

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Crown Wears (Pvt) Ltd.
Address of the Factory	: Zamirdia, Habirbari Union, Bhaluka, Mymensingh, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 22-June-2013
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 15-May-2014
BGMEA Membership No	: 3790

BASIC INFORMATION:

The present garment factory comprises three main production buildings and one ancillary building. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: Building 1 is a cast-in-place reinforced concrete structure. The third story is currently under construction. The structural floor system generally consists of two-way 5" thick slabs, with beams (cast integrally with the slab) and columns. The building lateral force resisting system appears to be a beam-column moment frame system. Building 2 is a 2-story cast-in-place reinforced concrete structure. Seventy five percent of the roof is covered with a steel roof, creating a covered dining area. The structural floor system generally consists of two-way 7" thick slabs, with beams (cast integrally with the slab) and columns. The building lateral force resisting system appears to be a beam-column moment frame system. The one story generator shed is a steel roof supported on concrete and masonry column walls.
iii.	Floor System	: Beam supported slab
iv.	Floor Area	: 277,744 SF.
v.	No. of Stories	: Building 1 is 3 Stories (G+3); Building 2 is (2 stories (G+2); Building 3 is currently 2 stories but will be 4 stories when construction is completed.
vi.	Construction Year	: Buildings 1 & 2 were constructed in 2005-2007; The construction period for Building 3 is from 2012 - Present
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Available for main buildings but not available for ancillary building.
ix.	Soil investigation Report	: Unknown.
x.	Construction Materials	: Reinforced Concrete for RCC building.
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

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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.

Mid Term (6 Weeks) :

- i. The slab and beam areas of new construction which exhibit areas of unconsolidated concrete (i.e. rock pockets) shall be repaired under the direction of the engineer-of-record. Also, the safety requirements of Section 9 of the Alliance Standard shall be adhered to during all ongoing construction practices.
- ii. Have a qualified structural engineer prepare credible as-built documents for the generator shed based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- iii. "Have a qualified structural engineer complete an analytical evaluation of the structural impact of all mentioned additions."
- 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. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vi. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- vii. "Once plans have been posted, redistribute floor loads to comply with the Floor Loading Plans.
- viii. "Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3"
- ix. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
- x. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xi. 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."
- xii. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- xiii. "Repair the exterior façade system to prevent water intrusion."

Long Term (6 Months) :

- i. Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer. Or

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provide 2% slope on the exposed surface to prevent accumulation of water.

- ii. Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p> <p>Find out the cause of overheating, overloading, or signs of burning and take proper action.</p>
Short Term (3 Weeks)	<p>Provide capacity information labels (maximum current rating, no of circuit breakers etc.) for distribution boards.</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>
Mid Term (6 Weeks)	<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 or multi looping of wiring/cables at circuit breakers within switchboards and/or distribution boards.</p> <p>Provide dedicated neutral for each circuit.</p>
Long Term (6 Months)	<p>Provide an earthing/grounding system for all metal in the building.</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>

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Remove all impediments, obstructions, and stored materials from the means of egress. Keep all elements of the means of egress (exit path, aisles, stairs, corridors, etc.) continuously free and clear of all obstructions. Remove thresholds and replace with compliant ramps.</p> <p>Remove all storage underneath the cutting tables and similar obstructions.</p>
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Short Term (3 Weeks)	<p>Install additional egress stairs to accommodate the floor occupant load of 1216. Alternately, reduce the maximum number of occupants at any time to 673 persons.</p> <p>Remove all locking devices from all egress doors and means of egress components.</p>
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 Defense. Assign a person to contact the fire department in the event of fire alarm activation until this connection is set up. Locate an annunciator to alert this person in a constantly attended location (such as a fire control room).</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.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level in both English and Bengali.</p>
Long Term (6 Months)	<p>Separated the emergency stair from the building with 2-hour rated construction. The separation shall extend 10 feet from the emergency stair in each direction.</p> <p>Remove all existing gates and doors. Install fire doors at the stairs that are listed, approved, swinging, automatic-closing, in compatible fire rated frames with latching panic hardware.</p> <p>The calculated stair width has been reduced to the landing width. Alternately, stair capacity can be increased by reworking the stair landings to match the stair widths.</p> <p>Reroute exit discharge directly to the exterior. Construct rated egress corridors to connect stair discharge to an exterior discharge.</p> <p>Install listed firestop systems at every penetration through fire rated walls and assemblies.</p> <p>Install listed firestop systems at every penetration through floors.</p> <p>Install a Class III standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Install a listed, approved fire pump to supply the calculated demand of the required standpipe system, per NFPA 20.</p> <p>Add strobes for improved visual notification. Add smoke detectors. All systems, devices and installation shall comply with NFPA 72. Submit plans for approval.</p> <p>Remove gates and install required fire doors.</p> <p>Remove all existing gates and roll up doors. All doors shall be side-hinged doors that swing in the direction of egress.</p> <p>Protect all egress stairs with a shaft enclosure including 2-hour fire-rated construction. Install approved, listed, labeled fire rated doors that include the approved closing hardware</p>

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	<p>and sequencers. Install electromagnetic hold open devices connected to the fire alarm system or keep the doors normally closed.</p> <p>Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections 3.4.2 and 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide handrails on both sides of each stairway. Mount handrails at a height between 30 in. and 44 in.</p> <p>Provide continuously illuminated exit signs. Signs shall be placed at all required exits and along egress paths, especially where there is a change in direction for the path of travel.</p> <p>Install emergency lighting for all paths of egress. Illumination needs to be a minimum of 10 lux for all corridors, exit doors and stairways. Illumination for aisles needs to be a minimum of 2.5 lux.</p> <p>Implement a hot work permit program. Comply with the requirements of NFPA 51B.</p>
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