

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ANMONA FASHION LTD
Address of the Factory	: Enayetnagar, Fatullah, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 29 th July, 2015.
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 29 th July, 2015.
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 29 th July, 2015.
BKMEA Membership No.	: 211.

BASIC INFORMATION:

The assessed factory building was a 5 -Storey RCC building. The structural system of the building is RCC beam column frame and beam slab floor system. All floors of building were occupied by the assessed factory as ownership basis. The following information was noted:

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| i. Building Usage Type | : Knit Garment Factory. |
| ii. Structural System | : RCC beam column frame system. |
| iii. Floor System | : RCC beam slab floor system. |
| iv. Floor Area | : Typical Plinth area is 11556 sft & total area of 57780 sft. |
| v. No. of Stories | : 5-Storey. |
| vi. Construction Year | : 1st phase construction started in 1989 and 2nd phase construction started in 2006. |
| vii. Foundation Type | : Pile Foundation. |
| viii. Design Drawings | : Unavailable. |
| ix. Soil Investigation Report | : Available. |
| x. Construction Materials | : Brick aggregate. (Identified by removing plaster) |
| xi. Generator | : Generator is located outside the main building at the north-east corner. |

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:

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| Short Term (Immediate) | : | <ul style="list-style-type: none">• Factory Management to remove any storage loading from column supporting floors of Building 1 and maintain maximum live load not greater than 10.0 psf on the working floors.• Factory Engineer to review design, loads and columns stresses of the total building.• Verify in-situ concrete stresses by 100mm dia. cores for B2 and E3 columns of the factory Building.• A Detail Engineering Assessment of Factory to be commenced, see attached Scope. |
| Mid Term (6-weeks) | : | |

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- Produce and actively manage a loading plan for all floor plates of the Building, giving consideration to floor capacity and column capacity.
- Detail Engineering Assessment to be completed.
- As built architectural and engineering drawings to be prepared and submitted for approval by appropriate authorities. As part of this process the building engineer will be required to make a number of checks on the structural design.

Long Term (6-months) :

- Continue to implement load plan for Building.

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>N/A</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"> • 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.
<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"> • 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 1.5 hours fire rated doors in all stair way encloses. • 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. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor

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	<p>electrical substation, generator room, which located at the adjacent to final exit.</p> <ul style="list-style-type: none"> • Prepare proper plan and design for 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 3rd floor boiler, which located at the adjacent to finishing section • Produce design and plan for automatic detection system with automatic fire alarm. • Install Manual activation call point at all exit routes • 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. • Visual alarm should be placed at the generator room. • Obtain building approval from 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"> • 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 ground floor electrical substation, generator room, which located at the adjacent to final exit • Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. • Provide 4 hours fire rated barriers with 2 hours fire rated door at 3rd floor boiler, which located at the adjacent to finishing section • 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 travel distance as per RMG guideline. Or rearrange the placement hose station • Stand pipe supplying first aid hose should have

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	<p>minimum pressure of 200 KPa.</p> <ul style="list-style-type: none"> • Provide dedicated storage tank for firefighting operation
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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>	<ul style="list-style-type: none"> • Over current protection devices (Circuit breakers) should be installed at all distribution panels.
<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"> • Re-locate oil / fuel tanks away from control panels in generator room. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
<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"> • All unwanted materials should be removed from 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. All stranded conductors > 6mm² to be provided with cable sockets. • 2. All stranded conductors < 6 mm², at exposed end should be soldered / crimped. • 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/DB)'s. Ensure that all the electrical

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	<p>connections are properly secured with lugs and glands.</p> <ul style="list-style-type: none"> • Select conductors and 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 partitions. Ensure that all cable penetrations through walls should be adequately sealed 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.
<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"> • 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-

	<p>charge.</p> <ul style="list-style-type: none">• 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.• 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 48m², or relocate the generator room.• Provide and maintain proper clearance in all sides of generator for ease of maintenance.• <ol style="list-style-type: none">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.• 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).• Seal the cable entry-exit points of (LT/DB)'s with non-flammable materials. In addition: <ol 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.• <ol style="list-style-type: none">1. Provide the ECC to meet minimum cross-sectional area as per table 4.5.2. Ensure that a connection between conductors /
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	<p>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.</p> <ul style="list-style-type: none">• Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.
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