

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

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| Name of the Factory                       | : <b>DIVINE FASHION LTD.</b>  |
| Address of the Factory                    | : West Shoiladubi, Sultan market, Kashimpur,<br>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             | : 21 June, 2014   |
| Fire & Electrical assessment conducted by | : Accord (Full report available at bangladeshaccord.org)            |
| Date of Fire & Electrical Inspection      | : 8 July, 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         | : Down stand concrete beams/slab and flat slab and concrete column frame structure |
| iii. Floor System             | : Beam slab  |
| iv. Floor Area                | : Total floor area of factory building is 42,101sft.                               |
| v. No. of Stories             | : 4 storied  |
| vi. Construction Year         | : 2008   |
| vii. Foundation Type          | : Pad foundation   |
| viii. Design Drawings         | : Available (Signed in 2009 by the Local Authority)                                |
| ix. Soil investigation Report | : Available (Dated 2008)   |
| x. Construction Materials     | : Brick aggregated   |
| 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): NA

Mid Term (Within 6 Weeks):

1. Building engineer to check that slabs and beams have sufficient capacity to support fully filled water tanks (inc. plinths) and storage loads on floors.
2. Sections of plaster finish to be removed to investigate if cracks penetrate the building structure.
3. Engineer to carry out design checks on affected areas.

Long Term (Within 6 Months):

1. Loading plans should be produced and storage loads managed to ensure that they comply with the loading plans.
2. Carry out any remedial works as directed by the Building Engineer.
3. Roof canteen and outbuilding structures should be checked in accordance with code vertical and wind loads by the Building Engineer.
4. Install and manage a drainage system from roof to avoid long term deterioration of slab.

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5. Building engineer to confirm road construction is suitable for traffic and to ensure ground beams are not loaded.

### **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. Based on ceiling configuration, provide additional detectors where needed, and space them in accordance with NFPA 72.

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

1. Separate the hazardous materials / flammable liquid storage room by a minimum 2hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. Separate the boiler, generator and compressor rooms 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 are not 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 dedicated storage rooms separated by minimum 1-hr fire-rated construction or Remove the storage area from egress path.
5. 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.
6. Provide a minimum 2-hr fire rated shaft to separate the utility risers from each floor level.
7. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
8. Modify the egress door to swing in the direction of egress travel.
9. Provide handrails and intermediate handrails on both side and middle of exit stairs.
10. Reduce occupant load (312 persons) to not more than available exit capacity (303 persons) and in the future provide additional exits to increase capacity.
11. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

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12. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
13. 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. 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. Alternatively, provide a second remote discharge path to the public way (only include this if feasible).
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.
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. Install ladders for supporting the overhead service cables. Ensure the cables are tightly attached with 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 entering debris, dust and lint.
2. Cables passing through permanent walls must be protected in steel/PVC pipes and remaining hole around the pipe must be sealed.
3. Install the MCCB into a metallic enclosure made of metal sheet of minimum 20 SWG thicknesses.
4. MCCBs located in below stairs must be relocated to safe location. Every item of installation should be rearranged so as to facilitate its operation, inspection, maintenance & access. Keep the provision for appropriate door while constructing the wall.
5. Use cable tray/ladder to support the cable top/below the panel.
6. Arrange periodic inspection & thermal scan to identify the overloading, loose connection, unbalanced load which may cause the excessive heat-rise and take action accordingly.
7. Cables connecting to bus bars inside panel must be connected firmly providing proper sized copper lugs, nut, bolt and washer, cable-sleeve.
8. Cables in trench must be supported & arranged on trays inside trench. Clean the debris and dust in cable trench and install metallic cover (checkered plate) to prevent the ingress of debris, dust and lint.
9. Use PVC flexible conduit, clamped with saddle, for carrying cables.
10. 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

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edges of the hole of panels. Provide covers (of noncombustible material) if any additional gap remains after installing cable glands.

11. The cable trench must be tightly covered to avoid physical damage to the cables from falling objects. The cover must prevent the trench from falling debris, dust and lint.
  1. 12 .Fix cables in cable tray with proper size of cable tie and clean regularly.
12. Replace rewire fuses (cut out fuse) mounted on the wall with MCBs and install it using protective enclosure.
13. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer shall be used.
14. Cable ducts must be cleaned regularly and covered to prevent ingress of dust and lint.
15. Existing Aluminum wiring ducts with ends open must be closed with end cover. Ends should be sealed to prevent ingress of lint and duct.
16. SLD and schematic drawings of electrical system shall be developed a qualified engineer. SLD shall show be maintained and continuously updated to reflect as built condition.

### Short Term (Within 3 Months):

1. The panels should be fixed with the foundation plinth (floor) with nuts and bolts.
2. The cable should be supported on covered tray or ladder throughout its length.
3. Relocate the generator to a room of required area as per BNBC Table 8.2.9 or keep minimum 1 meter clearance around the generator for maintenance purpose keeping the provision of necessary ventilation and louvers.
4. Provide fire rated material to block the penetrations of the cable. Ensure the cables are not touched to the sharp edges of the concrete that could damage the insulation of the cable.
5. Install a ladder to support the cables. Ensure the cables are tightly latched inside the ladder and provide covers made of noncombustible material preferably metallic sheet to protect the cables' insulation from physical damage as well as prevent the ingress of debris, dust and lint.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA