

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

---

Name of the Factory	: CHOICE GARMENTS LIMITED
Address of the Factory	: FIDC Road, BSCIC Industrial Estate, Kalurghat, 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	: 21 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 7 June, 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	: R.C Beam and column frame with a 2-way solid slab
iii. Floor System	: Beam slab
iv. Floor Area	: Unavailable
v. No. of Stories	: 5 storied
vi. Construction Year	: 1986
vii. Foundation Type	: Unavailable
viii. Design Drawings	: Available
ix. Soil investigation Report	: Unavailable
x. Construction Materials	: Unavailable
xi. Generator	: In a separate single storied structure

**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. Temporary propping to be applied to ensure sufficient capacity of the stair under emergency evacuation loading.

Mid Term (Within 6 Weeks):

1. Factory Engineer to design remedial strengthening or full new staircase.
2. Staircase to be strengthened or replaced as quickly as possible.
3. Maintain 2 safe exits during all construction work.
4. Detailed Engineering Assessment to be carried out, paying particular attention to columns and slabs on adjacent perimeter walls.
5. Engineer to survey actual site conditions and establish discrepancies with existing drawings.
6. Structural Engineer to review capacity of steel roof trusses and anchors in their existing condition.
7. Strengthening works or replacement trusses to be designed if necessary.
8. As part of the Detailed Engineering Assessment, consider the capacity of cantilever beams and slabs where loaded by boilers/uncontrolled storage.
9. Factory Engineer to review design, loads and column stresses in both buildings.

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

---

10. Verify insitu concrete stresses by 100mm diameter cores through 4 typical internal columns.
11. Carry out repair to damaged elements and add remedial props in locations displaying excessive deflection or cracking.
12. Engineer to assess buildings.

### Long Term (Within 6 Months):

1. Structural Engineer to be consulted before constructing future escape stairs (or other structural alterations).
2. Monitor condition of escape stairs regularly.
3. Load path down adjacent structural elements (ie. between the two buildings) to be established and checked for capacity.
4. New set of architectural and structural as-built drawings to be produced, with re-approval from the Local Authority to be sought.
5. Any alterations deemed necessary by Engineer to be implemented to exact detailed specification.
6. If over capacity, remove heavy items from cantilever, and preferably to ground floor level.
7. Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to column capacity and floor capacity.
8. Remedial measures suggested by Engineer, following aforementioned assessment, to be implemented.
9. Monitor perimeter cracking to ensure that it does not spread to structural elements.
10. If cracking develops (opens up or spreads to structural columns), consult a Structural Engineer.

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

#### Immediate (Within 1 month):

1. Remove locking features from all egress doors and gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Keep egress paths and stairs clear of storage.
3. Replace all gates and 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. Regularly inspect all exit signage and replace and install lights as needed to illuminate signs.
5. Provide exit signs above all exits to the exterior and all doors to the exit stairs.
6. Reduce occupant load to not more than available exit capacity (225). In future, provide additional exits to increase occupant load.

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

1. 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)

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

---

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.

2. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
3. Separate the boiler room by a minimum 2-hr fire-rated construction. Seal and protect all openings to maintain the required fire separations.
4. Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction.
5. Provide minimum aisle widths of 36-in.
6. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
7. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
8. 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.
9. Provide a minimum 2-hr fire rated shaft to separate the utility risers from each floor level.
10. Modify the egress door to swing in the direction of egress travel.

### Mid Term (within 6 Months):

1. Remove single station smoke alarms. Provide automatic smoke detection throughout the building in accordance with NFPA 72.
2. Modify stair to discharge directly outside.

### 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. Install cable tray or ladder or construct cable trench with cover (metallic) for the protection of the cable laid on floor. Ensure the cables are tightly latched inside the ladder/tray and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from any physical damage. Excessive length can be clamped on wall by using saddle.
2. Disconnect (shutdown) the transformer from service line and fill the breather oil cup with transformer oil up to the required level as instructed by the manufacturer. Consult with transformer servicing company before performing the task. Establish a routine maintenance & inspection program for transformer as well as all other electrical equipment to ensure any future repetition of the occurrence.
3. Arcing horns may be installed as per the transformer manufacturer's requirement.
4. Isolate the transformer from the grid and clean the transformer room. Establish a routine cleaning program as a part of routine maintenance to keep the room neat and clean.

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

---

5. Encased the generator batteries and its charger in metallic acid proof stand and insulate the battery terminals. Establish a routine maintenance checklist for the generator where the battery maintenance checklist should be included.
6. Multiple cable terminating at a terminal in bulbar must be separated.
7. Disconnect the power source of the cable laid into channel 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 the channel for preventing ingress of dust and debris in future.
8. Disconnect the power source of the cable laid into Control Panel and clean dust and lint of all interior components. Establish a periodic cleaning program and maintain records of the activities. Provide cover made of noncombustible material on the channel for preventing ingress of dust and debris in future.
9. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used. Multiple cables connecting at a MCCB terminal must be disconnected.
10. MCB Enclosure cover must be closed to avoid the lint and dust deposits.
11. 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.
12. The steel pipes must not be laid on top of raceways to hang extra electrical fittings.

### Short Term (Within 3 Months):

1. HT cable dropping from 11kV pole must be firmly fixed to the pole with supports and clamps till the roof top beam and, further clamps on rooftop beam may be provided for rigid support.
2. HT cables passing through wall must be protected in HDPE pipe or steel pipe and the remaining holes around it must be sealed.
3. The cables trench must be free from dust, lint and debris and it must be tightly covered by concrete slab or checkered plate to avoid physical damage to the cables from falling objects. The cables lying outside the trench must be properly arranged in cable trench.
4. Every item of installation should be arranged so as to facilitate its operation, inspection, maintenance & access. Access of the DB must be kept obstacle free. Some of the panels may be relocated to provide adequate and safe working space. Provide at least 1 meter clearance in front the panels for ease of its operation and maintenance.
5. Check the connected load and tighten connections. If required, replace the burn cable. If necessary replace the burnt cable. Assign an engineer to take necessary action depending on the problem.
6. Cables must be protected, supported and installed through a safe route. Existing cables passing through window and ventilators must be removed.
7. Assign an electrical engineer to determine the capacity of the installation and redesign the wirings of the panel. If the wirings and loads exceed the capacity of the panel, install additional panel. Establish a load management program for avoiding any installation exceeding its capacity in future. Install slotted wiring-duct inside the panel to arrange and latch the haphazard cables.

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

---

8. Existing wooden ducts supporting wiring may be replaced with non-combustible ducts, with ample strength and rigidity, supported at regular intervals.
9. Protective devices should be encased in metal casing made of 20 SWG thickness metal sheets to reduce the risk of fire spreading due to short circuit.

### Mid Term (Within 6 months):

1. Transformer room may be rearranged or some of the panels may be relocated to increase the room size of the transformer. The room area for the transformer should be 13 sq m according to BNBC 2006, Section-2.6.3. Make sure that the transformer room should be fire rated and separated from other occupancy. Assign an electrical engineer to rearrange the room.

Long Term (More than 6 months): NA