

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Srkh Design Ltd.
Address of the Factory	: Nawjore (Itahata More), Tangail Road, Chandona
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 28 th January, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 1 st February, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 1 st February, 2015
BGMEA Membership No.	: 5594

BASIC INFORMATION:

The factory building is a three storied RCC building with beam and column system and flat slab system. The following information was noted:

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| i. Building Usage Type | : Garment Factory. |
| ii. Structural System | : Profile sheet truss structure supported by RCC columns. |
| iii. Floor System | : Ground Floor. |
| iv. Floor Area | : Total plinth area is 21,385.00 sq.ft. |
| v. No. of Stories | : Single storied shed |
| vi. Construction Year | : 2007. |
| vii. Foundation Type | : Unavailable. |
| viii. Design Drawings | : Available (Signed by Gazipur Upazilla Parishad on 13th February, 2013). |
| ix. Soil Investigation Report | : Unavailable. |
| x. Construction Materials | : Brick aggregate. |
| xi. Generator | : Adjacent to exit of North facing wall. |

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) | : N/A |
| Mid Term (6-weeks) | : 1. The connection of steel structure needs to be checked by building engineer. The bracing system and tie between purlin are required to ensure the stability of the steel shed.
2. The RCC frame needs to be checked by building engineer. The lateral system is required to ensure the stability of RCC structure.
3. Sections of plaster finish to wall-column joint to be removed to investigate if cracks penetrate the building structure. Investigation needed to determine why cracks occurring. |

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- Long Term (6-months) :
1. As built structural drawings to be prepared. As part of this process the building engineer will be required to make a number of checks on the structural design.
 2. Carry out any remedial actions as directed by the Building Engineer for non-engineered steel structure.
 3. Carry out any remedial actions as directed by the Building Engineer for lateral stability system in RCC structure.
 4. Carry out any remedial actions as directed by the Building Engineer for cracks in wall and column joint.
 5. Sections of plaster finish to brick wall and column to be removed to investigate if dampness penetrates into the building wall or in concrete. Investigation needed to determine the source of the damp and way to prevent it re-occurring.
 6. Carry out any remedial actions as directed by the Building Engineer for dampness.

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"> • Remove all temporary items from all escape routes, aisles and passageway. • Evacuation pathway at knitting, cutting & finishing section need to provide aisle marking with arrow guiding and exit signage. Exit sign need to be posted above the emergency exit door at knitting section. The exit signs need to be clearly visible at all times, where necessary supplemented by directional signs. All exit doors need to be clearly marked for easy identification. • The egress paths need to be illuminate with emergency lighting with power back-up supply & illumination need to have a minimum of 10 lux for all corridors & exit doors. Aisles need to have provided with a minimum 2 lux. • Factory has to periodic checking of alarm call point & fire alarm with properly maintain the record. • Provide fire extinguisher at godown section and to keep the record for periodic checking of fire extinguisher. Fire extinguishers are not properly tagged. • The extinguisher need to be placed near the path of exit travel and it need to be easily accessible. • Practice of periodic checking of hose performance need to be periodically to ensure whether it is functional or not, and properly tagged.

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	<ul style="list-style-type: none"> • Remove combustible/flammable material near to electrical circuit board at finishing section. • Fire drill need to conduct quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan and should maintain the record properly. • Fire safety training need to be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan and should maintain the record properly. • Provide firefighting training for 25% of workers from external fire safety agency. • The updated evacuation plan need to post at all exit way of each floor & accessible position
<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"> • Produce proper plan and design for step/ramp with hand rail for smooth evacuation from knitting section emergency exit door to outside of the factory. • Remove all existing doors on evacuation routes, exit doors, which are collapsible / sliding / roll down gates and end shutters in egress route. Proper design drawing for side hinged type door, which swing outward of the room or in the direction of travel. • The width of emergency exit need to have minimum width with fire resistive rated door. • Produce proper plan and design to provide fire resistance door at generator room & CNG meter room. Window for air ventilation at generator room is needed to seal with fire rated barrier and vent need to be provided at ceiling to protect the exit pathway from smoke & fire. • Prepare design of godown window for seal with fire rated construction and provide fire rated door for separation for other operational area. • All high risk room like boiler room is need to enclosed by fire rated construction / barrier with fire rated door from the rest of the operational area. • Provide smoke and heat vents on the roof / ceiling / wall at godown section, closure of natural draft, smoke & heat vent. • Produce proper design, drawing and plan to provide automatic detection system with automatic fire alarm. • Produce design to install standard standpipe and adequate no. of hosepipe. • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing authority. • Provide child care room at low noise area near egress route. • Power backup supply need to be provided for fire alarm

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	<p>system.</p> <ul style="list-style-type: none"> • Visual alarm system need to place at generator room
<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"> • Execute the step/ramp with hand rail for smooth evacuation from knitting section emergency exit door to outside of the factory. • Ensure to remove required emergency exit doors on evacuation routes, which are collapsible / sliding / roll down gates and end shutters in egress route, install side hinged type door, which swing outward of the room or in the direction of travel. Swinging of the door need to not be constricting the width of the corridor / passage below 0.9 meter. • Install fire resistance door at generator room & CNG meter room. Window for air ventilation at generator room is needed to seal with fire rated barrier and vent need to be provided at ceiling to protect the exit pathway from smoke & fire. • At Godown window need to seal with fire rated construction and provide fire rated door for separation for other operational area. • Install automatic detection system with automatic fire alarm. • Install standard standpipe and adequate no. of hosepipe. • Install dedicated fire pump with alternate backup power. • Provide dedicated water stored in storage tank for firefighting operation complying with the requirement of RMG guideline table 3.1 and not to be used for other purposes

(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>	N/A
<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>	<ol style="list-style-type: none"> 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. <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 cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.

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<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. <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"> • Accessories of transformers like breathers, vent pipe, buchholz relay, silica gel must be in order at substation. • All unwanted materials should be removed from Generator room. • Provide rubber mats in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. <ul style="list-style-type: none"> • 1. Provide High / Medium Voltage DBs marked with "Danger" signage. 2. Ensure that all DBs shall have marked with "Danger" signage. <ul style="list-style-type: none"> • 1. Provide and maintain at least 10 lux illumination at floor level for exit sign. 2. Provide alternate / emergency backup for illuminating the exit signs for at least 30 minutes. <ul style="list-style-type: none"> • 1. Wooden switchboards / panel boards should be replaced by non-flammable materials. 2. Prefer switchboards made of non-flammable materials. <ul style="list-style-type: none"> • Provide cable connections with properly soldered / welded lugs. Ensure that all the electrical connections are properly secured with lugs and glands. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases. • 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 (LT/MDB/DB/SDB)'s with non-flammable materials. In addition: <ul style="list-style-type: none"> 1. Ensure that HT / LT panels / Switchgears to be vermin / damp proof.
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	<p>2. Ensure all unused holes / openings in DBs to be blocked properly.</p> <ul style="list-style-type: none"> • 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"> • Area of substation / transformer to meet requirements of Table 4.3 of RMG Guideline. The area should be 45m². • Provide 4 hour fire rated walls all around the transformer / generator room on ground level. • Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels. • Provide adequate cable trenches with non-flammable covers at substation areas. • Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs). • 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. • Seal the cable penetrations through walls adequately with fire resistive elements. • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 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. • Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels.