

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ATLAS FABRICS LTD.
Address of the Factory	: Kashipur, Hatkhola, Narayanganj
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 20 May, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 20 May, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 20 May, 2015
BKMEA Membership No.	: 784

BASIC INFORMATION:

The assessed factory building is a 5- Story RCC building. The frame system of the building is beam-column frame. The following information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : RCC beam column system. |
| iii. Floor System | : RCC Beam slab. |
| iv. Floor Area | : Typical Plinth area 7715 sft & total area 38575 sft. |
| v. No. of Stories | : Ground Floor + 4 Floors |
| vi. Construction Year | : 1992 |
| vii. Foundation Type | : Spread foundation on arrays of timber piles. (as per structural drawing) |
| viii. Design Drawings | : Available (RAJUK, on 05th July, 1992 as a 5-Storey factory building) |
| ix. Soil Investigation Report | : Available |
| x. Construction Materials | : Brick aggregate. |
| xi. Generator | : Situated on south side of the main building in an adjacent area having 36 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:

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| Short Term (Immediate) | : 1. Factory Management to remove any storage loading from column supporting floors and maintain maximum live load not greater than 25.0 psf on the working floors. |
| | 2. Factory Engineer to review design, loads and columns stresses in area identified above. |
| | 3. Verify in situ concrete stresses by 100mm dia. cores for D5, D6, E4, B5 and H4 columns. |

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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.

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"> • Factory management should checked alarm call points & manual alarm system periodically and maintained the record properly. • The first aid hose and standpipe performance should be checked periodically and properly tagged. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly.
<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. • Exit door should have minimum clear width 0.9 meter. • 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. • Provide stair ways so that - <ul style="list-style-type: none"> - stair treads should be of nominal uniformity, - The difference between the largest and the smallest riser should not exceed 25mm and stair riser height should be maximum 215 mm.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> • 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). • Provide 2 hour fire rated construction at unprotected opening window, which is adjacent to exterior staircase. • Provide 2 hour's fire rated doors at 1st floor boiler room, which located at the adjacent to finishing section. • 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.(Also needs to cover the floors occupied by other tenants). • Install Manual activation call point at all exit routes • Prepare proper design and plan tfor 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. • Implement to a single fire safety management system with approvals from all tenants in the factory building. • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing authority.
<p>Long Term <i>(The remedial works indicated must be</i></p>	<ul style="list-style-type: none"> • Install automatic detection system with automatic fire alarm.(Also needs to cover the floors occupied by other tenants)

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

<i>carried out within a period of 6 months)</i>	<ul style="list-style-type: none"> • Install dedicated fire pump with alternate backup power supply • 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>	<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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated. • 1. Disconnect the loads from cable of signs of overloading / abnormal temperature found. 2. Make necessary repairs to avoid further accidents.
<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"> • 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. • Provide rubber mats of adequate size in front of distribution panels. • 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 DB. Ensure that all the electrical connections are properly secured with lugs. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>current carrying capacity for insulation.</p> <ul style="list-style-type: none"> • 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. 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 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. 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. • 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. • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • 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 DB with non-flammable materials. In addition:

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ol style="list-style-type: none">1. Ensure that DB panels / Switchgears to be vermin / damp proof.2. Ensure all unused holes / openings in DBs to be blocked properly. <ul style="list-style-type: none">• 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 2. Ensure that connections between conductors / equipment 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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