

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: BANGLA-JAPAN TRADING LTD
Address of the Factory	: Gazir Chat (Madrasha Road), Ashulia, Savar, Dhaka, Bangladesh.
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	:
Date of Structural Inspection	:
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 5 August, 2005
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 5 August, 2005
BKMEA Membership No.	: 1738

BASIC INFORMATION:

The factory building is a 7-Storey RCC building RCC building. The following information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : RCC beam column system.
- iii. Floor System : RCC Beam slab.
- iv. Floor Area :
- v. No. of Stories : 7 Storied
- 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:

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|------------------------|---|
| 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"/> The minimum clear width of the pathway should be 0.9 meter <input type="checkbox"/> Remove all temporary items from all escape routes, aisles and passageway. <input type="checkbox"/> Direct route of access to required exits should be provided through stairway which is maintained free of combustibles. <input type="checkbox"/> Provide aisle marking with arrow guiding and exit signage on all Evacuation pathways or provided with overhead signage fixed at ceiling level. - Illuminated exit sign should be posted above the exit door, - It should be clearly visible at all time, - Provide directional signs wherever necessary. - All exit doors should be clearly marked for easy identification. -Signage should be uniform <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 firefighting equipment like sand & water buckets near exit or easily accessible area for first phase fire fighting. <input type="checkbox"/> 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"> <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

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	<p>handrail.</p> <ul style="list-style-type: none"><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.(Also require fire rated entry lobby 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 and design for 4 hours fire rated barriers with 2 hours fire rated doors at ground floor stari-2 exit way, which located at the adjacent to the final evacuation route.<input type="checkbox"/> Produce proper design and plan for 2 hours fire separation for lift wells.<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"/> Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 5t floor boiler room, which located at the adjacent to the operational area.<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 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"/> Automatic alarm systems must be provided throughout the factory; the alarm must be automatically triggered on detection of a fire.<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"/> Replace existing 1 inch hose pipe with 1.5 inch hose pipe to meet the requirement of RMG guideline.<input type="checkbox"/> Prepare plan and design for dedicated water storage tank for
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	<p>firefighting operation as per RMG guideline.</p> <ul style="list-style-type: none"> <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"/> 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"/> 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.(Also require fire rated entry lobby at the floor occupied by other tenants) <input type="checkbox"/> 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 for fire separated corridor. <input type="checkbox"/> Provide 4 hours fire rated barriers with 2 hours fire rated doors at ground floor stari-2 exit way, which located at the adjacent to the final evacuation route. <input type="checkbox"/> Implement the design for 2 hours fire rated walls for lift wells <input type="checkbox"/> Provide 2 hrs fire rated barrier with 1.5 hrs fire rated door for storage area. <input type="checkbox"/> Provide 4 hours fire rated barriers with 2 hours fire rated door at 5t floor boiler room, which located at the adjacent to the operational area. <input type="checkbox"/> Install automatic detection system with automatic 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"/> Provide dedicated storage tank for firefighting operation <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

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	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><input type="checkbox"/> Re-locate oil / fuel tanks away from control panels in generator room.</p> <p><input type="checkbox"/> All strands cables at exposed ends should be properly soldered / crimped and insulated.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p><input type="checkbox"/> Provide adequate illumination for substation.</p> <p><input type="checkbox"/> Provide rubber mats of adequate size in front of all distribution panels.</p> <p><input type="checkbox"/> Install smoke/heat detection and provide firefighting equipment in the substation and generator room.</p> <p><input type="checkbox"/> Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of LT panels.</p> <p><input type="checkbox"/> Adequate number of caution boards should be kept in the substation/ transformer room.</p> <p><input type="checkbox"/> 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign.</p> <p>2. The source of illumination should be providing not less than 50 lux.</p> <p><input type="checkbox"/> 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.</p> <p><input type="checkbox"/> Provide proper clearance of 0.8 - 1.0 m in front of LT panel.</p> <p><input type="checkbox"/> Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation.</p> <p><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 incoming and outgoing circuit at the distribution boards.</p> <p><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.</p>

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	<ul style="list-style-type: none"> <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. <input type="checkbox"/> Provide separate earthing connection to electrical equipments. 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. <input type="checkbox"/> Provide adequate earthing to body and doors to all MDBs / DBs/SDBs. 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"/> Provide adequate clearance in all sides of main HT/LT panel boards/transformer for easy maintenance. <input type="checkbox"/> Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline; the area should be 25 m2, or relocate the substation/ transformer room. <input type="checkbox"/> Maintain the minimum height of 3.6 m for the substation room. Increase the height or relocate it. <input type="checkbox"/> Provide adequate ventilation arrangements for indoor substation. <input type="checkbox"/> Modify Area of generator room to meet requirements of Table 4.4, RMG Guideline; the area should be 30m2 for 120kW, 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"/> 1. Design to have proper segregation of different end used loads. <input type="checkbox"/> 2. Wiring design to have separate and distinct sub-circuits for power and heating system. <input type="checkbox"/> 3. All DBs to be placed conveniently.

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	<p>4. Wiring to be neat, tidy and located near ceiling.</p> <ul style="list-style-type: none"><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"/> 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 (LT/DB)'s with non-flammable materials. In addition:<ol style="list-style-type: none">1. Ensure that LT panels 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.<ol style="list-style-type: none">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.<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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