

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

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Name of the Factory	: ARION DRESSES LIMITED.
Address of the Factory	: Adhunik Chawk Super Market (3rd floor), Chalk Bazar, Chittagong
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	: 20 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 28 May, 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 and commercial purpose
ii. Structural System	: RC beam and column frame with a 2-way cast in place slab
iii. Floor System	: Beam slab
iv. Floor Area	: The 3rd floor of the building, which is occupied by the factory measures approximately 10,000sqft
v. No. of Stories	: 5 storied
vi. Construction Year	: 1997
vii. Foundation Type	: Unavailable
viii. Design Drawings	: Available
ix. Soil investigation Report	: Unavailable
x. Construction Materials	: Brick aggregated
xi. Generator	: Ground floor (Separate 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):

1. Load in this area does not exceed 2.0kPa on every floor.
2. Factory Engineer to review design, loads and columns stresses if or the entire building.
3. Verify in-situ concrete stresses either by cores or existing cylinder strength data for [the identified columns / cores from 4 columns].
4. A Detail Engineering Assessment of Factory to be commenced immediately.

Mid Term (Within 6 Weeks):

1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Detail Engineering Assessment to be completed.
3. Factory Engineer to survey the actual conditions and revise the drawings.
4. Factory Engineer to review design, loads and columns stresses to confirm suitability for loads applied.
5. The Factory Engineer to investigate the cause of cracks by appropriate methods.

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6. The distress found is to be suitably rectified and then repaired.
7. The Factory Engineer to monitor the cracks by appropriate methods.
8. Request that the Detail Engineering Assessment of the overall building to be carried out and in particular, stability and foundation aspects should be investigated in detail.
9. Factory Engineer to inspect water damaged structures and repair with a suitable method.

### Long Term (Within 6 Months):

1. Continue to implement load plan.
2. Implement any strengthening works recommended by the DEA.
3. Maintain standards of quality control to ensure that loading plan is correctly followed so that problems do not arise in the future.
4. For both durability and serviceability, rustproofing is recommended.
5. Waterproofing on the roof slab is recommended. Moreover the slab drainage system should be investigated.
6. Maintain standard of quality control.
7. For both durability and serviceability, rust proof paint or any appropriate methods is recommended.
8. Engineer to inspect whether waterproofing material is applied or where it can be maintained.
9. For both durability and serviceability, waterproofing on the roof slab is recommended. Moreover the roof slab drainage system should be investigated.

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

#### Immediate (Within 1 month):

1. Remove locking features from all egress doors. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Replace all 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.
3. Provide emergency lighting with "IPS" back-up on both stairwell.

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

1. Separate the boiler and generator 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.
3. Provide noncombustible construction materials on the factory.
4. Modify the egress door to swing in the direction of egress travel.
5. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

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6. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
7. 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):

1. 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.
2. Remove single station smoke alarms. Provide automatic smoke detection 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.

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

#### Immediate (Within 1 month):

1. Clean the ducts and cover tightly with non-combustible materials.
2. Sharp bends in power cables must be avoided. Existing cables with sharp bends must be reconnected to avoid sharp bends.
3. Remove diesel and other oil barrels from generator room.
4. Electrical devices must be protected and installed in non-combustible protective enclosure. Rewireable fuse may be replaced with MCCB.
5. Unused gland holes in base plates or top cover must be sealed with blanking plates or plugs.
6. Cables terminating at MCCBs must be installed with cable lugs/terminals of required size and rating.
7. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used.
8. Multiple cables terminating at a terminal in bus bars must be separated.
9. Every wire terminating must be installed using independent lug/terminal.
10. All panels used for distribution of circuits must be provided with earth strip inside panel for downstream earth branches.
11. Panel door(s) must be connected with earth bond connecting frame and door.
12. Wirings extended from wiring ducts in flexible PVC conduit to ceiling points must be protected and supported independent of the supports used for other purpose.
13. Wooden plank/board used, as base, to mount MCCB on the wall must be removed. All control devices must be protected in non-combustible enclosures.

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14. The wire running along the ceiling without the conduit must be supported and protected by a rigid conduit.
15. The power indication LED circuit must be incorporated to indicate the existence of the power.
16. Wires in wiring must be protected and supported throughout its length. Wiring exposed between different wiring systems may be prevented by selecting appropriate adapter to connect.
17. Wiring in flexible PVC conduit must be supported near panel on tray/riser to prevent stress at the entry point (socket & check nuts).

### Short Term (Within 3 Months):

1. Service cables/lines from the transformer till it enters the building must be protected.
2. Cables supported on external walls must be laid horizontal/vertical to the wall, supported in cable trays/ladder.
3. Flexible PVC conduit wiring must be additionally supported on cable tray and risers.
4. Service cables must be supported by a rigid tray or riser.
5. Cables, terminating to panel, between floor and base of panel must be protected in rigid conduits with ample strength. Conduit must be securely fixed to the wall with saddle or clamps.
6. Conduit wiring entering/leaving panel must be securely fixed to wall (near panel) or supported on trays/ladder.
7. Cables passing through permanent walls must be protected with rigid conduits/pipes and supported near entry point.
8. The generator cable must be supported by a rigid support and must be protected throughout its length.
9. Cables terminating to the panel must be supported by a tray/ladder.
10. Wiring in PVC flexible conduit entering panels must be firmly fixed at the panel (base / Top) using socket and check nuts.
11. Existing panels with cables entering through, forcefully punched into, panel may be dismantled and reinstalled through base plates with cable supports and glands.
12. Bearing grease applied on Change-Over-Switch contacts for mobility must be cleaned. For lubricating, thin layer of contact grease may be used.
13. Cables inside panel must be securely fastened, through ducts or by ties, to avoid crossing live parts.
14. The cables must be supported on cable trays and additionally protected. Flexible PVC conduit is not adequate for protection.
15. Existing Aluminum wiring ducts with ends open must be closed with end cover. Ends may be sealed to prevent ingress of lint and duct.
16. Cables terminating at the generator output panel must be firmly fixed with cable glands and supported on cable trays (overhead).

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### Mid Term (Within 6 months):

1. 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.
2. Wooden plank/board used, as base, to mount the CT must be removed. A non-combustible material may be used.

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

1. Expand the existing generator room to provide safe working space.