

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

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Name of the Factory	: <b>SKAMP GARMENTS INDUSTRIES LTD.</b>
Address of the Factory	: Plot no. 974, Zhajar Road, Uttar Khaikur, Board Bazar, Gazipur, Bangladesh
Dhaka Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 28 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 3 July, 2014

**Basic Information:** The present garment factory is a commercial building with beam-column frame system. The following general information was noted:

i.	Building Usage Type	: Garment factory
ii.	Structural System	: RC beam & slab system
iii.	Floor System	: Beam slab
iv.	Floor Area	: Gross floor area of the factory building is 24000 sq. ft.
v.	No. of Stories	: 3 storied
vi.	Construction Year	: 2007-2009
vii.	Foundation Type	: Pad foundation
viii.	Design Drawings	: Available (Signed by the LGED authority in 2007)
ix.	Soil investigation Report	: Available (2007)
x.	Construction Materials	: Brick aggregated
xi.	Generator	: Ground floor, accessed from the south, exterior side of the building

**Recommendations for Corrective Action:** The recommendations of corrective action for both Structural and Fire & Electrical Safety are as follows:

**The recommendations for Structural Safety corrective actions are:**

Immediate (Now): NA

Mid Term (Within 6 Weeks):

1. Design of the emergency exit staircase should be checked by a suitably qualified Structural Engineer to confirm capacity for vertical loading. Checks also to be carried out to confirm that stair is capable of resisting the applied horizontal loads and that it is suitably horizontally restrained by the building.
2. A suitably qualified Structural Engineer is to confirm that, in areas where there are differences between the record information and the as-built structure, there is sufficient capacity in beams, slabs and columns.
3. Suitably qualified Structural Engineer to produce plans showing maximum allowable floor loads.

Long Term (Within 6 Months):

1. Staircase to be maintained so that its structural integrity is not affected by corrosion.
2. Suitably qualified structural engineer to check, collect information and produce accurate and complete as-built documentation as soon as possible.
3. Continue to implement load plan.

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## **The recommendations for Fire Safety corrective actions are:**

### Immediate (Within 1 month):

1. Remove locking features from all egress doors and gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Remove all storage from exit stairs and egress paths.
3. Replace all gates and sliding doors along the means of egress with side-hinged, swinging egress doors. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
4. Configure the fire alarm system to initiate automatic occupant notification on all floor levels to facilitate whole building evacuation upon any manual fire alarm station activation.

### Short Term (Within 3 Months):

1. Separate the boiler room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction. Where separate storage rooms may not be feasible, provide defined storage areas and limit the storage arrangement as follows:
  - Maximum height of 2.4m and maximum area of 23m<sup>2</sup>
  - If sprinkler protected: maximum height of 3.66m and maximum area of 93m<sup>2</sup>.

Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.

3. Provide minimum 1.5-hr fire rated doors and seal all unprotected openings to separate the exit stairs from work areas and other building spaces on all floor levels. Ensure that the fire doors are self-closing and positive latching and that they are provided with fire exit (panic) hardware where serving production floors. If fire doors are required to be held open for functional reasons, provide automatic closing devices tied to the fire alarm system. Seal all unprotected openings to the exterior west exit stair extending to a distance of 10 ft. from either end of the stairs.
4. Provide a minimum 2-hr fire rated shaft to separate the utility risers from each floor level.
5. Seal all penetrations with fire rated penetrations in the east exit stair enclosure walls to maintain the fire separation.
6. Provide minimum aisle widths of 36-in.
7. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
8. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
9. Test the emergency lighting system on each floor and provide additional emergency fixtures to provide adequate illumination along the means of egress. Provide a minimum illumination of 10 lux at the floor level within exit stairs and exit discharge paths and minimum 2.5 lux along exit access aisles.

### Mid Term (within 6 Months):

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1. Seal all penetrations and openings to the interior of the building along the discharge path, up to a height of 10 ft., to provide a minimum 1-hr fire separation. Remove storage along the egress path.
2. Remove single-station smoke alarms. Provide automatic smoke detection throughout the building, tied into the fire alarm system, in accordance with NFPA 72.

### Long Term (More than 6 months):

1. Replace the fire alarm system with a new, listed addressable fire alarm system in accordance with NFPA 72.

### **The recommendations for Electrical Safety corrective actions are:**

#### Immediate (Within 1 month):

1. Install a vertical cable tray (instead of using flexible pipes) or duct ranging from generator terminal (output) box to cable trench to support the generator output cables.
2. Provide acid resistant stand for the batteries and keep sufficient distance around individual battery for maintenance and inspection purpose.
3. Generator must be connected to earth securely at least at two points. Ensure the earthing cable size is not less than 35sqmm.
4. Motor in boiler must be fixed firmly on the concrete floor (base slab may be built).
5. Bus bar strips should be insulated or cables must be protected from bare bus bar strips.
6. Install the cables tray or duct with cover (metallic) for the protection of the cable. Ensure the cables are tightly latched inside the ladder/tray and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from any physical damage as well as prevent the ingress of debris, dust and lint.
7. Keep necessary clearance between the steam pipe and electrical wiring and raceways to prevent the cable insulation from damage due to heat emitting from steam pipe.
8. Live wires should be terminated properly according to the electrical standard.
9. Cables entering or exiting from panels or switchgears must be laid in an orderly manner into cable tray and shall be well covered and protected. Cables should be neatly dressed and firmly installed or tied.
10. Joint shall be provided with proper connector and PIB tape wound around into a junction box.
11. Provide earth connection for body and doors of metallic distribution boards using green cables (minimum size of earth cable is 14SWG) preferably earth braid so that the metallic door remains at zero potential all the time.
12. SLD and schematic drawings of electrical system shall be developed by a qualified engineer. SLD shall be maintained and continuously updated to reflect as built condition.

#### Short Term (Within 3 Months):

1. Service cable must be supported by steel or concrete pole.

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2. Cable must be supported on cable ladder or riser. Provide covers made of non-combustible material preferably metal to protect the cables' insulation from any physical damage. . Flexible conduit must not be used for long point wiring (except for special wirings).
3. Fasten all the protective devices rigidly inside the panels and use industrial graded (heat resistant) pipe/steel pipe for control and power cable-carrying inside the boiler.
4. Power cable way must be separated from water line with minimum 0.9 meter.
5. Install a ladder to support the cables. Ensure the cables are tightly latched inside the ladder and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from physical damage as well as prevent the ingress of debris, dust and lint.
6. Cables entering or exiting from panels or switchgears must be laid in an orderly manner into cable tray and shall be well covered and protected. Cables should be neatly dressed and firmly installed or tied.
7. Electric cables must be supported and arranged on cable trench with metal covers. Provide cover made of non-combustible material on trench for preventing any physical damage & ingress of dust and debris in future.
8. Mid-length joints in down conductor of earthing must be avoided.

Mid Term (Within 6 months):      NA

Long Term (More than 6 months):

9. Adequate space inside generator room should be provided for easy maintenance and inspection.