

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

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Name of the Factory	: SKYLINE CASUAL APPARELS LTD.
Address of the Factory	: Palashbari, Ashuria, Savar, Bangladesh
Dhaka Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Accord (Full report available at <a href="http://bangladeshaccord.org">bangladeshaccord.org</a> )
Date of Structural Inspection	: 24 March, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at <a href="http://bangladeshaccord.org">bangladeshaccord.org</a> )
Date of Fire & Electrical Inspection	: 2 April, 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	: Concrete Beam and column frame with two way slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: Unavailable
v.	No. of Stories	: 7 storied
vi.	Construction Year	: 2008
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available (September, 2006)
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Unavailable
xi.	Generator	: Ground floor

**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):**

1. Factory Engineer to review design, loads, column stresses for all floors and confirm suitability for applied loads by way of a Detailed Engineering Assessment.

**Mid Term (Within 6 Weeks):**

1. Verify in situ concrete stresses either by cores or existing cylinder strength data for affected beams and columns.
2. Detailed Engineering Assessment to be completed.
3. Produce and actively manage loading plan for all floor plates giving consideration to floor capacities and column capacity.
4. Reduce stacking height of fabric rolls to ensure total load does not exceed 3.0kPa.
5. Adopt some sort of signage/staff guidance to ensure that the maximum weight of storage is not exceeded by way of a floor loading plan.
6. Fire proofing material for structural steel element may be required – investigate further.
7. Install steel bracing as per the structural drawings.
8. A Detailed Engineering Assessment is to be carried out and in particular will require stability and foundation aspects to be investigated in detail.

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## Long Term (Within 6 Months):

1. Develop and continue to implement loading plan.
2. Maintain standards of quality control to ensure that storage procedures are correctly followed so that overloading problems do not arise in the future.
3. Maintain standards of maintenance.

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

### Immediate (Within 1 month):

1. Remove locking features from all egress doors / 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 / 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. Remove manual on/off switches from emergency lighting / exit signage units to prevent them from being switched off.

### Short Term (Within 3 Months):

1. Separate the boiler, generator and EMR rooms 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.
4. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
5. Provide a minimum 2-hr fire-rated shaft to separate the utility risers from each floor level. Seal all penetrations and openings in floor/ceiling assemblies to maintain the fire separation.
6. Reduce occupant load to not more than available exit capacity or Provide additional exits.
7. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

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### Mid Term (within 6 Months):

1. Replace the single-station smoke alarms with automatic smoke detectors tied into the fire alarm system. Configure the fire alarm system to initiate occupant notification upon activation of any two smoke detectors in addition to the manual fire alarm stations.

### 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. Tables and chairs, used for office works, near the panels must be removed and the panel room in production floors must not be used for office purposes.
2. Check terminations (crimping cable lugs) for loose connection and re-install the terminals.
3. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used.
4. Panel door(s) must be connected with earth bond connecting frame and door.
5. Generator Battery must be placed on the acid proof battery stand.

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

1. Oil leakages from transformer bushing may be due to stress on bushing from cable terminations.
2. Transformer breather must be installed to prevent moisture ingress.
3. Overhead service cable must be firmly fixed at both ends and supported on catenary wire.
4. Cables passing through permanent walls must be protected in steel pipes and remaining holes around the pipe must be sealed.
5. Cables terminating at MCCBs must be installed with cable lugs/terminals of required size and rating.
6. Additional panels may be installed by redesigning the electrical distribution systems to ease crowding inside panel.
7. Multiple cable terminating at a terminal in busbars must be separated.
8. Cable terminating at Generator output terminal box must be supported on riser and protected. Existing cables laid on floor may be installed in cable trench or on trays.
9. Damaged tray supporting cables must be repaired to support the cables throughout the cable length.

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10. Flexible PVC conduit wiring must be additionally supported on cable tray and risers.
11. Existing cables or wiring drawn in flexible PVC conduit and installed outdoor must be additionally protected against weather and supported in rigid conduit or cable supports. Wiring outdoor must be protected in enclosure to protect against rain and UV (weather).
12. Cables drawn in flexible PVC conduit not covering throughout cable length must be additionally protected and supported till the panel edge.
13. Existing wooden ducts modified with backlite (ebonite) sheet lining must be replaced. The sheet lining does not guarantee or ensure protection of wooden duct from fire hazards.

### Mid Term (Within 6 months):

1. Cables must be supported on cable trays and riser. Cables may be laid in cable trench with covers.
2. Some of the existing panels near generator may be relocated to another rooms.
3. Transformer may be separated from panels by constructing barrier walls.

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