

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ALL ROUND KNIT WEAR LTD.
Address of the Factory	: D-583, Jalkuri Road, Godenail, Siddhirganj, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 15 th February, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 15 th February, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 15 th February, 2015
BGMEA Membership No.	: 5957
BKMEA Membership No.	: 1110

BASIC INFORMATION:

The assessed factory building is a 5 storied RCC building. The structural system of the building is beam column frame and beam slab floor system. ALL ROUND KNIT WEAR LTD. has occupied this building as rental basis. The following general information was noted:

i. Building Usage Type	: Garments Factory.
ii. Structural System	: RCC beam column frame system structure.
iii. Floor System	: RCC Beam-slab floor system.
iv. Floor Area	: The typical plinth area is 8694 sft. and total production floor is 38940 sft.
v. No. of Stories	: 5 Storey.
vi. Construction Year	: Unknown.
vii. Foundation Type	: Spread Footing (Shallow Foundation)
viii. Design Drawings	: Available (approval from Siddhirganj Pouroshova on 6th April, 2010 for commercial use)
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Stone Aggregated in columns.
xi. Generator	: Outside of main 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)	: None.
Mid Term (6-weeks)	: None.
Long Term (6-months)	: <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.• Proper roof drainage system and water proofing need to be implemented as per direction of building engineer.

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

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(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"> • None.
<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. • Direct route of access to required exits should be provided through stairway which is maintained free of obstructions. • Exit sign should be posted above the exit door, it should be clearly visible at all time, where necessary supplemented by directional signs. All exit doors should be clearly marked for easy identification. The minimum clear width of the aisle needs to have 0.9 meter. • 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. • The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. • The hose pipe performance should be checked periodically and properly tagged. • The factory should be provided additional firefighting equipment like sand & water buckets near to exit or easily accessible area for first phase firefighting. • Remove combustible material at the 4th floor near main distribution board. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & 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. • Provide firefighting training for minimum 25% of workers from external fire safety agency.

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	<ul style="list-style-type: none"> 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 fire rated 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. Produce proper plan and design for fire rated barriers with fire rated doors at generator room & boiler room. Produce proper design and plan for automatic detection system with automatic fire alarm. Produce design for dedicated fire pump with alternative backup power. Prepare a plan and design to provide dedicated water stored in storage tank for firefighting operation comply with the requirement of RMG guideline 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. 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. Valid fire license is needed from Bangladesh Fire Service & Civil Defence. The factory building should have approval from Shiddirgonj Pouroshava. Obtain fire license from the proper issuing authority. The factory has to implement single fire safety management system means the coordination of automatic fire alarm system with addressable smoke detector in all floor of the building. Visual fire alarm should 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</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

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<p><i>months)</i></p>	<p>self-closing door, which swing outward of the room or in the direction of travel as per design and plan</p> <ul style="list-style-type: none"> • Provide fire rated barriers with fire rated doors at generator room & boiler room. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternative backup power. • Provide dedicated water stored in storage tank for firefighting operation comply with the requirement of RMG guideline.
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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"> • None.
<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"> • Adequate illumination shall be provided for all working spaces of substation • All strands at the exposed ends of the cable shall be soldered together or crimped using suitable sleeve or ferrules. Live cables end should not be kept exposed or open in any circuit • Remove all inflammable materials surrounding electric circuitry immediately and conduct periodic maintenance to ensure cleanliness • No circuits shall be drawn for loads without the incorporation of a overcurrent protection device (circuit breaker). • (1) Separate branch circuits shall be provided for the installation which needs to be separately controlled. These branches should not be affected by the failure of other branch circuits. • The number of final circuits required & the points supplied by any final circuit shall be complied with - <ul style="list-style-type: none"> a) The requirement of over current protection, b) The requirement for isolation and switching, and

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	<p>c) The selection of cables and conductors.</p> <ul style="list-style-type: none"> • All final circuits shall be wired using looping wiring system; no joint box shall be used. All pool in positions shall be the switchboards. • (2) Separate branch circuits shall be provided from miniature circuit breaker (MCB) or fuse distribution boards (FDB) for general lighting, automatic and fixed appliances with a load of 500 watt or more and plug receptacles. Each automatic or fixed appliance shall be served by an individual circuit • Cable joints shall be realized through porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.
<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"> • Provide Single Line Diagram (SLD) prepared after proper locations of all outlets with cable size, MCCB/MCB rating, load end rating etc. have been selected. • 1. Provide an electrical layout drawing shall be prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. have been selected. • 2. All runs of wiring and the exact positions of all points of switch boxes and other outlets shall be first marked on the plan of the building and approved by the engineer-in-charge. • Necessity and capacity of the electrical substation shall be set by regulations in the Electricity Act or by the relevant electrical utilities. • All unwanted materials and temporary connections should be removed from substation. • The required number of rubber mats with adequate sizes shall be kept in front of panels in the substation. • Provide the distribution boards shall be of the metal case and marked with “Danger 415 Volts” and identified with proper phase marking and danger marks. • The generator oil tank should be place away from the control panel side. In case of gas engine generator extra precaution must be taken regarding ventilation, leakage to prevent explosion.

