

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ANMA SWEATERS LTD.
Address of the Factory	: House#62, Road#02, Sharifpur, National University, Gazipur.
Present status of the factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-26
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-26
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-26
BKMEA Membership No.	: 1889

BASIC INFORMATION:

The present garment factory is a factory building with RCC column and flat plate system structure. The following general information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC column and flat plate frame system
iii. Floor System	: RCC Flat plate system.
iv. Floor Area	: Floor area is (3182sft x 6) = 19092sft for main factory building.
v. No. of Stories	: 6- storied.
vi. Construction Year	: 2010 to 2011.
vii. Foundation Type	: Individual Footing.
viii. Design Drawings	: Available document: Approval plan, Machine layout plan, structural drawing, soil test report. Not available: Architectural drawing, floor load plan, material test report has not been found.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Bricks Chips (beam, column, slab)
xi. Generator	: 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:

Short Term (Immediate)	: 1. Overstress area should not be used as storage.
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2. A Detail Engineering Assessment of Factory to be commenced

Mid Term (6-weeks) : 1. Detail Engineering Assessment to be completed.
2. Factory Engineer to assess the structural integrity of the existing emergency staircase to take the anticipated loadings due to emergency. Carry out any alterations required from the Assessment.

Long Term (6-months) : 1. Continue to implement load plan.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

Immediate <i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i>	N/A
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<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's need to test with proper documents. • 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. • All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.
<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 all the stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route). • Factory need 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. • Factory needs to maintain minimum width of exit 0.9 m and height 2 m. • Factory needs to ensure minimum clear width of stair 0.90 m as per minimum requirement. • Final exit route-1 (stair-1 route) need to be protected (2 hour rated construction with 1.5 hour rated door) at each floor level entrance and need to be protected from west side boiler room and east side generator room at ground floor by 4 hours rated construction with 2 hours rated door/opening.

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	<ul style="list-style-type: none">• Also Final exit route-1 (stair-1 route) need to be protected (2 hour rated construction with 1.5 hour rated door) from parking area at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.• Final exit route-2 (stair-2 route) need to be protected (2 hour rated construction with 1.5 hour rated door) at each floor level entrance and need to be protected from the production area at ground floor by 2 hours rated construction with 1.5 hours rated doors/opening, also need to have a protected escape route till to reach safe refuse area.• Yarn store and fabric store located on 3rd need to be protected with a 4 hours fire resistant and smoke proof lobby (4 hours rated enclosure and 2 hour rated door) at 3rd floor entrance of exit-1.• Both the boiler and generator room needs to be fire separated from final exit route-1 (stair-1 route) with 4 hours fire rated enclosure and 2 hour rated opening or doors.• Also boiler and generator room needs to be separated from parking area with 4 hours fire rated enclosure and 2 hour rated opening or doors.• Stair-1 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.• Also stair-1 need to be protected with a 4 hours fire resistant and smoke proof lobby (4 hours rated enclosure and 2 hour rated door) at 3rd floor entrance of exit-1 with yarn and fabric store.• External steel stair-2 need to be protected by closing all opening with 2 hours rated construction within 3m (both side) of the stair and fitted 1.5 hours rated doors/opening at each floor level entrance except ground floor, also close the window/opening by 2hours rated construction with 1.5hours rated doors/opening which is beside the exit route-2 from stair-2 at discharged level.• Stair-1 need to be protected with a 4 hours fire resistant and smoke proof lobby (4 hours rated enclosure and 2 hour rated door) only at 3rd floor entrance of exit-1 with yarn and fabric store.• 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.
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	<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 needs to install proper standpipe system with having at least 75 mm dia of riser. • 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 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"> • Provide two separate and distinct connections of earthing for the generator. • Ensure all electrical panel boards (including panel door) are earthed properly. • Ensure all electrical cable properly terminated at its point of termination. • 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 is being completed and documented for all earthing system.

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<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"> • Post safety signage in the generator room and 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 have adequate illumination level as per standard. • Ensure switchboards are installed in compliant location in terms of height. • Ensure switchboard has a minimum clearance of 1 m (39 in) in front. • Provide dedicated & adequate size of earthing with proper identification for each circuit. • Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's/MCCB's. • 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/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe 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 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 production area. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Ensure all panel 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.

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	<ul style="list-style-type: none">• 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.
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