

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ANGSUK LTD..
Address of the Factory	: AKH Tower, 133-134, Hemayetpur, Savar,Dhaka.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 12-Mar-14
Fire & Electrical assessment conducted by:	Alliance
Date of Fire Inspection	: 12-Mar-14
Date of Electrical Inspection	: 12-Mar-14

BASIC INFORMATION:

The present garment factory is a RCC building. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: Beam Column Frame systems.
iii.	Floor System	: Beam Supported slab.
iv.	Floor Area	: 260000 sft.[Total]
v.	No. of Stories	: 10 storied building + 1 Basement floor
vi.	Construction Year	: 2006
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete (Stone chips).
xi.	Generator	: Unknown

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. 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.
- ii. 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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Mid Term (6 Weeks)

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- i. Engage qualified structural engineer to conduct a detailed engineering assessment (DEA) of building within 6 weeks. DEA should include assessment of the strength of the concrete and quantity of the steel in the columns. Concrete strength shall be assessed by taking at least 4 nos. of 4 inch diameter cores from the area of concern. If cores are to be taken from column, it is advisable to take it from an upper level where the stresses are low (for practical reasons 3 inch cores may be taken from columns).
- ii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads such as storage of materials, water tanks, and transmission tower. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
- iii. 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. It should be displayed in each section of the floor (particularly for the storage area it is very important).
- iv. The effect of this tower on the building needs to be assessed through a detailed analysis (to be performed by a QSEC appointed by the Factory Owner). Adequately anchor and brace all non-structural elements noted above to resist earthquake forces to comply with the BNBC and Alliance Standard.
- v. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- vi. Post load plans in each floor as per Alliance Standard Sections 8.10 and 8.20.5.3.
- vii. Provide signage or the appropriate markings at all areas used for storage such as ground floor storage area, 3rd Floor NE storage area, and 9th Floor Storage) to indicate the acceptable loading limits detailed in the Load Plan.

Long Term (6 Months)

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- i. Necessary remedial action subjected to detail engineering assessment is recommended.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Storage underneath the cutting tables shall be kept clear of combustibles at all time.
Short Term (3 Weeks)	Remove all hasps and locking devices. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.

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	<p>Flammable chemicals should be stored per BNBC Part 3 Section 2.1.13</p>
Mid Term (6 Weeks)	<p>Post maximum occupant load for all areas (near exit)</p> <p>Install signage adjacent to each stair door indicating the stair name (designate each stair with a unique name/ID) and the floor level at the noted locations.</p>
Long Term (6 Months)	<p>Remove all roll down doors at and within the exit stairs and along all portions of the means of egress. Replace with side hinged swinging type doors per Alliance Standards Part 6 Section 6.8 Doors and Gates.</p> <p>Factory should either:</p> <ol style="list-style-type: none"> 1) Appropriately seal the floor to floor penetrations with appropriate materials to meet fire rating of floors. 2) Convert the room into a 2- hour fire rated shaft by installing fire rated door assembly. Shaft must extend from top to bottom of building. <p>Provide fire-resistive rated construction barriers at exit enclosures. Provide minimum 1.5-hr fire rated doors and seal all unprotected openings (e.g. windows) to separate the exit stairs from work areas and other building spaces on all floor levels. Ensure that the fire doors are self-closing and positive latching and that they are provided with fire exit (panic) hardware where serving production floors. If fire doors are required to be held open for functional reasons, provide automatic-closing devices tied to the fire alarm system. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Existing pump must be evaluated against requirements of NFPA 20 by a qualified fire engineer. Any deficiencies must then be rectified based on advise of engineer. All evaluations should be fully documented. All valves controlling fire pumps systems shall be electrically supervised by fire alarm system control unit.</p>

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	<p>Install automatic fire alarm system with sufficient smoke/heat detectors as per NFPA 72. Automatic detectors should be tied into the fire alarm system. Alarm system should initiate occupant notification upon activation of detectors in addition to the manual fire alarm stations. All fire alarm installations shall be submitted for review by the Alliance for review prior to commencement of installation.</p> <p>Interior exit stairways and ramps shall terminate at an exit discharge except where terminating at an exit passageway is constructed to meet the same rating requirement as the exit that is being served and shall not be less than 1 hr fire-resistance rated construction, therefore a fire rated exit passageway would need to be created. (NOTE: if sprinklers are installed as noted above, this installation will not be necessary per exemption of code)</p> <p>Interior exit stairways and ramps shall terminate at an exit discharge except where terminating at an exit passageway is constructed to meet the same rating requirement as the exit that is being served and shall not be less than 1 hr fire-resistance rated construction, therefore a fire rated exit passageway would need to be created. (NOTE: if sprinklers are installed as noted above, this installation will not be necessary per exemption of code)</p> <p>During installation of fire rated door assemblies assure that every door in a stair enclosure serving more than 4 stories is provided with re-entry unless it meets the requirements of Alliance Standards Part 6 Section 6.8.3.1.</p> <p>Install emergency lighting at all paths of egress. Confirm through testing (light meter) or other certification that means of egress will have illumination of 10 lux for all corridors, exit doors, and stairways and no less than 30 min in the event of failure of normal lighting.</p> <p>Handrails shall be provided on both sides of each exit stairway and ramp. New handrails shall have a minimum height of 865 mm (34 in.) and a maximum height of 965 mm (38 in.) as measured from the leading edge of the tread.</p>
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	<p>Fire department (Siamese) inlet connections should be installed to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet connections shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard. Signage for standpipe system is not in compliance with NFPA 14 Chapter 6 (e.g. no sign on Fire Department connection indicating STANDPIPE in 1 in lettering)</p> <p>Provide fire-resistive rated construction barriers between hazard types.</p> <p>Any room or space housing boilers or other heat producing equipment shall be separated from other occupancies by a minimum 1 hour construction.</p> <p>Rooms used for the housing of oil-filled transformers shall be in compliance with BNBC Part 4 Section D 15 for high-rise buildings. Oil filled transformers for non high-rise buildings shall be separated by a minimum 2 hour fire resistive rated construction.</p> <p>Rooms used for storage of combustible materials shall be separated from the surrounding occupancy with a minimum 1 hour construction.</p> <p>Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install Illuminated exit signs at path of egress where the continuation of egress is not obvious or there is a change in the direction of the path of travel (southwest stair, ground floor).</p> <p>The standpipe system needs to be evaluated for compliance with the design pressure and flow demands of NFPA 14 or BNBC as cited in 5.4.3. Standalone standpipe systems shall be confirmed to meet the local BNBC requirements with a minimum 450 kPa (65 psi) pressure at the hydraulically most remote hose connection or NFPA 14. This testing should be documented and available for review.</p> <p>Establish an inspection, maintenance, and testing program</p>
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	<p>for the fire pump. Program must comply with NFPA 25. Additionally, all valves controlling fire pumps shall be electrically supervised by a listed fire alarm system control unit.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer in accordance with NFPA 13</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	N/A
Short Term (3 Weeks)	<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>Install individual circuit breaker (MCCB) for every drawn circuit. The practice of “inserting multiple cable into single terminal of a breaker” must be avoided to avert loose connection. Consult a qualified electrical engineer to properly size the new overcurrent protection devices based on the capacity of the circuit. Ensure sufficient spare capacity is available within the distribution boards for the additional circuits.</p> <p>Complete further investigation to determine the cause of the overheating. Unexpected heats are typically caused by either loose connections or overloading. Consult a qualified electrical engineer to determine if the circuits are overloaded or have a qualified electrician tighten the loose terminations Establish a periodic inspection program (thermal-scan preferably) to identify the overloading of cables and unexpected heat rise.</p>

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Mid Term (6 Weeks)	<p>Clear & Permanent identification marks should be printed in all DBs, Switchboards, Sub-distribution boards & switches as necessary. BNBC- Part 8 section 2.11.5.4.</p> <p>Provide electrical insulation mats in front of distribution boards, substation room etc.</p> <p>Light fixtures without protective covers (otherwise known as naked lights) shall not be allowed in storage areas or in any area where the Inspector of the Factories Rules disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> <p>Install phase separators between terminal connections at the noted locations.</p>
Long Term (6 Months)	<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>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>