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	<ul style="list-style-type: none">• The intensity of illumination at floor level by means of escape lighting shall not be less than 10 lux.• Provide proper illumination of exit signs and the lighting of the means of escape and exit access and powered by an alternate or emergency electrical system to ensure continued illumination for a duration not less than 30 minutes after the failure of primary power supply.• Each 15/20A socket outlet in a building for the use of domestic appliances such as air conditioner, water-cooler, sewing machines, fans etc, shall be provided with its own individual fuse, with suitable discrimination with backup fuse or miniature circuit breaker (MCB) in the distribution / sub-distribution boards. The socket outlet need not necessarily embody the fuse as an integral part of it.• Free accessibility shall be provided for all MDBs / SDBs for normal operation• Provide standby generating set on the basis of essential light load, essential air-conditioning load, essential equipment load and essential services load, such as one lift out of a bank of lifts, one or all water pumps, etc.• The switch boards / panel boards shall be made of non-flammable materials. Wooden boxes shall be avoided in factories for mounting the lighting boards, switch controls, etc.• Cables shall be connected to terminals only by soldered or welded lugs, unless the terminal of such form that it is possible to securely clamp them without cutting away the cable strands.• Conductors for power and lighting circuits shall be of adequate size to carry the designed circuit load without exceeding the permissible thermal limits for the insulation.• All distribution boards shall be marked “Lighting” or “Power”, as the case may be, and also be marked with the voltage and number of phases of the supply. Each shall be provided with a circuit list giving diagram of each circuit which it controls and the current rating for the circuit and size of fuse element• Flexible cable or cords shall not be used as fixed wiring
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	<p>for fixed machines unless it contained in an enclosure affording mechanical protection. Flexible cords may be used for connections of portable equipment.</p> <ul style="list-style-type: none"> • In case of concealed wiring, the wires shall be encased in metallic (GI) or non-metallic (PVC) conduits that shall be buried in roof or floor concrete and in brick/concrete wall. • LT panels and switchgears shall be all vermin and damp-proof and all unused openings or holes should be blocked properly • The generator body frame shall be earthed by two separate and distinct connections to earth / ground. • All LT panels shall be efficiently earthed and properly connected to the required number of earth electrodes • In general all distribution boards shall be earth potential, thus ensuring that persons coming in contact with distribution boards shall also be at earth potential at all times. • A building shall have protection against lightning depending on the probability of a stroke and acceptable risk levels. Steps shall be taken for an objective assessment of the risk and of the magnitude of the consequences of lightning strikes
<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"> • Suitable arrangements should exist / present to prevent the entrance of storm or flood water into the substation area. Arrangement shall be made to prevent storm water entering the transformer and switch rooms through the soak pits, if floor level of the substation is low. Floor level should be higher than the ground level • Clearances in the front, rear and sides of the main HT and LT and sub switch hoards should be adequate to do maintenance work freely • The minimum height of the substation room shall be 3.6 m • All incoming and outgoing circuits of HT and LT panels shall be clearly and indelibly labelled for identifications. • All cable trenches shall be provided with non-flammable covers at substation areas.

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	<ul style="list-style-type: none">• As per Table 4.4 of RMG guideline, Area Requirements for Standby Generator Room is 36 m²• There shall be proper clearance in rear, front and back side of generator for maintenance work• In wiring layout, power and heating sub-circuits shall be kept separate and distinct from lighting and fan sub-circuits. All wiring shall be done on the distribution system with main and branch distribution boards placed at convenient positions considering both physical aspects and electrical load centres.• Ammeters and voltmeters shall be provided at distribution boards in working condition. Calibration of instruments should be done time to time• The DBs shall be marked with “Danger 415 Volts” and identified with proper phase marking and danger marks.• They shall be fixed on suitable stanchion or wall and shall be accessible for replacement of fuses, and shall not be more than 2 m from floor level.• There shall be a distance of 0.8 to 1 meter clearance in front of the switchboards.• The cable penetration through wall shall be sealed or covered properly with the fire respective element,• The use of common neutral for more than one circuit shall not be permitted. There should be one common neutral for one single circuit• Wiring systems shall be installed so that the general building structural performance and fire safety are not reduced. Where a wiring system passes through elements of building construction such as floors, walls, roofs, ceilings, partitions or cavity barriers, the openings remaining after passage of the wiring system shall be sealed according to the degree of fire resistance prescribed for the respective element of building.• The electrical conductors between conductors and other equipment shall be provided durable electrical continuity and adequate mechanical strength and protection.
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