

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Apparel Gallery Ltd.
Address of the Factory	: 147-148, Norshingpur, Asulia, Savar, Dhaka
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 23 March, 2014
Fire & Electrical assessment conducted by:	Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 31 March, 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	: Garments Factory
ii.	Structural System	: RC Flat Slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: Unavailable
v.	No. of Stories	: 7 Storey
vi.	Construction Year	:2005
vii.	Foundation Type	: Not applicable
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Unavailable
xi.	Generator	: Separate Generator 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:

- A full Detailed Engineering Assessment is to be commenced for columns in the area of the raised platform at ground floor (Grid B2 to E7 noting the further build up between B2 and E4).
 - Until DEA is complete reduce load at all levels to less than 1.5kN/m² and especially from stacked garments from area highlighted on page 5
 - At ground floor (grid B2-D4) remove the second lift of raised platform and investigate the construction of the lower platform. If found to be solid or filled with sand, remove material or evacuate areas above until structure and foundations proven.
 - Conduct concrete tests to prove concrete strength.
 - DEA to prove adequacy of foundations in the area B2 to E7 noting the cracking to basement slab at column D3. DEA to confirm if movement is still live as it was noted that the soffit of the ground floor slab had been freshly painted.
 - Factory Engineer to review design, loads and columns stresses in area identified above.
 - Verify insitu concrete stresses either by cores or existing cylinder strength data for columns. We note that cylinders have been provided for slabs and foundations but also note that these elements were specified with a different concrete mix and target strength.
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Mid Term (Within 6 Weeks):

- Detail Engineering Assessment and strengthening / remedial works as specified by the building engineer to be completed.
- Evidence of repairs to cracks in soffit of ground floor under raised floor area's repair should be removed by Building Engineer and reinforcement behind check for possible signs of corrosion.
- Remove source of water to avoid further corrosion to reinforcement. Clean all affected reinforcement back to bare steel. Repair concrete using suitable structural mortar.
- Building Engineer to inspect section of roof that remains and verify its adequacy against uplift giving consideration to open door on roof.
- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Impact protection should be provided.

Long Term (Within 6 Months):

- Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
- Create controlled loading plans for all floors, designating where storage can be placed and can not be placed.
- Provide calculations showing the structural adequacy of all slabs/beams, taking into account the loading plans and all built structure including additions beyond the original design. Provide concrete strength tests.
- Repairs as detailed by the Building Engineer to be completed should investigations above reveal corrosion of reinforcement.
- Provide calculations showing the structural adequacy of floor with opening.
- Engineer to inspect water leakage and damaged structure including the exterior and propose a suitable repair.
- Continue to implement load plan.

The recommendations for Fire Safety corrective actions are:

Immediate:

1. Remove all storage from exit stairs and egress paths.
 2. Remove locking features from all egress doors / gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
 3. 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.
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Short Term (Within 3 Months):

1. Seal all penetrations and openings in floor/ceiling assemblies to maintain the fire separation.
2. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
3. Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction.
4. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
5. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
6. Provide a minimum 2-hr fire rated shaft to separate the utility risers from each floor level. Seal all penetrations and openings in floor/ceiling assemblies to maintain the fire separation.
7. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
8. Provide a minimum 2-hr fire rated enclosure to separate the elevator shaft from factory floors. Protect all openings with 1.5- hr fire-rated, smoke-proof doors.

Mid Term (within 6 Months):

1. Replace the single-station smoke alarms with automatic smoke detectors tied into the fire alarm system.

Long Term:

1. Provide automatic sprinkler protection throughout the building in accordance with NFPA 13.
2. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

The recommendations for Electrical Safety corrective actions are:

Immediate:

1. Excess length of the cable must be trimmed off. Cable inside the panel should be arranged inside the PVC wiring duct.
 2. The cables must be supported additionally on cable tray/ladder and to prevent any physical damage.
 3. Gap surrounding BBT passing through floor (ceiling) must sealed with appropriate fire rated materials. Concrete slabs or checkered plates may be used to seal the holes around the BBT passing through floor.
 4. Existing cables or wiring drawn in flexible PVC conduit and installed outdoor must be additionally protected against weather and supported in rigid conduit or cable tray with protective cover.
 5. Cables must be protected and supported (providing tray or duct) and installed through safe and prescribed routes. Existing cables passing through window and ventilators must be removed immediately.
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

6. Wires in wiring must be protected in rigid pipe and supported throughout its length.
7. All electrical installations, including wiring and cable must be protected against heat from the boiler by supporting and separating at safe distance. (May keeping sufficient clearance between steam pipes and cable/installing adequate thermal-insulation on the steam pipe).
8. Wiring in flexible PVC conduit must be supported near panel on tray/riser to prevent stress at the entry point or termination point.
9. Temporary wirings connected to the bus bars inside panel passing through the front door (door kept open) must be removed.
10. Install separators between different phases of MCCB. Standard separators provided by the MCCB manufacturer must be used.
11. Multiple cables connecting at a MCCB terminal must be removed. Individual circuit breaker must be used for each load according to the respective cable-size.
12. Provide earth connection for doors of metallic distribution boards using green cables preferably braid so that the metallic door remains at zero potential all the time.
13. Wooden planks or boards used for mounting electrical socket or apparatus must be removed and if necessary, must be made of non-combustible materials.
14. Looping MCB terminals must be removed and individual cable should be used for each device.
15. Cables and wires inside panel must be securely fixed and arranged safely through PVC wiring duct inside the panel.
16. Panel boards made from wooden boards must be replaced with non-combustible materials and with standard panels.

Short Term (Within 3 Months):

1. Cables extended from BBT breaker to distribution boards various floors must be supported on trays/risers to reduce stress on the cable termination.
 2. Cables must be supported in ducts or trays up to the base plate or the top plate of the panel to prevent any physical damage.
 3. Cables in flexible PVC conduit must be additionally protected and supported in tray, duct or ladders with protective cover.
 4. Cables must be protected and supported (providing tray or duct) and installed through safe and prescribed routes. Existing cables passing through window and ventilators must be removed immediately.
 5. Flexible PVC conduit wiring must be additionally supported. The flexible-PVC wiring may be replaced with rigid conduit wiring, clamped with saddle at regular interval.
 6. MCB, contactor and other devices used in panel must be firmly fixed to the panel providing proper screw or nut bolts.
 7. Cables in boiler room must be supported and protected. Cables on concrete floors near entrance may be placed such that it will not obstruct the exit/entrance.
 8. Electrical panel(s) must not obstruct the emergency exit routes, in production floors.
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Mid Term:

1. HT cable dropping from HT pole must be protected in steel pipe of required size at least 2m from the ground level to protect the cable from any physical damage. The cable should be supported on covered tray or ladder throughout its length up to the HT panel base-plate (except the part of the cable laid underground at a depth of at least 1 meter).
2. 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. The wall should have the provision for necessary ventilation and fire rated door on required side.
3. Terminate each cable individually on the bus bar (providing individual lug according to the cable size). Multiple cables shall not be terminated on same point of bus bar.

Long Term:

1. Metallic cover (checkered plate) should be provided on cable trench to prevent the damage of cable insulation or falling of operator.
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