

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Coast To Coast (Pvt) Ltd
Address of the Factory	: 1st, 2nd, 7th Floor, Itahata, Union: Bashon, Mouza 35 (Chandana), Gazipur Sadar, Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 27-Feb-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 27-Mar-14 & 27-Feb-14

BASIC INFORMATION:

The present garment factory is comprises of a 1 Main Buildings 2 Ancillary Buildings. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC building with steel in concrete. Beam-column frame structure. Monolithic RC slab with beams.
- iii. Floor System : RCC Beam Slab.
- iv. Floor Area : 26450 Sft.
- v. No. of Stories : Main 9 (+Basement), Ancillary – 2, Child Care – 1.
- vi. Construction Year : 2006-2009
- vii. Foundation Type : Unknown.
- 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 : N/A

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 do not at any time exceed the factory floor load limits as described on the Floor Load Plans.

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Mid Term (6 Weeks)

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- i. Under guidance of a qualified structural engineer conduct destructive core testing to validate the in-situ concrete compressive strength of the structural elements.
 - ii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
 - iii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
 - iv. Adequately anchor and brace all non-structural elements noted to resist earthquake forces to comply with the BNBC and Alliance Standard.
 - v. The authority should engage an expert structural engineer to calculate actual live load for each critical section of the floor, particularly storage area and sewing section. Measured live load should be verified with the designed live considering factor of safety.
 - vi. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
 - vii. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Load Plans shall be prepared for each floor. These Load Plans shall document the actual maximum operational loading that is intended and/or allowable on each floor. For each section of a floor, live load should be posted in the adjacent column, particularly for the critical sections.
 - viii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.

Long Term

: N/A

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove/grind down lip to meet standard of change in elevation of walking surfaces do not exceed 6.35 mm (1/4 in) unless provided with a beveled slope of 1 in 2 that does not exceed 12.7 mm (1/2 in). Do not allow storage of combustible materials under cutting tables.
Short Term	N/A
Mid Term (6 Weeks)	Post the occupant load for all assembly and production floor areas in a conspicuous space near the main exit or exit access doorway for the space in accordance with Alliance Standard Section 6.4.4 Arrange for direct connection of the fire alarm and detection system to a central station monitoring service or

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	<p>the Fire Service and Civil Defence as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up, a person shall be assigned to contact the fire department in the event of fire alarm activation. An annunciator shall be located in a constantly attended location to alert this person.</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. Battery power for all emergency lights and exit signs should be checked regularly in a systematic way with documented records available for review.</p> <p>Install signage for all standpipe system components (e.g valves, pipes, connections, etc) in compliance with NFPA 14 Chapter 6. For example valve cabinets shall be marked in 2 1/2 in lettering (red with white background) indicating contents.</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 in English and Bengali.</p>
Long Term (6 Months)	<p>Replace all non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be listed, approved, self-closing, fire rated doors assemblies (door and frame) with latching panic hardware.</p> <p>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.</p> <p>Factory will need to install fire rated door assemblies at all exits. Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614. Part II. Doors must remain in closed position or be of self-closing type. Doors may be provided with locking hardware from the ingress side provided that a panic bar is installed on any door with an occupant load exceeding 49 persons</p> <p>Automatic sprinkler systems shall be provided throughout existing high-rise buildings. A properly designed sprinkler system should be installed per code requirements. Factory should retain the services of a qualified fire protection design firm to design the system. All sprinkler installations shall be submitted for review by the Alliance prior to</p>

