Name of the Factory	: **ZAKMARS FASHION LIMITED**
Address of the Factory	: Block B, Plot A-4, Nasirabad, Industrial Area P.S. Bayzid Bostami, Chittagong,Bangladesh
Present Status of the Factory	: **Under Operation**
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 12 Apr 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 27 Mar 2014 & 05 Apr 2014

BASIC INFORMATION:

The present garment factory is comprises of a 2 Main Buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: Sheds are PEB roofing system braced steel structures. Foundation is spread footing type.RCC building-1: This building is a 3 storied concrete framed structure. The periphery columns and beams are RCC members. However, interior columns and beams are steel members. Foundation is isolated footing.
iii.	Floor System	: Building #1 is RC beam-column structure (From ground to level 4) and level 5 is RCC column structure with tin shed roof. Building #2 is also RC beam-column structure..
iv.	Floor Area	: 62,200 SF.
v.	No. of Stories	: Bldg #1 is five storied & Bldg #2 is four storied.
vi.	Construction Year	: Bldg #1: 2000, Bldg #2: 2004-2007, 2013
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RCC (brick 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. 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 load limits as described on the Floor Load Plans.

Mid Term (6 Weeks) :

i. Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.

ii. 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.

iii. Have a qualified structural engineer provide further analysis and testing of the noted settlement and crack issues. If required, a remediation plan shall also be provided by the qualified structural engineer.

iv. 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

v. 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.

vi. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

vii. Have a qualified structural engineer prepare credible as-built documents for both buildings based on the requirements of Part 8 Section 8.19 of the Alliance Standard.

viii. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures.

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.

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. Under guidance from a qualified structural engineer arrange geotechnical investigation at close vicinity of the structure and make the report available for review. This report should include the soil bearing capacity at the level of the base of the footings (8 feet below grade)..

Long Term (6 months) :

i. Repair the exterior façade system to prevent water intrusion.

ii. Roof should be sealed with protective coating under guidance of a qualified engineer

iii. Provide Certificates of Occupancy for review

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Find out the cause of overheating and take proper action.
Short Term (3 Weeks)	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. Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Keep records of completed training available on site. 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.
Mid Term (6 Weeks)	.Have a qualified Electrical Engineer develop an as-built single line diagram detailing key components and capacity of the electrical system. Need to separate the multiple and looping cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements. Provide dedicated neutral for each circuit.
Long Term (6 Months)	Complete thermo graphic scans at least on a three year cycle. Thermo graphic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA70B or a comparable standard. Have a qualified Electrical Engineer design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system.

The recommendations for Fire Safety corrective actions are:

Immediate	N/A
Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. According to section 6.8.2.2 doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions. According to

	section 6.8.2.3 doors may be provided with locking hardware from the ingress side provided that a panic bar is installed on any door with an occupant load exceeding 49 persons. The re-entry provisions of section 6.8.3 must be met.
Mid Term (6 Weeks)	Post the occupant load for every assembly and production floor in the facility in a conspicuous space near the main exit or exit access doorway for the space. Develop a testing and maintenance program that ensures the operation of all exist lights are 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. 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 to be tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year. Implement training programs and document in accordance with the Alliance Safety Training Curriculum. Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities. Fire drills shall be conducted under the direction of a Fire Safety Director. All other requirements for fire drills shall be conducted in accordance with BNBC Part 4 Appendix A. Develop an emergency evacuation plan which includes duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc. and all components required by the Alliance Standards and communicate the plan to all employees. The evacuation plan shall include provisions to assist physically disabled persons. A list of all employees with physical disabilities shall be kept by the Fire Service Director. Complete fire department pre-planning activities with the local Fire Service and Civil Defense. Install signage adjacent to each stair door indicating the stair name and the floor level in both English and Bengali. Apply to appropriate authority for issuance of occupancy certificate and pursue the matter to expedite. Get all the licenses and permits required from the proper issuing authority.
Long Term (6 Months)	Replace all collapsible, sliding, roll-down gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating. Get at least 25 percent worker trained and certified in fire fighting, first aid and rescue training by the proper

	authority. Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to 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. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation according to 5.4.3.2. System design should also account for the two additional stories currently under construction. Testing of the installation shall be conducted in accordance with NFPA 14 acceptance testing requirements. Documentation of all testing shall be submitted for review by the Alliance. Final inspection and testing of the installation shall be witnessed by the Alliance as per clause 5.4.3.3. Install outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers. Install a dedicated fire pump for the facility in accordance with NFPA 20 to supply the demands of the connected fire protection systems along with a stored source of water sufficient to meet the demands in accordance with NFPA 22. Fire pump installation is to be tested for final acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance as per clause 5.5.5. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance. The pump is to be connected to an alternative power source such as a generator. The generator is to be configured with an ATS (auto starter). Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. This includes electrical supervision of all valves controlling fire protection systems (sprinklers, fire pumps, water supplies, etc.). Connect devices to an automatic fire alarm and detection system for the facility. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation. 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 and shall not be less than 1 hr fire-resistance rated. Cover the openings in exit passageway by opening protectives. Or, close the openings if possible. Provide 1.5 hr rated fire door. Provide fire-resistive rated assemblies at the required exit access corridors. The rated assembly should be approved

	and designed by a qualified fire protection engineer. Exit access corridors serving an occupant load exceeding 30 are to be separated by walls having a fire resistance rating of 1 hr in accordance with 4.5 unless provided with automatic sprinkler protection throughout the story or building. 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. Install fire department connections where required and in compliance with the Standard. According to Alliance Standard 5.5.4 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. Install Illuminated exit signs at entrances to exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of the path of travel. Provide handrails on both sides of each stairway. Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.). Inspect, test and maintain fire extinguishers in accordance with NFPA 10 Chapter 7, which is required as per Alliance Standard Part 13 Section 13.10.3. Provide fire-resistive rated construction barriers between hazard types. Consult a qualified fire protection engineer to design the required rated construction barrier. Since the childcare is located on 1st floor, direct access to an exit enclosure shall be provided. Develop a hot work permit program. The program must comply with the requirements of NFPA 51B. Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry the required duties. The duties of the Fire Safety Director shall include the following: (1) Establish internal and external rally points and communicate to all employees in the building. (2) Fire department pre-planning. (3) Conduct safety inspections as outlined in Alliance standard 13.9. (4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance standard 13.10. 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.