Term <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"> • Discharge the generator exhaust to the exterior of the building in a safe location. • Provide two separate and distinct connections of earthing for each generator. • Ensure all distribution boards (including panel door) are earthed properly. • Ensure cables are properly terminated at its point of termination using appropriate size and type of lug. • Ensure overcurrent protection device (circuit breaker/fuse) for

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	<p>each circuit/branch circuit.</p> <ul style="list-style-type: none"> • 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. • Ensure inspection for all earthing system 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"> • Install appropriate number and type of safety signage and fire-fighting equipment 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, all working place, exit light and escape light have adequate illumination level as per standard. • Ensure distribution board is installed in compliant location in terms of access. • 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 ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's. • Replace wooden bases with metal clad construction for mounting socket and use metal enclosure for circuit breaker installation. • Ensure all electrical cables are sized according to capacity of circuit breakers. • 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. • Provide adequate covers on cable channel. • Connect all metal in the building to the building earthing system. • Ensure Lighting fixtures are supported from the structure properly.

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<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 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/main building.• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.• 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 and means of identification is obtained as per list.• Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.• Provide proper cable terminator/conductor for stranded conductors.• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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