

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Standard Group Ltd.
Address of the Factory	: Civil Engineer's City-2, 4th-6th & 9th-10th Floor, Jarun Koanbari, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 28-May-14
Electrical assessment conducted by	: Alliance
Date of Electrical Inspection	: 22-May-14
BGMEA Membership No	: 3955

BASIC INFORMATION:

The present garment factory comprises of one eleven story Main Building and six Ancillary Buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: The main production building is a RCC regular frame Structure and The Ancillary structures in the premises are PEB single storied special type structure except the generator building. The generator building is a RCC regular frame (beam column supported) structure.
iii.	Floor System	: Beam supported slab in RCC building
iv.	Floor Area	: 536,887 sft.
v.	No. of Stories	: 1) Eleven story RCC main production building: Stories above grade: 11, Stories below grade: 0, 2) Six story RCC main production building: Stories above grade: 6, Stories below grade: 0, 3) Single story generator building: Stories above grade: 1, Stories below grade: 0, 4) Single story prefab utility shed: Stories above grade: 1, Stories below grade: 0, 5) Single story prefab fabric & chemical shed: Stories above grade: 1, Stories below grade: 0, 6) Single story child care with brick wall and CI shed: Stories above grade: 1, Stories below grade: 0, 7) Single story RCC security post: Stories above grade: 1, Stories below grade: 0, 8) Single story prefab security gate pass shed: Stories above grade: 1, Stories below grade: 0, (Six story building and eleven story building is connected by expansion joint)
vi.	Construction Year	: Factory personnel informed the dates of construction as follows: 1) Eleven story RCC main production building: Started in 2005 and finished in 2010, 2) Single story generator building: Finished in 2006, 3) Single story prefab utility shed: Finished in 2003, 4) Single story prefab fabric & chemical shed: Finished in 2010, 5) Single story child care with brick wall and CI shed: Finished in Feb 2014, 6) Single story RCC security post: Finished in 2013, 7) Single story prefab security gate pass shed: Finished in 2013.
vii.	Foundation Type	: Isolated footings & combined foundation
viii.	Design Drawings	: Partially Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RC materials with steel materials
xi.	Generator	: Ground floor in ancillary building

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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 loading limits as described on the Floor Loading Plans.

Mid Term (6 Weeks) :

- i. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- ii. 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
- iii. 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.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- v. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- 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. Floor load plans should be visibly posted on all levels of all buildings.
- 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 (6 Months) :

- i. Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector
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	<p>of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p> <p>Find out the cause of overheating and take proper action.</p>
Short Term (3 Weeks)	<p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p>
Mid Term (6 Weeks)	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Ensure the generator room properly rated and physically separated from the remainder of the building.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Switchboards and/or distribution boards.</p> <p>Provide two separate points earthing (grounding) for generator.</p> <p>Provide covers or blanks to conceal all live internal components of distribution boards.</p> <p>Ensure clear and permanent identification marks are painted in all distribution boards, switchboards, sub main boards and switches.</p> <p>Provide mechanical guards for electrical equipment where necessary.</p> <p>Provide adequate supports for electrical wiring and conduit.</p> <p>Ensure Signage indicating the prohibition of light fixtures without protective covers is installed at required locations.</p>
Long Term (6 Months)	<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>Provide adequate fire rating/ protection for substation room and make it separated from rest of the building.</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical wiring/cables are sized according to capacity of circuit breakers.</p> <p>Remove multi looping of wiring/cables at circuit breakers within distribution boards.</p> <p>Install switchboards and/or distribution boards in compliant locations so that operation is not hampered due to limited</p>

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	<p>access.</p> <p>Ensure panel boards are not installed above gas stoves or sinks or within 2.5m of any washing unit in washing rooms or laundries.</p> <p>Ensure switchboards and/or 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 following NFPA 70 section 408.54</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> <p>Provide dedicated neutral for each circuit.</p> <p>Provide wire/cable shaft for the whole building. Wiring and cables are arranged in shaft for ease of inspection and maintenance.</p> <p>Consult with an expert electrical engineer and prepare drawing for lightning protection including risk index and make sure your system is secured against lightning.</p> <p>Consult with an Expert electrical engineer to make sure your system have appropriate numbers of down conductors</p> <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>Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Ensure all electrical wiring/cable properly terminated at its point of termination.</p> <p>Ensure inspection, maintenance, and testing procedures of the emergency generator being completed and documented.</p>
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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.
Short Term (3 Weeks)	Remove all non-compliance doors on noted locations.

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<p>Mid Term (6 Weeks)</p>	<p>Develop an emergency evacuation plan which includes duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc. and all components required by the Alliance Standards. Communicate the plan to all employees. The evacuation plan shall include provisions to assist physically disabled persons. A list of all employees with physical disabilities shall be kept by the Fire Service Director.</p> <p>Post the occupant load 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 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>Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address the process of request and approval from authorities, necessary checks prior to approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedures, etc.</p>
<p>Long Term (6 Months)</p>	<p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by the Alliance and reviewed prior to start of work. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation according to 5.4.3.2. System design should also account for the two additional stories currently under construction.</p> <p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense. Until that time that monitoring can be set up, arrange a monitoring system using own central detection</p>

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	<p>system and personnel. 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 (such as a fire control room) to alert this person.</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer. All installation and design requirements outlined in BNBC Part 4 Chapter 4 shall be replaced by the requirements of NFPA 13. Pipe schedules shall not be used to size pipe. All systems shall be hydraulically calculated to meet the required NFPA 13 design requirements. The hydraulic design of the sprinkler system has to be pre-approved by CoE of Alliance.</p>
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