

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ACTIVE COMPOSITE MILLS LTD.
Address of the Factory	: Dewan Idris Road, Zirabo, Ashulia, Savar, Dhaka, Bangladesh
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 21 June, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 6 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	: R.C. flat slabs and columns
iii. Floor System	: Beam slab
iv. Floor Area	: The total floor area of the factory building is 80,500 sq.ft.
v. No. of Stories	: 7 storied
vi. Construction Year	: 2002
vii. Foundation Type	: Pad foundation
viii. Design Drawings	: Unavailable
ix. Soil investigation Report	: Available (Dated April, 2014)
x. Construction Materials	: Brick aggregated
xi. Generator	: Separate 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):

1. Verify existing reinforcement in columns.
2. A Detail Engineering Assessment of Main Factory to be commenced, see attached Scope.
3. As part of Detail Engineering Assessment Factory Engineer to review design, loads and punching stresses in slabs
4. Verify insitu concrete stresses either by 100mm dia. cores or existing cylinder strength data for or 100mm dia. cores from 4 different areas on each slab, remote from columns.
5. As part of Detail Engineering Assessment (see Item 1), Building Engineer to investigate the cracking on the soffit of the 6th floor where water was observed to be penetrating the slab.
6. The cause of the cracking should be identified and remediated as required, including corrosion protection to the reinforcement.

Mid Term (Within 6 Weeks):

1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
2. Detail Engineering Assessment to be completed.
3. Results of flat slab review to be input to Loading Plan.
4. Apply loading plan to all areas of the factory.

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5. Building engineer to record all cracking throughout building and monitor on an on-going basis.
6. If further cracking occurs, Building Engineer to investigate and remediate as appropriate.
7. As part of Detail Engineering Assessment (see Item 1), Building Engineer to carry out survey of as-constructed building.

Long Term (Within 6 Months):

1. Continue to implement load management plan.
2. As part of Detail Engineering Assessment (see Item 1), develop full engineering as-built drawings showing structure, loading, elements, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings.

The recommendations for Fire Safety corrective actions are:

Immediate (Within 1 month):

1. Remove locking features from all egress doors. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Replace all 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. Remove manual on/off switches from emergency lighting units to prevent them from being switched off.
4. Regularly test the emergency lighting system on each floor and replace/repair lights as needed.

Short Term (Within 3 Months):

1. Separate the boiler and generator room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. 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.
3. 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 23m²

-If sprinkler protected: maximum height of 3.66m and maximum area of 93m².

Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.

4. 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.
5. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

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6. 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 (seal all window opening or vestibules to separate any storage). 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.
3. Provide additional notification appliances such that the fire alarm system is audible throughout the building 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. OH LV cable must be firmly fixed at both ends and supported on catenary wire or cable tray may be extended throughout the length.
2. Install a metallic (checkered plate) cover to the existing cable ladder to protect the cables from physical damage from falling object.
3. Panel base plates must be installed, at all time, and cable(s) entering panel must be firmly fixed with cable gland.
4. Arrange periodic inspection & thermal scan to identify the cause of excessive heat-rise and take action accordingly. Replace device if necessary.
5. Earthing bus bar and earthing cable must be provided to each panel according to BNBC regulation (min size 14SWG, 16mm² for main conductor sizes 16-35mm²; main conductor size above 35mm² , the earth conductor must be at least half the main conductor).
6. Cables connecting to machines must be protected in cable trench or rigid conduit. Use steel pipe/cable tray to ensure the mechanical protection of cable laid on floor otherwise cable insulation may damage due to falling object or stepping of occupants onto it.
7. Wiring in flexible PVC conduit must be additionally supported by rigid conduit or cable tray. The wiring must rise vertically along wall, continue horizontally on ceiling and drop vertically along wall or column support. Wiring shall not be drawn overhead half way across walkways.
8. Use cable tray or conduit to pass cables through wall and seal the unused openings by fire rated materials.
9. Existing raised cable trenches inside building must be covered with protective covers (concrete slabs or checkered plates).
10. Thoroughly clean all the combustible materials like dust, lint and yarn from cable raceways, arrange the wires properly and the raceways must be covered with all its accessories like bends, junction, end cover, top cover, etc., to prevent ingress of lint and dust.

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11. The PVC/rigid pipe (instead of flexible conduit) must be used for wiring. The wiring must be continuous through-out its length and properly supported (clamped with saddle, at regular interval of 600 mm). The conduit shall run vertically or horizontally, shall never at angle. Use appropriate size junction box at the transiting junction.
12. The exhaust fans may be controlled by Direct-On-Line (DOL) switch.
13. Wires close/attached to boiler and generator must be protected from external heat and moisture by metallic heat resistant conduits. If possible, keep sufficient clearance between heat sources and cable/wires.
14. Cables must be protected, supported and installed through a safe route. Existing cables passing through window and ventilators must be removed.

Short Term (Within 3 Months):

1. Existing generator installed at a level below ground level must be raised above minimum local floor level.
2. Wiring system must be neatly done and wires/cables inside conduits must be sufficiently protected and supported. Provide cable tray made of noncombustible material preferably metal to additionally support and protect the conduits, cables & wires. Ensure the tray is covered with noncombustible material so that it prevents ingress of dust and debris.
3. Lightning arrestor must be installed (according to BNBC Part 8, section 2.9.) with proper size air termination network, down conductors and earth termination.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA