Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: AHANA KNIT COMPOSITE LTD.
Address of the Factory	: Post Office Road, Lalpur, Fatullah, Narayanganj.
Present status of the factory	: Under Operation.
Structural Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Structural Inspection	: 2015-06-14
Fire Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Fire Inspection	: 2015-06-14
Electrical Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Electrical Inspection	: 2015-06-14
BKMEA Membership No.	: 1946

BASIC INFORMATION:. The following general information was noted:

i. Building Usage Type	: Knit Garment Factory
ii. Structural System	: RCC Beam Slab Frame(Ground Floor), Flat Slab(1st Floor to 3rd Floor)
iii. Floor System	: RCC Beam Slab and Flat Slab
iv. Floor Area	: Ground floor = 8952 sft , Entire building = 25874.5 sft (Approx.)
v. No. of Stories	: GF+ 3 floors (4 storey)
vi. Construction Year	: Construction started in 2007 and completed in a single phase.
vii. Foundation Type	: Individual Column Footing
viii. Design Drawings	: Available but without approval from proper authority.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Brick aggregate in all columns, beams and slabs in all floors
xi. Generator	: The generator room was located at the ground floor on the building plinth at the west side.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

No critical or high risk observation was found which can pose hamper to the production or worker as well. Some non-conformity was found at the factory on the day of assessment for which mid-term and long term corrective actions have been suggested. There is no need to suspend operation in the factory.

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. As built architectural and engineering drawings to be prepared and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a number of checks on the structural design as described in the following recommendations.
Long Term (6-months)	: 1. Stability system needs to be checked by building engineer. Lateral bracing system is required to ensure the stability of the structure.

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

(A): Recommendations for Fire Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - Illuminated exit sign should be posted above the exit door, - It should be clearly visible at all time, - Provide directional signs wherever necessary. - All exit doors should be clearly marked for easy identification. - Signage must be uniform. Lightning and signage must be provided on the evacuation route over the roof. • Factory management should checked alarm call points & manual alarm system periodically and maintained the record properly. • Provide right number of fire extinguisher at all floors and to keep the record for re filling & properly tagged. • The first aid hose and standpipe 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 & should kept record properly.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 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. • 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. • Exit door should have minimum clear width 0.9 meter. • Prepare proper plan & design for staircase. - Minimum clear width should be 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. • Doors in stair should be outward opening, side-swing, self closing, non-lockable 1.5 hours fire rated door at stair-1 and 0.75 hours fire rated door at stair-2 in all stair way encloses and also provide fire rated entry lobby with 4 hrs fire rated wall and 2 hrs fire rated door at accessories store. • Provide 1 hour fire rated construction and 45 minute fire rated door at unprotected opening window, which is adjacent to external staircase. • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor. And also prepare proper plan & design for evacuation route from exterior stair to stair-2 at roof of 2 storied building, it should be protected with concrete roof without any openings. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor boiler room & generator room (shed-2) and ground floor dry chemical room (building-1), which located at the adjacent to final evacuation route. • Prepare proper plan and design for 2 hours fire rated barriers with 1.5 hrs fire rated door at ground floor gray fabric & finished fabric store which is adjacent to dyeing section. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at ground floor (shed-2) boiler room & chemical room, ground floor (shed-1). • 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. Lightning must be provided on the evacuation route over the roof. • The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. • Produce design and plan for automatic detection system with automatic fire alarm. • Install Manual activation call point at all exit routes • 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. • Prepare proper design and plan for dedicated fire pump with alternate backup power supply. • Replace existing 1.5 inch standpipe \ with 2 inch standpipe to meet the requirement of RMG guideline. • Power backup supply should be provided for fire alarm system.

	• Visual alarm should be placed at the generator room. • Obtain the fire license with full covered area from the proper issuing authority. • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing authority.
Long Term (The remedial works indicated must be carried out within a period of 6 months)	• Install staircase as per plan and design. - Minimum clear width should be 0.9 meter. • All stairway to have direct access to outside of the factory building, which requires fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor. And also provide for evacuation route from exterior stair to stair-2 at roof of 2 storied building, it should be protected with concrete roof without any openings. • Provide 4 hour's fire rated barriers with 2 hours fire rated doors at ground floor boiler room & generator room (shed-2) and ground floor dry chemical room (building-1), which located at the adjacent to final evacuation route. • Provide 2 hour's fire rated barriers with 1.5 hrs. fire rated door at ground floor gray fabric & finished fabric store which is adjacent to dyeing section. • Provide 4 hour's fire rated barriers with 2 hours fire rated door at ground floor (shed-2) boiler room & chemical room, ground floor (shed-1). • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa.

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)*	• Relocate the open type switchboards in dry and ventilated areas, away from chemical fumes. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 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. • Necessity and capacity of the electrical substation shall be set by regulations in the Electricity Act or by the relevant electrical utilities. • 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. • All unwanted materials should be removed from Generator room. • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the generator room. • 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign. 2. The source of illumination should be providing not less than 50 lux.

	• Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. • Provide supports for main service line complete with adequate insulation. • 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 cable connections with properly soldered / welded lugs at circuit breaker. Ensure that all the electrical connections are properly secured with lugs. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity 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 load, voltage, number of phases. • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • Provide separate earthing connection to electrical equipments. 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. • Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.
Long Term (*The remedial works indicated must be carried out within a*	• Provide adequate ventilation arrangements for the generator room. • Provide 4 hour fire rated walls all around the generator room on ground level. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 78m2, or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance.

period of 6 months)	• Provide calibrated Ammeters and Voltmeters at main distribution board. • 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 MDB/SDB's with non-flammable materials. In addition: 1. Ensure that all 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 at roof top of building.