

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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Name of the Factory	: THE NEW DELTA APPARELS LTD.
Address of the Factory	: Plot# 6,8,10, Road# 1/A, Turag Housing, Mohammadpur, Dhaka -1207
Dhaka Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Structural Inspection	: 31 May, 2014
Fire & Electrical assessment conducted by	: Accord (Full report available at bangladeshaccord.org)
Date of Fire & Electrical Inspection	: 3 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	: RC structure with beam and slab supported on columns
iii.	Floor System	: Beam slab
iv.	Floor Area	: Total floor area: 43,400Sq.ft.
v.	No. of Stories	: 7 storied
vi.	Construction Year	: 2012
vii.	Foundation Type	: Piled foundation
viii.	Design Drawings	: Available (Approved by RAJUK in 2009)
ix.	Soil investigation Report	: Available (Prepared in February 2011)
x.	Construction Materials	: Stone aggregated
xi.	Generator	: 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):

1. Building Engineer to review design, loads and column stresses in all edge columns attracting loads from cantilevers.
2. Live load in cantilever/undocumented perimeter slab areas to be limited to 1.5kPa pending outcome of DEA.
3. Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns].
4. A Detail Engineering Assessment of the Factory Building to be commenced, see attached Scope.
5. Building Engineer to commence update of the drawings to reflect the as-built structure and loading levels at all floor levels, including as built floor finishes thickness.

#### Mid Term (Within 6 Weeks):

1. Detail Engineering Assessment to be completed.
2. Produce and actively manage a loading plan for all floor plates within the Building giving consideration to floor capacity and column capacity.
3. Complete update of as-built drawing.

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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4. As part of DEA, Building Engineer to review and ensure that columns are protected from possible vehicle impact.
5. Building Engineer to investigate cracking and determine cause
6. Building Engineer to carry out full design check of all floor slabs to confirm that the slabs are capable of carry the building design loads.

### Long Term (Within 6 Months):

1. Actions identified in the Detail Engineering Assessment to be implemented.
2. Continue to implement the load management plan.
3. Lightweight steel roofs are to be reconstructed/upgraded to ensure adequacy for code vertical and wind loads by the Building Engineer.
4. Building engineer to survey factory and identify areas of water ingress. Divert all water away from structure to protect the RC structures from direct contact with water.

### **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. Remove all storage from exit stairs and egress paths.
3. Keep egress paths and stairs clear of storage.
4. 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.
5. Remove manual on/off switches from emergency lighting and exit signage units to prevent them from being switched off.

#### Short Term (Within 3 Months):

1. Separate the boiler, generator, transformer room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations.
2. 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 23m<sup>2</sup>

-If sprinkler protected: maximum height of 3.66m and maximum area of 93m<sup>2</sup>.

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

3. 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.
4. Relocate day-care room to another location on the ground floor with maximum travel distance of 9m (30 ft).

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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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.
7. 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. HT cable dropping from 11 kV pole must be protected in steel pipe of required size at least 2 Meter from the ground level to protect from physical injury by moving objects.
2. Cables passing through permanent wall must be protected in steel pipes and remaining holes around the pipe must be sealed. HT & LT cable passing through the same wall must be segregated and laid separately.
3. Arcing horns must be aligned and gap maintained as per the transformer manufacturer's instruction. Cleaning dust and lint must be done as part of maintenance. Check the tightness of nuts and bolts on transformer bushing by taking short shutdown and maintaining the accessories of transformer in order.
4. Fill the Breather oil cup with transformer oil up to the required level as instructed by the manufacturer. Consult with transformer servicing company before performing the task. Establish a routine maintenance & inspection program for transformer as well as all other electrical equipment to ensure any future repetition of the occurrence.
5. Encased the generator batteries 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.
6. Capacitor and control devices inside the panel must be rigidly fixed to the frame to avoid from electrical fault and mechanical displacement.
7. Fix the panel base securely to the foundation with appropriate fastening devices. Provide cable support for incoming and outgoing cables.
8. All electrical installation, including wiring and cable work must be protected against heat from the boiler by supporting and separating at safe distance.
9. Control devices used in panel must be firmly fixed with functional safety.

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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10. Replace the existing trench cover either with concrete slab covers or checkered plate. Existing cover must be additionally supported until it is replaced for safety.
11. Install base plate of the panel and make hole into it then fit cable gland (required sized) for cable entry and exit to the panel and seal all the unused openings by suitable means to make the panel dust and vermin proof.
12. Multiple cables connecting at a MCCB terminal must be removed. Individual circuit breaker must be used for each load according to the respective cable-size.

Short Term (Within 3 Months): NA

Mid Term (Within 6 months):

1. Every item of installation should be arranged so as to facilitate its operation, inspection, maintenance & access. Access of the DB must be kept obstacle free. Provide at least 1 meter clearance in front the panels for ease of its operation and maintenance.

Long Term (More than 6 months): NA