

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: TEAN T-SHIRT FASHION LTD.
Address of the Factory	: Jatramura, Rupganj, Narayanganj, Dhaka
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 19 December, 2013
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 10 July, 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 two-way spanning slab supported by RC beams and columns, RC flat slab
iii. Floor System	: Beam slab
iv. Floor Area	: Unavailable
v. No. of Stories	: 6 storied
vi. Construction Year	: 2006
vii. Foundation Type	: Unavailable
viii. Design Drawings	: Available (signed in 2006 by the Local Municipality)
ix. Soil investigation Report	: Unavailable
x. Construction Materials	: Unavailable
xi. Generator	: No generator was provided in the building

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. Produce and actively manage a loading plan for all floor plates within the Factory and Annex giving consideration to floor capacity, (including punching shear), and column capacity.
2. Sections of plaster finish and brickwork to be removed to investigate if cracks penetrate the building structure.
3. Cracks in brick wall to be reviewed to identify the cause and confirm that it is nonstructural.
4. Building Engineer to carry out design calculations to verify that cantilever slab and support system has sufficient capacity to support the design loading.
5. Loading Plan to be prepared by Building Engineer highlighting allowable load for cantilever.
6. Building Engineer to carry out design calculations to verify that the annex roof/floor structure and support columns have sufficient capacity to support fully filled water tanks.
7. Steel roof should be designed by the Building Engineer and, if required, upgraded to support code vertical and wind loads or the area should be vacated and removed.
8. Building Engineer to carry out a survey of column locations and relative alignment, on plan, of internal and perimeter columns in the factory area.

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9. Engineer to inspect area of water damaged structure and identify remedial works –if required.

Long Term (Within 6 Months):

1. Implement loading plan on an on-going basis.
2. Building Engineer to carry out design check on columns/slabs to confirm that these cracks are non-structural.
3. Building Engineer to issue details of repair works to be completed.
4. Continue to implement Loading Plan.
5. Building Engineer to review floor slab design –both beam/slab and flat slab and any implications resulting from the column locations per the above survey. If required-Building Engineer to advise of floor slab allowable load reassessment.
6. Rainwater downpipes/roof drainage/weatherproofing to be maintained on an on-going basis.
7. If any additions to the building structure are proposed, the Building Engineer shall provide calculations showing the structural adequacy of all columns taking into account any additions to the existing structure, the loading plans and as built structure, including insitu concrete strength testing.

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. 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.
3. Configure the fire alarm system to initiate automatic occupant notification on all floor levels to facilitate whole building evacuation upon any manual fire alarm station activation.
4. Regularly inspect all exit signage and replace or install lights as needed to illuminate signs.
5. Regularly test the emergency lighting system on each floor and replace or repair lights as needed.
6. Remove manual on/off switches from emergency lighting and exit signage units to prevent them from being switched off.

Short Term (Within 3 Months):

1. Separate the boiler and gas meter room by a minimum 2-hr fire-rated construction. Seal and 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 are not feasible, provide defined storage areas and limit the storage arrangement as follows:
 - Maximum height of 2.4m and maximum area of 23m²
 - If sprinkler protected: maximum height of 3.66m and maximum area of 93m²Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.

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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 2-hr continuous stairwell enclosure to all floors.
6. Modify the egress door to swing in the direction of egress travel.
7. Provide handrails on at least one side of exit stair.
8. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
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):

1. Provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas) or provide sprinkler protection for discharge floor in accordance with NFPA 13.
2. 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. Cables passing through permanent wall must be protected in cable tray/duct/HDPE/steel pipe and remaining gaps around it must be sealed with fire resistant materials.
2. Provide cable support/protection by installing a covered vertical and horizontal cable tray/duct/ladder with proper clamping at regular interval ranging from panel/COS output terminal box to cable tray/duct/trench. The cables needs to be properly arranged, drawn swiftly (without bends) and clamp it properly to the support.
3. Switch off the main connection and thoroughly clean dust and lint deposits in panels. Establish a routine cleaning program to keep all the panels in factory neat and clean.
4. 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.
5. No combustible materials should be used to mount and enclose the electrical devices. To retain the MCCB for future use, replace the locally fabricated enclosures with standard MCCB protective enclosures.
6. Cables entering base/top plates without glands leaving opening gaps around cables must be sealed with metal plates. Compression glands may be used to fix existing cables to the base/top plates.

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7. Install separators between different phases of MCCBs. Standard separators provided by the MCCB manufacturer must be used.
8. Multiple cables terminating at a terminal must be avoided. Wires and cables terminating at bus bars must be connected independently from other wires/cables.
9. Multiple cables connecting at a MCCB terminal must be disconnected. Existing multiple circuits may be distributed through bus bars.
10. Damaged PVC conduit/casing capping must be replaced to protect wires in it throughout its length.
11. Both the red (L) and Black (N) cables (Phase & neutral cables) of final circuit must run from DB up to Switchboard without joints. Under the circumstance (where this is not possible, cable joints must be realized through porcelain or PVC connectors with PIB tape wound around. Install slotted wiring-duct inside the panel to arrange and latch the haphazard cables.
12. The exhaust fans may be controlled by Direct-On-Line (DOL) switch.
13. Assign a qualified engineer to develop an as-built drawing according to the actual installation.

Short Term (Within 3 Months):

1. Cable raceways installed near steam lines must be protected from external heat and moisture by keeping sufficient clearance between steam pipes and raceways. Cable raceways must be covered and provide adequate thermal-insulation on the steam pipe.
2. Relocate the panels to a place (at reachable height, panel top end at 2 meter) where a technical person can work smoothly for operation and maintenance without any obstacles.
3. Avoid using flexible PVC conduit for long wiring points. Wirings on walls in flexible PVC conduits must be replaced with casing capping or rigid conduit (HDPE/PVC conduit) securely fixed at regular intervals. Wirings on floor must be protected (throughout its length) either in steel pipe or in cable tray with ample strength.
4. Cable raceways must be cleaned thoroughly and it must be covered in full length with all its accessories like joints, bends and cover with proper sealing of all gaps to prevent ingress of lint and dust.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA