

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ABBA KNIT WEAR LTD.
Address of the Factory	: Moyuri Super Market, Kutubail, Narayanganj
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 9 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 9 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 9 June, 2015
BKMEA Membership No.	: 1343

BASIC INFORMATION:

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: Both Flat slab and beam slab.
iii. Floor System	: RCC slab Structure.
iv. Floor Area	: Around 6566 sft (per floor)
v. No. of Stories	: 8 storied (North Portion) 6 Storied (South Portion)
vi. Construction Year	: after 2005
vii. Foundation Type	: Unknown
viii. Design Drawings	: Not available: Approval drawing, as build structural drawing, architectural drawing, machine layout drawing, Soil test report, material test report and floor load plan
ix. Soil Investigation Report	: Not Available
x. Construction Materials	: Stone Chips (North Portion), Brick Chips (South portion).
xi. Generator	: Basement of the North portion of 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)	: 1. A Detail Engineering Assessment (DEA) of Factory to be commenced.
Mid Term (6-weeks)	: 1. A Detail Engineering Assessment (DEA) of Factory to be completed. 2. Building engineer should check the design and confirm the ability of the existing structure to withstand the additional load coming from additional structure. 3. Building engineer to design adequate bracing for the shed.

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- Long Term (6-months) :
1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
 2. Building engineer have to prepare Approval drawing, as build structural drawing, architectural drawing, soil test report, machine layout plan, floor load plan, material test reports under the part of DEA
 3. Install adequate vertical and horizontal bracing.
 4. Continue to implement load plan.

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>	<ul style="list-style-type: none"> • N/A
<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. • Lights in storage area needed to be installed with protective covers and conduits. • Ensure adequate exit signs in all floors so that it is visible from all positions
<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 (Including machine layout) with proper dimensions showing means of escape. • Factory need to valid fire license with full occupied area coverage. • 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 equipment. • All the exit doors of staircase enclosure need to be replaced by side swinging fire rated doors so that the staircase remains free from smoke as well as the 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. • Factory needs to be installed with adequate illuminated emergency light in floors, exits & stairs.(Escape route) • Factory need to have emergency backup power for critical fire safety system with sufficient capacity &

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	arrangement according to NTPA Guideline
<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. • Both of the final escape route (Final exit-1 & 2) needs to provide protected by 2 hour fire rated enclosure construction and 1.5 hour fire rated opening or door at each floor level entrance, also need to have this protected route till to reach safe refuse area or outside of the building. • Storage area need to be protected with 2 hour rated construction & 1.5 hour rated opening or doors with the knitting section of 4th floor. • Boiler: <ul style="list-style-type: none"> Boiler room need to be protected with 4 hour rated construction & 2 hour rated opening / door from the working floor (Iron section and Finishing section) • Generator: <ul style="list-style-type: none"> Generator room need to be protected with 4 hour rated construction & 2 hour rated opening / door. • The entire exits connecting to the staircases(2 numbers staircase) need to be protected with fire and smoke resistant enclosures and opening (2 hour 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 protect by 2 hours rated construction and 1.5 hours rated opening with the smoke protection of basement area. • 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 needs 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. • Install proper standpipe system having at least 100 mm diameter of standpipe. First aid hose system (38 mm nominal) shall be provided. In addition 50 mm or larger hose connection facility shall be provided. • 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)

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	<p>may have a minimum pressure of 200 Kpa.</p> <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 $1900 \times 75 = 142500$ 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 switch or fuse unit throughout the wiring installation. • 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. • 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+ 40C) and take proper action.
<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>	<ul style="list-style-type: none"> • Provide adequate means of ventilation for the generator room based on the installed equipment and ensure that ventilation does not impact on fire barriers, e.g. fire dampers. • Ensure all distribution boards (including panel door) are earthed properly. • Ensure overcurrent 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.
<p>Mid Term</p> <p><i>(The remedial works indicated must be</i></p>	<ul style="list-style-type: none"> • Install appropriate number and type of safety signage and fire-fighting equipment at generator room. Also ensure graded rubber mats are provided in front of all

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<p><i>carried out within a period of 6 weeks)</i></p>	<p>distribution boards.</p> <ul style="list-style-type: none"> • 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. • 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 ensure each incoming supply to an MCB has a dedicated supply from bus bar. Avoid the use of multiple cables on outgoing side of MCB's. • Remove wooden bases to mount panel boards and energy meter and replace wooden bases with metal clad construction enclosure for mounting the circuit breakers. • 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. • Provide emergency power connection for life safety loads (fire alarm, fire pump, emergency lighting, exit signage, etc.) temporarily within 6 weeks and find out a permanent solution within 6 months. • Connect all metal in the building to the building earthing 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"> • 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 the generator room has adequate fire separation from the production area. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • 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.

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	<ul style="list-style-type: none">• Provide mechanical guards for electrical equipment where necessary.• 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.
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