

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: CHITRA COMPOSITE LTD.
Address of the Factory	: Plot# A/22, BSCIC,I/A, Enayetnagar, Fatullah, Narayangonj,
Present status of the factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Structural Inspection	: 2015-09-13
Fire Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Fire Inspection	: 2015-09-13
Electrical Assessment Conducted by	: VERITAS Engineering& Consultant
Date of Electrical Inspection	: 2015-09-13
BKMEA Membership No.	: 1983

BASIC INFORMATION:

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

- i. Building Usage Type : Garment factory.
- ii. Structural System : RCC column frame system.

- iii. Floor System : Beam slab.

- iv. Floor Area : Floor area is (3100sft x 7) = 21,700sft for main RCC factory building.

- v. No. of Stories : 7-stories

- vi. Construction Year : 1st Phase 2002 and 2nd Phase 2005.

- vii. Foundation Type : Pile foundation(according to soil report)

- viii. Design Drawings : Available documents: approval plan, structural design drawing, architectural drawing, soil test report and machine layout plan (without dimensions).

Not available: Floor loading plan and material test report.

- ix. Soil Investigation Report : Available.
- x. construction Materials : Stone Chips(Column)
- xi. Generator : At Ground Floor.

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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) : N/A

Long Term (6-months) : 1. Remedial action to be undertaken to prevent the seepage of water from pipes and other sources.
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.

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"> • 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. • 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). • Generator is available but no connection & arrangement for crititcal fire safety system.
<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. • Final exit route-1 & generator room need to be protected (4 hours rated construction with 2 hours rated door) at ground floor, also need to have a protected escape route till to reach safe refuse area. • Final exit route-2 & production floor at ground floor need to be protected (2 hours rated construction with 1.5 hours rated door) also need to have a protected escape route till to reach safe refuse area .

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	<ul style="list-style-type: none">• Boiler : Boiler room need to be protected by 4 hours rated construction with 2 hours rated opening / door.• Generator: Generator room need to be protected by 4 hours rated construction with 2 hours rated opening / door.• All the stairs 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.• 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. • 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"> • 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+ 40 C) and take proper action.
<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"> • Ensure all panel boards (including panel door) are earthed properly. • Provide additional insulation for wiring exposed to external heat sources to protect cable/conduit. • 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. • Ensure inspection is being completed and documented for all earthing 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"> • 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 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 bus-bar of distribution boards and ensure continuous earth path is back to main building intake. • 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 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+(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 main building. • 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 s 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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