Name of the Factory : **Ritzy Apparels**

Address of the Factory : 175/A/186, Sheikh Mujib Road, Agrabad, Double Mooring, Chittagong, Bangladesh

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

Structural assessment conducted by : Alliance

Date of Structural Inspection : 17 May 2014

Fire & Electrical assessment conducted by: Alliance

Date of Fire & Electrical Inspection : 17 May 2014

BASIC INFORMATION:

The present garment factory is a six storied building with beam-column frame system. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: RC flat plate
iii.	Floor System	: Flat plate
iv.	Floor Area	: Total area of building is 52675 sft.
v.	No. of Stories	: Six stories (G+5)
vi.	Construction Year	: Phase 1- December 2002 to April 2005 (Up to 3rd floor) Phase 2- March 2006 to June 2007 (4th and 5th floor) Phase 1- May 2014 to continuing (6th floor)
vii.	Foundation Type	: Individual footing.
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Columns- Stone aggregate with 40 grade rebar. Beams/Slabs- Brick aggregate with 40 grade rebar.
xi.	Generator	: Ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

The recommendations for Structural Safety corrective actions are:

Immediate : NA

Short Term : NA

Mid Term (6 Weeks):

i. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and have it posted in all required location.
ii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
iii. 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 (slabs and beams).

iv. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
v. 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.

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)	Provide fire-resistive rated construction barriers at exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr fire resistance rating. Install Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices spaced appropriately based on occupancy type in the factory main building and ancillary shed building. Reference NFPA 72. Install fire extinguishers for the Fabric store. Also install fire extinguishers at appropriate locations and heights based on hazard type per BNBC Part 4 and NFPA 10. Extinguishers shall be placed so that maximum travel distance to the nearest unit shall not exceed 30 m (100 ft.). Set up a Fire alarm and detection system central station monitoring service or direct connection to the Fire Service and Civil Defense. Assign a person at the facility to contact the fire department in the event of fire alarm activation. Provide side-hinged swinging type doors for all means of egress. Provide rated exit passageway (i.e., protected path of egress from the exit enclosure 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 fire-resistance rated, which in this case is 2-hour. Provide re-entry to floor levels from the stairwells in accordance with Allainace Standard Section 6.8.3. Provide fire-resistive rated construction barriers between hazard types. Minimum 1-hr fire-rated wall and door for boiler room and minimum 1-hr fire rated door for fabrics store room. Establish an inspection, testing, and maintenance program for all fire extinguishers in accordance with NFPA 10. 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 lux. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2 cd/m2, may also be used. Provide an emergency power source for illuminated exit signs, either by battery back-up or by connecting to the emergency power system. Install continuous illuminated exit sign at all exit points. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs which provide evenly

	illuminated letters having a minimum luminance of 0.2 cd/sq.-m may also be used. Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry out the required duties. Develop a hot work permit program. The program must comply with the requirements of NFPA 51B Providing handrails on the other side of each stairway. Separation of boiler rooms from the production floors with properly rated fire doors & protection of penetrations Need required number of people (trained and certified) in firefighting, first aid, and rescue training by the appropriate authority accordance with the Alliance Safety Training Curriculum. Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. Install required fire rated door assemblies at all exits. Provide required fire-resistive rated opening protection (Door, Window, Hatch Cover etc.) at openings and penetrations through fire rated walls and/or assemblies. Consult a qualified fire protection engineer to design the required rated opening protection. Provide parapets or guards for all occupiable roofs with a minimum height of 1067 mm (42 in.) as required by Alliance Standard Part 6 Section 6.12.2.4. A fire pump shall be provided for the building in accordance with the Alliance document Section 5.5 and NFPA 20. The water supply will also need to be upgraded to serve the required fire pump and standpipe systems. All new installations and design requirements outlined in BNBC Part 4 Chapter 4 for water supplies shall be replaced by the requirements of NFPA 20 (fire pumps), NFPA 22 (water tanks), and NFPA 24(underground water mains).The Owner shall contact the Alliance prior to conducting the final acceptance testing of the fire pump installation to allow the Alliance to witness this test. A final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance. 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.

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Ensure the generator room clean and free of dirt, debris, and improperly stored materials. Find out the cause of burning signs and consider replacement of conductor or equipment.
Short Term (3 Weeks)	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. Provide clearance of at least 1 m (39 in) in front of distribution board Provide two separate points earthing (grounding) provided for generator. Connect all metal in the building to the building earthing system such as metal rebar in concrete, metal frame of building, or metal water pipe.
Mid Term (6 Weeks)	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. Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm2 or greater. Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Switchboards and/or distribution boards. Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system. Remove multi looping of wiring and cables at circuit breakers within switchboards and distribution boards. Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.
Long Term (6 Months)	Ensure the generator room properly rated and physically separated from the remainder of the building. Provide Shielding or additional insulation for wiring exposed to external heat sources. Ensure overhead service conductors are covered by replacing the existing conductors or by covering the existing conductors with an approved material. Consulate a qualified electrical engineer before completing work.