Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	:	Xin Bangla Fabrics
Address of the Factory	:	1, Kalma, Savar, Dhaka
Present Status of the Factory	:	Under Operation
Structural Assessment Conducted by	:	TUV
Date of Structural Inspection	:	26th February, 2015
Fire Assessment Conducted by	:	TUV
Date of Fire Inspection	:	26th February, 2015
Electrical Assessment Conducted by	:	TUV
Date of Electrical Inspection	:	26th February, 2015
BGMEA Membership No.	:	3958

BASIC INFORMATION:

The assessed factory is a 3 -storey RCC building which is approved for a 10 storey factory building with beam and column structural frame system. The following information was noted:

i.	Building Usage Type	:	Garment Factory.
ii.	Structural System	:	R.C.C. Beam Column Frame.
iii.	Floor System	:	Beam Slab.
iv.	Floor Area	:	Typical Plinth area 8006.41 Sq. ft. Total area 19215 Sq. ft.
v.	No. of Stories	:	Three
vi.	Construction Year	:	2003 (Verbally).
vii.	Foundation Type	:	Not identified
viii.	Design Drawings	:	Available (Approved for a 10 storey building on 27th April, 2010 from Savar union parishad)
ix.	Soil Investigation Report	:	Unavailable.
x.	Construction Materials	:	Stone Aggregated.
xi.	Generator	:	Adjacent to a separate building near the exit of South facing wall at ground 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) :

Mid Term (6-weeks) :

Long Term (6-months) :

i. Sections of plaster finish to beam and column to be removed to investigate if cracks penetrate into the building structure. Investigation needed to determine why cracks occurring.

ii. Water proofing and proper roof drainage system need to be implemented as directed by the guidance of building engineer.

iii. Exposed reinforcement need to be covered by lean graded concrete following the guidance of Building Engineer.

iv. Sections of plaster finish to beam and column to be removed to investigate if dampness penetrates into the building wall. Investigation needed why it is 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*):	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. i. Illuminated exit sign should be posted above the exit door. ii. It should be clearly visible at all time. iii. Provide directional signs wherever necessary. iv. All exit doors should be clearly marked for easy identification. v. Signage should be uniform Factory management should check alarm call points, alarm & detection system periodically and maintained the record properly. 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. Stair treads should be of nominal uniformity. Differences more than 25mm from the adjacent steps are be modified to be within this tolerance. Doors in stair should be outward opening, side-swing, self-closing, non-lockable 0.75 hours fire rated doors in all stair way encloses.

	Prepare proper plan and design for fire rated barrier for 1 hour fire rating separated corridor with 0.75 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 ground floor generator room, which located at the adjacent to production 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. Power backup supply should be provided for fire alarm system. Visual alarm should be placed at the generator room. Obtain fire license from issuing authority
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	All stairway to have direct access to any designated refuge area which requires 1 hour fire rated construction with 0.75 hrs. fire rated door at ground floor for fire separated corridor. Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor generator room, which located at the adjacent to production 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. Provide dedicated storage tank for firefighting operation

(B): Recommendations for Electrical Safety corrective actions:

Immediate	N/A

(*the factory should not continue to be occupied until these non-conformities have been rectified*):	
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	All strands cables at exposed ends should be properly soldered / crimped and insulated. 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.1. Provide High / Medium Voltage DBs marked with "Danger" signage. • 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. 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. • 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.Select conductors with adequate sizing without exceeding permissible thermal limits for insulation. Individual Fuse protection should be provided to every 15/20 A socket. • 1. Overhead service connections should be covered and meet the requirements mentioned in RMG Guidelines. 2. 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 (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. Seal the cable penetrations through walls adequately with fire resistive elements. Provide separate earthing connection to electrical equipment's. 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)*	Provide adequate clearance in all sides of main HT/LT panel boards/transformer for easy maintenance. Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline; the area should be 24m2, or relocate the substation/ transformer room. Maintain the minimum height of 3.6 m for the substation room. Increase the height or relocate it. Provide adequate ventilation arrangements for indoor substation. Provide 4 hour fire rated walls all around the transformer / generator room on ground level. Provide adequate cable trenches with non-flammable covers at substation areas. Relocate generator set in substation building / adjacent to substation room. Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 36m2, or relocate the generator room. Provide and maintain proper clearance in all sides of generator for ease of maintenance. 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. • 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/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 / equipment's 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.