

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

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Name of the Factory	: ALAUDDIN GARMENTS LTD.
Address of the Factory	: 88 Kazi Nazrul Islam Avenue, Tajgaon, Dhaka-1215
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	: 12 April, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at <a href="http://bangladeshaccord.org">bangladeshaccord.org</a> )
Date of Fire & Electrical Inspection	: 27 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	: RC beam slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: The floor area of 4,700 sq. per floor
v.	No. of Stories	: 8 storied
vi.	Construction Year	: 1978
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available (Incomplete permit drawing)
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Unavailable
xi.	Generator	: In separate building on 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. The areas where the infilling has taken place is to be cordoned off and not used until further notice. This was explained to the factory owner at the time of the survey.
2. Carry out a Detailed Engineering Assessment of the infilling and carry out remedial works as necessary.
3. Confirm allowable design floor loadings.
4. A Detail Engineering Assessment of the Factory to be commenced, see attached scope.
5. Verify in-situ stress and material properties by testing 100mm dia. Concrete cores of 4 columns.

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

1. Complete the correct infilling construction work.
2. Factory engineer to produce and actively manage a loading plan for all floor plates.
3. Include in the Detailed Engineering Assessment of Factory, see attached scope.
4. Check the capacity of the slabs, beams and columns in the area of the roof top water tanks.

#### Long Term (Within 6 Months):

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1. Maintain Loading Plan.
2. Remove billboard if necessary.
3. Improve base connections if required.
4. Spread out the water tanks more evenly or remove altogether if necessary.
5. Produce a Detailed Engineering Assessment of these steelwork roofs.
6. Improve with proper connections, fixing and bracing as necessary.
7. Apply a new waterproofing membrane.

### **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. Keep egress paths and stairs clear of storage.
3. Remove all storage from exit stairs and egress paths.
4. 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.
5. Remove manual on/off switches from emergency lighting units to prevent them from being switched off.

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.
4. 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.
5. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
6. Provide minimum aisle widths of 36-in.

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7. Provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas). Or provide sprinkler protection for discharge floor in accordance with NFPA 13.
8. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
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.
10. Regularly inspect all exit signage and replace/install lights as needed to illuminate signs.

### Mid Term (within 6 Months):

1. Replace the single-station smoke alarms. Provide automatic smoke detection throughout the building in accordance with NFPA 72.
2. Provide additional notification appliances such that the fire alarm system is audible throughout the building 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.
2. Provide automatic sprinkler protection throughout the building in accordance with NFPA 13.

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

#### Immediate (Within 1 month):

1. MCCB (electrical devices) mounted on the wall must be installed with protective enclosures.
2. Arrange periodic inspection & thermal scan to identify the overloading, loose connection, unbalanced load which may cause the excessive heat-rise and take action accordingly.
3. Generator frame should be earthed with two separate and distinct connections to earth with better earth continuity.
4. Duct covers must be regularly checked and tightly placed. Damaged (broken or buckled) covers must be repaired or replaced immediately.
5. Cables connecting to bus bars inside panel must be connected firmly with cable lugs. Cable terminating to the bus bars must be fixed with proper size nuts and bolt with washers.

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

1. Overhead cables must be firmly fastened at both ends.
2. Make circular hole at the base plate/top plate of panels and provide cable gland according to the respective cable size for cable entry and exit so that the cables are not stressed on the sharp edges of the hole of panels. Provide covers (of noncombustible material) if any additional gap remains after installing cable glands.

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3. Install base/top plate of the panel and make hole into it then fit cable gland (required sized) for cable entry and exit to the panel and seal all the unused openings by suitable means to make the panel dust and vermin proof.
4. Wire terminating to devices inside panel must be connected firmly and wires approaching devices must be securely fastened to avoid unintentional contact with live parts.
5. Wires terminating to devices inside panel must be connected firmly and wires approaching devices must be securely fastened to avoid unintentional contact with live parts. Install slotted wiring duct to latch the cable inside the duct.
6. Additional panels may be installed by redesigning the electrical distribution systems to avoid the crowding inside the panel. . Install slotted wiring duct to latch the cable inside the duct.
7. Make circular hole at the base plate of panels and provide cable gland according to the respective cable size for cable entry and exit so that the cables are not stressed on the sharp edges of the hole of panels. Provide covers (of noncombustible material) if any additional gap remains after installing cable glands. Provide proper sealant to fill the remaining openings (fire rated materials).
8. Redesign and calculate the load, select the suitable MCCB.
9. Panel door(s) must be connected with earth bond connecting frame and door to maintain zero potential.
10. Install cable tray or rigid conduit to support the flexible PVC conduit. Flexible PVC conduit should be properly latch in the cable tray with cover.
11. Install ladder cable tray or riser to lay the flexible PVC conduit. Use proper sealant fitting to connect the flexible PVC conduit to the panel.
12. Cables drawn in flexible PVC conduit not covering throughout cable length must be additionally protected and supported till the panel edge. By using Ladder cable tray or rigid conduit.
13. Existing Aluminum wiring ducts with ends open must be closed with end cover. Ends may be sealed to prevent ingress of lint and duct. (Cleaning required)
14. Conduit wiring entering/leaving panel must be securely fixed to wall (near panel) or supported by ladder cable tray or rigid conduit.

### Mid Term (Within 6 months):

1. Install cable ladder tray or rigid conduit to support the cable. Cable should be dressed properly in the cable tray and the tray or riser protected with the cover.
2. Replace rewire fuses (cut out fuse) with MCBs.
3. Expand the existing generator room to provide safe working space.
4. Control devices removed and disconnected cables must not be joined to extend the cables. Cables must be connected and extended from the terminals.

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