Name of the Factory : **Daeyu Bangladesh ltd**

Address of the Factory : 731, Bhannara, Mouchak, Kaliakoir Gazipur, Dhaka, Bangladesh

Present Status of the Factory : **Under Operation**

Structural assessment conducted by : Alliance

Date of Structural Inspection : 20 Mar 2014

Fire & Electrical assessment conducted by: Alliance

Date of Fire & Electrical Inspection : 20 Mar 2014

BASIC INFORMATION:

The present garment factory comprises of five buildings. One with RC beam column frame structure and four ancillary single storied shed. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: According to the structural design, it is RC slab with beam column frame structure.
iii.	Floor System	: Beam Supported slab
iv.	Floor Area	: 71,000 sft
v.	No. of Stories	: Main Building : 2 Ancillary Buildings: 1
vi.	Construction Year	: Main building, 1998 Ancillary buildings, 2013
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Not Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced Concrete (Brick aggregate with rebar).
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.

Mid Term: (6 Weeks) :

i. The management should obtain design report so that design load criteria can be inspected. Design report should include wind, seismic, and other load data.

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 prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.

iv. The compressive strength of columns, floor framing and shear walls using MCAC shall be investigated by an appropriate program of in-situ testing and representative destructive testing of core samples.

v. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate loads on mezzanine floor in yarn store. If provisions have not been made, have a qualified structural engineer develop a remediation plan.

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 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. Under guidance from a qualified structural engineer design and apply roof drainage system with proper slope.

ix. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3

x. Load plans (see other action item regarding preparation of plans) should be posted on each floor.

xi. 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 : NA

The recommendations for Fire Safety corrective actions:

Immediate (3 to 6 Days)	Remove all stored materials in the stairwells at the noted locations. Means of egress must be full free and clear from impediments, obstructions, and stored materials immediately.

Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Remove all combustibles stored underneath the cutting tables at the noted locations.
Mid Term (6 Weeks)	Occupancy certificate (mention occupancy type) for each building. Make aisles marking with proper direction and provide minimum clear width of 36 inch. Keep aisles free of obstruction. Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum. Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year. 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. Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities with record keeping .These fire drills need to be conducted under the direction of a Fire Safety Director. Post occupant loads for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space. Stair designation signs are provided at each floor entrance from the stair to the floor in English and Bengali. Signs indicate the name of the stair and the floor level. Signs are posted adjacent to the door. Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense.
Long Term (6 Months)	Shafts should be enclosed by fire rated walls/doors. Provide fire-resistive rated construction barriers at exit enclosures. Provide minimum 1.5-hr fire rated doors and seal all unprotected openings 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. Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614. Part II. Consult a qualified fire protection engineer to design the required rated construction barriers.

	An automatic fire alarm and detection system shall be provided throughout the building. Replace the single-station smoke alarms with automatic smoke detectors tied into the fire alarm system. Configure the fire alarm system to initiate occupant notification automatically upon activation of detectors in addition to the manual fire alarm stations. Initiating devices shall include either smoke or fire detection devices spaced in accordance with NFPA 72. Install automatic fire alarm and detection system (as noted elsewhere). Arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defense 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 to alert this person. Occupancies such as chemical storage and other storage should be separated by 1-hour fire rated construction. Move combustible materials to a new location meeting this requirement or construct a chemical storage room with sufficient fire rating (1-hr). Handrails shall be provided on both sides of each stairway. 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. Any room or space housing boilers or other heat producing equipment shall be separated from other occupancies by a minimum 1 hour construction. Install 1 hour fire rated door assembly as required. Develop a hot work permit program. The program must comply with the requirements of NFPA 51B Install or revise existing standpipe system at required locations designed by a qualified fire protection engineer. System should include rated fire pump and Class I standpipe hose connections (65 mm) in each stairwells at each floor level including occupiable roofs.

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Clean panel boards in generator room to remove dust and debris. Switchboards and/or distribution boards should be kept free of dirt and debris. Covers and doors should be kept closed to prevent entrance of dust. Institute maintenance schedule to ensure no or little dust collection on/in the panels. Summary of Maintenance records must be displayed in the panel and detailed maintenance record should be maintained in central office.
Short Term (3 Weeks)	Instruction board for first aid and artificial respiration should be installed in substation room. Reference NFPA 70E. Develop and implement an electrical safety program. Include key topes such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements.
Mid Term (6 Weeks)	Have a qualified electrical engineer develop as-built electrical drawings providing detailing key components of the electrical system. Provide electrical insulation mats in front of distribution boards. Switchboards and/or distribution boards must be labeled with capacity information labels or ratings. Retain an electrical engineer to determine the ratings and provide proper labels. The permanent label should identify the maximum voltage present in an item of equipment or within the enclosure.
Long Term (6 Months)	Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition and installed in accordance with the listed ratings. 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. 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.