

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Woolen & Wool Ltd.
Address of the Factory	: Khaikur, Bat Tala Road, Board Bazar, Gazipur-1704, Bangladesh.
Present Status of the Factory	: Under operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-02-04
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-03-31
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-03-31
BGMEA Membership No.	: 3743

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	: Garment Factory.
ii. Structural System	: RCC Flat plate system and PEB shed
iii. Floor System	: Flat slab system and roof truss system
iv. Floor Area	: Total floor area is 75213.2 sq. ft.
v. No. of Stories	: 8 stories and single storey
vi. Construction Year	: Building was built in one phase (2002-2003).
vii. Foundation Type	: Isolated footing.
viii. Design Drawings	: Available: Approval drawing, architectural and Structural drawing and soil test report. Not Available: floor load plan, material test report, And machine layout plan
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregated
xi. Generator	: Separated building.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate)	: 1. Detail Engineering Assessment of Factory to be commenced.
Mid Term (6-weeks)	: 1. Detail Engineering Assessment of Factory to be completed. 2. Building Engineer to carry out design checks on additional structure under the part of DEA.
Long Term (6-months)	: 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. 2. Building Engineer to survey and prepare as-built drawings for additional structure under the part of DEA.

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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"> • Need to have Exit at ground floor, 1st floor, and 2nd floor. • Lights in storage area need to be installed with protective covers and conduits. • Kitchen room is needed to fire rated wall & door. • Ensure adequate numbers of fire drills under the Fire Safety Plan. • Combustibles are to be managed with yarn store. 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. • Kitchen room is needed to fire rated wall & door. • Ensure illuminated emergency light in floors and escape routes. • Ensure Emergency backup power for critical fire safety 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"> • Factory needs to have as built drawing with proper dimensions showing all the means of escape. • Fire license need to be updated for mention full occupied area. • Factory needs to have a proper pre-plan for fire department. • All the firefighting equipment need to be tested with proper documents. • Stair needs to have provided both side handrails. • Both of the stairs have need to intermediate handrail. • Store room is needed to fire rated wall & door. • Ensure adequate illuminated emergency lighting with backup power in all floors, exit & stair.

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	<ul style="list-style-type: none"> • Factory needs to provide fire rated construction between Production and Yarn store. • Automatic Fire Detection (AFD) and alarm system needs to be installed in all types of buildings.
<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"> • All the exit doors need to be replaced by side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key. • Factory needs to install standard standpipe, hose and fire pump system to ensure required hose pressure. • Factory needs to ensure fire protected route from stair-2 to final exit - 2 safely outside of the building. • Generator room needs to be fire separated with 4 hour fire rated enclosure and 2 hour rated opening having direct access from outside. • Boiler room needs to be separated with 4 hour fire rated enclosure and 2 hour rated door/opening. • Yarn store need to be separated with the linking section by 2 hour rated construction & 1.5 hour rated door. • All the exits connecting to the staircase-1 & 2 need to be protected with fire and smoke resistant enclosures and opening (1.5 hour rated enclosure and 1 hour rated door) and provide a protected route from all through the stairway to the final exits. • Install control panel for automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory needs to install control panel for detection and alarm system at required location. • Install proper standpipe system having at least 100 mm die of standpipe. First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility shall be provided. • 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 and backup power. • Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900 ltr x 75 min=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"> 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.
<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. 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. Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. 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</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"> 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. Ensure distribution boards are installed in compliant locations in terms of height. Ensure distribution boards have a minimum clearance of 1 m (39 in) in front.

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	<ul style="list-style-type: none"> • 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 and panels with metal clad construction for mounting the circuit breaker and switch controls. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate covers on cable channels. • 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. • 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</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 main building. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.

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	<ul style="list-style-type: none">• 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.• Install switchboards in proper way or proper place to ensure safe installation.• Provide dedicated & adequate size of neutral with proper identification for each applicable circuit.• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.• 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.• Run cable in a designated route with mechanical protection and fire sealing of floor slab and wall penetrations.• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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