

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ZANANI KNIT COMPOSITE LTD.
Address of the Factory	: Khilpara (Madbor Bazar), Jalkuri, Siddirganj, Narayanganj.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-07
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-07
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-07
BKMEA Membership No.	: 1755

BASIC INFORMATION: The present garments factory is a single storied non-engineered shed supported on RCC column. The following general information was noted:

i. Building Usage Type	: Garment factory
ii. Structural System	: RCC Flat plate with edge beam.
iii. Floor System	: RCC Flat plate System.
iv. Floor Area	: 21200 sft
v. No. of Stories	: 4 stories.
vi. Construction Year	: 2006
vii. Foundation Type	: pile foundation.
viii. Design Drawings	: Available: Structural design drawing (mismatched), Machine layout plan (without dimension) Not Available: Approval plan, as built structural drawing, Materials test report and floor load plan.
ix. Soil Investigation Report	: Available
x. construction Materials	: Brick chips (column, edge beam).
xi. Generator	: Separate shed

RECOMMENDATIONS FOR CORRECTIVE ACTION: Corrective action for structure's are,

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for or 100mm dia. cores from 4 different areas on each slab, remote from columns. 2. Engineer to inspect whether waterproofing material is applied or where it can be maintained. For both durability and serviceability, waterproofing on the roof slab is recommended. Moreover the roof slab drainage system and leakage of pipes should be investigated.
Long Term (6-months)	: 1. Continue to monitor the load management plan.

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2. Develop set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings.

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"> • 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. • Factory need to have proper testing plan & record for fire safety equipment. • Factory needs to have sufficient number of marked aisles & maintained minimum width of aisles (0.9 m) at every floor. • 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.
	<ul style="list-style-type: none"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • Factory needs to have valid fire license covering the full occupied area. • Fire manager/Director need to have safety training from proper

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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>	<p>authority & worker of the factory should as far as possible be trained for use fire extinguisher.</p> <ul style="list-style-type: none"> • 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. • All the stairways need to have handrail on both sides. • Both the stairways need to have intermediate handrail. • 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. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator & Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the working floor. • All the stairs need to be protected with fire and smoke resistant enclosures & 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. • 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 having at least 100mm dia of riser according to NTPA guideline. • 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

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	<p>department connection.</p> <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"> • Ensure there is no break in the neutral wire in the form of a fuse unit throughout the wiring installation. • Remove all unused cables from distribution board and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug.
<p>Short Term (Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)</p>	<ul style="list-style-type: none"> • Discharge the generator exhaust to the exterior of the shed in a safe location. • Provide two separate and distinct connections of earthing for the generator. • Ensure all panel boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit or branch circuit. • Ensure proper earthing connections at all electrical equipment. • Clean interior components from dust and seal all openings within the enclosure to prevent dust from entering. • Ensure inspection of all earthing system 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 appropriate type and number of safety signage , firefighting equipment graded rubber mats at required location. • Provide Instruction board for first aid and artificial respiration in the generator room. • Ensure distribution board has a minimum clearance of 1 m (39 in) in front.

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	<ul style="list-style-type: none"> • Install MCCB, MCB and socket in proper way or proper place to ensure safe installation. • 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 on outgoing side of MCB's and busbar. • Replace wooden base with metal clad construction for mounting the circuit breaker and fuse. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for electrical equipment and wiring. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the main earthing system. • Ensure Lighting fixtures are properly supported from the structure. • 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 production area. • Ensure panel boards have no opening and all live internal components are concealed properly.

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	<ul style="list-style-type: none">• 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 wiring systems are erected so that no damage is caused by the ingress of water.• 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 and shed.
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