

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Ankhi Apparels Ltd.
Address of the Factory	: 121/285, BADC Road, West Khulshi, Chittagong.
Present status of the factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-12
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-12
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-12
BGMEA Membership No.	: 5039

BASIC INFORMATION:

The present garment factory is RCC beam column frame structure. The following general information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC Beam Slab Frame
iii. Floor System	: RCC Beam Slab.
iv. Floor Area	: Floor area is (6630sft x 6) = 39780sft
v. No. of Stories	: 5- storied+Non-engineered shed
vi. Construction Year	: 1995-1996
vii. Foundation Type	: Building foundation could not be verified since there is no structural design drawing but soil test report recommended pile or mat foundation.
viii. Design Drawings	: Available document: Approval plan Not available: Architectural drawing, structural drawing, machine layout plan, floor load plan, and material testreport.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Bricks Chips (beam, column, slab)
xi. Generator	: Outside of the 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. Area of overstress should not to be used for storage. 2. A Detail Engineering Assessment of Factory to be commenced
------------------------	---

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

3. Sections of plaster finish to beams, slabs and walls to be removed to investigate if cracks penetrate the building.

- Mid Term (6-weeks) : 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.

- Long Term (6-months) : 1. Continue to implement load plan.
2. Install vertical and horizontal bracing 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"> • Ensure adequate numbers of fire drills under the Fire Safety Plan. • All the firefighting equipment need to be tested with proper documents. • 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. • All required means of exit or exit access in buildings or areas

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.</p>
<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. • 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 needs to provide handrail on both sides of stairways as per the requirements of NTPA guideline. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route). • 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 department. • Final exit route-2(Stair-2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected from generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area. • Child care room is needed to be separated from other occupancies with 3 hours fire rated construction with 3 hours fire rated door. • Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors. • Generator: Generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door from stair-2 as well as from the final exit route-2 located at ground floor. • Boiler: Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the working floor (Dining area) at 5th floor of the building. • All the stairs need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hours rated door)and provide a protected route from all though the stairway to the final exits.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> • Factory needs 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. • Factory needs to install proper standpipe system with having at least 100 mm dia of riser. • Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of fabric hose with variable nozzle. • 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 install dedicated fire pump with sufficient capacity and backup power as per NTPA Guideline. • Factory needs 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.
--	--

(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 cause (improper cable selection, improper termination, rusted connection, etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary. • 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.
---	---

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

<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. • 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. • 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"> • 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. • Provide two separate and distinct connections of earthing for each generator. • Provide dedicated & adequate size of earthing with proper identification for each circuit 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 bases with metal clad construction for mounting the circuit breakers and switch controls. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide mechanical guards for electrical equipment. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the building earthing system. • Ensure Lighting fixtures are supported from the structure properly. • 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 (<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 the building are led via adequate size and type of service masts. • Ensure the generator room has adequate fire separation from the main building. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Ensure panel boards have no opening and all live internal components are concealed properly. • Provide dedicated & adequate size of neutral with proper

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>identification for each circuit.</p> <ul style="list-style-type: none">• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.• Provide adequate 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.
--	---