

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: DESUN GARMENTS LTD
Address of the Factory	: 89/1, Birulia Road, Savar, Dhaka, Bangladesh
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 13 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 11 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
ii.	Structural System	: RC Beam & Column with a 2-way slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: The total floor area of the building is 20,010 sft.
v.	No. of Stories	: 4 storied
vi.	Construction Year	: 1994
vii.	Foundation Type	: Pad foundation
viii.	Design Drawings	: Available (Dated December, 2006)
ix.	Soil investigation Report	: Unavailable
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):

1. Building Engineer to review design, loads and column stresses in all ground floor columns.
2. Verify insitu concrete stresses either by min. 4 no. 100mm diameter cores or existing cylinder strength data for the identified columns at upper levels. Reinforcement quantities also to be confirmed.
3. A Detail Engineering Assessment of the Factory to be commenced, see attached Scope.
4. As part of Detail Engineering Assessment (see Item 1), Building Engineer to review the design of the transfer beam at 1stfloor to ensure that it has sufficient capacity to carry the applied loads.
5. If the Building Engineer determines that the beam has insufficient capacity, then temporary propping under the beam should be put in place with immediate effect and proposals for permanent strengthening should be developed.

Mid Term (Within 6 Weeks):

1. Detail Engineering Assessment to be completed.
2. Make structural alterations as advised by Engineer and remove props.
3. Produce a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

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4. If found necessary, carry out the strengthening works.
5. Monitor cracks on beams. Building Engineer to investigate the extent of propagation of cracking.
6. As part of Detail Engineering Assessment, Building Engineer to update the structural and architectural drawings to reflect the as-built layouts.

Long Term (Within 6 Months):

1. Continue to implement the Loading Plan.
2. Revise the as-built drawings to incorporate the transfer beam.
3. Building Engineer to advice on load reduction and repair and strengthening of the beams if required.
4. Additional structures to be design checked to ensure adequacy for code vertical and wind loads by the Building Engineer.
5. Undertake strengthening if required.
6. Building Engineer to produce appropriate documentation and as-built drawings.

The recommendations for Fire Safety corrective actions are:

Immediate (Within 1 month):

1. Remove all storage from exit stairs and egress paths.
2. 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.
3. Configure the fire alarm system to initiate automatic occupant notification on all floor levels to facilitate whole building evacuation upon any manual fire alarm station activation.

Short Term (Within 3 Months):

1. Separate the boiler and generator rooms by a minimum 2-hr fire-rated construction. Seal and 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 23m²

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.
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.

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. Modify stair to discharge directly outside. Or provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas).
3. Replace the single-station smoke alarms. Provide automatic smoke detectors throughout the building in accordance with NFPA72.

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. Existing panel installed near exit may be relocated to prevent obstruction to emergency exits, as required by fire safety regulations. While relocating, arrange cables using cable duct and use cable tray to support and protect cables.
2. Panels located below stairs must be relocated to safe place for ease of access to panel.
3. Cables behind panel must be supported and arranged on cable trays or ladder. Flexible conduit must not be used for long point wiring (except for special wirings). Flexible pipes shall not be installed inside the panel (the pipes must ends at the cable gland at top plate).
4. Make circular hole at the base 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.
5. Front door of panel must be installed to provide basic protection for the live parts of the panel. The door earthing must be provided with copper braid.
6. 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.
7. Disconnect the power source of the panel and clean dust and debris of all interior components. Establish a periodic cleaning program and maintain records of the activities. Provide cover made of noncombustible material on unused opening for preventing ingress of dust and debris in future.
8. Replace rewire fuses (cut out fuse) with MCBs installed in protective enclosure (metallic).
9. Provide earth connection for doors of metallic distribution boards using green cables preferably braid so that the metallic door remains at zero potential all the time.
10. Cables must be protected and supported and installed through safe and prescribed routes. Existing cables passing through window and ventilators must be removed immediately.

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11. Heat resistant conduits may be used to protect wirings inside the boiler room to prevent the damage of cables due to external heat. The conduit may be additionally supported on cable duct fixed on wall rigidly.
12. The materials stored in the generator room should be removed.
13. The cables must be supported on cable trays and additionally protected. Flexible conduit shall not be used for long point wiring. In special cases, use industrial graded flexible pipes.
14. Disconnect the electric supply of the cable duct and clean all the duct and cables. Provide cover made of noncombustible material to avoid ingress of dust in future. Establish a routine cleaning program for all the electrical channels and ducts.
15. Incoming cable of the panel must be connected to bus bar through a protective device (MCCB). The MCCB shall be chosen such that the rating of the device does not exceed the current carrying capacity of the cable.
16. Cables shall be connected to terminals only by copper lugs, punched with proper crimping tools.

Short Term (Within 3 Months):

1. Cable must be supported or protected laid inside cable tray with protective cover. Flexible conduit must not be used for long point wiring (except for special wirings).
2. Protective devices should be encased in metal casing made of 20 SWG thickness metal sheets.
3. Cable terminating at the panel must be firmly fixed with glands and at gland plates, to reduce stress at the termination point.
4. 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.
5. Provide earth connection for body of metallic distribution boards using green cables so that the metallic body remains at zero potential all the time.
6. Disconnect the electric supply and replace the wooden board with noncombustible material preferably metal. Provide metal enclosure for the circuit breakers.
7. Cables laid on outside-wall of the building must be supported in cable trays/ladder with metallic protective covers and protected against harsh weather and possible physical damages.
8. Unused holes of the panel board must be blocked using noncombustible material to avoid lint/dust deposit inside the panel.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA