

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: CDF Design
Address of the Factory	: 384/B, Tejgaon Industrial Area, Dhaka-1208
Present Status of the Factory	: Under Operation
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	: February 27, 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	: Garments Factory
ii.	Structural System	: RCC beam slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: Unavailable
v.	No. of Stories	: 7 Storey
vi.	Construction Year	: 1993-1998
vii.	Foundation Type	: Individual
viii.	Design Drawings	: Available(Rajuk,1998), P K Howlader (Engineer)
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Unavailable
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:

- Area highlighted in Red above and in page 4 to be totally evacuated and loading in remaining factory (Orange) to be limited to 1.0kN/m², pending verification of column capacity by the Building Engineer.
- Factory Engineer to review design, loads and column stresses in area identified above.
- Verify in situ concrete strength either by cores or existing cylinder strength data for 6 columns (Core minimum sizes 100mm diameter).
- A Detail Engineering Assessment to be commenced, see attached Scope.

Mid Term (Within 6 Weeks):

- Produce and actively manage a loading plan for all floor plates within the Factory Building giving consideration to floor capacity and column capacity.
 - Detail Engineering Assessment to be complete.
 - Sections of plaster finish to beams to be removed to investigate if cracks penetrate the building structure.
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- Check of beam(s) to be carried out as part of the Detail Engineering Assessment.
- As part of the Detail Engineering Assessment investigate cracking cause, need for remedial works and potential for future monitoring.
- As part of the detail engineering assessment verify that cantilever slab and supporting columns have sufficient capacity to support sand-filled plinths plus toilet loading.
- Survey all areas as part of the Detail Engineering Assessment.
- Building engineer to produce/complete calculations to justify additional structure or modified structure for undocumented changes.
- Steel structures to be surveyed and analysed as part of the detail engineering assessment and any remedial work or additional strengthening measures scheduled.

Long Term (Within 6 Months):

- Continue to implement load plan.
- Building Engineer to prepare Allowable Floor Loading Plans.
- Monitor cracks on slab. Conduct regular inspection of cracks. Investigate if cracks are only in the plastering.
- If cracks grow larger, remove all items above the slab and close working areas below the affected areas.
- Building engineer to collect information and complete documentation.
- Steel structures should be designed and upgraded to support code vertical and wind loads by the Building Engineer, or they should be vacated and removed.

The recommendations for Fire Safety corrective actions are:

Immediate:

1. Remove all lockable gates and doors at exits and along the means of egress. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
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. Remove manual on/off switches from exit signage units to prevent them from being switched off.

Short Term (Within 3 Months):

1. Separate the generator room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
 2. Separate the boiler room 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 on all production floors where transient storage is required for operations. Where separate storage rooms are not feasible, provide defined storage areas and limit the storage arrangement as follows:
 - Maximum height of 2.4 m and maximum area of 23m²
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- If sprinkler protected: maximum height of 3.66m and maximum area of 93m² Separate areas of unenclosed combustibile storage by a minimum clear distance of 3m.

4. Provide minimum 32-in width for employees to exit.

5. Specify appropriate upgrade based on conditions:

- Reduce occupant load to not more than available exit capacity.

- Provide additional exits.

6. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

Mid Term (within 6 Months):

1. Reconfigure the egress arrangement to reduce the maximum common path of travel to not more than 30 m.
2. Provide adequate exit separation distance by adding an additional exit stair.
3. 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:

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:

1. Install covered cable tray or ladder to support the main service cables from pole mounted distribution transformer to LT panel in order to protect the cables' insulation from any physical damage.
 2. Install covered cable tray (supported on wall) to support the main service cables from pole mounted distribution transformer to LT panel in order to protect the cables' insulation from any physical damage. Ensure the insulation of the cable does not get damaged during installation work.
 3. Cable terminating at Generator output terminal box must be supported on riser and protected. Install cable duct to protect the generator output cables and provide covers made of non-combustible material preferably metal to protect the cables' insulation from any physical damage.
 4. Generator Battery must be placed on the acid proof battery stand and wires connecting point should be covered to prevent the risk of short circuit.
 5. Protective devices should be encased in metal casing made of 20 SWG thickness metal sheets.
 6. Remove diesel and other oil barrels from generator room. Inflammable items (may help spreading fire) stored near generator room must be removed.
 7. Check for loose earthing-connection and take necessary action accordingly.
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8. Electrical room must not be used for storing/keeping items that are not associated with the operation and maintenance of the panel. Inflammable items (may help spreading fire) stored near panel(s) must be removed.
9. Disconnect the panel from power source and clean the interior of the panel regularly and seal the openings to protect ingress of lint and dusts. Provide covers if any additional gap remains after installing cable glands.
10. Sub-station room must be separated from other section by a barrier walls. The walls must be fire resistant and should have height up to the ceiling. The wall should have the provision for necessary ventilation and fire rated door on required side.
11. Use covered cable duct/ladder to support the cable at bottom of the panel. Flexible conduit must not be used for long point wiring (except for special wirings). Use industrial graded flexible pipes instead of using normal flexible pipes (if required).
12. Provide earth connection for body and doors of metallic distribution boards using green cables preferably braid so that the metallic door remains at zero potential all the time.
13. Provide phase separators between poles of MCCB made of noncombustible materials preferably use rubber having enough dielectric strength to insulate phases from each other.
14. Multiple cables connecting at a MCCB terminal must be removed. Individual circuit breaker must be used for each load according to the respective cable-size.
15. Terminate each cable providing individual lug according to the cable size. Multiple cables shall not be terminated on a single point of the bus-bar.
16. Provide cable gland at the base plate of panels 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.
17. Provide cable gland at the base plate of panels 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.
18. The height of cable duct must be considered at minimum safety level so that workers can work there easily without touching it.
19. Cable must be arranged and latched properly on the cable tray. Provide cover made of non-combustible material preferably metallic sheet to protect the cables' insulation from physical damage as well as prevent the ingress of debris, dust and lint.
20. Broken/Damaged switch fitting or power receptacles must be replaced with new one.

Short Term (Within 3 Months): NA

Mid Term: NA

Long Term: NA
