

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ALPHA CLOTHING LTD
Address of the Factory	: South Panishail, Kashimpur, Gazipur, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 25-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 25-May-14

BASIC INFORMATION:

The present garment factory is comprises of a 1 Main Buildings 10 Ancillary Buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: Main Building: RCC Beam-Column frame system and foundation system is isolated column footing.
iii.	Floor System	: Beam Supported slab type in RCC Building and PEB sections used in roof top shed.
iv.	Floor Area	: 23,270 SF
v.	No. of Stories	: 4-storied Building and one roof top shed.
vi.	Construction Year	: 2002-2003
vii.	Foundation Type	: Isolated Spread Footing.
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete (brick chips).
xi.	Generator	: Ground Floor

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for Structural, Fire and Electrical Safety comprises of Short Term, Mid Term and Long Term basis are as follows:

The recommendations for Structural Safety corrective actions are:

Immediate : NA

Short Term: (3 Weeks) :

- i. Designate a representative as the Factory Load Manager. The Factory Owner shall ensure that at least one individual, the Factory Load Manager who is located onsite full time at the factory, is trained in calculating operational load characteristics of the specific factory. The Factory Load Manager shall serve as an ongoing resource to RMG vendors and be responsible to ensure that the factory operational loads do not at any time exceed the factory floor load limits as described on the Floor Load Plans.

Mid Term (6 Weeks) :

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- i. Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure. Despite previous government approval, do not vertically expand factory building beyond the current 4 levels as preliminary calculations indicate the structural system may become overstressed. Prior to further vertical expansion, have a structural engineer verify the load-bearing capacity of the building to support the vertically expanded building configuration. That analysis should include destructive testing to validate the in-situ concrete compressive strength of the structural elements.
- ii. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- iii. Develop a program to ensure that all live loads for which a floor or roof has been designed for will not be exceeded. The designated Load Manager shall oversee this program and ensure it is enforced.
- iv. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20.
- v. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
- vi. Have a qualified structural engineer confirm that capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- viii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance standard part 7 section 7.2 and take appropriate remedial measures.
- ix. Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer.
- x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- xi. Have a qualified structural engineer to prepare load plans including in section 8.20 of the Alliance standard. Floor load plans shall be visibly posted on all building levels.
- xii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xiii. Provide Occupancy Certificate for Review.
- xiv. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.

Long Term (6 months) :

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- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- ii.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations as soon as possible.
Short Term (3 Weeks)	Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Mid Term (6 Weeks)	<p>Post the occupant loads for every assembly and production floor in the facility in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees.</p> <p>Develop a testing and maintenance program that ensures the operation of all exit signs is verified at least once per year. If battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 min once per year.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil defense.</p> <p>All applicable permits & license shall be up to date including BEREC waiver certificate.</p> <p>Collect Occupancy certificate for each building and ancillary structure as per building use from approving authority.</p> <p>Provided at each floor entrance from the all stairs to the floor in English and Bengali. Signs need to be indicating the name of the stair and the floor level. Signs shall be posted adjacent to the door.</p>

