

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: CLIFTON COTTON MILLS LIMITED
Address of the Factory	: CDA Plot # D28, 28-D/1, 28-D2, Char Rangamatia, Kalurghat, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 9-Apr-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 9-Apr-14

BASIC INFORMATION:

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

- i. Building Usage Type : Garments Factory.
- ii. Structural System : Main Building: Concrete beam & slab system with beams spanning both directions between column. Foundation and lateral-load resisting systems are moment resisting concrete frame. Foundation is monolithic RC slab with beams.
Generator Building: 1 storied brick masonry wall and tin shade
- iii. Floor System : RCC Beam Slab.
- iv. Floor Area : 100800 sft
- v. No. of Stories : Main: 6 story, Generator: 1 story
- vi. Construction Year : 2006
- vii. Foundation Type : Isolated Spread Footing.
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC (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. 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.
- ii. 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

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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. Remove plaster and replaster again with proper curing.
- ii. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings (collect code confirmation and design criteria). Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20
- iii. Engage a qualified structural engineer to develop the required documents to confirm the designed load path. If necessary, have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading. Compliance may be waived if the Factory Owner provides satisfactory evidence of a cyclone operations plan that includes full evacuation of the factory in advance of any approaching cyclone.
- v. The compressive strength of columns, floor framing and shear walls using MCAC shall be investigated by an appropriate program of in-situ testing and representative destructive testing of core samples.
- vi. Under guidance from a qualified structural engineer identify the source of moisture resulting in water damage/efflorescence. Any and all sources of moisture should be rectified/repared. Once source is identified and repaired Damaged walls should be cleaned and replastered as necessary. (Failure to address the source of moisture will result in repeated issues).
- vii. Have a qualified structural engineer confirm that capacity to support the load of the sub-stores on each floor is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed (see recommendations elsewhere in this report).
- viii. Engage a qualified structural engineer to confirm and document foundation/floor casting design can accommodate concentrated storage loads observed (see elsewhere regarding development of load plans)in fabric storage on ground floor.
- ix. Develop engineered plans to brace all non-structural elements to resist wind and earthquake loads to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- xi. Create and post load plans in each floors as per Alliance Standard Sections 8.10 and 8.20.5.3.
- xii. Provide signage or the appropriate markings at all areas used for storage such as ground floor storage area, 3rd Floor NE storage area, and 9th Floor Storage) to indicate the acceptable loading limits detailed in the Load Plan.

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Long Term : NA

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Storage underneath the cutting tables shall be kept clear of combustibles at all time as per Alliance Standard Part 17 Section 13.7.2 Cutting tables. Remove all combustibles stored underneath the cutting tables at the noted locations.
Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices all doors to exits / means of egress. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.
Mid Term (6 Weeks)	<p>Arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defence per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time the fire safety officer shall be assigned to contact the fire department in the event of fire alarm activation.</p> <p>Post maximum occupant load for all areas (near exit)</p> <p>Install identification signage at the required locations. The five basic types of identification signs are as follows: Type A- Control Valve Sign Type B- Multi-Purpose Text Signs Type D- Fire Alarm Sign Type E- Hydraulic Calculation Sign (including location of design area, discharge densities, required flow and residual pressure demand, occupancy class or commodity class and max storage height) Reference NFPA 13 for additional details.</p> <p>Signage for standpipe system should be in compliance with NFPA 14 Chapter 6 such as a sign on Fire Department connection once installed (see recommendation elsewhere). Such signs shall read: AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable in 1 in lettering. Supplemental signage must be provided when an FDC-connected system does not serve an entire building (sign should indicate the areas served).</p> <p>Install signage adjacent to each stair door indicating the stair name (each stair should have unique name/id) and the floor level at the noted locations.</p>
Long Term (6 Months)	<p>Provide design specifications for installed sprinkler systems and provide evidence of installation at the heights designated in the design.</p> <p>Remove all sliding or rolling doors at and within the exit</p>

	<p>stairs and along all portions of the means of egress. Replace with side-hinged swinging type doors in compliance with Standard. As noted elsewhere, exit enclosures require fire rated door assemblies (which should be side-hinged).</p> <p>Floor to floor penetrations shall be protected/sealed with a listed through penetration fire stop system tested in accordance with ASTM E814. Confirmation should be provided that any materials used can conform to standard as per Alliance Standard Section 4.7 Penetrations</p> <p>Revise the standpipe system to include Class I (65 mm connections meant for Fire Department use in fighting fires) connections as defined by NFPA 14 in all stairwells at each floor level. System changes should be designed by a qualified fire protection engineer.</p> <p>Provide minimum 1.5-hr fire rated doors and seal all unprotected openings to separate the west side 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. Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614 Part II. Retain the services of qualified fire engineer to assist in specifying and installing fire rated assemblies.</p> <p>Provide design specifications for installed sprinkler systems and provide evidence of design to specific commodity class and hazard. Provide provide shop drawings and hydraulic calculations as outlined in NFPA 13. These drawings shall include all details as outlined in NFPA 13.</p> <p>Openings from the exit enclosure to the storage area shall be provided with a vestibule with appropriate fire rating (same as exit enclosure minimum 2-hour with 1.5 hour door/openings). Consult with qualified fire safety engineer in design of vestibule.</p> <p>Fire department (Siamese) inlet connections should be installed to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet connections shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard. Signage shall comply per recommendations found elsewhere.</p> <p>Provide electrically supervised devices on the valves controlling the automatic sprinkler systems. Devices are to be supervised by a listed fire alarm system control unit.</p>
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	<p>During installation of fire rated door assemblies noted elsewhere assure that every door in a stair enclosure serving more than 4 stories should be provided with re-entry unless it meets the requirements of Alliance Standards Part 6 Section 6.8.3.1.</p> <p>Install intermediate handrail in west stairwell as per standard. New handrails shall have a minimum height of 865 mm (34 in.) and a maximum height of 965 mm (38 in.) as measured from the leading edge of the tread.</p> <p>Remove lips / slider tracks in the paths of exit/egress in all noted locations.</p> <p>Separate boiler room from other occupancies by a minimum 1 hour construction. Retain the services of a qualified fire engineer to properly design and approve enclosure.</p> <p>Separate oil filled transformers by a minimum 2 hour fire resistive rated construction. Retain the services of a qualified fire engineer to properly design and approve enclosure. Penetrations (doors, cables) must also be sealed or have appropriate protective (1.5 hour fire rated door assembly).</p> <p>Remove all storage items that encroach on the minimum clearance distance to the sprinkler deflector as per Alliance Standards Part 5 Section 5.3.6.1 Storage Clearance. Mark on walls the maximum height of storage and assure no storage will exceed this mark at all times.</p> <p>Develop and inspection, testing, and maintenance schedule/program for all installed sprinkler systems. Reference NFPA 25 Chapter 5 Sprinkler Systems Table 5.1.1.2 for the frequency of testing. All inspections, maintenance and testing should be fully documented and available for review.</p> <p>Install an approved audible device connected to every automatic sprinkler system and activated by water flow equal to the flow of one sprinkler. Where a fire alarm system is installed, activation of the water flow shall activate the fire alarm system.</p> <p>The standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC as cited in 5.4.3. Standalone standpipe systems shall be confirmed to meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection or NFPA 14. This testing should be documented and available for review.</p> <p>Existing pump must be evaluated against requirements of NFPA 20 by a qualified fire engineer. Any deficiencies</p>
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	<p>must then be rectified based on advice of engineer. All evaluations should be fully documented. All valves controlling fire pumps systems shall be electrically supervised by fire alarm system control unit. Inspections and testing should be conducted as per NFPA 25 Chapter 8. All testing should be made available for review.</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate	N/A
Short Term (3 Weeks)	<p>Develop an electrical safety training program for all workers that may be exposed to electrical safety hazards.</p> <p>Install a sign in the generator room that provides details on electrical shock first aid procedures. Signage should also include instructions on artificial respiration.</p> <p>Install signage in all storage areas or other areas of combustibles indicating no use of light fixtures without protective covers.</p> <p>Ensure meters (Ammeter, Voltmeter, PFI Auto Controller, etc) on the main electrical equipment are operational.</p>
Mid Term (6 Weeks)	<p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits should be permanently marked with signs that readily identify them as a component of the emergency power system.</p> <p>Provide power distribution schedules for all equipment and capacity information labels on switchboards and/or distribution boards.</p> <p>All cables should be laid in trenches, on proper ladders/trays with appropriate covers, or using suitable support clamps at regular intervals as per BNBC.</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).</p>