

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

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Name of the Factory	: <b>BHIS APPARELS LTD</b>
Address of the Factory	: 671, Datta Para, Hossain Market, Tongi, 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	: 1 <sup>st</sup> June, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 6 September, 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         | : Beam slab frame   |
| iii.  | Floor System              | : Beam slab   |
| iv.   | Floor Area                | : The total floor area of the factory is about 150,861 sq-ft. |
| v.    | No. of Stories            | : 6 & 3 storied   |
| vi.   | Construction Year         | : 2011  |
| vii.  | Foundation Type           | : Pad foundation  |
| viii. | Design Drawings           | : Available   |
| ix.   | Soil investigation Report | : Available (Issued in April, 2010)                           |
| x.    | Construction Materials    | : Brick aggregated  |
| xi.   | Generator                 | : On the 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. Maintain current use of the floors and don't change use or increase occupation, either of which could increase loading.
2. Factory Engineer to review design, loads and column stresses in all columns in the building.
3. Verify insitu concrete strength either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns. Verify reinforcement and grade of steel reinforcement used.
4. A Detail Engineering Assessment of the entire building to be commenced, see attached Scope.
5. Maintain current use of the floors and don't change use or increase occupation, either of which could increase loading.

Mid Term (Within 6 Weeks):

1. Detail Engineering Assessment for the entire building to be completed.
2. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
3. Building Engineer to assess capacity of purlins under vertical and wind loads and strengthen as appropriate.

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### Long Term (Within 6 Months):

1. Continue to implement load plan.
2. Steel roofs/structures should be designed and upgraded to support code vertical and wind loads by the building Engineer, or they should be vacated and removed.
3. Building engineer to carry out a structural assessment of pipe supports and strengthen as appropriate.
4. Building Owner to engage an Engineer to carry out As Built survey of building and produce accurate complete as-built drawings.

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

#### Immediate (Within 1 month):

1. Reduce occupant load to not more than available exit capacity (863). Or provide additional exits.
2. 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.
3. Post emergency evacuation plans at all the entrances to the exit stairs and all the exits to the exterior.
4. Keep egress paths and stairs clear of storage.
5. Remove all storage from exit stairs and egress paths.
6. 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.
7. Regularly inspect all exit signage and replace install lights as needed to illuminate signs.

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

1. Provide a minimum 2-hr fire rated shaft to separate the utility risers from each floor level.
2. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
3. Separate the hazardous materials and flammable liquid storage rooms by a minimum 2-hr fire-rated construction. Seal and protect all openings to maintain the required fire separations.
4. Separate the boiler room by a minimum 1-hr fire-rated construction. Separate the generator and transformer rooms by a minimum 2-hr fire rated construction. Seal and protect all openings to maintain the required fire separations.
5. Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction. Provide defined storage areas and limit the storage arrangement as follows:
  - Maximum height of 2.4m and maximum area of 23m<sup>2</sup>
  - Separate areas of unenclosed combustibile storage by a minimum clear distance of 3m.
6. Provide minimum aisle widths of 36-in.
7. Relocate day-care room with maximum travel distance of 9m (30 ft).

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8. Modify the egress door to swing in the direction of egress travel.
9. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
10. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
11. 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.
2. Provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas).
3. Provide additional notification appliances such that the fire detection system is active throughout the building in accordance with NFPA 72. Check all the detectors and replace or reinstall the detectors as needed and connect the detection system with the fire alarm system to activate the alarm system automatically with a single fire detection.
4. 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): NA

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

#### Immediate (Within 1 month):

1. Breather oil cup must be filled with transformer oil to required level as instructed by the manufacturer.
2. Provide insulating cover to the battery terminal to prevent short circuit due to falling foreign metal on it.
3. Arrange periodic inspection & thermal scan to identify the overloading, loose connection, unbalanced load which may cause the excessive heat-rise and take action accordingly.
4. Standard separators must be used; preferably the separator provided by the breaker manufacturing company.
5. Provide graded and adequate size of rubber mat in front of the panel.
6. Remove lint and dust from the panel and make a periodical cleaning program.
7. 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.
8. Multiple cable shall not be terminated into single terminal of MCB which may induce loose connection and overheat and provide bus bar for phase and earth.
9. Install the end cover of BBT channel to prevent the ingress of lint and dirt.

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10. Sharp cable bends shall be avoided such that no stress is imposed on the termination of the cable or insulation of the cable.

### Short Term (Within 3 Months):

1. Use industrial graded (heat resistant) pipe for control and power wiring of boiler.

### Mid Term (Within 6 months):      NA

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

1. HT cable must be protected in steel sheet/PVC pipe of required size at least 2m from the ground level to protect from physical injury by moving objects.
2. Sharp cable bends shall be avoided such that no stress is imposed on the termination of the cable or insulation of the cable. Switch off the power & Cut off the excess cable or/and provide proper support & protection to the cable installing tray.
3. The transformer must be installed with barrier walls between transformer and other panels. The walls must be fire resistant and should have height up to the ceiling. Assign a qualified engineer to design a required transformer room according to BNBC, Section-2.6.3.
4. Lightning arrestor must be installed (according to BNBC Part 8, section 2.9.) with proper size air termination network, down conductors and earth termination.