

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ANARKOLI KNITWEAR LTD.
Address of the Factory	: 120, 121, Bscic I/A, Enayetnagore, Fatullah, Narayanganj.
Present status of the factory	: Under Not Operation
Structural Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Structural Inspection	: 2015-10-20
Fire Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Fire Inspection	: 2015-10-20
Electrical Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Electrical Inspection	: 2015-10-20
BKMEA Membership No.	: 573

BASIC INFORMATION: The following general information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC Beam Slab Frame |
| iii. Floor System | : RCC Beam Slab. |
| iv. Floor Area | : Ground floor = 3200 sft , Entire building = 15360 sft (Approx.). |
| v. No. of Stories | : 4 floors + GF (5 Storey) |
| vi. Construction Year | : Construction started in 2002. |
| vii. Foundation Type | : Individual column footing |
| viii. Design Drawings | : Not available. |
| ix. Soil Investigation Report | : Not available. |
| x. construction Materials | : Brick aggregate in all columns, beams and slabs in all floors |
| xi. Generator | : Generator is present at outside 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) : N/A

Mid Term (6-weeks) : 1. As-built architectural and engineering drawing to be prepared for entire building and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a number of checks on the structural design and as-built construction.

Long Term (6-months) : N/A

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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 needs to conduct fire drill quarterly (4 times a year) under the fire safety plan and needs to kept the written record of such drills for at least 3 years for the inspection of fire brigade whenever called for. • 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. • 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. • Provide handrail on both sides of stairways. • 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

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	<p>safety system and not less than 30 minutes in case of failure of power supply.</p>
<p>Long Term (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. • Factory needs to ensure fire protected the final exit -1 safely outside of the building by 4 hours rated construction with 2 hours rated door/opening and need to be protected with fabric store and generator room at ground. • Factory needs to ensure fire protected the final exit -2 safely outside of the building by 2 hours rated construction with 1.5 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area as per NTPA guide line. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator & boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside. • All the exits connecting to the staircase need to be protected with fire and smoke resistant enclosures and opening (4 hours rated enclosure and 2 hour rated door)and provide a protected route from all though the stairway to the final exits. • Factory needs to provide 3 hours rated construction between office and jacquard section. • 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 75 mm dia of riser. • Install 1 riser per 1000 m² of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area. • 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.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> • 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>	<ul style="list-style-type: none"> • Ensure there is no break in the neutral wire in the form of a fuse unit throughout the wiring installation.
<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 distribution boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker) 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"> • Install appropriate type of safety signage at generator room. Also ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction boards 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. • 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 wooden bases with metal enclosure for mounting the fuses and circuit breakers.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for electrical equipment and wiring where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • 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, multiple cables point,) of overheating { ambient+(20°C-40°C)} 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 production area. • 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 applicable circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Use noncombustible material to make cable channel and 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.