Name of the Factory	: AZAD KNIT COMPOSITE TEXTILE MILLS (PVT) LTD
Address of the Factory	: Kutubail (Kather Pool), Fatullah, Narayanganj, Banlgadesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 15th June, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 15th June, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 15th June, 2015
BKMEA Membership No.	: 714.

BASIC INFORMATION:

The assessed factory building was a 7 - Storey RCC building. The frame system of the building is flat slab without periphery beam. AZAD KNIT COMPOSITE TEXTILE MILLS (PVT) LTD has occupied all floors of this building on ownership basis. The following general information were noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC flat plate frame system.
iii.	Floor System	: RCC two way flat slab system.
iv.	Floor Area	: The typical plinth area is 3400 sft. and total production floor is 23800sft.
v.	No. of Stories	: 7 Storey.
vi.	Construction Year	: 2011.
vii.	Foundation Type	: Pile Foundation.
viii.	Design Drawings	: Available. (Approval for a 7-Storey industrial building on 2nd February 2012, from Fatullah Union Parishad)
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Stone aggregate.
xi.	Generator	: At south-east side at ground floor of this 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) :

- Factory Engineer to review design, loads and columns stresses in area identified above.
- Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for columns F1, F2 & E2.

Long Term (6-months) :

- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Building Engineer needs to check existing flat slab system. Lateral system is required to ensure stability of the structure. Carry out necessary remedial actions as per suggested by factory engineer.
- Exposed rebar needs to be covered by lean graded concrete as per direction of building engineer.

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*):	• None.
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• Remove all temporary items from all escape routes, aisles and passageway. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • The first aid hose and standpipe performance should be checked periodically and properly tagged. • Provide additional firefighting equipment like sand & water buckets near exit or easily accessible area for first phase firefighting. • 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. • 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 2 hours • Fire Safety Assessment Report: Azad Knit Composite Textile Mills (Pvt.) Ltd. fire rated doors with 4 hours fire rated walls in all stair way encloses. • Prepare design for installation of fire rating smoke proof enclosure. 2 hours fire rating doors for exit should not be less than that of 4 hours fire resistance rating of the walls of the smoke proof fire rated entry lobby. • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor at ground floor. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor substation, generator & boiler room, which located at the adjacent to evacuation route. • Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Provide 2 hours fire rated door at 3rd floor boiler room, which located at the adjacent to operational area. • 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. • Produce design and plan for automatic detection system with automatic fire alarm. • 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. • Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline. • Prepare proper design and plan for fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the

	building. • 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. • Visual alarm should be placed at the generator room. • Cover all units / floors in a valid fire license • Obtain the boiler license from the proper issuing authority.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Install smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. • All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction at ground floor for fire separated corridor. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor substation, generator & boiler room, which located at the adjacent to evacuation route. • Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. • Provide dedicated storage tank for firefighting operation • Install fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. • 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:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• None.
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	• Re-locate oil tanks away from control panels in generator room. • All strands cables at exposed ends should be properly soldered / crimped and insulated.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Refill the silica gel. Ensure that accessories of transformers like breathers, vent pipe, buchholz relay, silica gel must be in order at substation. • Provide rubber mats of adequate size in front of all distribution panels. • Provide cable connections with properly soldered / welded lugs at DB's. 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 bunch of cable at MCCB/MCB and 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 proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. • Provide adequate earthing to body and doors to all 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 period of 6 months)*	• 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 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. • Oil filled Transformer should be on lowest floor level, with easy access for maintenance. • Make suitable arrangements to prevent storm water to enter substation / transformer / switch rooms. • 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 56 m2, or relocate the generator room. • 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. • For buildings > 20m high, provide at least one vertical shaft of 200 x 400 mm for every 1500 sq.m. floor area. • 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. • Power cables/ telecommunication cables should be laid separately. • 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 DB's with non-flammable materials. In addition: 1. Ensure that panel bards 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.