

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: RISING SUN KNIT LTD.
Address of the Factory	: Khaleque Bhaban, 9, Rahim Uddin Road, Natun Bazar, Tongi, Gazipur
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 7 December, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 7 December, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 7 December, 2015
BKMEA Membership No.	: 1184

BASIC INFORMATION:

It was three storey RCC structure. The structural system of the building was beams in both direction from GF to 1st floor and flat plate floor slab at 2nd floor. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC Beam slab frame – GF to 1st floor Flat Slab Frame – 2nd floor.
iii. Floor System	: RCC Beam slab – GF to 1st floor Flat plate floor slab – 2nd floor.
iv. Floor Area	: Total floor area is 11,740 sq. ft. approx
v. No. of Stories	: 3 Storey
vi. Construction Year	: Not Identified
vii. Foundation Type	: Not Identified
viii. Design Drawings	: Available (Approval document was available at the factory from RAJUK on 08th August, 1991 for 4 storied commercial building. As-built structural drawing was not available)
ix. Soil Investigation Report	: Not 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)	: N/A
Mid Term (6-weeks)	: N/A
Long Term (6-months)	: 1. Factory Engineer to review design of slab of all floors to measure the lateral capacity of structure. 2. As built engineering drawing to be prepared for entire building. As part of this process building engineer will be required to make a number of checks on the as-built construction.

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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"> <input type="checkbox"/> The minimum clear width of the pathway should be 0.9 meter <input type="checkbox"/> Rearrange the evacuation pathway to ensure the minimum width. <input type="checkbox"/> Remove all temporary items from all escape routes, aisles and passageway. <input type="checkbox"/> Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. <input type="checkbox"/> - Illuminated exit sign should be posted above the exit door, <input type="checkbox"/> - It should be clearly visible at all time, <input type="checkbox"/> - Provide directional signs wherever necessary. <input type="checkbox"/> - All exit doors should be clearly marked for easy identification. <input type="checkbox"/> -Signage should be uniform <input type="checkbox"/> Provide fire extinguisher at 1st & 2nd Floor and to keep the record for re filling & properly tagged. <input type="checkbox"/> The first aid hose and standpipe performance should be checked periodically and properly tagged. <input type="checkbox"/> Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly.
<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"> <input type="checkbox"/> Replace all existing exit doors on evacuation routes, exit doors with side hinged type door, which swing outward and in the direction of travel. Swinging of the door should not constrict the width of the corridor / passage below 0.9 meter. <input type="checkbox"/> Remove all locking device from all egress door. All exit doors should be open-able from the side they serve without the use of a key. <input type="checkbox"/> Prepare proper plan & design for another staircase. - Minimum clear width should be 0.9 meter. <input type="checkbox"/> 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. <input type="checkbox"/> Doors in stair should be outward opening, side-swing, self

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	<p>closing, non-lockable 0.75 hour fire rated doors and 1 hour fire rated wall in all stair way encloses. (Also require fire rated door at the floor occupied by other tenants)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare proper plan and design for fire rated barrier for 1 hour fire rating separated corridor with 0.75 hour fire rated door at ground floor. <input type="checkbox"/> Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. <input type="checkbox"/> Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 1st floor boiler room, which located at the adjacent to rest of the operational areas. <input type="checkbox"/> The egress paths should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for all corridors & exit doors. Aisles should be provided with a minimum 2 lux. <input type="checkbox"/> The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. <input type="checkbox"/> Produce design and plan for automatic detection system with automatic fire alarm. (Also needs to cover the floors occupied by other tenants) <input type="checkbox"/> Prepare proper design and plan for dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline. <input type="checkbox"/> Implement to a single fire safety management system with approvals from all tenants in the factory building.
<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"> <input type="checkbox"/> Install another staircase as per plan and design. - Minimum clear width should be 0.9 meter. <input type="checkbox"/> All stairway to have direct access to outside of the factory building, which requires 1 hour fire rated construction with 0.75 hour fire rated door at ground floor for fire separated corridor. <input type="checkbox"/> Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. <input type="checkbox"/> Provide 4 hours fire rated barriers with 2 hours fire rated door at 1st floor boiler room, which located at the adjacent to rest of the operational areas. <input type="checkbox"/> Install automatic detection system with automatic fire alarm. (Also needs to cover the floors occupied by other tenants) <input type="checkbox"/> Install dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Provide sufficient number of hose pipe with respect to area

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	<p>and travel distance as per RMG guideline.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. <input type="checkbox"/> Provide dedicated storage tank for firefighting operation
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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"> <input type="checkbox"/> Over current protection device (MCB/MCCB) was not installed for outgoing circuit at distribution board.
<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"> <input type="checkbox"/> 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"> <input type="checkbox"/> 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. <input type="checkbox"/> 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. 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. <input type="checkbox"/> All unwanted materials should be removed from Generator room. <input type="checkbox"/> Provide rubber mats of adequate size in front of distribution panel. <input type="checkbox"/> Install smoke detection and provide firefighting equipment in the generator room. <input type="checkbox"/> Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the signage. <input type="checkbox"/> Individual Fuse protection should be provided to every 15A socket. <input type="checkbox"/> Provide cable connections with properly soldered / welded lugs at (DBs). Ensure that all the electrical connections are properly secured with lug.

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	<ul style="list-style-type: none"> <input type="checkbox"/> Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. <input type="checkbox"/> Avoid Looping at MCB terminal, bunch of cable at bus bar terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. <input type="checkbox"/> Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. <input type="checkbox"/> Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. <input type="checkbox"/> Provide separate earthing connection to electrical equipment. Ensure that earth potential provided for all parts of equipment / installation (other than live parts) and that continuous earth connection is provided back to the main intake supply earth. <input type="checkbox"/> Provide adequate earthing to body and doors to all DB /. 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"> <input type="checkbox"/> Provide adequate ventilation arrangements for Generator room. <input type="checkbox"/> Provide 1.5 hour fire rated door of the generator room on ground level. <input type="checkbox"/> Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 24m², or relocate the generator room. <input type="checkbox"/> Provide and maintain proper clearance in all sides of generator for ease of maintenance. <input type="checkbox"/> 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. <input type="checkbox"/> Provide calibrated Ammeter & Voltmeter at distribution board (DB). <input type="checkbox"/> Review capacity of standby generator on basis of loads for essential lighting. Replace generator with larger capacity or install second generator if review indicates existing unit is too small. <input type="checkbox"/> 1. Wooden Circuit Breaker Base should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. <input type="checkbox"/> Each circuit should have a separate neutral (use of common

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	<p>neutral for more than one circuit shall not be permitted).</p> <ul style="list-style-type: none"><input type="checkbox"/> Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes.<input type="checkbox"/> Seal the cable entry-exit points of (DB)'s with non-flammable materials. In addition:<ol style="list-style-type: none">1. Ensure that DB panels / Switchgears to be vermin / damp proof.2. Ensure all unused holes / openings in DBs to be blocked properly.<input type="checkbox"/> <ol style="list-style-type: none">1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.2. Ensure that connections between conductors / equipment 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.<input type="checkbox"/> Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.
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