

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: CAESAR APPARELS LTD.
Address of the Factory	: 82 Nasirabad Industrial Area, Bazid Bosami, Dist. Chittagong
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 19 April, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 18 May, 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 1-way solid slab
iii.	Floor System	: Beam slab
iv.	Floor Area	: The total floor area of the building is 65,000sq.ft.
v.	No. of Stories	: 6 storied
vi.	Construction Year	: 1992
vii.	Foundation Type	: Unavailable
viii.	Design Drawings	: Available (Inaccurate permit drawings)
ix.	Soil investigation Report	: Unavailable
x.	Construction Materials	: Brick stone chips
xi.	Generator	: In a 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. Block entrance to the unstable sheds.
2. Commence full engineering assessment of sheds.
3. Follow recommendations of assessment.
4. Last 2 floors need to be closed down. Remove steel shed at roof and finishes.
5. Verify in-situ stress and material properties by testing 100mm dia. Concrete cores of 4 columns.
6. Commence Detailed Engineering Assessment.

Mid Term (Within 6 Weeks):

1. Create and actively manage loading plan for all floors.
2. Carry out a detailed engineering assessment of steel roofs evaluating capacity to gravity, lateral loads and uplift forces.

Long Term (Within 6 Months):

1. Consider applying a new waterproofing membrane.

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The recommendations for Fire Safety corrective actions are:

Immediate (Within 1 month):

1. Remove locking features from all egress gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
2. Remove all storage from exit stairs and egress paths.
3. Replace all gates 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.
4. Regularly inspect all exit signage and replace/install lights as needed to illuminate signs.

Short Term (Within 3 Months):

1. 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 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. 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.
4. Immediately reduce occupant load to not more than available exit capacity. If desired, provide additional exits to increase exit capacity.
5. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
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. Replace the single-station smoke alarms with automatic smoke detectors tied into the fire alarm system. Configure the fire alarm system to initiate occupant notification upon activation of any two smoke detectors in addition to the manual fire alarm stations.

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):

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1. Transformer oil must be filled to the required level. Preferably, Assign Supplier Company to take necessary steps as soon as possible.
2. Arcing horns must be installed (consult with the transformer servicing company).
3. Transformer breather must be installed to the ingress of moisture into the oil. During the breathing process, the incoming air may consist of moisture and dirt which should be removed in order to prevent any damage to the insulating property of transformer oil (consult with the transformer servicing company).
4. Disconnect the power source of the cable laid into trench and clean dust and debris of all interior components. Establish a periodic cleaning program and maintain records of the activities. Metallic cover (checkered plate)/concrete slab should be provided on cable trench to prevent the damage of cable insulation or falling of operator.
5. Install covered cable-tray or ladder (instead of using flexible PVC pipes) clamped or supported at regular interval in order to support and protect the main cables.
6. Install covered tray duct to protect the HT cables behind the HT panel. Make circular hole at the base plate of panels and provide cable gland according to the respective cable size.
7. 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).
8. Conduits protecting cables must be fixed firmly to the panel base with conduit sockets and check nuts. Panel base-plate must be installed. Provide cable gland (at base plate) according to the cable size 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.
9. Panel base-plate must be installed. Make circular hole at the base-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.
10. Cables must be terminated to MCCB providing lugs of required size according to the size of the respective cable.
11. Cables inside panel must be securely fastened, through ducts or by ties, to avoid crossing live parts or install slotted wiring-duct inside the panel to arrange and latch the haphazard cables.
12. Wires terminating to devices inside panel must be connected firmly and wires approaching devices must be securely fastened to avoid unintentional contact with live parts. Install slotted wiring-duct inside the panel to arrange and latch the haphazard cables.
13. Disconnect the panel from power source and clean the interior of the panel regularly and seal the opening to protect ingress of lint and dusts. Provide covers if any additional gap remains after installing cable glands.
14. Use single (individual) cables from the bus bar to MCB input or use plug-in bus bar for MCB input to avoid loose connection and ease of maintenance work. If needed install additional Bus bars to distribute different circuits.
15. Provide phase separators between poles of MCCB made of noncombustible materials preferably use rubber having enough dielectric strength to insulate phases from each other.
16. Multiple cables connecting at a MCCB terminal must be removed. Individual circuit breaker must use for each load according to the respective cable-size.

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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.
18. 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.
19. Wooden planks or boards used for mounting electrical panels or apparatus must be removed and if necessary, must be of non-combustible materials (steel fabricated frame).
20. Connect generator earth directly to main earth strips. Generator body must have two separate and distinct earth connections with 35 sq.mm conductor.
21. Generator room must not be used as maintenance room or office.
22. Remove all the oil drum from generator room, any kind of combustible materials cannot be stored inside the generator room and near any electrical panel. Establish a routine cleaning program to keep the generator room neat, clean and dry.
23. Generator and electrical equipment must be installed on raise plinth. The plinth must be raised higher than the local floor level.
24. Transformer must be regularly cleaned and maintained as part of the routine maintenance. Disconnect the transformer from the electrical system before maintenance work and cleaning.
25. Establish a routine cleaning program to keep neat and clean the transformer room. Shut the power of the transformer and clean the exterior of the transformer at scheduled period.

Short Term (Within 3 Months):

1. HT Cable must be supported by cable riser or ladder with cover to ensure the mechanical protection of the cables from any physical damage or reduce the stress on termination point /bushing.
2. Excess cable length may be supported or laid outside building, at safe location. Install covered cable duct to protect & support the HT cables from any kind of damage on it.
3. Cables terminating in the panel must not contact/touch the bare bus bar. Install slotted wiring-duct inside the panel to arrange and latch the haphazard cables.
4. Disconnect the power source of the cable laid into channel 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.
5. Corroded panels not repairable/serviceable must be replaced with new panel made of metal sheet minimum 20 SWG thickness.
6. All panels used for distribution of circuits must be provided with earth strip inside panel for downstream earth branches.
7. PVC concrete must be dismantled and install cable duct to protect the generator output cables and provide covers made of non-combustible material preferably metal to protect the cables' insulation from any physical damage as well as prevent the ingress of debris, dust and lint.

Mid Term (Within 6 months):

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1. Construct a fire rated room for the transformers. Assign a qualified engineer to design a required transformer room according to BNBC, Section-2.6.3. 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.
2. Enlarge the transformer room as per standard (BNBC table 8.2.8) or maintain sufficient working space (preferably 1 meter) around the transformer.
3. Transformer must be installed on raise plinth. The foundation plinth must be raised higher than the local floor level.

Long Term (More than 6 months): NA