

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: The Civil Engineers - Woven Unit
Address of the Factory	: 8,9,159,& 160 Baghbari, Horindhara, Hemayatpur, Savar, Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 25 May 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 25 May 2014

BASIC INFORMATION:

The present garment factory is comprises of a Ten storied RCC main building (with partial basement) and a five storied RCC ancillary building. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC structure with beam column frame system.
- iii. Floor System : RCC Beam Supported slab.
- iv. Floor Area : Main building is 406,000 sft. Ancillary building is 69300 sft.
- v. No. of Stories : main building is 10 storied with partial basement. Ancillary building is 5 storied.
- vi. Construction Year : 2010
- vii. Foundation Type : Unknown
- viii. Design Drawings : Not Available
- ix. Soil investigation Report : Available
- x. Construction Materials : Reinforced Concrete (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 : 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 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)

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- i. Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies. Structural engineer shall also provide remediation documents if required.
 - ii. Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans and the correction be reviewed by an engineer.
 - iii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
 - 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. 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.
 - vi. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - vii. Provide Certificates of Occupancy for review.
 - viii. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
 - ix. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
 - x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.

Long Term

: NA

The recommendations for Fire Safety corrective actions are:

Immediate	NA
Short Term	NA
Mid Term (6 Weeks)	<p>Employ a qualified technician to resolve the trouble and alarm conditions per NFPA 72.</p> <p>Training programs should be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Post emergency egress maps at the entrance to each exit stair or main point of egress.</p> <p>Arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defense. Until that time that a</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>central station monitoring service or direct connection to the Fire Service and Civil Defense can be set up, a person trained to contact the Fire Service and Civil Defense in the event of fire alarm activation shall be provided. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person.</p> <p>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.</p> <p>Develop a testing and maintenance program that ensures the operation of all exist 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>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.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in both English and Bengali.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p>
<p>Long Term (6 Months)</p>	<p>Install a dedicated fire pump for the facility in accordance with NFPA 20. Also, install a water storage tank in accordance with NFPA 22.</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer.</p> <p>Provide required fire rated construction 10 ft beyond the ends of the exterior stairs. Enclose any openings (windows, etc.) with required fire rated construction within that 10 ft wall section. The rated assembly should be approved and/or designed by a qualified fire protection engineer.</p> <p>Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated doors assemblies (door and frame) with latching panic hardware.</p> <p>Provide fire-resistive rated penetration protection for rated walls and assemblies in accordance with Alliance Standard Sections 4.6 and 4.7. Consult a qualified fire protection engineer to design the required penetration systems.</p> <p>Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Section 6.3.1.2. . Consult a qualified fire protection engineer to design the</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>required rated construction barriers.</p> <p>Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. Devices should be part of an automatic fire alarm and detection system for the facility. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Train and certify the required number of people in firefighting, first aid, and rescue training by the appropriate authority in accordance with the Alliance Safety Training Curriculum in accordance with the Alliance Safety Training Curriculum.</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.</p> <p>Provide handrails on both sides of each stairway. Intermediate handrails shall be provided when the stair width exceeds 2.2 m (87 in.). Mount handrails at a height between 30 in. and 44 in..</p> <p>Install Illuminated exit signs at entrances to exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of the path of travel.</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>A hot work permit system program shall be enacted for all RMG facilities in accordance with NFPA 51B.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must 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. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m² (500 ft²). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.). Maintain electrical systems in good working order and keep free of lint buildup to reduce the potential for ignition. This includes cleaning inside junction boxes, buses, trays, tunnels, etc.</p>
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	All dirt, debris, lint, water, oil, and improperly stored materials should be removed immediately from the substation room.
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>Generator frame earthing shall be two points separately. This is a violation of Bangladesh Electricity rules 1937, Clause 57 (2).</p> <p>Required equipment & safety signage should be posted within the room.</p> <p>Establish a routine maintenance and testing program for the emergency generator. The program shall be based on all of the following: (1) Manufacturer's recommendations (2) Manufacturer's Instruction manuals</p>
Mid Term (6 Weeks)	<p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system, including electrical equipment layout, distribution schedule, and grounding riser plan.</p> <p>Single cable entering should be in one point.</p> <p>All metal in the building should be connected to the building earthing/grounding system.</p> <p>Need to proper cover on cable trenches.</p> <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. 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> <p>Switchboards and/or distribution boards should be needed to install in compliant location.</p> <p>Provide capacity information labels on switchboards and distribution boards.</p>
Long Term (6 Months)	<p>Consult with a qualified electrical engineer to prepare the lighting protection system layout diagram and ensure the required numbers and appropriate spacing of vertical and horizontal conductors.</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</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>breakers, switches etc. and between each phase and earth. 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>
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