

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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Name of the Factory	: <b>Wucho Fashion Ltd.</b>
Address of the Factory	: Baipail, Ashulia Road, Middle Gazirchat, Ashulia, Savar Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 16 Jun 2015
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 16 Jun 2015

### **BASIC INFORMATION:**

The present garment factory is comprises of 1 Building. The following general information was noted:

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|-------|---------------------------|--|
| i.    | Building Usage Type       | : Garments Factory.                        |
| ii.   | Structural System         | : Flat slab structure with peripheral beam |
| iii.  | Floor System              | : Flat slab structure with peripheral beam |
| iv.   | Floor Area                | : 34,000 SF.                               |
| v.    | No. of Stories            | : Two storied RCC Building                 |
| vi.   | Construction Year         | : 2007                                     |
| vii.  | Foundation Type           | : Not Available                            |
| viii. | Design Drawings           | : Available.                               |
| ix.   | Soil investigation Report | : Available                                |
| x.    | Construction Materials    | : RCC (brick 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 loading limits as described on the Floor Loading Plans

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Mid Term (6 Weeks)

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- i. Engage a qualified structural engineer to confirm structural performance of the structure via a Detailed Engineering Assessment. This assessment should be performed immediately. Live load should be immediately restricted to 20 psf on all levels of all portions of the building.
- ii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- iii. 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.
- iv. Confirm steel reinforcing configuration (number and size of bars) within all columns at lowest level of the building via additional ferro-scanning and destructive testing as described in the Alliance Assessment Protocols section 3.D.
- v. 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.
- vi. 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.
- vii. 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.
- viii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- ix. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- x. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
- xi. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- xii. 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 the building.
- xiii. 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. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.

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- ii. Repair the exterior façade system to prevent water intrusion.
- iii. 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. Alternatively, provide a 2% slope on the exposed surface to prevent accumulation of water
- iv. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same

### The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out the cause of overheating and take proper action.</p> <p>Ensure the generator room clean and free of dirt, debris, and improperly stored materials.</p>
Short Term (3 Weeks)	<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>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>
Mid Term (6 Weeks)	<p>Connect all metal in the building to the building grounding system such as metal rebar in concrete, metal frame of building or metal water pipe.</p> <p>Have a qualified Electrical Engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Remove multi looping of wiring/cables at circuit breakers within switchboards and/or distribution boards.</p>
Long Term (6 Months)	<p>Complete thermo graphic scans at least on a three year cycle.</p> <p>Thermo graphic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems &amp; Rotating Equipment and NFPA70B or a comparable standard.</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>

### The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables in accordance with Alliance Standard Section 13.7.2.
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Short Term (3 Weeks)	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.
Mid Term (6 Weeks)	<p>Implement training programs and document in accordance with the Alliance Safety Training Curriculum.</p> <p>Develop an emergency evacuation plan in accordance with the Alliance Standard and communicate the plan to all employees.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is verified at least once per year. If battery-operated signs are used, these signs 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 all egress lighting is verified at least once per year. If battery-operated lights are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lights shall be provided for a minimum 30 min once per year.</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>Install signage adjacent to each stair door indicating the stair name and the floor level in both English and Bengali.</p> <p>Complete Fire Department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance Standard Section 13.1.1(2).</p> <p>Apply to the proper authority and keep all the licenses and permits up to date.</p> <p>Apply to appropriate authority in an expeditious manner for issuance of the Certificates of Occupancy for each building and ancillary structure according to building use.</p>
Long Term (6 Months)	<p>Provide fire-resistive rated opening or 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 opening protectives or penetration systems.</p> <p>Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Sections 4.5 and 4.6.</p> <p>Consult a qualified fire protection engineer to design the required rated construction barrier and opening protection.</p> <p>Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. Connect devices to an automatic fire alarm and detection system for</p>

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	<p>the facility. All fire alarm installations or modifications shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Provide training and certification for the required number of people (25% of total workers) in fire fighting, first aid, and rescue training by an appropriate authority in accordance with the Alliance Safety Training Curriculum.</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 door assemblies (door and frame) with latching panic hardware.</p> <p>Provide rated exit passageway i.e. protected path of egress from stair to the public way. The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served.</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 door assemblies (door and frame) with latching panic hardware.</p> <p>Route exits directly to the exterior or provide an exit passageway in accordance with Alliance Standard Section 6.15 or an Egress Court in accordance with Alliance Standard Section 6.17.2 for non-compliant arrangements. Consult a qualified fire protection engineer to design and/or approve the required exit passageway or egress court.</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>Provide an emergency power source (battery back-up or connection to emergency power system) to provide compliant illumination of exit signs.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers and prepare proper documentation. Program must comply with NFPA 10.</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 new handrail at a height consistent with existing height (between 30 in. and 44 in).</p> <p>Provide continuously illuminated exit signs per Alliance Standard Section 6.11. 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>Provide parapets or guards with a minimum height of 1067 mm (42 in.) for all occupiable roof areas in accordance with Alliance Standard Section 6.12.</p> <p>Create a Fire Safety Director position and fill the position</p>
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	<p>with an individual that has sufficient training to be able to carry out the required duties in accordance with Alliance Standard Section 13.1.</p> <p>Provide continuously illuminated exit signs at all required exits and along egress paths, especially where path has a change of direction. Exit signs may be illuminated either by lamps exterior to the sign or contained within the sign. 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 0.2 cd/m<sup>2</sup> may also be used.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</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> <p>Establish an inspection, testing, and maintenance program for the existing standpipe system. Program must comply with NFPA 25.</p>
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