

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Southern Services Ltd.
Address of the Factory	: Doctorbari, Zirabo, Ashulia, Savar Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 2-Jun-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 2-Jun-14

BASIC INFORMATION:

i. Building Usage Type	: Garments Factory.
ii. Structural System	: Building #1: Concrete slab, steel beam and column frame system with individual spread footing foundation system. Building #2: Steel angle roof truss supported by concrete columns and covered with corrugated roof sheathing. Foundation system is individual spread footings. Building #3: Concrete slabs, beam and column frame system with individual spread footing foundation system.
iii. Floor System	: Concrete slab
iv. Floor Area	: 3,400 SF.
v. No. of Stories	: Single storied Prefab Building, 2 Storied Prefab Building, 3 Storied RCC Building and others are single storied building.
vi. Construction Year	: Building #1: 2009, Building #2: 2013, Building #3: 2013
vii. Foundation Type	: individual spread footings.
viii. Design Drawings	: Not 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.

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- 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. Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- 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. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
- 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. This should be completed for all buildings.
- vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements constructed with MCAC.
- viii. 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% roof slope and drains with downspouts at low points to prevent water retention.
- ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- x. 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.
- xi. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xii. "Provide Certificates of Occupancy for review."

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Long Term (6 months) :

- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.

The recommendations for Fire Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Keep all means of egress (Exit path, Aisles, Stair ways, Corridor etc.) continuously free and clear of all obstructions as per Alliance Standard Part 6 Section 6.3.8 & Section 6.3.9.</p> <p>Remove all combustibles materials stored underneath the cutting tables at the noted locations as per Alliance Standard Part 13 Section 13.7.2.</p>
<p>Short Term (3 Weeks)</p>	<p>Remove all stored materials from the stairwells at the noted locations.</p> <p>Remove all hasps, locks, slide bolts or other locking devices at the noted locations as per Alliance Standards Part 6 Section 6.8.</p>
<p>Mid Term (6 Weeks)</p>	<p>Install an automatic fire alarm and detection system for the facility. System shall comply with the Alliance Standard and NFPA 72. Consult a qualified fire protection engineer and/or authorized fire alarm company to design and install the system.</p> <p>Arrange sufficient programs for fire fighting, first aid, and rescue training and prepare proper documentations and keep evidence for Alliance review as per Alliance Standards Part 13. Train-up sufficient number (25 %) of worker for fire fighting and emergency purposes. Also take feedback from the worker for their better understanding.</p> <p>Install a new automatic fire alarm and detection system. Once installed, 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 Defence can be set</p>

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	<p>up, a person trained to contact the Fire Service and Civil Defence 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. Assign a person to contact with the fire department in the event of fire alarm activation.</p> <p>Provide the occupant load signage for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space as per Alliance Standards Part 6 Section 6.4.4.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year as per Alliance Standard Part 10 Section 10.12. 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 an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees as per Alliance Standards Part 13 Section 13.1.</p> <p>Post emergency egress maps at the entrance to each exit stair or main point of egress as per Alliance Standards Part 13 Section 13.4 Evacuation Plan.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense as per Alliance Standards Part 13 Section 13.1.</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> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations as per Alliance Standard Part 6 Section 6.9.</p>
Long Term (6 Months)	Provide proper aisles marking (clear width minimum 36 in.) and keep aisles free of storage as per Alliance Standard part

