

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: WEGA STYLEWISE (PVT) LTD.
Address of the Factory	: Plot# 6, Mouza-10, Shalikchura, Tongi, Gazipur, Bangladesh
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 25 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 31 August, 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 Beam and column frame with a 2-way solid slab, Steel frame above in main factory space
iii. Floor System	: Beam slab
iv. Floor Area	: Total floor area of factory premises is 160,000 sq.ft
v. No. of Stories	: 4 storied
vi. Construction Year	: 2007
vii. Foundation Type	: Unavailable
viii. Design Drawings	: Available (Permit drawing)
ix. Soil investigation Report	: Unavailable
x. Construction Materials	: Unavailable
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): NA

Mid Term (Within 6 Weeks):

1. Factory Engineer to review design, loads and column stresses, particularly in central line of concrete columns.
2. Verify in-situ concrete stresses by 100mm diameter cores.
3. Detailed Engineering Assessment required to establish the re-arranged load path due to additional steel props.
4. Capacity of concrete beams below to be established.

Long Term (Within 6 Months):

1. Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to floor capacity and column capacity.
2. Any strengthening works deemed necessary to the concrete beam supporting the steel props to be implemented.
3. Construction to be overseen by a competent Structural Engineer.
4. Factory Engineer to design appropriate means of horizontal bracing and bottom flange restraint.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

5. Engineer to oversee works to ensure that erection is completed as-designed.
6. Factory Engineer to review fire resistance of the structure.
7. Fire protection to be added to achieve required level of fire resistance, as stipulated in Bangladesh National Building Code.

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. Keep egress paths and stairs clear of storage.
3. Remove all storage from exit stairs and egress paths.
4. Provide emergency evacuation plan at all the entrances to the exit stair and all the exits to the exterior.
5. 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.
6. Provide exit signs above all exits to the exterior and all doors to the exit stairs.
7. Regularly inspect all exit signage and replace and install lights as needed to illuminate signs.

Short Term (Within 3 Months):

1. 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.
2. Seal all penetrations and openings in the wall assemblies to maintain the fire separation.
3. Seal all penetrations and openings in exit stair enclosure walls to maintain the fire separation.
4. Separate the boiler room by a minimum 1-hr fire-rated construction. Separate the generator and transformer room by a minimum 2-hr fire rated construction. Seal and protect all openings to maintain the required fire separations.
5. Provide defined storage areas and limit the storage arrangement as follows:
 - Maximum height of 2.4m and maximum area of 23m²
 - Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.
6. Provide minimum aisle widths of 36-in.
7. Modify the egress door to swing in the direction of egress travel.
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.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

10. 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. 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. Replace silica gel and must include in routine maintenance to check and maintain.
2. Breather oil cup must be filled with transformer oil to the required level as instructed by the manufacturer.
3. Earthing bus bar must be clean and wires connected to bus bar by proper cable lugs.
4. LT cables should be supported in such a way that there will be no strain on the termination point (LT bushing) to avoid further leakage through bushing. Leakage must be checked during maintenance and repaired as soon as possible.
5. Cable tray or conduit must be passed across the wall to support and protect the cables. The openings after the passage of cable tray or conduit (the wiring system) should be sealed with the fire rated materials.
6. Over current flowing through the neutral wire due to fault of one phase of the system. Arrange periodic inspection & thermal scan to identify the overloading, loose connection, unbalanced load which may cause the excessive heat-rise and take action accordingly.
7. Install the cables tray or duct with cover (metallic) for the protection of the cable laid on floor. Ensure the cables are tightly latched inside the ladder/tray and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from any physical damage as well as prevent the ingress of debris, dust and lint.
8. Earth and neutral point should be terminated at separate point and insulation must be checked again.
9. Control devices must be firmly fixed in DIN RAIL inside panel. Make circular hole at the base plate/top plate of panels and provide cable gland according to the respective cable size for cable entry and exit so that the cables are not stressed on the sharp edges of the hole of panels. Provide covers (of noncombustible material) if any additional gap remains after installing cable glands.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

10. The temporary connections connected to the changeover bus bar should be removed as soon as possible.
11. Panel top cover plate must be installed to prevent the ingress of lint/dust into the panel.
12. Install a tray/ladder to support the excess length cables and provide covers made of noncombustible material preferably metal to protect the cables' insulation from physical damage as well as prevent entering debris, dust and lint.
13. Rotating machines like motors must be firmly fixed to the foundation.
14. Install a vertical cable tray/ladder to support the HT cable which will reduce the cable from stress.
15. Panel should be made vermin proof by providing base plate. Cables entering through base plate must enter from cable entry openings guarded with rubber bushings/glands and the remaining gaps in the opening must be sealed with noncombustible materials. Panels must be maintained neat and clean all the time.
16. Cables must be protected, supported and installed through safe routes. Cables passing through window and ventilators must be removed immediately. Install the cables on the ladder/tray. Ensure the cables are tightly latched inside the ladder and provide covers made of non-combustible material.
17. Remove all the multiple connections made at a single point of MCCB in panel and connect individual branch cables to individual MCCB in panel providing individual lug according to the respective cable size. Mixing of branch circuit is not allowed.

Short Term (Within 3 Months):

1. Thermo graphic scanning of the entire electrical system must be performed on tri-annual basis and recorded.
2. Insulation resistant test of all the cables must be performed once every 5 year cycle and recorded.
3. Electrical safety training and awareness program for the electrical personal and workers must be initiated and recorded.
4. Check the noted earthing cable and ensure the earth continuity is okay. Periodic earth continuity test should be performed to ensure earth continuity of the installation/equipment.
5. Route of power cables and water pipe lines must be separated.
6. Install a vertical cable tray (instead of using flexible pipes) or duct ranging from generator terminal (output) box to cable trench to support the generator output cables.
7. Encased the generator batteries and it's charger 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.
8. Generator room must be kept dry and free from oil and water.
9. Provide cover on cable ducts made of non-combustible material preferably metallic sheet to protect the cables' insulation from physical damage as well as prevent the ingress of debris, dust and lint.

Mid Term (Within 6 months): NA

Long Term (More than 6 months):

1. Provide steel pipe of required size to support and protect HT cable from physical damage by moving objects.
2. Use steel pipe/cable tray to ensure the mechanical protection of the cable laid on floor otherwise cable insulation may damage due to falling object or stepping of occupants onto it.
3. Generator frame should be earthed with two separate and distinct connections to earth with better earth continuity.