

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Badhan Corporation Ltd.
Address of the Factory	: Zamgara, Earpur, Ashulia, Savar, Dhaka.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	:
Date of Structural Inspection	:
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 26 August, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 26 August, 2015
BGMEA Membership No.	: 5830

BASIC INFORMATION:

The surveyed factory building is a 6-Storey RCC building with one semi basement and one ancillary dining shed. The following information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System :
- iii. Floor System :
- iv. Floor Area :
- v. No. of Stories :
- vi. Construction Year :
- vii. Foundation Type :
- viii. Design Drawings :
- ix. Soil Investigation Report :
- x. Construction Materials :
- xi. Generator :

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) | : |

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The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>None</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Factory management should be check alarm call points & manual alarm system periodically and maintained the record properly. <input type="checkbox"/> Provide the right number fire extinguishers at all areas of the factory. <input type="checkbox"/> The first aid hose and standpipe performance should be checked periodically and properly tagged.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Prepare proper plan and design for one more exit in a way not to exceed the maximum travel distance or If the factory design to equip with an automated fire alarm, portable fire-fighting system and appropriate standpipe and hose system through the entire building the length of travel should not be exceed 60 meter. <input type="checkbox"/> 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. <input type="checkbox"/> 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. <input type="checkbox"/> Prepare proper plan & design for staircase. <ul style="list-style-type: none"> - Minimum clear width should be 0.9 meter. <input type="checkbox"/> 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 <input type="checkbox"/> 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) <input type="checkbox"/> Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor. <input type="checkbox"/> Prepare proper plan for 4 hours fire walls and 2 hours fire rated self closing doors in basement level. <input type="checkbox"/> Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. <input type="checkbox"/> Provide 2 hours fire rated door at 1st floor boiler area, which

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	<p>located at the adjacent to finishing section.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide smoke and heat vents on the roof / ceiling / wall at godown section. <input type="checkbox"/> 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. <input type="checkbox"/> The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. <input type="checkbox"/> 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) <input type="checkbox"/> Provide adequate nos. of smoke detectors to cover the whole factory building. <input type="checkbox"/> Prepare proper design and plan for dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Power backup supply should be provided for fire alarm system. <input type="checkbox"/> Visual alarm should be placed at the generator room. <input type="checkbox"/> Cover all units / floors in a valid fire license <input type="checkbox"/> Implement to a single fire safety management system with approvals from all tenants in the factory building. <input type="checkbox"/> Obtain the boiler license from the proper issuing authority. <input type="checkbox"/> Obtain the boiler operator license from the proper issuing authority.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 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. <input type="checkbox"/> Install staircase as per plan and design. - Minimum clear width should be 0.9 meter. <input type="checkbox"/> All stairway to have direct access to any designated refuge area which requires 2 hour fire rated construction and 1.5 hour fire rated door at ground floor for fire separated corridor to finished directly to outside. <input type="checkbox"/> Implement the plan for fire separation 4 hours fire walls and 2 hours fire rated self closing doors in basement level. <input type="checkbox"/> Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. <input type="checkbox"/> Install automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by

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	<p>other tenants)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Install dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline. <input type="checkbox"/> Stand pipe supplying first aid hose should have minimum pressure of 200 KPa.
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(B): Recommendations for Electrical Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>None</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> All strands cables at exposed ends should be properly soldered / crimped and insulated.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Provide adequate illumination for substation. <input type="checkbox"/> Provide rubber mats of adequate size in front of all distribution panels. <input type="checkbox"/> Install smoke detection and provide firefighting equipment in the substation and generator room. <input type="checkbox"/> Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels. <input type="checkbox"/> 1. All stranded conductors > 6mm² to be provided with cable sockets. <input type="checkbox"/> 2. All stranded conductors < 6 mm², at exposed end should be soldered / crimped. <input type="checkbox"/> Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures. <input type="checkbox"/> 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. <input type="checkbox"/> Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. <input type="checkbox"/> Avoid looping and bunch of cable at MCCB/MCB or bus bar terminal, use individual circuit and over current device for every

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	<p>incoming and outgoing circuit at the distribution boards.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. <input type="checkbox"/> Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. <input type="checkbox"/> Seal the opening of wall at wiring passing through wall/roof/floor partitions. Ensure that all cable penetrations through walls should be adequately sealed with fire resistive elements. <input type="checkbox"/> Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. <input type="checkbox"/> Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 1. Provide updated SLD matching the existing installation at the factory. <input type="checkbox"/> 2. SLD to indicate exact positions of all points of switch boxes and other outlets. <input type="checkbox"/> 3. SLD to be approved by the engineer-in-charge. <input type="checkbox"/> 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. <input type="checkbox"/> 2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. <input type="checkbox"/> 3. As built drawing to be approved by the engineer-in-charge. <input type="checkbox"/> Substation should be on lowest floor level, with easy access for maintenance. <input type="checkbox"/> Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline; the area should be 45m², or relocate the substation/ transformer room. <input type="checkbox"/> Provide adequate ventilation arrangements for indoor substation. <input type="checkbox"/> Provide 4 hour fire rated walls all around the transformer / generator room on ground level. <input type="checkbox"/> Provide adequate cable trenches with non-flammable covers at substation areas. <input type="checkbox"/> Relocate generator set in substation building / adjacent to substation room. <input type="checkbox"/> Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 48m², or relocate the

	<p>generator room.</p> <ul style="list-style-type: none"><input type="checkbox"/> 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. <ul style="list-style-type: none"><input type="checkbox"/> Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs).<input type="checkbox"/> 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.<input type="checkbox"/> Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).<input type="checkbox"/> Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be covered in proper conduit pipes.<input type="checkbox"/> Seal the cable entry-exit points of (LT/MDB/DB/SDB)'s with non-flammable materials. In addition:<ul style="list-style-type: none">1. Ensure that HT / LT panels / Switchgears to be vermin / damp proof.2. Ensure all unused holes / openings in DBs to be blocked properly.<input type="checkbox"/> 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.
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