

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: AST KNITWEAR LTD.
Address of the Factory	: East Chandana, Plot no. 3/1, Joydevpur, Gazipur-1700, Bangladesh
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 6 October, 2013
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 20 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. Beam and column frame with a 2-way solid slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: The building has total floor area of 84,265sqft
v.	No. of Stories	: 6 storied
vi.	Construction Year	: 2000
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Unavailable
xi.	Generator	: Diesel generator is in ground floor of building 1 and gas generator is in separate Shed

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 columns stresses
2. Verify insitu concrete stresses either by cores or existing cylinder strength data for 4 typical columns at Ground Level.
3. Non-structural comment: Remove all bags of fabric and any other flammable material from lift core.

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. Provide calculations showing the structural adequacy of all beams, slabs, columns and footings of the east side additions, taking into account the loading plans and as-built structure including additions beyond the original design.
3. Mitigate source of water damage at roof.
4. Repair roof plaster.

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5. Building Engineer to create controlled loading plans for all floors designating where storage can be placed and cannot be placed.
6. Ensure loading on west side cantilever slab are within limits.
7. Engineer to inspect water damaged structure including the exterior and verify no structural damage has occurred. Install or repair roof drainage system.

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 inspect all exit signage and replace/install lights as needed to illuminate signs.
5. Provide emergency evacuation plan posted at the entrances in every floor.
6. 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.
7. Provide exit signs above all exits to the exterior and all doors to the exit stairs.

Short Term (Within 3 Months):

1. 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.
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. Separate the boiler and generator rooms by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
4. Separate the hazardous materials / flammable liquid storage room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
5. Provide handrails on at least one side of exit stair.
6. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.

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7. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
8. Provide handrails on at least one side of exit stair.
9. Provide additional means of egress.

Mid Term (within 6 Months):

1. Provide 2-hr fire-rated exit passageway leading directly outside (vestibules to separate any storage areas).
2. Modify exit arrangement or provide additional exits.

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. 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.
2. Provide steel pipe of required size to support and protect HT cable from physical damage.
3. Phase barriers between different phases must be installed to avoid arc flashing. Standard separators provided by the MCCB manufacturer must be used.
4. Check and redesign the requirements to control the circuits. If three phase control is not required, then replace with suitable control devices.
5. All panels must be connected to earth at least at two points for guaranteed earth connection. All metal parts of electrical appliances and devices must be connected to earth. Panel doors and other metal parts used must be connected with earth bond.
6. Cables shall be connected to terminals only by soldered/welded lugs according to cable size.
7. Cables terminating at change over switch must be supported in risers and protected throughout its length till the panel top- plate.
8. Bearing grease applied on Change-Over- Switch contacts for mobility must be cleaned. For lubricating, thin layer of contact grease may be used.
9. Make circular hole at the base plate/top plate of changeover switch 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.
10. Arrange periodic inspection & thermal scan to identify the overloading, loose connection, unbalanced load which may cause the excessive heat-rise and take action accordingly.
11. The necessary circuit connection for the voltage and current indicating meters must be done, as to indicate the presence of power in the panel.

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12. Cables shall be connected to terminals only by soldered/welded lugs according to cable size.

Short Term (Within 3 Months):

1. The factory must have As-built electrical SLD with electrical wiring layout designs and drawings. Any changes in load, protection system, conductors, Generation and supply system must be reflected in the As-built SLD and drawings.
2. Thermo graphic scanning of the entire electrical system must be performed on tri- annual basis and recorded.
3. Insulation resistant test of all the cables must be performed once every 5 year cycle and recorded.
4. Electrical safety training and awareness program for the electrical personal and workers must be initiated and recorded
5. Install a ladder for supporting the service cables.
6. Remove all the multiple cables connected at single terminal of MCCB. Make single connection with proper lugs from MCCB terminal to bus bar and distribute to different loads from bus bar through protective devices.
7. Cable trench must be covered by rigid material (checkered plate) and flammable things must be removed from the room.
8. Cables must be carried in cable trays with protective cover from LT panel to production floors to protect them against possible physical stress/damages throughout its length.
9. Cables passing through permanent walls must be protected in covered cable tray/ steel pipe /PVC pipes and supported near the panel entry; the remaining gaps after the passage of conduits must be sealed with fire resistance materials.
10. Terminate each cable providing individual lug according to the cable size. Multiple cables shall not be terminated on a single point of the bus-bar.
11. 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.
12. Ensure the wires are tightly latched inside the cable duct through-out its length and provide covers made of non-combustible material preferably metallic sheet to protect the cables' insulation from physical damage as well as prevent ingress of debris, dust and lint.
13. Cables connecting to bus bars inside panel must be connected firmly with cable lugs. Cable terminating to the bus bars must be fixed with proper size nuts, bolt and washer.
14. Clean all the cable channels and put metallic cover on it to make it dust and vermin proof. Establish a routine cleaning program to keep the cable channels neat and clean to avoid fire hazard.
15. Using of flexible pipe must be avoided for cabling and cables must be supported by the cable tray.
16. Disconnect the power source of the Panel and clean dust and debris of all interior components. Establish a periodic cleaning program and maintain records of the activities. Provide cover made of noncombustible material on the channel for preventing ingress of dust and debris in future.

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17. Remove all the multiple connections made at a single point of bus bar and connect individual branch cables to individual points on bus bar using individual lug according to the respective cable size.

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA