

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: COTTON HARVEST LTD
Address of the Factory	: Plot #4, Kadamtoli, Shampur, Dhaka-1204, Bangladesh
Dhaka Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 17 June, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 19 July, 2014

Basic Information: The present garment factory is a commercial building with beam-column frame system. The following general information was noted:

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|-------|---------------------------|---|
| i. | Building Usage Type | : Garment factory |
| ii. | Structural System | : Down stand concrete beams and concrete column frame structure |
| iii. | Floor System | : Beam slab |
| iv. | Floor Area | : The gross area of the factory premises is 2570.26 sq. meter |
| v. | No. of Stories | : 6 storied |
| vi. | Construction Year | : 2002 |
| vii. | Foundation Type | : Pad foundation |
| viii. | Design Drawings | : Available (Granted in 2002 by RAJUK) |
| ix. | Soil investigation Report | : Available (Dated 2004) |
| x. | Construction Materials | : Stone aggregated |
| xi. | Generator | : Rear of building on west side in a 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 column stresses in all ground floor columns.
2. Verify in situ concrete strength either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns.
3. Verify reinforcement provided in existing columns.
4. Produce and actively manage a loading plan for all floor plates within the Building giving consideration to floor capacity and column capacity.
5. Building Engineer to verify that roof and floor beam/slab has sufficient capacity to support fully filled water tanks, toilet plinths and concrete ceilings.
6. Building Engineer to verify that slab has sufficient capacity to support self-weight, façade and imposed loading.

Long Term (Within 6 Months):

1. Continue to implement load management plan.

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2. Building Engineer to investigate cause of cracking. Check design of concrete section and carry out remedial measure if required.
3. Building Engineer to review stability and structural adequacy of masonry roof parapet.
4. Carry out any necessary remedial actions as advised by the Building Engineer.
5. Surrounding structures should be designed and upgraded to support code vertical and horizontal loads by the Building Engineer.
6. It should be noted that no permit or structural drawings are available for these structures.
7. Building Engineer to review car park access areas and provide protection to concrete columns, as required.
8. Building Engineer to provide detailed calculations for the steel roof canopy and cantilever floor slabs. These should confirm their ability to withstand all design loadings.
9. It should be noted that no structural drawings are available for the canopy structure. As built drawings to be provided.

The recommendations for Fire Safety corrective actions are:

Immediate (Within 1 month):

1. Remove locking features from all egress doors / 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. Fire drills shall be conducted on a quarterly basis as outlined in BNBC part 4 Appendix A.
5. Fire evacuation maps shall be posted at the entrance to each exit stair.
6. 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.
7. Configure the fire alarm system to initiate automatic occupant notification on all floor levels to facilitate whole building evacuation upon any manual fire alarm station activation.
8. Remove manual on/off switches from [emergency lighting / exit signage] units to prevent them from being switched off.

Short Term (Within 3 Months):

1. Separate the flammable liquid storage room by a minimum 2hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. 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.
3. 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

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

4. Provide minimum aisle widths of 36-in.
5. Modify the egress door to swing in the direction of egress travel.
6. Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.
7. Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.
8. 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. 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. Service cable must be supported by steel or concrete pole before entering building.
2. Cable terminating at Generator output terminal box must be supported on riser and protected. Existing cables laid on floor may be installed in cable trench or on trays.
3. Power cables duct installed near steam lines must be protected from external heat and moisture (may keeping sufficient clearance between steam pipes and duct/installing adequate thermal-insulation on the steam pipe).
4. Use heat shrinkable PVC cape for tapping purpose.
5. Cables/wirings passing through permanent wall must be protected installing pipes and remaining gaps must be sealed with fire resistant materials. Covered cable tray/ladder shall be installed for the support of the cable throughout its length.
6. The PVC/rigid pipe used for surface 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.
7. 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.
8. The openings remaining after passage of the wiring system should be sealed according to the degree of fire resistance prescribed for the respective element of building. Install covered cable tray to route and protect the cables hung from wall.

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9. Generator frame must be connected to earth with proper size earth conductor. Solid copper conductor connecting to earth must be connected securely with loops.
10. 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.
11. PVC/steel conduits must be additionally provided and clamped with saddle at regular interval for protection of the cables from any physical damage.
12. Control device must be installed on metallic plate with proper enclosure instead of wooden board.
13. The temporary connections connected to the change-over bus bar should be removed as soon as possible.
14. Assign an electrical engineer to design the lightning protection system as per Accord Standard for the entire building and install the protection system as per the design and drawing.
15. Thermographic scanning inspection should be done three times per year.
16. Insulation Resistance test of electrical equipment should be done in five years cycle.
17. Earth resistance test should be done in five years cycle.

Short Term (Within 3 Months):

1. PVC/rigid pipes must be used with proper support for exposed wiring. Use industrial graded flexible pipes instead of using normal flexible pipes (if required).

Mid Term (Within 6 months): NA

Long Term (More than 6 months): NA