Name of the Factory	: Azam Knitting Ltd.
Address of the Factory	: 472, North Pahartali, Ispahani C Gate, Ali Azam Sharak, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 27th February, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 27th February, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 27th February, 2015
BGMEA Membership No.	: 3810.

BASIC INFORMATION:

The assessed factory building was a 7 Storey RCC building. The structural system of the building is RCC beam column frame and beam slab floor system. Azam Knitting Ltd. has occupied this building as rental basis. The following general information were noted:

i.	Building Usage Type	: Knitting Factory.
ii.	Structural System	: RCC beam column frame system.
iii.	Floor System	: RCC beam slab floor system.
iv.	Floor Area	: The typical plinth area is 3562 sft. and total production floor is 28,522 sft.
v.	No. of Stories	: 7 Storey.
vi.	Construction Year	: 2002 (One phases).
vii.	Foundation Type	: Shallow foundation.
viii.	Design Drawings	: Available (Approval for a 7 storey commercial building from CDA Chittagong on 04th June, 1995)
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Brick aggregate.
xi.	Generator	: At ground floor in bellow stair case.

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 insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for the A2 to A12 and B1, C1 columns; corner column A1, or 100mm dia. cores from any column.

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.
- Sections of plaster finish of walls to be removed to investigate if cracks penetrate the building structure. Investigation needed to determine why cracks occurring.
- Sections of plaster finish to brick wall to be removed to investigate if dampness penetrates into the building wall. Investigation needed to determine the source of the damp and way to prevent it re-occurring.

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*	• The minimum clear width of the pathway should be 0.9 meter • 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 should be uniform • 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. • Combustible materials should keep away from electrical appliances and all the lighting in storage area must have protecting covers and wiring must be in conduits.

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 rated doors 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. • Produce proper plan and design to provide 2 hours fire rated doors at boiler room in ground floor and 4 hours fire rated barriers with 2 hours fire rated doors at generator room, which located at the adjacent of final evacuation route. • 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. • A suitable public address system should be provided for communicating to all floors as well as facilities to receive messages from all floors. • Visual alarm should be placed at the generator room. • 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 smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. • Provide 2 hours fire rated doors at boiler room in ground floor and 4 hours fire rated barriers with 2 hours fire rated doors at generator room, which located at the adjacent of final evacuation route. • 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*):	• N/A
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 / fuel tanks away from control panels in generator room. • All strands cables at exposed ends should be properly soldered / crimped and insulated. • Provide weather proof casing for switchboards exposed to weather (located outside the building).
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• All unwanted materials should be removed from substation & Generator room. • Provide rubber mats of adequate size 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 LT panels. • Adequate number of caution boards should be kept in the substation 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. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at DBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • 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 (LT/DB/SDB)'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 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. • Seal the opening of wall at wiring passing through wall/roof/floor partitions. Ensure that all cable penetrations though walls should be adequately sealed with fire resistive elements. • 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)*	• Provide 4 hour fire rated walls all around the transformer / generator room on ground level. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 100m2, or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • 1. Wooden switchboards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. • Power cables/ telecommunication cables / antenna cables should be laid separately.

	• 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: 1. Ensure that 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 at roof top of building.