

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

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| Name of the Factory                       | : DIGANTA SWEATERS LTD.                                  |
| Address of the Factory                    | : Diganta Complex, Naoujoor, Tangail Road, Gazipur       |
| 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             | : 1 April, 2014  |
| Fire & Electrical assessment conducted by | : Accord (Full report available at bangladeshaccord.org) |
| Date of Fire & Electrical Inspection      | : 30 March, 2014   |

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

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|-------|---------------------------|--|
| i.    | Building Usage Type       | : Garment factory  |
| ii.   | Structural System         | : RC beam slab   |
| iii.  | Floor System              | : Beam slab  |
| iv.   | Floor Area                | : 432000.0 square feet of land   |
| v.    | No. of Stories            | : Multi-storied  |
| vi.   | Construction Year         | : 2005-2011  |
| vii.  | Foundation Type           | : Unavailable  |
| viii. | Design Drawings           | : Available (Signed by an Assistant Engineer in the Local Government Engineering Department in 2007) |
| ix.   | Soil investigation Report | : Unavailable  |
| x.    | Construction Materials    | : Brick aggregated   |
| xi.   | Generator                 | : South of Building No. 1  |

**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. Factory Engineer to review design, loads and column stresses in areas identified above.
2. Verify insitu concrete stresses either by cores or existing cylinder strength data , or take 100mm dia. cores from min. 4 no. ground floor columns
3. Factory Engineer to review design, loads and slab/beam stresses in areas identified above.
4. Building Engineer to review bracing requirements for steel roof and compile remedial modifications as necessary.
5. Building engineer to review roof design for elements where large deflections are present in Building 7.

Long Term (Within 6 Months):

1. Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to floor capacity and column capacity
2. Implement any actions arising from design review.
3. Building Engineer to ensure that any necessary remedial modifications are completed.

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4. Implement actions arising from review of roof design.

### **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.

Short Term (Within 3 Months):

1. Separate the hazardous materials / flammable liquid storage room by a minimum 2- hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. Separate the industrial dryers by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
3. 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.

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.
7. Modify the egress door to swing in the direction of egress travel.
8. Reduce occupant load to not more than available exit capacity.
9. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
10. 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.
11. Provide exit signs along all exits paths to the exterior and all doors to the exit stairs.
12. Regularly test the emergency lighting system on each floor and replace/repair lights as needed.
13. 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)

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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.

14. Modify the egress door to swing in the direction of egress travel.

### 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): NA

### Short Term (Within 3 Months):

1. Noncombustible material like mild steel chequered plate or concrete slabs must be used for cable trench cover and the flammable materials should be removed from generator room.
2. The fuse unit must be IP rated to be installed outdoor and if it is not external shed must be provided to prevent moisture ingress into the fuse unit.
3. Phase barriers between different phases at connection point with breaker and cable must be installed to avoid arc flashing.
4. Looping from cable end lug must be avoided by providing proper connection point from Bus bar and unused open live cable from panel must be completely removed from panel.
5. LT cables must be laid in cable trench and provide noncombustible ridged trench cover throughout its length.
6. Midway wiring cable joints must be avoided and if necessary, proper binding method must be implemented with adequate electrical insulation wrapped around it.
7. Temporary wiring system must be removed and permanent electrical installation system must be implemented in chemical room. Open, live and exposed conductors should be removed immediately.
8. Electrical switchgears must not be directly fixed on wall. It has to be protected inside proper enclosure all the time.
9. Enclosure of panel must be earthed and door earth bonding must be provided.
10. Multiple cable termination using single lug must be avoided. Power cables must be connected with independent lug at independent connection slot at bus bar.
11. The overhead distribution cable trays should be closed and protected from dusts and lint and must be cleaned weekly.
12. Panel base plates must be installed and all cables entering panel must be firmly fixed with cable glands. Gaps in after cable entry must be sealed with blanking plates or plugs.

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Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA