

## **Summary of Preliminary Assessment on Structural, Fire and Electrical Safety**

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Name of the Factory	: SYNERGEY TEXTILE LTD.
Address of the Factory	: Varaider Chala, Natun Bazar, Sreepur, Gazipur
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 14 July, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 14 July, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 14 July, 2015
BKMEA Membership No.	: 1843

### **BASIC INFORMATION:**

The factory building is a three storied RCC dual system (both beam column and flat plate) structure; 1st floor and 2nd floor of the building is RCC beam column frame system and ground floor of the building is RCC flat plate system. The following information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : Dual system (beam column frame and flat plate).
- iii. Floor System : Beam slab and flat plate.
- iv. Floor Area : Floor area is 18,100 sft (Total)
- v. No. of Stories : 3 stories
- vi. Construction Year : Building was built in one phase (2009-10).
- vii. Foundation Type : Could not be verified, since foundation drawing and soil
- viii. Design Drawings : Not Available
- ix. Soil Investigation Report : Not Available
- x. Construction Materials : Brick aggregate.
- xi. Generator : Ground Floor.

### **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. Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data. Cores to be taken from 4 different areas of slab at different level.   |
| Long Term (6-months)   | : 1. Results of flat plate review to be input to Loading Plan.<br>2. Prepare full set of as built structural drawing and floor load plan and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.<br>3. Factory management should take approval from proper authority and soil test should be conducted vicinity to the structure |

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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>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>	<p>Fire drill needs to be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills needs to be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</p> <p>All the firefighting equipment's need to test with proper documents.</p> <p>Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat.</p> <p>All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.</p> <p>Potable fire extinguisher needs to be installed as an approved type and installed as per manufacturer's instruction and placed near the path of exit travel where easily accessible</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</p> <p>Fire license needs to be updated for full occupied area.</p> <p>Fire manager/Director need to have safety training from proper authority &amp; worker of the factory should as far as possible be trained for use fire extinguisher.</p> <p>All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits &amp; stairs.(Escape route(. Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of</p>

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	failure of power supply.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Factory needs to have a proper pre-plan for fire department. Factory need to arrange/made another exit as per NTPA guideline.</p> <p>Factory needs to ensure minimum width of stair either 0.9 m or 8 mm per occupant, the largest one of those and also provide another stair of this factory.</p> <p>Final exit route (Stair route) need to be protected (1 hour rated construction with 0.75 hours rated door) at each floor level entrance and need to be protected from working floor (knitting section) at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</p> <p><b>Generator:</b> Generator room need to be protected with 4 hours rated construction &amp; 2 hours rated opening / door from knitting section located at ground floor.</p> <p><b>Sub-station:</b> Sub-station need to be protected with 4 hours rated construction &amp; 2 hours rated opening / door from knitting section located at ground floor.</p> <p>All the stairs need to be protected with fire and smoke resistant enclosures and opening (1 hour rated enclosure and 0.75 hours rated door)and provide a protected route from all though the stairway to the final exits.</p> <p>Factory need to install centralized and automatic fire detection &amp; alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</p> <p>The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.</p> <p>Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install proper standpipe system with having at least 75 mm dia of riser.</p> <p>Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of fabric hose with variable</p>

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	<p>nozzle.</p> <p>Install standard standpipe and hose system as well as fire pump system to ensure required hose pressure at the highest and most remote part of the building.</p> <p>Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</p> <p>Factory needs to install dedicated fire pump with sufficient capacity and backup power as per NTPA Guideline.</p> <p>Depend on the proper fire-fighting system and arrangement, factory needs to have sufficient water storage capacity to get adequate pressure for a specified duration to feed firefighting equipment.</p>
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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>N/A</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>Provide two separate and distinct connections of earthing for each generator.</p> <p>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Provide additional insulation for wiring exposed to external heat source to protect cable.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be</i></p>	<p>Install appropriate number and type of safety signage and fire-fighting equipment at substation and generator room. Also ensure graded rubber mats are provided</p>

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<p><i>carried out within a period of 6 weeks)</i></p>	<p>in front of all distribution boards.</p> <p>Provide Instruction boards for first aid and artificial respiration in the substation room and generator room.</p> <p>Ensure in the substations room and generator room, all working place, exit light and escape light have adequate illumination level as per standard.</p> <p>Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil.</p> <p>Ensure distribution board has a minimum clearance of 1 m (39 in) in front.</p> <p>Provide dedicated &amp; adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous earth path is back to main building intake.</p> <p>Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's.</p> <p>Ensure all electrical cables are sized according to capacity of circuit breakers.</p> <p>Provide adequate support or mechanical guards for electrical wiring where necessary.</p> <p>Provide adequate covers on cable channel.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Connect all metal in the building to the building earthing system.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</p> <p>Inspect electrical panel boards on an annual basis.</p> <p>Ensure the substation room has minimum area as per NTPA Table-4.</p>

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	<p>Ensure the substation room has adequate fire separation from the production area.</p> <p>Provide adequate means of ventilation for the substation room based on the installed equipment considering fire barriers.</p> <p>A proper, secured and restricted entrance provision should be provided for the substation room.</p> <p>Ensure underground cables for electrical distribution in the premises are encased in GI or PVC pipes and laid in earth trenches of sufficient depth as per mentioned standard.</p> <p>Ensure all high tension cables are laid following standard cable laying techniques.</p> <p>Ensure the generator room has adequate fire separation from the production area.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p> <p>Install circuit breakers in proper way using metal enclosure to ensure safe installation.</p> <p>Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</p> <p>Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the building.</p>
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