

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Super Shine Fashions Ltd.
Address of the Factory	: 58,Shantidhara,DN link road Fatullah, Narayanganj
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 12 th February, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 12 th February, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 12 th February, 2015
BGMEA Membership No.	: 2864

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:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC beam column system. |
| iii. Floor System | : Beam slab. |
| iv. Floor Area | : 32158 sq. ft. |
| v. No. of Stories | : G+ 7 storied |
| vi. Construction Year | : 1978 to 1980 and 1994 to 2002. |
| vii. Foundation Type | : Isolated Footing and Pile. |
| viii. Design Drawings | : Available- Approval drawing, Structural drawing material test report, not available- Floor load plan, machine layout plan. |
| ix. Soil Investigation Report | : Available. |
| x. Construction Materials | : Brick aggregate. |
| xi. Generator | : Ground Floor. |

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) :

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- Mid Term (6-weeks) :
1. Factory Engineer to review design, loads and columns stresses in area identified above.
 2. Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for the identified columns or 100mm dia. cores from 4 columns.
 3. Sections of plaster finish to beam & column to be removed to investigate if cracks penetrate into the building structure. Investigation needed to determine why cracks occurring.

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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. Carry out any remedial actions as directed by the Building Engineer regarding cracks.
 3. Vertical extension needs to be checked by building engineer and as built architectural and engineering drawing to be prepared and submitted for approval by appropriate authority. As part of this process building engineer will be required to make a number of check on the structural design as described in the following recommendations.

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"> • Remove all temporary items from all escape routes, aisles and passageway. • Evacuation pathway need to be provided aisle marking with arrow guiding and exit signage. Exit sign need to be posted above the exit door, it need to be clearly visible at all time, where necessary supplemented by directional signs. All exit doors need to be clearly marked for easy identification. • The egress paths need to be illuminated with emergency lighting with power back-up supply & illumination need to be a minimum of 10 lux for all corridors & exit doors. Aisles need to be provided with a minimum 2 lux. • The stairway need to be illuminated with emergency lighting with power back-up supply & illumination need to be a minimum of 10 lux for stairway. • Provide sufficient number of fire extinguisher at each section in the factory as per RMG guide line. • The extinguisher should be placed near the path of exit travel and it need to be easily accessible. • The hose pipe performance should be checked periodically and properly tagged. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan and maintain the record properly. • Fire safety training should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan maintain the record properly.

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	<ul style="list-style-type: none"> • Provide firefighting training for minimum 25% of workers from external fire safety agency. • The updated evacuation plan should be posted at all exit way of each floor.
<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"> • Produce proper plan and design for side hinged type self closing door, which swing outward of the room or in the direction of travel. Swinging of the door need to not be constricting the width of the corridor / passage below 0.9 meter. • Remove all locking device from all egress door. All exit doors need to be open-able from the side they serve without the use of a key. • The minimum clear width of the exit door should not be less than 0.9 meter. • Provide handrails on both side of each stairway with height of 0.9m measured from the nose of stair to the top of the handrail. • Provide fire rated construction to cover the window at exterior staircase. • Produce proper plan and design to provide fire rated barriers with fire rated doors at ground floor Boiler room, which located near production building. • Produce proper design and plan to provide automatic detection system with addressable fire alarm. • Provide manual activation call point at all exit route of the building. • An automatic alarm system must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire. • Provide adequate nos. of smoke detectors to cover the whole factory building. • Produce design to install dedicated fire pump for firefighting. • Prepare a plan and design to provide dedicated water stored in storage tank for firefighting operation comply with the requirement of RMG guideline. • Complete full design and plan for providing fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. • A suitable public address system need to be provide for communicating to all floors as well as facilities to receive messages from all floors. • Fire license need to be covered for all production units/ floors. • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing

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	<p>authority.</p> <ul style="list-style-type: none"> • Visual fire alarm need to be place at the high noise area.
<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"> • Replace all existing doors on evacuation routes, exit doors, which are collapsible / sliding / roll down gates and end shutters in egress route with side hinged type fire rated door, which swing outward of the room or in the direction of travel as per design and plan. • Provide fire rated barriers with fire rated doors at ground floor boiler room, which located near the production building. • Install automatic detection system with addressable fire alarm. • Install dedicated fire pump for firefighting. • Provide dedicated water stored in storage tank for firefighting operation comply with the requirement of RMG guideline. • Provide fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor.

(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"> • Over current protection devices (Circuit breakers) should be installed at all distribution panels.
<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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
<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"> • 1. Provide updated SLD matching the existing installation at the factory.2. SLD to indicate exact positions of all points of switch boxes and other outlets.3. SLD to be approved by the engineer-in-charge. • 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and

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	<p>transportable appliances, motors etc.</p> <p>2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. 3. As built drawing to be approved by the engineer-in-charge.</p> <ul style="list-style-type: none">• Provide adequate ventilation arrangements for indoor substation.• Provide adequate illumination for substation.• All unwanted materials should be removed from transformer / Generator room.• Provide rubber mats in front of all distribution panels.• Install smoke detection and provide firefighting equipment in the substation and generator room.• Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels.• 1. Provide High / Medium Voltage DBs marked with "Danger" signage.2. Ensure that all DBs shall have marked with "Danger" signage.• Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures.• 1. Wiring design should have separate and distinct sub-circuits for power and heat source. 2. Switchboards / wiring to be located away from steam / heat pipelines.• The electrical panels to be of metal case and should be marked with “Danger 415 Volts” and identified with proper phase marking and danger signage.• Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards.• Provide cable connections with properly soldered / welded lugs at (LT/MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands.• Select conductors with adequate sizing without exceeding permissible thermal limits for insulation.• Avoid looping and bunch of cable at MCCB/MCB or bus bar terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards.• Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases.• Seal the cable penetrations through walls adequately with fire resistive elements.• Provide adequate earthing to body and doors to all MDBs /
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	DBs. Ensure that all electrical panels provided with proper and separate earth potential.
<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"> • Substation should be on lowest floor level, with easy access for maintenance. • Provide adequate clearance in all sides of main HT/LT panel boards for easy maintenance. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 36m². • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • 1. Design to have proper segregation of different end used loads.2. Wiring design to have separate and distinct sub-circuits for power and heating system.3. All DBs to be placed conveniently. 4. Wiring to be neat, tidy and located near ceiling. • Provide calibrated Ammeters / Voltmeters at distribution boards MDB. • Review capacity of standby generator on basis of loads for essential lighting / AC /Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small. • 1. Wooden switchboards / panel boards should be replaced by non-flammable materials.2. Prefer switchboards made of non-flammable materials. • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes • Seal the cable entry-exit points of (LT/MDB/DB/SDB)'s with non-flammable materials. In addition: <ol style="list-style-type: none"> 1. Ensure that HT / LT panels / Switchgears to be vermin / damp proof. 2. Ensure all unused holes / openings in DBs to be blocked properly. • 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 2. Ensure that connections between conductors / equipments provided to durable electrical continuity and adequate mechanical strength and protection. 3. The continuous earth connection is provided back to the main intake supply earth. • Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels.