

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Columbia Garments Ltd.
Address of the Factory	: Vogra, Chandana, Gazipur Sadar, Gazipur, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 1-March-2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 13-May-2014
BGMEA Membership No	: 704

BASIC INFORMATION:

The present garment factory comprises of 2-story factory building, a one story Generator Shed, a one story Effluent Treatment Plant and a 2-story Utility Building. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: The 2-story factory building is a steel framed structure with composite concrete and steel framed floor. The lateral force resisting system appears to be a beam-column moment frame. The Generator Shed building is a single story steel framed structure. The lateral force resisting system also appears to be a steel beam-column moment frame. The Effluent Treatment building is a cast-in-place concrete structure with a mild reinforced waffle slab roof. The lateral force resisting system appears to be a concrete beam-column moment frame system. The Utility building is a 2-story cast-in-place concrete structure with mild reinforced slab-beam floor system, and a steel framed roof.
iii.	Floor System	: The 2-story factory building is a steel framed structure with composite concrete and steel framed floor.
iv.	Floor Area	: Unknown
v.	No. of Stories	: Factory building is 2 stories tall.
vi.	Construction Year	: 2001
vii.	Foundation Type	: unknown.
viii.	Design Drawings	: Available but incomplete structural documentation.
ix.	Soil investigation Report	: unknown
x.	Construction Materials	: Reinforced Concrete for RCC building and steel for steel framed structure.
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)	:

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- 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)

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- i. 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
- ii. The capacity of the Level 1 floor structure in the main factory building to safely accommodate the racked material storage must be confirmed. The factory owner should obtain evidence from the building structural engineer of record that the floor was designed to safely accommodate these storage loads. Alternatively, the storage must be reduced to limit floor loads to the design capacity of the floors.
- iii. 2006 BNBC Part 6 Section 1.5. Compliance may be waived if the Factory Owner provides satisfactory evidence of a cyclone operations plan that includes full evacuation of the factory in advance of any approaching cyclone"
- iv. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- v. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- vi. Once floor loads plans are posted redistribute floor loads to comply with the Floor Loading Plans.
- vii. Structural documents, if available, should be made available for review
- 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.

Long Term (6 Months)

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- i. "Provide Certificates of Occupancy for review."
- ii. 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.

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The recommendations for Electrical Safety corrective actions are:

Immediate	Ensure switchboards and distribution boards free of dirt and debris.
Short Term (3 Weeks)	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Install distribution board in compliant locations so that operation is not hampered due to limited access.</p> <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>
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.</p> <p>As per BNBC section 2.11.5.4, ensure clear and permanent identification marks are painted in all distribution boards, switchboards, sub main boards, and switches.</p> <p>Provide electrical insulation mats in front of distribution boards.</p> <p>Provide capacity information labels (maximum current rating, number of circuit breakers, etc.) for switchboards and/or distribution boards.</p>
Long Term (6 Months)	<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>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> <p>Consult with a qualified electrical engineer and ensure electrical wiring and cables are sized according to the capacity of the circuit breakers.</p>

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The recommendations for Fire Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Remove all storage from under the cutting tables.</p> <p>Remove all storage from egress paths and keep corridors completely clear.</p>
<p>Short Term (3 Weeks)</p>	<p>Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p>
<p>Mid Term (6 Weeks)</p>	<p>Create signs and post as required.</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 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 Defense 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 (such as a fire control room) to alert this person.</p> <p>Install egress maps at the few stair entrances where they are missing.</p> <p>Install signs on all floor landings.</p>
<p>Long Term (6 Months)</p>	<p>Install additional exit stairs to meet the occupant load of the 1st floor. Alternately, reduce the occupancy of the 1st floor to the calculated capacity of 787.</p> <p>Remove all existing doors, gates hardware tracks and devices. Install listed rated fire doors in all stair shafts and fire walls with required approved hardware.</p> <p>Reroute stair discharge to the exterior.</p> <p>Modify stairs or create exit pathways that discharge directly to the exterior.</p> <p>Install listed firestop systems at every penetration through fire rated walls and assemblies.</p> <p>Protect all egress stairs with a shaft enclosure including 2-hour fire-rated construction. Install fire rated doors with required hardware.</p> <p>Rework the alleys to create a level walking surface for the full width of the alley.</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>Install additional lighted exit signs so that a sign is visible from every location in the building.</p>

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	<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. The program shall comply with the requirements of NFPA 51B.</p> <p>Remove all storage from egress areas and keep corridors completely clear.</p>
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