

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Design & Source Ltd.
Address of the Factory	: 30, Kawran Bazar, Dhaka
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 12 December, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 12 December, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 12 December, 2015
BGMEA Membership No.	: 3108

BASIC INFORMATION:

The surveyed building was an 8-Storey RCC structure with a partial shed-Storey and BTS room with 9' height tower at the 8th floor level. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC Beam-Column & Flat Slab Frame.
iii. Floor System	: RCC Beam-Column & Flat Slab Frame.
iv. Floor Area	: Ground floor = 4100 sft, Entire building = 32800 sft (Approx.)
v. No. of Stories	: 7 floors + GF (8 Storey), No Basement
vi. Construction Year	: Construction started in 1991.
vii. Foundation Type	: Cast in situ pile foundation
viii. Design Drawings	: Available (approval for 8 storey RCC building from RAJUK on 30th October 1990 for commercial use)
ix. Soil Investigation Report	: Stone chips in all columns, beams and brick aggregate in all slabs in all floors.
x. Construction Materials	: Brick aggregate.
xi. Generator	: Generator is present at ground floor of the building at north side..

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)	: 1. As built engineering drawing to be prepared for full building. As part of this process building engineer will be required to make a number of checks on the structural design on as-built construction. 2. Building engineer to verify strength and stiffness of lateral stability system for lateral loads.

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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"/> The minimum clear width of the pathway should be 0.9 meter <input type="checkbox"/> Direct route of access to required exits should be provided through stairway which are maintained free of obstructions. <input type="checkbox"/> Factory management should be checked alarm call points, alarm & detection system periodically and maintained the record properly. <input type="checkbox"/> The first aid hose and standpipe performance should be checked periodically and properly tagged. <input type="checkbox"/> Provide additional fire fighting equipment like sand & water buckets near exit or easily accessible area for first phase fire fighting. <input type="checkbox"/> Combustible materials should keep away from electrical appliances and all the lighting in storage area must have protecting covers and wiring must be in conduits.
<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"/> 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"/> 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 2 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 design for installation of fire rating smoke proof enclosure. 2 hours fire rating doors for exit should not be less than that of 4 hours fire resistance rating of the walls of the smoke proof fire rated entry lobby. <input type="checkbox"/> Prepare proper plan and design for fire rated barrier for 4 hour fire rating separated corridor with 2 hour fire rated door at ground floor. <input type="checkbox"/> Provide 2 hours fire rated door at ground floor generator room & 7th floor boiler room which located at the adjacent to

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	<p>the operational area.</p> <ul style="list-style-type: none"> <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 addressable fire alarm and control panel. (Also needs to cover the floors occupied by other tenants) <input type="checkbox"/> Install Manual activation call point at all exit routes. <input type="checkbox"/> Prepare proper design and plan for dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Replace existing 1 inch hose pipe with 1.5 inch hose pipe to meet the requirement of RMG guideline. <input type="checkbox"/> Prepare proper design and plan for fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. <input type="checkbox"/> Complete full design and plan for providing fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor. <input type="checkbox"/> Implement to a single fire safety management system with approvals from all tenants in the factory building
<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"/> Install smoke proof fire rated entry lobby at emergency stairways to separate from the area of incidence. <input type="checkbox"/> All stairway to have direct access to outside of the factory building, which requires 4 hour fire rated construction with 2 hour fire rated door at ground floor for fire separated corridor. <input type="checkbox"/> Install automatic detection system with addressable fire alarm and control panel. (Also needs to cover the floors occupied by other tenants) <input type="checkbox"/> Install dedicated fire pump with alternate backup power supply. <input type="checkbox"/> Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. <input type="checkbox"/> Install fire lifts equipped with approved intercommunication (including two way voice communications) with the fire command station or control room on the ground floor lobby of the building. <input type="checkbox"/> Provide fire command station equipped with detailed floor plans along with clearly demarcated locations of fire detection and fighting devices and through the panel board able to detect fire alarm from any floor.

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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>	<p>None</p>
<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 rubber mats of adequate size in front of all distribution panels. <input type="checkbox"/> 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. <input type="checkbox"/> Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. <input type="checkbox"/> Avoid Looping, bunch of cable at MCB, bus bar terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. <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"/> Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
<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. 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. <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. 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. <input type="checkbox"/> Provide 1.5 hour fire rated door of the generator room on

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	<p>ground level.</p> <ul style="list-style-type: none"><input type="checkbox"/> Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30m², or relocate the generator room.<input type="checkbox"/> Provide and maintain proper clearance in all sides of generator for ease of maintenance.<input type="checkbox"/> Provide calibrated Ammeter & Voltmeter at distribution board (MDB).<input type="checkbox"/> For buildings > 20m high, provide at least one vertical shaft of 200 x 400 mm for every 1500 sq.m. floor area.<input type="checkbox"/> Provide and maintain proper height of panel boards (< 2m from floor level).<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"/> Seal the cable entry-exit points of (DB)'s with non-flammable materials. In addition:<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.<input type="checkbox"/> <ol 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.<input type="checkbox"/> 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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