

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: A. B. SWEATER LTD
Address of the Factory	: 359-360, Siddhirganj, Adamjee Road, Narayanganj-1400, Bangladesh.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-29
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-29
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-29
BKMEA Membership No.	: 564

BASIC INFORMATION: The present garment factory is a six storied industrial building with beam columns frame structure. The following general information was noted:

i. Building Usage Type	: Garment factory
ii. Structural System	: R.C.C beam column frame structure.
iii. Floor System	: Beam slab floor system.
iv. Floor Area	: 19,000 sft. per floor
v. No. of Stories	: 6 stories
vi. Construction Year	: Building was built in one phase (1992).
vii. Foundation Type	: Unknown
viii. Design Drawings	: Available - Approval drawing, Soil test report, Machine lay-out plan. Not available- Structural design drawing, Architectural design drawing, material test report, floor load plan
ix. Soil Investigation Report	: Available.
x. construction Materials	: Brick chips (Column, beam & slab)
xi. Generator	: Ground floor

RECOMMENDATIONS FOR CORRECTIVE ACTION: No critical or high risk observation was found at the factory which may pose harm to production and workers as well during assessment. A non- conformity was found at the factory on the day of assessment, for which long term corrective action has been recommended. There is no need to suspend operation in the factory.

Short Term (Immediate)	: 1. Live load should be reduced to 20 psf from all floors. 2. A Detail Engineering Assessment of Factory to be commenced.
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.

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2. Adequate slope and proper drainage system to be checked by the factory engineer.

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 needed to be installed with protective covers and conduits. • Factory need to close the penetration with 2 hours fire rated construction / materials. • 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.
<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 license needs to be renewed by mentioning full coverage area. • 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. • Child care needs to be fire separated from the QC working area with 3 hours fire rated construction and 3 hours rated door to safe discharge area. • 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.

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<p>Long Term</p> <p>(The remedial works indicated must be carried out within a period of 6 months)</p>	<ul style="list-style-type: none">• Fire department pre-plan needs to be developed.• The escape route final exit-01 needs to provide protected paths of travel with the generator room 4 hours fire rated construction and having direct access to the road with safe refuse area.• The escape route final exit-03 needs to provide protected paths of travel with the fabric store of Papillon Knit Composite Ltd for 2 hours fire rated construction and 1.5 hours rated door having direct access to the road with safe refuse area.• Accessories store need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors from 3rd floor of the building.• Generator room needs to have a 4 hours fire resistance wall and entry also needs to have 2 hours fire rated door having direct access to the road with safe refuse area.• All the exits connecting to the staircases need to be protected with fire and smoke resistant enclosures and opening i.e. 2.0 hours rated enclosure and 1.5 hours rated door and provide a protected route from all though the stairway to the final exits.• 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.• 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 hoses.• 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.
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	<ul style="list-style-type: none"> • Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.
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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.
<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. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented. • Discharge the generator exhaust to the exterior of the building in a safe location. • Ensure all distribution boards (including panel door) are earthed properly. • Ensure over current protection device (circuit breaker/fuse) for each circuit/branch circuit. • 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.

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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"> • Install appropriate type of safety signage 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. • Ensure switchboards and distribution boards have a minimum clearance of 1 m (39 in) in front. • 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 avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's. • Replace all wooden bases used inside distribution boards. • Ensure all electrical cables are sized according to capacity of circuit breakers. • 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.

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	<ul style="list-style-type: none">• 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.• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.• Install circuit breaker using metal enclosure.• 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 support or mechanical guards for electrical equipment and wiring where necessary.• Provide adequate covers on cable channel.• 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.• Install separate distribution boards for lighting and power circuits.• Provide individual fuse with suitable discrimination with backup fuse or miniature MCB for each 15A socket outlet.• Install lightning protection system on the building.
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