Name of the Factory	: Brightex Apparels Ltd.
Address of the Factory	: 687, Al-Haj Nurl Amin Sowdagar Lane CDA, R/A, Road No 20, South Agrabad Chittagong Chittagong Bangladesh
Present Status of the Factory	: Under operation
Structural Assessment Conducted by	: ALLIANCE
Date of Structural Inspection	: 2014-04-03
Fire Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Fire Inspection	: 2015-07-31
Electrical Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Electrical Inspection	: 2015-07-31
BGMEA Membership No.	: 5375

BASIC INFORMATION:

The present Garment factory is a commercial building with beam column frame structural system. The following information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: Moment resisting frame system.
iii.	Floor System	: Beam Slab.
iv.	Floor Area	: Building#1=36200 sft Building#2=7000 sft Building#3=36000 sft
v.	No. of Stories	: Building#1=6storied, Building#2=4storied ,Building#3=5storied
vi.	Construction Year	: Building#1=2010-to till now, Building#2=1991- 1992, Building#3=1989
vii.	Foundation Type	: Bored cast in situ R.C.C.
viii.	Design Drawings	: Not found for building- 2 and 3. Building-1 has proper Documentation.
ix.	Soil Investigation Report	: Geotechnical Report were not available in building #2 and#3.
x.	Construction Materials	: Not mentioned.
xi.	Generator	: At ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate) :

1. Building# 2&3=Internal column and Edge column should be checked by qualified structural engineer.
2. A qualified structural engineer shall be engaged for remedial meager.

Mid Term (6-weeks) :

1. A qualified structural engineer shall be engaged for an analytical evaluation of the additional RC floors and their structural impact in Building# 2 and 3.
2. A qualified structural engineer shall be engaged for re-orientation of water tank.
3. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

4. Water tanks shall be adequately anchored and braced to resist earthquake force as per BNBC and Alliance Standard.

6. A program shall be developed 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 that it is enforced.

7. 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 sample testing of concrete compressive strength.

8. A qualified structural engineer shall be engaged 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.

9. Alliance Standard Part 9: Construction Practices and Safety shall be followed during all construction activities.

10. After prepared floor load plan redistribute floor loads to comply with the floor loading plans.

11. A qualified structural engineer shall be engaged to prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.

12. A qualified structural engineer shall be engaged to address all areas of needed maintenance by correcting the identified issues.

13. 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.

Long Term (6-months) :

1. Areas used for storage of work materials and work products shall be clearly marked indicating acceptable loading limits.

2. A representative shall be designated 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.

3. A qualified structural engineer shall be engaged to develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3

4. A qualified structural engineer shall be engaged to develop floor load plans and shall be posted including the information required in Section 8.20 of the Alliance Standard.

5. A qualified soil investigation firm shall be engaged to arrange geotechnical investigation at close vicinity of the structure and make the report available for review.
6. Certificates of occupancy shall be obtained from appropriate authority.

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• The minimum clear width of the pathway should be 0.9 meter • Rearrange the evacuation pathway to ensure the minimum width.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Replace all existing exit doors on evacuation routes, exit doors with side hinged type door, which swing outward and in the direction of travel. Swinging of the door should not constrict the width of the corridor / passage below 0.9 meter. • Remove all locking device from all egress door. All exit doors should be open-able from the side they serve without the use of a key. • Provide handrails on both side of each stairway with height of 0.9m measured from the nose of stair to the top of the handrail. • Doors in stair should be outward opening, side-swing, self-closing, non-lockable 1.5 hours fire rated doors in all stair way encloses. (Also require fire rated door at the floor occupied by other tenants) • Prepare proper plan and design for fire rated barrier for 2 hour fire rating separated corridor with 1.5 hrs fire rated door at ground floor. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated doors at generator room, which is located at adjacent to final evacuation route of Stair 02 without proper fire separation. • Prepare proper plan and design for 4 hours fire rated barriers with 2 hours fire rated door at 4th floor-boiler room, which is located at adjacent to Finishing section.

	• Produce design and plan for automatic detection system with automatic fire alarm and control panel.(Also needs to cover the floors occupied by other tenants) • Install Manual activation call point at all exit routes • Provide adequate nos. of smoke detectors to cover the whole factory building. • Prepare proper design and plan for dedicated fire pump with alternate backup power supply. • Prepare plan and design for dedicated water storage tank for firefighting operation as per RMG guideline. • Implement to a single fire safety management system with approvals from all tenants in the factory building. • Obtain the boiler license from the proper issuing authority.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• All stairway to have direct access to outside of the factory building, which requires 2 hour fire rated construction with 1.5 hrs fire rated door at ground floor for fire separated corridor. • Provide 4 hours fire rated barriers with 2 hours fire rated doors at generator room, which is located adjacent to final evacuation route of Stair 02 without proper fire separation. • Provide 4 hours fire rated barriers with 2 hours fire rated door 4th floor-boiler room, which is located at adjacent to Finishing section. • Install automatic detection system with automatic fire alarm and control panel. (Also needs to cover the floors occupied by other tenants). • Install dedicated fire pump with alternate backup power supply. • Stand pipe supplying first aid hose should have minimum pressure of 200 KPa. • Provide dedicated storage tank for firefighting operation

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should bea regular activity*	• All strands cables at exposed ends should be properly soldered / crimped and insulated.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Provide electrical graded rubber mats of adequate size in front of all distribution panels. • Install smoke detection in the generator room. • The electrical panels to be of metal case and should be marked with "Danger 415 Volts" and identified with proper phase marking and danger signage. • Select conductors and MCCB/MCB with adequate sizing without exceeding permissible current carrying capacity for insulation. • Avoid looping and bunch of cable at MCCB/MCB and bus bar

	terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • Provide separate earthing connection to electrical equipment's. Ensure that earth potential provided for all parts of equipment / installation (other than live parts) and that continuous earth connection is provided back to the main intake supply earth. • Provide adequate earthing to body and doors to all DBs. • Ensure that all electrical panels provided with proper and separate earth potential.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• 1. Provide updated SLD matching the existing installation at the factory. 2. SLD to indicate exact positions of all points of switch boxes and other outlets. 3. SLD to be approved by the engineer-in-charge. • 1. Provide updated Electrical layout drawing prepared after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. 2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. 3. As built drawing to be approved by the engineer-in-charge. • 1. Design to have proper segregation of different end used loads. 2. Wiring design to have separate and distinct sub-circuits for power and heating system. 3. All DBs to be placed conveniently. 4. Wiring to be neat, tidy and located near ceiling. • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • Seal the cable entry-exit points of DB's with non-flammable materials. In addition: Ensure all unused holes / openings in DBs to be blocked properly. • 1. Provide the ECC to meet minimum cross-sectional area as per table

	4.5. 2. Ensure that a connection between conductors / equipment's provided to durable electrical continuity and adequate mechanical strength and protection. 3. The continuous earth connection is provided back to the main intake supply earth. • Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.