	<p>commencement of installation.</p> <p>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.</p> <p>Existing pump must be evaluated against requirements of NFPA 20 by a qualified fire engineer. Any deficiencies 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.</p> <p>Automatic detection systems shall be installed throughout ALL existing buildings and structures. Factory should install automatic detection systems in basement area (understanding this may conflict with government circular on removing electrical systems from storage areas). The required installation of automatic sprinklers (as required by separate correction item) with a flow switch can also serve this purpose per Alliance Standard 5.7.3.1 (not necessary to install both detection systems and sprinkler systems). All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation.</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. Correct and repair the system as needed.</p> <p>Interior exit stairways and ramps shall terminate at an exit discharge except where terminating at an exit passageway is constructed to meet the same rating requirement as the exit that is being served and shall not be less than 1 hr fire-resistance rated construction (NOTE: if sprinklers are installed as noted above, this installation will not be necessary per exemption of code)</p> <p>Interior exit stairways and ramps shall terminate at an exit discharge except where terminating at an exit passageway is constructed to meet the same rating requirement as the exit that is being served and shall not be less than 1 hr fire-resistance rated construction (NOTE: if sprinklers are installed as noted above, this installation will not be</p>
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	<p>necessary per exemption of code)</p> <p>Factory should either:</p> <ol style="list-style-type: none">1) Appropriately seal the floor to floor penetrations with appropriate materials to meet fire rating of floors.2) Convert the room into a 2- hour fire rated shaft by installing fire rated door assembly, fire dampers on ventilation opening. Shaft must extend from top to bottom of building. <p>Rooms used for storage of combustible materials shall be separated from the surrounding occupancy with a minimum 1 hour construction. Storage should not be sharing area with canteen even under temporary conditions. Other arrangements should be made for storage.</p> <p>Substation room should be constructed with 2-hour fire rated construction and assemblies (e.g. fire doors of equivalent rating) and all penetrations must be properly sealed to maintain fire rating.</p> <p>Handrails shall be provided on both sides of each exit stairway and ramp. 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>Install identifications for fire department connections as per NFPA 14 (e.g. sign on Fire Department connection indicating STANDPIPE in 1 in lettering, etc.)</p> <p>Confirm through testing (light meter) or other certification that means of egress will have illumination of 10 lux for all corridors, exit doors, and stairways and no less than 30 min in the event of failure of normal lighting.</p> <p>Remove/grind down lip to meet standard of change in elevation of walking surfaces do not exceed 6.35 mm (1/4 in) unless provided with a beveled slope of 1 in 2 that does not exceed 12.7 mm (1/2 in)</p> <p>During installation of fire rated door assemblies assure that every door in a stair enclosure serving more than 4 stories is provided with re-entry unless it meets the requirements of Alliance Standards Part 6 Section 6.8.3.1.</p> <p>Install illuminated exit sign indicating proper direction of final exit, outside of the building. Install a gate or other mechanism at the top of basement stairs with sign "not an exit". Swing of gate should not impede the egress of other workers.</p> <p>Establish an inspection, testing, and maintenance program</p>
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	<p>for the standpipe system. Program must comply with NFPA 25. 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.</p> <p>Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25. Provide training on proper operation of fire pumps.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B. Develop a maintenance and contractor safety policy that includes procedures for conducting hot work (e.g. welding). All hot work should be conducted with a proper permit and precautions must be available in case of fire (e.g. fire watch, fire extinguisher, etc).</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate	N/A
Short Term (3 Weeks)	<p>Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements.</p> <p>All Distribution Board covers in the building should be connected to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe in accordance with BNBC 2006 Part 8.</p> <p>Switchboards and/or distribution boards should have clear and permanent unique identification markings as per BNBC Part 8 Section 2.11.5.4 .</p> <p>Switchboards and/or distribution boards should have capacity information labels or voltage rating.</p> <p>Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p>
Mid Term (6 Weeks)	<p>Provide dedicated neutral for each circuit.</p> <p>Assure working condition of all latches and locks on panel doors. Panel doors should remain closed and latched except when accessed by authorized personnel.</p> <p>Remove multi looping and bunch of cables at circuit breakers within distribution boards.</p> <p>Ensure distribution boards provided with physical means to prevent the installation of more over current devices than that number for which the panel board was designed, rated, and listed.</p> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity</p>

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	of the electrical system.
Long Term (6 Months)	<p>The substation room should have the required fire rating/protection and physically separated as per the Alliance standard 3.4.2.1 (2-hour fire rated construction).</p> <p>A wire/cable shaft should be provided for the whole building. Wiring and cables should be arranged in shaft for ease of inspection and maintenance. Consult with a qualified electrical engineer to assist with the design of wire/cable shaft per Alliance requirements.</p> <p>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>