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Long Term (6 Months)	<p>Install a dedicated fire pump in accordance with NFPA 20 to supply the water demands for the fire protection systems along with a stored source of water to meet the demands per NFPA 22. Once new fire pump is installed, establish an inspection, testing, and maintenance program for the fire pump. Program must comply with NFPA 25.</p> <p>Provide 2-hour fire-resistance rated construction barriers at exit enclosures of with 1.5-hour fire-rated opening protection (Door, window, etc.). Fire door assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614 Part II. Fire window shall conform to NFPA 257 or British, European, Chinese, or Indian standard for fire window tests. The new fire rated door will side-hinging swinging opening direction of egress type, with auto closure and panic bar and without locking arrangement as per Alliance Standards Part 6 Section 6.8 Doors and Gates. Required total width of the fire rated door need to be calculated as per alliance standard section 6.5 and minimum width of new fire rated door will 1.00m as per BNBC Chapter 4 section 3.9.3. Consult a qualified fire protection engineer to design the required rated construction barriers with opening protection.</p> <p>Modify existing or install new standpipe system to meet the requirements of Alliance Standard Part 5 Section 5.4. Standpipe system must also comply with the requirements of NFPA 14. Any newly installed standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC Section 5.4.3. Consult a qualified fire protection engineer before modify existing or installing new system.</p> <p>Provide 2-hour fire-resistive rated continuous construction barriers at exit enclosures with 1.5-hour fire-rated opening protection (Door, window, etc.). Close the opening over the exit by 2-hour fire-rated barrier. Close the unprotected opening on the common wall of warehouse and cutting section by 1-hour fire-rated barrier or installed 0.75 hour fire- rated opening protection (Window). Consult a qualified fire protection engineer to design the required rated opening protection.</p> <p>Replace all non-compliant doors and frames in the means of egress with side swinging doors in accordance with Alliance Standard Section 6.8. Replacement doors shall be listed, approved, self-closing, fire rated door assemblies (door and frame) with latching panic hardware.</p> <p>Install handrails on the both sides of the stairs. A minimum height of 865 mm (34 in.) and a maximum height of 965 mm</p>
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	<p>(38 in.) as measured from the leading edge of the tread need to be maintained when installing new handrails. Guards, where required shall be provided in accordance with Alliance Standard Section 6.3.7.</p> <p>Rooms used for housing of combustibile materials, boiler shall be separated from the surrounding occupancy with a minimum 1-hour fire rated construction with 0.75-hour fire rated opening protection (doors, windows, etc.). Room used for housing generator shall be separated from surrounding occupancy with a minimum 2-hour fire rated construction with 1.5-hour fire rated opening protection (doors, windows, etc.). Separate finishing section from stores. Consult a qualified fire protection engineer to design the required rated construction barrier with opening protection.</p> <p>Install Portable fire extinguishers as per potential fire class and hazards all through the building in accordance with NFPA 10 Chapter 5.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year. If battery operated signs are used, these lights are tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Provide Fire Department (Siamese) connections in accordance with Alliance Standard Section 5.5.4. Connections shall match the Fire Service and Civil Defense hose thread standard. Consult with a qualified fire protection engineer to design the Fire Department Connections.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers. Program shall be complying with the requirements of NFPA 10 Chapter 7.</p> <p>Remove the threshold or provide a proper slope do not exceed 12.7 mm (1/2 in) on both sides of the threshold. Mark with additional signage or floor markings.</p> <p>Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry the required duties.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall,</p>
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	<p>ceiling, supply and return air Ventilation systems. Promptly reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and Rescheduling.</p> <p>Once a compliant system is installed, establish an inspection, testing, and maintenance program for the standpipe and hose system. Program needs to comply with the requirements of NFPA 25.</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate	NA
Short Term (3 Weeks)	<p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system.</p> <p>Provide protective covers for every naked light installed inside storage area.</p> <p>Install two distinct earth connections of minimum 35 sqmm for generator frame earthing.</p> <p>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions.</p> <p>Light fixtures without protective covers (otherwise known as naked lights) shall not be allowed in storage areas or in any area where the Inspector of the Factories Rules (1.6.3.7) Part 53 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p>
Mid Term (6 Weeks)	<p>Install phase separators between terminal connections at the noted locations. Phase barriers between different phases (above 230V) must be installed to prevent flashover.</p> <p>Provide earthing connection to all exposed-conductive parts (metal) related to/in close proximity to electrical equipment/installation and utility service such as metallic water/gas/steam pipes etc. such that all the metals remain at a substantially same potential of building earthing system.</p> <p>Provide individual neutral connections same as the respective phase cable-size for all single-phase loads. The number of neutral connections in neutral bus bar must be same as the number of single-phase circuit breakers.</p> <p>Check all the cable and circuit breaker for sorting out the higher rated circuit breakers. The rated current of a protective device (MCB, MCCB, fuse) must not exceed the current carrying capacity of any conductor in the circuit.</p> <p>Provide a capacity information label containing the current carrying capacity and size of main cable, rated capacity of</p>

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	<p>circuit breaker and the busbar (with dimensions).</p> <p>Provide permanent identification marking mentioning name of panels (i.e. MDB-250A, Ground Floor) on a durable material sheet posted on panels' door. Include danger sign where required.</p> <p>Use PVC connector with PIB tape wound around with a junction box for every cable joints.</p> <p>Keep minimum 1 meter clearance in front of the panel for easy access to panel for its operation.</p>
Long Term (6 Months)	<p>Develop an Insulation Resistance Measurement Program that ensures deterioration of insulation resistance will be identified quickly. Testing should be in compliance with International Electrical Testing Association (NETA). All transformers, switchgears etc. shall be subject to an insulation resistance measurement test to ground after installation but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches etc. and between each phase and earth.</p> <p>Thermographic scanning should be part of the electrical maintenance program. Complete Thermographic scans at least on a three year cycle. Thermographic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA70B or a comparable standard.</p>