

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Cutting Edge Industries Ltd
Address of the Factory	: 1612, Dhakin Salna, Salna Bazar, Gazipur Sadar, Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 23-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 23-May-14

BASIC INFORMATION:

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

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: Main Building: Part-1, Prefabricated steel frame. Part-2, RCC Column frame with slab.
iii.	Floor System	: Part#1: Steel Building with Decking Panel at Floor. Part-2 Beam slab type in RCC Building.
iv.	Floor Area	: 2,25600 sft
v.	No. of Stories	: Part-1: 6 Storied Steel Building, Part-2: 6 Storied RCC Building.
vi.	Construction Year	: 2010
vii.	Foundation Type	: Unknown.
viii.	Design Drawings	: Not Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RCC (Stone 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.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Mid Term (6 Weeks)

- :
- i. Engage a qualified structural engineer to confirm structural performance of the structure.
 - ii. Complete further testing on areas of deterioration and have a qualified structural engineer develop a remediation plan.
 - iii. 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
 - iv. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
 - v. Assign 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.
 - vi. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
 - vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
 - viii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
 - ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
 - x. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of all buildings.
 - xi. 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 (6 months)

- :
- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - ii. Repair the exterior façade system to prevent water intrusion.
 - iii. Provide Certificates of Occupancy for review.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Keep areas beneath cutting tables clear of combustibles at
-------------------------	--

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	all times.
Short Term	N/A
Mid Term (6 Weeks)	<p>Installed enclosed exit with minimum clear width of 2.2 m or reduce the occupant load from 1st, 2nd and 4th floor maintaining 521 per floor.</p> <p>Post the occupant loads for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Develop a testing and maintenance program that ensures the correct operation of all egress lighting, including emergency and illuminated exit signs, is verified at least once per year. If stand alone, battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lighting shall ensure that full operation is provided for a minimum 90 min, once per year.</p> <p>Develop a testing and maintenance program that ensures the correct operation of all egress lighting, including emergency and illuminated exit signs, is verified at least once per year. If stand alone, battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lighting shall ensure that full operation is provided for a minimum 90 min, once per year.</p> <p>Install automatic fire detection and alarm system throughout the factory designed in accordance with NFPA 72. Until that time a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up; a person needs to be assigned to contact the fire department in the event of fire alarm activation. An annunciator needs to be located in a constantly attended location to alert this person. Trouble or alarm notifications shall be indicated on the fire alarm control panel.</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>Stair designation signs shall be 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> <p>Obtain Occupancy certificate for the factory building as per building use from approving authority.</p>
Long Term (6 Months)	<p>Install 1.5- hour fire-resistive opening protection (door) at shaft opening(s). Consult a qualified fire protection engineer to design the required rated door of shaft.</p> <p>Replace all non-compliant doors and frames in the means of</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>egress with sides swinging opening in the direction of egress type 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>Keep the doors lock free in the direction of egress under any conditions. All hasps, locks, slide bolts and other locking devices shall be removed where available.</p> <p>Installed enclosed exit with minimum clear width of 2.2 m having same width of landing or reduce the occupant load from 1st, 2nd and 4th floor maintaining 521 per floor.</p> <p>Provide 1-hour fire-resistive rated assembly with 0.75-hour opening protection in line with the stair and extend 3.05 m (10 ft.) beyond the ends of the stair between the exterior exit stairs and the building to achieve the required separation. The rated assembly should be approved and/or designed by a qualified fire protection engineer.</p> <p>Provide exits within 45 m (147.6 ft.) from any point of the processing area or provided automatic fire detection or automatic sprinkler system all through the Main building Part-1.</p> <p>Provide training for the required number of people certified in firefighting, first aid, and rescue training by the appropriate authority.</p> <p>Provide required fire resistance rated opening protection (Door, Window, Hatch Cover etc.) at opening and penetration through fire rated walls and/or assemblies or closed the unprotected openings by fire-resistance rated barrier as per requirements. Seal penetrations around conduits by proper fire rated sealing materials. Consult a qualified fire protection engineer. Consult a qualified fire protection engineer to design the required rated opening protection.</p> <p>Install automatic sprinkler system all through the Main building part-1 as per NFPA 13. Any newly installed automatic sprinkler system shall be evaluated for compliance with the design pressure and flow demands of NFPA 13. Consult a qualified fire protection engineer before installing new system. Automatic sprinkler system installation is to be tested for final acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance as per clause 5.3.4. Acceptance testing of the installation shall be in accordance with NFPA 13 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. If the construction type of Main building:Part 1 is upgraded to be a fire-rated structure, then an automatic sprinkler system is not required.</p> <p>Modify or install the standpipe System (Class-I and class-II) to meet the requirements of Alliance standard and NFPA 14. Any newly installed standpipe system shall be evaluated for compliance with the design pressure and flow demands</p>
--	---

	<p>of NFPA. Consult a qualified fire protection engineer before modify existing or installing new system.</p> <p>Modify the existing one or install new 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 fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections 3.4 and 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Remove the floor(s) from the part-1 of main building in such height that the highest occupiable floor above grade level remain below 20 m (65 ft.) or the whole structure of part-1 would need to be a fire rated structure as part-2. If removal is done it should be done in such a manner so that the process does not create any adverse effect of the structure. Consult a qualified structural engineer after the removal to conform the structural stability of the building.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers. Program must comply with the requirements of NFPA 10.</p> <p>Install appropriate means of illumination at the noted locations. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2cd/m², may also be used. Illumination shall be a minimum of 10 lux for all corridors, exit doors and stairways. Illumination for aisles shall be a minimum of 2.5 lux.</p> <p>Evaluate the interior finishes materials of exits as per ASTM E84. If does not meet the rating requirements for Class A, B and C materials then replace non compliant finishes with compliant finishes that have a maximum flame spread index of 75 and smoke developed index of 450 .</p> <p>Ensure ceiling height in the means of egress maintain minimum 2.3 m (7 ft 6 in) and with projection from the ceiling not less than 2.03 m (6 ft 8 in)</p> <p>Provide parapet in every occupied roofs with same fire rating of outer wall of the building and a minimum height of 1067 mm (42 in.).</p> <p>Install handrails on the both side of the stairs. 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 need to be maintained when installing new handrails. The spacing between vertical members will not exceed 200 mm (8 inch). Also provide intermediate handrails when the stair</p>
--	---

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>width exceeds 2.2 m (87 in.).</p> <p>Provide identification mark on fire department connections.</p> <p>Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25. Train workers on proper operation of fire pump.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program shall comply with the requirements of NFPA 25.</p> <p>Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall, 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>
--	---

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out the cause of overheating, overloading, or signs of burning and take proper action.</p>
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.</p> <p>Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building or metal water pipe.</p> <p>Generator frame earthing shall be two points separately by proper size of earthing cable and specify the earthen pit for maintenance.</p> <p>All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so that they will be readily identified as a component of an emergency circuit or system. The required marking can be by color code, the words "emergency system," or any other method that identifies the box or enclosure as a component of the emergency system.</p>
Mid Term (6 Weeks)	<p>Remove multi looping of wiring/cables at circuit breakers and connect a single cable to a single port by the proper size of cable lugs within switchboards and/or distribution boards.</p> <p>All cable trenches should provide cover on the cable trench by non inflammable materials.</p> <p>Provide a capacity information label which contains the current carrying capacity and size of main cable, rated capacity of circuit breaker and the bus bar(with dimension). Display panel schedules posted on panels' door (inner side).</p> <p>Use protective devices on both sides of cables. Isolation and protection shall be provided for each individual circuit.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Long Term (6 Months)	<p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system.</p> <p>Provide cable shaft for the whole building. Wiring and cables are arranged in shaft for ease of inspection and maintenance.</p> <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>
----------------------	--