

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

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Name of the Factory	: ZAARA JEANS & KNITWEAR LTD.
Address of the Factory	: 13-14 Zoo Rd, Mollik Tower, Mirpur 1, Dhaka 1216
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	: 15 March, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 21 April, 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. Flat Slab and column frame
iii.	Floor System	: Beam slab
iv.	Floor Area	: Unavailable
v.	No. of Stories	: 14 storied
vi.	Construction Year	: 2005
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Unavailable
xi.	Generator	: Basement

**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. Cease any further Construction and no additional occupation or storage load to be added to the building.
2. Unoccupied levels 8, 9, 12 & 13 to remain unoccupied and all building rubble and storage to be removed.
3. Storage on all levels to be reduced to a maximum of 150kg/m<sup>2</sup>. Ground floor storage to be reduced to a maximum of 300kg/m<sup>2</sup>.
4. Detailed Engineering Assessment of as built structure to be commenced as per attached scope.
5. Requirements of BUET letter following their inspections dated 17/5/13 and 22/5/13 to be completed and issued.
6. Verify in-situ concrete strengths for all columns.
7. Remove render from cracked column at ground level to determine if cracking extends to structural Concrete.
8. Building engineer to determine cause and recommend immediate action to ensure building safety.
9. Building Engineer to provide justification for the horizontal stability system supported by design calculations & accounting for movement joints in slab at 4th Floor and below. (Refer Item 1).

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10. Reduce ground floor storage to a maximum of 300kg/m<sup>2</sup>.

### Mid Term (Within 6 Weeks):

1. Detailed Engineering Assessment to be completed.
2. Produce and actively manage a loading plan for all 16 floor plates within the building giving consideration to floor capacity and column capacity.
3. Conduct as built survey of the columns taking account of the depth of render finish
4. Building Engineer to provide calculations showing the structural adequacy of the column as built, taking into account loading from the finished height of the building. Provide concrete strength tests. (Refer item 1).
5. Reduce stack heights to 2m or 6 rolls maximum. Ensure that a clear walkway is left between stacks.
6. Weatherproof stairwells to prevent water flow.
7. Weatherproof upper levels and façade to protect structure against constant wetting.
8. Install Adequate Edge Protection Rail/Barrier.

### Long Term (Within 6 Months):

1. Continue to implement load plan.

### **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.

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

1. Separate the boiler, generator and transformer rooms by a minimum 2-hr fire-rated construction. Seal and/or 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 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.

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. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
5. Provide minimum aisle widths of 36-in.

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6. Reduce occupant load to not more than available exit capacity immediately. In the future, if a greater occupant load is desired, provide additional exits.
7. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
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. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.

Mid Term (within 6 Months): NA

Long Term (More than 6 months):

1. 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. Contact to the supplier company and take necessary steps as soon as possible. A periodic inspection program needs to be established to check the transformer routinely.
2. Disconnect the transformer from the feeder and clean the transformer room. Install a cable tray with protective cover or raceway to route and protect the cables (transformer secondary cables). Establish a routine cleaning program to keep the transformer room as well as the cable tray or raceway neat and clean.
3. Fix the cables to the raceway at regular intervals to support them properly.
4. Shut down the power and clean the cable trench then arrange the cables in the trench properly. Provide checkered cover or RC slab on cable trench to protect the cables from physical damage due to falling objects and stepping of occupants as well as prevent ingress of lint, dust and vermin in it.
5. Install separators/barriers between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used.
6. Shut down the panel power then clean it. Seal all the unused openings of the panel to prevent ingress of lint, dust and vermin into it. Establish a routine cleaning program to keep the panel neat and clean.
7. Terminate each cable individually on the bus bar. Multiple cables shall not be terminated on same point of bus bar.

Short Term (Within 3 Months):

1. The HT cable should be carried in required sized PVC/steel pipe when carrying through underground. Install cable tray with protective cover to route the HT cable as well as protect it from physical injury when laid directly on floor and installed through a safe routes.

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2. Required length of cable may be used. Install a cable tray with protective cover to route the HT cable as well as protect the cable from physical injury due to falling objects and stepping of occupants during maintenance work.
3. Install cable tray/raceway to route and protect the cables in good fashion. Arrange the cables on the raceway and put tags on all cables for easy identification, operation, test and maintenance.
4. Select a base plate for the panel and make circular holes into it and provide cable glands into the holes 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 to make the panels dust and vermin proof.
5. Collect a base plate for the panel and make circular hole at the base plate of panel then provide cable glands 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 non-combustible material) if any additional gap remains after installing cable glands to make the panel dust and vermin proof.
6. Keep 30% free inside cable tray/channels/ducts for proper heat dissipation and further extension. An additional cable channel may be installed to accommodate the extra cables the cable channel should be covered with metallic cover throughout its whole length. Establish a routine cleaning program to keep the channel neat and clean.
7. Construct a foundation to mount the motor above the floor level and fix the motor to the foundation by suitable fittings.
8. Install cable tray or raceway to support the cables properly. Fix the cables on cable tray or raceway at regular intervals tightly to reduce strain on the termination point.

### Mid Term (Within 6 months):

1. Install a cable tray with protective cover to route and protect the HT cable. Make sure that the cable should be protected in cable tray throughout its whole length. The cable should be routed by avoiding acute bend as well as reducing strain on termination point/ throughout its whole length.

### Long Term (More than 6 months): NA