Name of the Factory	: AL JOYNAL HOSIERY & GARMENTS.
Address of the Factory	: 56, S.M. Maleh Road, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 12th May, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 12th May, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 12th May, 2015
BKMEA Membership No.	: 1555

BASIC INFORMATION:

The assessed factory building is a 15-Storey RCC building with one basement and partial vertical extension floors. Basement is occupied by car parking, substation & generator. Ground floor & 1st floor is occupied by shopping center. 2nd floor to 5th floor is occupied by AL JOYNAL HOSIERY & GARMENTS. 6th floor to 14th floor is occupied by residential apartment. The structural system of the building is beam column frame and beam slab floor system. The whole building is owned by AL JOYNAL HOSIERY & GARMENTS. The following general information was noted:

i.	Building Usage Type	: Commercial cum residential building.
ii.	Structural System	: RCC beam column frame system.
iii.	Floor System	: RCC Beam-slab floor system.
iv.	Floor Area	: Typical Plinth area 8030 sft & total area 32120 sft.
v.	No. of Stories	: 0ne basement + 15 Storey + vertical extension
vi.	Construction Year	: 1999.
vii.	Foundation Type	: Cast in situ Pile Foundation (As per structural drawing).
viii.	Design Drawings	: Available (Approval for Rajdhani Unnoyon Kartipokkho on 8th November, 1999 as a 15 storey commercial building.
ix.	Soil Investigation Report	: Available.
x.	Construction Materials	: Stone Aggregated in columns.
xi.	Generator	: At basement 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) :

- Water tanks need to be emptied and adjacent slab panels of identified columns in all floors not to be used for storage.
- 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 identified columns.
- A Detail Engineering Assessment of Factory to be commenced, see attached Scope.

Mid Term (6-weeks) :

- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Detail Engineering Assessment to be completed
- Sections of plaster finish to wall to be removed to investigate if cracks penetrate the building structure. Investigation needed to determine why cracks occurring.

Long Term (6-months) :

- Continue to implement load plan.
- Carry out any remedial actions as directed by the Building Engineer regarding hair cracks.

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 • Rearrange the evacuation pathway to ensure the minimum width. • Remove all temporary items from all escape routes, aisles and passageway. • Direct route of access to required exits should be provided through stairway which are maintained free of obstructions. • Direct route of access to required exits should be provided through stairway which are maintained free of combustibles. • Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - Exit sign should be posted above the exit door, - It should be clearly visible at all time. • Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. • Provide fire extinguisher at 3rd, 4th and 5th floor and to

	keep the record for re filling & properly tagged. • 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. • 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. • 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. • Prepare proper plan & design for another staircase. - Minimum clear width should be 0.9 meter. Or rearrange the occupant load that cannot be exceed 298 occupants. • 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 enclosure. • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor at ground floor. • Prepare proper plan for fire separated entry lobby, 4

	hours fire walls and 2 hours fire rated self closing doors in basement level. • Provide 1.5 hours fire rated door at store room for separation for other operational area. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at 3rd floor finishing section (boiler). • 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. • Install Manual activation call point at all exit routes. • 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. • 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. • Visual alarm should be placed at the generator room. • Implement to a single fire safety management system with approvals from all tenants in the factory building.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Implement the plan and design for one more exit or implement with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building. • Install another staircase as per plan and design. - Minimum clear width should be 0.9 meter. • Install smoke proof enclosure 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. • Implement the plan for fire separation 4 hours fire walls and 2 hours fire rated self-closing doors in basement level. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at boiler, generator and substation room. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • 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*):	• Over current protection devices (Circuit breakers) should be installed at all distribution panels.
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. • Relocate switchboards away from gas stoves / sinks / washing area / laundry (> 2.5 m) . • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth /

	ground. • 1. Disconnect the loads from cable of signs of overloading / abnormal temperature found. 2. Make necessary repairs to avoid further accidents.
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. • 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. • Refill the silica gel. Ensure that accessories of transformers like breathers, vent pipe, bushels relay, silica gel must be in order at substation. • Provide adequate illumination for substation. • All unwanted materials should be removed from transformer / 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 HT / LT panels. • Adequate number of caution boards should be kept in the substation/ transformer 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. • Individual Fuse protection should be provided to every 15/20 A socket. • 1. All stranded conductors > 6mm2 to be provided with cable sockets. 2. All stranded conductors < 6 mm2, at exposed end should be soldered / crimped. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. • 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 proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards. • Provide cable connections with properly soldered / welded lugs at (LT/MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands. • 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 period of 6 months)*	• Substation should be on lowest floor level, with easy access for maintenance. • Provide adequate clearance in all sides of main HT/LT panel boards/transformer for easy maintenance. • Provide adequate ventilation arrangements for indoor substation. • 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 46m2, or relocate the generator room. • Provide and maintain proper clearance in all sides of generator for ease of maintenance. • Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs). • Relocate the MDBs with easy access. Ensure that all MDBs / SDBs should have easy accessibility. • Review capacity of standby generator on basis of loads for essential lighting / AC / Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small. • Provide standby power for lifts by a self contained generator set to be operated automatically. • Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level). • 1. Wooden switchboards / panel boards 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 HT / 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.