

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: BEST STYLE COMPOSITE LTD.
Address of the Factory	: Azad Plaza Bhaban, Israfil Sarker Road, Fatullah, Narayanganj, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 18 th April, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 18 th April, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 18 th April, 2015
BKMEA Membership No.	: 1655

BASIC INFORMATION:

The surveyed factory building was a 7 storey RCC building. The structural system of the building is beam column frame and beam slab floor system. The entire building is rented by Best Style Composite Ltd. The following general information was noted:

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 3200 sft & total area 19200 sft.
v. No. of Stories	: 7 Storey.
vi. Construction Year	: 2006.
vii. Foundation Type	: R.C.C. cast in situ Pile as per structural drawing.
viii. Design Drawings	: Available (Approval for a 6 storey commercial building from Rajdhani Unnoyon Kartipokkho on 18th January, 1998)
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick aggregate in column.
xi. Generator	: Situated inside the main building perimeter in parking area consisting 595 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:

Short Term (Immediate)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none">• Factory Engineer to review design, loads and columns stresses in area identified above.• Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for the identified columns or 100mm dia. cores from 4 columns.
Long Term (6-months)	: <ul style="list-style-type: none">• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

- Vertical extension needs to be checked by building engineer and as built architectural and engineering drawing need to be prepared for the entire building and submitted for approval additional floor by appropriate authority. As part of this process building engineer will be required to make a number of check on the structural design.

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"> • Direct route of access to required exits should be provided through stairway which is maintained free of obstructions. • Factory management should check alarm call points, alarm & detection system periodically and maintained the record properly. • Provide sufficient number of fire extinguisher at all floor production area and to keep the record for re filling & properly tagged. • The hose pipe 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"> • Prepare proper plan and design for one more exit in a way not to exceed the maximum travel distance than the requirement of the RMG guideline. • 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. • Prepare proper plan & design for exit door. <ul style="list-style-type: none"> - Minimum clear width should be 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.

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. • 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 2 hours fire rated construction with 1.5 hours fire rated door at 1st floor warehouse area for fire separation from others operational area. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at 2nd & 3rd floor boiler room, which are located at the adjacent to operational area. • 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. • 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. • Visual fire alarm should be place at Generator room. • Obtain the boiler 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"> • Implement the plan and design for one more exit to meet the requirements of the RMG guideline. • Install exit door as per plan and design.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<ul style="list-style-type: none"> - Minimum clear width should be 0.9 meter. • 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 generator room, which located at the adjacent to final exit. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at 2nd & 3rd floor boiler room, which are located at the adjacent to operational area. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. • Provide dedicated storage tank for firefighting operation.
--	--

(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"> • All strands cables at exposed ends should be properly soldered / crimped and insulated. • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground. • 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</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

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

<p><i>carried out within a period of 6 weeks)</i></p>	<p>boxes and other outlets.</p> <p>3. SLD to be approved by the engineer-in-charge.</p> <ul style="list-style-type: none">• 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. <ul style="list-style-type: none">• All unwanted materials should be removed from transformer / Generator room.• 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.• 1. All stranded conductors > 6mm² to be provided with cable sockets.2. All stranded conductors < 6 mm², at exposed end should be soldered / crimped.• 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs.2. Ensure that all electric circuitry clean of inflammable materials.3. Conduct periodic maintenance and maintain the records.• Provide suitable & non-flammable protected supports and shades for hanged light fittings/fixtures.• 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.• Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation.
---	--

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<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. • 1. Provide sufficient and separate earthing for MDB panels in substation/transformer room 2. Provide adequate number of earth electrodes. • 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 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"> • Provide 4 hour fire rated walls all around the transformer / generator room on ground level. • Relocate generator set in substation building / adjacent to substation room. • 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 calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs). • 1. Wooden switchboards / panel boards should be

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>replaced by non-flammable materials.</p> <p>2. Prefer switchboards made of non-flammable materials.</p> <ul style="list-style-type: none">• 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/MDB/DB/SDB)'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 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.• Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.
--	---