

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Binni Garments Ltd
Address of the Factory	: 164/1, South Kamalapur, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 25 th April, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 25 th April, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 25 th April, 2015
BGMEA Membership No.	: 497

BASIC INFORMATION:

The surveyed factory building was a 4 storey RCC building including Pre-engineered shed over 3rd floor covering 80% area of roof. The structural system of the building is beam column frame and beam slab floor system. Entire building is used for RMG on rented basis. Binni Garments Ltd occupies all floor area of the building except Ground floor. The following general information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC beam column frame system. |
| iii. Floor System | : RCC beam slab floor system. |
| iv. Floor Area | : Total floor area is 16335 sft. |
| v. No. of Stories | : 4 Storey. |
| vi. Construction Year | : 1982. |
| vii. Foundation Type | : Unknown. |
| viii. Design Drawings | : Available-Approval Plan
Not Available: structural design drawing, architectural design drawing, machine layout plan, soil test report, material test report and floor load plan. |
| ix. Soil Investigation Report | : Unavailable. |
| x. Construction Materials | : Brick aggregate in column. |
| xi. Generator | : At ground floor 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:

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| Short Term (Immediate) | : | <ul style="list-style-type: none">• Over loading should be removed and it should not exceed 2 KN/m².• Detail Engineering Assessment to be commenced. |
| Mid Term (6-weeks) | : | <ul style="list-style-type: none">• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.• Detail Engineering Assessment (DEA) should be completed. |

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Long Term (6-months) :

- 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>	<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 marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. • Factory needs to reduce the occupant from the abovementioned floor and should keep in allowable limit. • Lights in storage area needed to be installed with protective covers and conduits. • Factory needs to fix temperature type detectors and portable fire extinguishers in the kitchen area. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9m 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. • Ensure illuminated exit signs in 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 with floor machine layout showing means of escape with proper dimension. • 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.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> • 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). • 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. • Factory needs to ensure minimum clear width 0.90 m and height 2.0 m for all exits as per minimum requirements. • Factory needs to ensure minimum clear width of stair 0.90 m. • Final exit route-2(Stair-2 rout of B1) need to be protected by 2 hours rated construction with 1.5 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from working floor and resident building at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have the protected escape route with 1m width path till to reach safe refuse area. • Final exit route-1(Stair-1 rout of B1) need to be protected by 2 hours rated construction with 1.5 hours fire rated door/opening at each floor level entrance including ground floor and need to be protected from generator room 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. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside. • Boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hour rated opening having direct access from outside. • Building-1: All the exits connecting to the stair-1 for

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>building-01 & building-02 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.</p> <ul style="list-style-type: none">• Building-1: Stair-2 of building-1 need to be protected by closing all opening with 2 hours rated construction within 3m (both side) of the stair and fitted 1.5 hours rated doors/opening at each floor level entrance except ground floor.• 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 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.• Factory need to install proper standpipe system having at least 75 mm dia of riser for building-1 and 100 mm dia of riser for building - 2 of standpipe.• Factory needs to install one number of hoses per 1000 m² area of the floor.• 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.• 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 needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	and at least 1900liter x 75min=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 of overheating (Temperature differences greater than 40°C) and take proper actions (Make sure cables are not overloaded ,properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, proper cable bending, no insulation damage, single cable at single point etc.)
<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"> Ensure all distribution boards (including panel door) are earthed properly using appropriate type and size of cables and the earthing cables have continuity up to earthing pit. Ensure all unused cables are removed from distribution boards and if necessary make sure cables are properly terminated at its point of termination. Turn off all unprotected circuit and ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit within one week. Ensure proper earthing connections at all electrical equipment. Use nonflammable shades for light fittings. Avoid using Celluloid shade under any circumstance. Ensure distribution boards are clean and seal all openings. 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 number and type of safety signage and fire-fighting equipment at substation and generator room. Also 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. Provide two separate and distinct connections of earthing for the generator. Ensure distribution boards have a minimum clearance

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>of 1 m (39 in) in front.</p> <ul style="list-style-type: none"> • Provide dedicated & adequate size of earthing with proper identification for each circuit. • Rewire to ensure each incoming supply to an MCB has a dedicated supply from bus bar and avoid the use of multiple cables on outgoing side of MCB's. and busbar. • Replace wooden boxes with metal clad construction for mounting switch controls. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for electrical equipment where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building, or metal water pipe etc. • Find out the cause of overheating (Temperature differences of 21°C to 40°C) and take proper actions (Make sure cables are not overloaded ,properly terminated using proper lug, joints are made proper way, no rusted throughout the connection, proper cable bending, no insulation damage, single cable at single point etc.).
<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 to ensure that the equipment is in good working condition. • Ensure overhead service connections led via roof poles or service masts made of GI pipe at least 38 mm in diameter having a bend at the top and installed on the outer wall. • Ensure the generator room has adequate fire separation

	<p>from the production area.</p> <ul style="list-style-type: none">• Provide adequate means of ventilation for the generator room based on the installed equipment without hampering fire separation of the room.• Ensure appropriate location and available space of the generator inside generator room in order to properly access the generator to perform routine maintenance activities.• Replace switchboards and distribution boards with metal enclosed body.• Ensure distribution boards have no opening and all live internal components are concealed properly.• Ensure distribution boards are installed in compliant locations in terms of height, access and surrounding weather.• Provide dedicated & adequate size of neutral with proper identification for each circuit.• Ensure each distribution board is provided with a circuit list and provide means of identification for cables accordingly.• Use non-combustible material to make cable channel and provide adequate covers on cable channel.• Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm² or greater or solder together all strands at the exposed ends or are crimped using suitable sleeve or ferrules for stranded conductors less than 6mm².• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building conforming requirements and adequacy of the system.
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