

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

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Name of the Factory	: TIME KNITWEAR (PVT) LTD.
Address of the Factory	: Baraibogh, Enayetnagar, Narayangonj, 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	: 4 June, 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	: RC structure with beam and slab supported on columns
iii.	Floor System	: Beam slab
iv.	Floor Area	: The total floor area of factory building is 20,100 sq.ft.
v.	No. of Stories	: 5 storied
vi.	Construction Year	: 2003
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available (stamped by local authority in 2003 and by RAJUK in 2010 )
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 (Now): NA

Mid Term (Within 6 Weeks):

1. Structural engineer to check the capacity of the cantilevers for building loads.
2. Engineer to Produce and actively manage a loading plan for all floor plates within the Building giving consideration to floor and column capacity.
3. Structural engineer to confirm by calculation that the slabs are designed for the as constructed spans and are capable of carrying the building loads.

Long Term (Within 6 Months):

1. Continue to implement the load management plan.
2. Building engineer to update all drawings including load management plans to reflect the as built structure at each level.
3. Building engineer to survey factory and identify areas of water ingress. Divert all water away from structure to protect the RC structures from direct contact with water.

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4. All exposed reinforcement is to be protected from corrosion which may cause degradation of the concrete.

### **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.
2. Keep egress paths and stairs clear of storage.
3. Remove all storage from exit stairs and egress paths.
4. 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.
5. Modify the fire alarm system to trigger the alarm for the whole factory.
6. Provide exit signs above all exits to the exterior and all doors to the exit stairs.
7. Remove manual on/off switches from [emergency lighting / exit signage] units to prevent them from being switched off.

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

1. Separate the boiler and generator 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.
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 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.
6. Provide minimum aisle widths of 36-in.
7. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
8. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
9. 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

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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. Alternatively, provide a second remote discharge path to the public way (only include this if feasible).
2. Provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas).
3. 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):

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. Service cables/lines from the transformer till it enters the building must be protected in rigid conduit or laid in covered trays. Install cable or ladder to support the main service cables from pole mounted distribution transformer to main switchgear panel.
2. Remove the wooden plank and place the protective devices inside an enclosed panel made of metallic sheet of min. 20 SWG thick. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used.
3. Avoid multiple connections. Terminate individual cables at individual point of bus bar. Provide copper cable-socket, copper nut-bolt and copper washer for termination. Proper crimping tools must be used to punch the socket.
4. Remove all the multiple connections made at a single point of MCCB and connect individual branch cables to individual points on MCCB using individual lug according to the respective cable size.
5. Cables passing through permanent walls must be protected in steel pipes. Seal all the penetrations using non appropriate fire rated material and ensure the cable insulation does not get damaged during sealing work.
6. Install the cable tray/ladder/ duct upto the cable entry of the panel in order to support the cables. Ensure the cables are tightly latched with the ladder and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from any physical damage as well as prevent ingress of debris, dust and lint. Provide cable gland for every cable entry and exit hole.
7. Replace re-wire-able cut-out with MCBs or MCCBs. Wooden planks cannot be used as a base to mount the fuse and sockets.
8. Provide a cable tray or rigid conduit (steel/HDPE pipe) throughout the cable length. The raceways/rigid conduit must be firmly fixed on floor or wall with clamping at regular interval.

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9. Encased the generator batteries 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.
10. Disconnect the panel from the electrical service (switch off the power) and tighten up the terminals. If the heat rise still persists, check the connected load & diversity factor and replace the cable if necessary.

### Short Term (Within 3 Months):

1. Wooden panels must be replaced by standard metallic panels.
2. Replace the re wire-able cut-out sockets with MCBs or MCCBs of appropriate current ratings.
3. Replace the entire wooden cable ducts with covered metallic cable trays or channels (with all its accessories like joints, bends and cover) to avoid fire hazard. Establish a routine cleaning program to keep the channels run over the production floor neat and clean.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA