Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Ritzy Knit Designs Ltd.
Address of the Factory	: Alongkar Shopping Complex, Port Connecting Road,Chittagong.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 23rd March, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 23rd March, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 23rd March, 2015
BGMEA Membership No.	: 4746

BASIC INFORMATION:

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC Flat Slab at ground floor parking area, Flat slab at one portion of under construction 6th floor (Segment 2), Beam – Column Frame at the rest of the area.
iii.	Floor System	: Flat slab at parking area + portion of 6th floor (Under Construction).
iv.	Floor Area	: Typical plinth area Approx. 32,280 sft. The total operational floor area of the factory is Approx. 32,280 sft.
v.	No. of Stories	: Semi-basement + Ground + 4-Storey + Shed (Segment 1) Semi-basement + Ground + 5-Storey + Shed (Segment 2)
vi.	Construction Year	: Phase 1: Semi-basement – 3rd Floor; Construction from 2003 - 2008. Phase 2: 4th Floor; Construction from 2010. Phase 3: 5th – 6th Floor; Construction from 2014.
vii.	Foundation Type	: Drawing Not Available.
viii.	Design Drawings	: Available (Approval for a Basement + 5-Storey commercial building on 8th February, 2003 from Chittagong Development Authority but no as-built drawing was available) .
ix.	Soil Investigation Report	: Not Available.
x.	Construction Materials	: Brick aggregate.
xi.	Generator	: Basement floor of building. Two generator rooms, areas of Generator Rooms are Approx.360 sft.

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) : 1. Factory management not to use the tributary area of the highly stressed columns for storage purposes.

2. Factory Engineer to review design, loads and columns stresses for all columns.

3. Verify in-situ concrete stresses by 100mm dia. cores from column at B4.

4. A Detail Engineering Assessment of Factory to be commenced, see attached Scope.

Mid Term (6-weeks) : 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

2. Detail Engineering Assessment to be completed.

Long Term (6-months) : 1. Continue to implement load plan.

2. Factory Engineer to review design, loads and punching capacity for slabs. Carry out any remedial actions as directed by the Building Engineer for punching capacity of slab.

3. A-built structural and architectural drawings need to be prepared for entire building. In part of this process building engineer has to couple of checks of as-built construction 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*	• The minimum clear width of the pathway should be 0.9 meter • Rearrange the evacuation pathway to ensure the minimum width. • Direct route of access to required exits should be provided through stairway which is maintained free of obstructions. • 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.
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 at floor wise up to 520 no. of occupant to fulfill the requirement. • 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 doors in all stair way encloses.(Also require fire rated door at the floor occupied by other tenants) • Prepare proper plan and design for fire rated barrier for 2 hour fire rated separated corridor with 1.5 hrs fire rated door at ground floor. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at basement generator room, which located at the adjacent to final evacuation route. • Prepare proper plan and design for 4 hours fire rated barriers with 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 and control panel.(Also needs to cover the floors occupied by other tenants) • 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 inch hose pipe with 1.5 inch hose pipe to meet the requirement of RMG guideline. • Prepare plan and design for dedicated water storage tank for

	firefighting operation as per RMG guideline. • 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)*	• Install another 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 2 hour fire rated construction with 1.5 hrs fire rated door at ground floor for fire separated corridor. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at basement generator room, which located at the adjacent to final evacuation route. • Provide 4 hours fire rated barriers with 2 hours fire rated door at 3rd floor boiler room, which located at the adjacent to operational area. • Install automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants) • Install dedicated fire pump with alternate backup power supply. • Provide dedicated storage tank for firefighting operation

(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*	• 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)*	• Provide cable connections with properly soldered / welded lugs at (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. • Seal the cable penetrations through walls adequately with fire resistive elements. • 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)*	• 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. • Make suitable arrangements to prevent storm water to enter substation / transformer / switch rooms. • Provide adequate ventilation arrangements for indoor substation. • Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 38m2, or relocate the generator room. • Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level). • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • 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.