

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Alvin Fashion Ltd.
Address of the Factory	: Chaydana, K.B. Bazar, Gazipur.
Present status of the factory	: Under Operation.
Structural Assessment Conducted by	: ACCORD
Date of Structural Inspection	: 2015-04-23
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-06-24
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-06-24
BGMEA Membership No.	: 5081

BASIC INFORMATION: The following general information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC column frame and truss corrugated PEB shed.
- iii. Floor System : RCC frame system.
- iv. Floor Area : Total floor area is = 3120m² Ground floor = 765m²
2nd floor=1530 m² 4th floor= 765m² Single storied tin
Shed- 1=30 m² Single storied tin shed-2=30 m²
- v. No. of Stories : 03 (Three) occupied floor out of 06 floors of the building. 01
(One) occupied floor out of 01 floors of the shed-1 01 (one)
Occupied floor out of 01 floors of the shed-2.
- vi. Construction Year : Construction of the Main Factory Building began in 1996 and
was completed in 1998.
- vii. Foundation Type : shallow open foundations.
- viii. Design Drawings : Available, But inconsistencies found to construction
- ix. Soil Investigation Report : Available but inconsistencies found to construction.
- x. construction Materials : Brick aggregate was observed in the Ground Floor columns,
High yield strength reinforcement used informed by factory.
- xi. Generator : At Ground Floor of the South-East of the Main Factory Building.

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. Live Load to be restricted to 1.5kPa on 1st, 2nd, 3rd and 5th floors, 3.0kPa on 4th floor and 1.0 kPa on roof.
 - 2. Building Engineer to review design, loads and column stresses in structure.
 - 3. A Detail Engineering Assessment of the Main Building is to be commenced –see attached scope.

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- Mid Term (6-weeks)
4. Verify insitu concrete stresses by taking 100mm diameter cores from min. 4 columns at ground floor level.
 5. Verify reinforcement grade and bar diameter within columns.
- : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Detail Engineering Assessment to be completed.
 3. Building Engineer to carry out a design check of the cantilevers to ensure structural integrity of the slabs.
 4. Building engineer to carry out a design check of the concentrated loads imposed on the main factory building from the link bridges and confirm whether the existing structure has capacity to accommodate these loads.
 5. Building Engineer to carry out a design check for heavy loads associated with the water tanks at roof level, 5th floor build up, 4th floor storage areas and 4th floor fusing machines and advise on any necessary alterations taking account of floor capacity and column capacity.
 6. Building Engineer to survey the structure and prepare a full set of “as-constructed” drawings as part of Detail Engineering Assessment (see Item 1).
 7. Building Engineer to check the design and capacity of the lightweight steel roofs and connection details to the ancillary buildings and make any necessary alterations.
- Long Term (6-months)
- : 1. Continue to implement loading plan.
 2. Implement any actions arising from design check.
 3. Monitor cracks to beams, slabs, columns and facades.
 4. Building Engineer to investigate if cracks are only in the external render, internal plastering.
 5. Building Engineer to advice on load reduction and repair and strengthening of the structure if required.

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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. • Lights in storage area are needed to be installed with protective covers and conduits. • Factory needs to close all the opening in the rated wall of the stair case by 2 hours rated construction/enclosure or 1.5 hours rated doors. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct need to be minimum 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.
<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. • Factory needs to provide handrail on both sides of all the stairways. • Factory needs to have emergency backup power for critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.
<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"> • Fire department pre-plan needs to be developed. • Final exit-2&4(Stair-2 route) needs to be protected by providing 2 hours fire rated construction with 1 hour fire rated automatic fire door in the opening of the cargo lift located at ground floor of the building. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Walls enclosing the lift core shall have a fire resistance rating of 2 hours and lift car doors shall have a fire resistance rating of at least 1 hour. • 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

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	<p>boxes on all occupied floors, including other tenanted floors of the building.</p> <ul style="list-style-type: none"> • Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm 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 1900ltr 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. • Find out cause of burning sign and take proper action including replacing cable or equipment where necessary. • 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.
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<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"> • Ensure all panel boards (including panel door) are earthed properly. • 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 (<i>The remedial works indicated must be carried out within a period of 6 weeks</i>)</p>	<ul style="list-style-type: none"> • Provide Instruction board for first aid and artificial respiration in the substation room and generator room. • Ensure in the substations room and generator room, all working place, exit light and escape light have adequate illumination level as per standard. • Provide two separate and distinct connections of earthing for each generator. • Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth bus-bar 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. • 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. • 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 (<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. • Ensure the generator room has adequate fire separation from the

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	<p>production building.</p> <ul style="list-style-type: none">• 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 provided as per list.• Provide adequate and noncombustible 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 confirming its requirements and adequacy.
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