

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : WARNACO KNIT COMPOSITE LTD. |
| Address of the Factory | : J.R. Trade Center, T.C. Road Mizimi, Siddirganj, Narayanganj. |
| Present Status of the Factory | : Under operation. |
| Structural Assessment Conducted by | : VEC |
| Date of Structural Inspection | : 27 July, 2015 |
| Fire Assessment Conducted by | : VEC |
| Date of Fire Inspection | : 27 July, 2015 |
| Electrical Assessment Conducted by | : VEC |
| Date of Electrical Inspection | : 27 July, 2015 |
| BKMEA Membership No. | : 1306 |

BASIC INFORMATION:

The building is a six storied dual system structure. RCC beam column frame structure except 5th floor which is flat plate system with peripheral beam. Undocumented additional floor found at roof covers 16% of roof area. The following information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RC flat plate and beam slab. |
| iii. Floor System | : RCC Beam slab. |
| iv. Floor Area | : Total floor area is 19080 sft. 6360 sft used for factory |
| v. No. of Stories | : 6- Storied and undocumented additional floor found at roof |
| vi. Construction Year | : 2008 and 2015 under construction.(known from factory representative) |
| vii. Foundation Type | : Pile foundation |
| viii. Design Drawings | : Available- approval plan, structural design drawing and soil test report Not available: Architectural design Drawing, machine layout plan, floor load plan and material test report. |
| ix. Soil Investigation Report | : Available |
| x. Construction Materials | : Brick aggregate. |
| xi. Generator | : N/A. |

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:

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| Short Term (Immediate) | : N/A |
| Mid Term (6-weeks) | : 1. Factory Engineer to review design, loads and columns stresses in area identified above. 2. Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data. Cores to be taken from 4 different areas of slab at different level |
| Long Term (6-months) | : 1. Produce and actively manage a loading plan for all floor plates within the factory giving |

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- consideration to floor capacity and column capacity.
2. Structural engineer to prepare as built structural drawing, floor load plan and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety Corrective Actions:

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| <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> | <p>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.</p> <p>Factory need to have proper testing plan & record of fire safety equipment.</p> <p>Factory needs to have sufficient number and width (0.9 m) of marked aisles at all occupied floors.</p> <p>All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted.</p> <p>The signs shall be clearly visible at all times, where necessary supplemented by directional signs.</p> |
| <p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p> | <p>Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</p> <p>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.</p> <p>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.</p> <p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape</p> |

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| | <p>route)</p> <p>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> |
| <p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p> | <p>Fire department pre-plan needs to be developed.</p> <p>Final exit route-1 (Stair-1 & 2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor and need to be protected from the generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area.</p> <p>Boiler: Boiler room need to be protected with 4 hours rated construction with 2 hours rated opening / door from stair-1 and generator room at ground floor of the building.</p> <p>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 the protected route from all though the stairway to the final exits.</p> <p>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.</p> <p>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.</p> <p>Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install proper standpipe system with having at least 100 mm diameter of riser.</p> <p>Factory need to ensure the minimum pressure for standpipes supplying a 50 mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38 mm 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.</p> |

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| | <p>Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.</p> <p>Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.</p> |
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(B): Recommendations for Electrical Safety Corrective Actions:

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| <p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p> | <p>Ensure there is no break in the neutral wire in the form of fuse unit throughout the wiring installation.</p> |
| <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> | <p>Ensure all distribution boards (including panel door) are earthed properly</p> <p>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> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit or branch circuit.</p> <p>Ensure proper earthing connections at all electrical equipment Clean interior components from dust and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</p> |
| <p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p> | <p>Ensure graded rubber mats are provided in front of all panel boards.</p> <p>Ensure distribution board has a minimum clearance of 1 m (39 in) in front.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake.</p> <p>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 and busbar.</p> <p>Replace wooden base with metal clad construction for mounting</p> |

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| | <p>fuses. Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Connect all metal in the building to the building earthing system.</p> |
| <p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p> | <p>Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</p> <p>Inspect electrical panel boards on an annual basis. Ensure overhead service connections to a building are achieved with covered conductor and led via roof poles or service masts made of GI pipe.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Provide dedicated & adequate size of neutral with proper identification for applicable each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</p> <p>Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.</p> <p>Provide adequate covers on cable channel.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Provide an emergency power generator with adequate capacity for the factory.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the building.</p> |