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	<p>6 section 6.5 egress width. The path of egress travel along a means of egress shall not be interrupted by any obstruction. The capacity of the means of egress shall not be reduced along the path of travel.</p> <p>Provide a fire barrier for interior exit stairway up to exit discharge.</p> <p>Provide 2 hr. (1 hr if less than 3 story) fire-resistive rated construction barriers at exit enclosures. Provide 1.5 hour (1 hr if less than 3 stories) rated opening protection (fire door and window, penetration sill) in all openings which are connected to stair case. Consult a qualified fire protection engineer to design the required rated construction barriers as per Alliance Standards- 4.5.4.1, 4.6, 4.5.7 Shafts. 4.5.7.1 & BNBC Part 4 Section 2.5.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Provide 2 hr. rated construction barrier and 1.5 hr rated opening protection for generator and transformer room. Provide 1 hr. rated construction barrier and 0.75 hour rated opening protection for boiler room. Consult a qualified fire protection engineer to design the required rated construction barrier as per Alliance Standards- 3.4.2.1.3, 3.4.2.1.4 & BNBC Part 4 Section 2.5.</p> <p>Provide pull stations/alarm call point at each egress points, smoke detectors in air handling equipment, visual and audible devices spaced appropriately based on occupancy type. Reference NFPA 72.</p> <p>Provide appropriate fire rated enclosure for exits directly to the exterior in accordance with Alliance Standard Section 6.15 and 6.17. Consult a qualified fire protection engineer to design and/or approve the required exit passageway or egress court.</p> <p>Provide side-hinged swinging type doors in all means of egress as per Alliance Standards Part 6 Section 6.8.</p>
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	<p>Provide fire-resistive rated construction barriers between hazard types as per Alliance Standards- 3.4.2.1.5 and BNBC Part 4. Provide 1 hr. rated construction barrier and opening protection for mentioned store room. Seal all the ventilation openings of the warehouses and accessories store or provide the appropriate fire rated opening protection. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install appropriate means of illumination at the noted locations. 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 luminescence of 0.2cd/m², may also be used.</p> <p>Develop a testing and maintenance program that ensures the operation of all egress lights is verified at least once per year as per Alliance Standards Part 10 Section 10.12. 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 90 min once per year.</p> <p>Provide an emergency power source, either by battery back up or by connecting to the emergency power system, for illuminated exit signs as per Alliance Standards Part 6 Section 6.11.</p> <p>Although the factory may not regularly conduct any hot work operations, it is expected that contractors conducting construction or other work on the building may from time to time conduct hot work on the premises. Therefore, it would be good practice for the factory to develop a written hot work permit program. The program must comply with the requirements of NFPA 51B. Develop a maintenance and contractor safety policy that includes procedures for conducting hot work (e.g. welding). All hot work should be conducted with a proper permit and precautions must be available in case of fire (e.g. fire watch, fire extinguisher, etc.)</p> <p>Create a Fire Safety Director position and fill the position</p>
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	<p>with an individual that has had sufficient training to be able to carry the required duties as per Alliance Standards Part 13 Section 13.1.</p> <p>Establish written corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall, ceiling, supply and return air ventilation systems as per Alliance Standards Part 13 Section 13.6. Promptly reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and rescheduling.</p>
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The recommendations for Electrical Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Find out the cause of overheating and overloading and take proper action.</p> <p>Clear & Permanent identification marks are printed in all DBs, Switchboards, Sub-main boards & switches as necessary.</p>
<p>Short Term (3 Weeks)</p>	<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>Light fixtures without protective covers (otherwise known as naked lights) should not be allowed in storage areas and other areas.</p> <p>All cable trenches should be covered by non inflammable materials.</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.</p> <p>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>Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions.</p> <p>Need to identify each cable and label for which load/equipment it is connected to.</p>

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<p>Mid Term (6 Weeks)</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>Electrical wiring/cables should be sized according to capacity of circuit breakers.</p> <p>Provide fire-resistive rated construction barriers between hazard types. Provide 2 hr. rated construction barrier and 1.5 hr rated opening protection for generator and transformer room.</p> <p>Need to connect single cable in single port by proper size of cable lug.</p> <p>All distribution boards should installed in suitable location for operation and maintenance.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBG for required number of electrodes.</p>
<p>Long Term (6 Months)</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>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>Alliance Standards Part 10 Section 10.13.8 Electrical Inspections</p>