

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: UNI GARMENTS LTD.
Address of the Factory	: 80, Nasirabad I/A, Chittagong, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 15-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 9-June-14
BGMEA Membership No	: 349

BASIC INFORMATION:

There are 05 building in the factory premises in which 01 is main production building and 4 are ancillary buildings. The buildings are named as: Four story main production building (four story-building 2 and two story building-1 connected by expansion joint. 2)Single story child care, prayer and generator building,3) Single story security and gas meter building,4) Single story wastage building,5) Single story oil-filled transformer building. (During structural inspection Two storied building was considered as Building-1 and four storied building was considered as Building-2). The following general information was noted:

- i. Building Usage Type : Garment Factory.
- ii. Structural System : Main Building 01: The building is two storied RCC moment resisting structure with infilled masonry wall. Exterior face of the masonry wall is of plaster and paint works. The main door of the building is a sliding glass in aluminum frame and the windows are of sliding glass in aluminum frame. Main Building 02: The building is four storied RCC moment resisting structure with infilled masonry wall. Exterior face of the masonry wall is of plaster and paint works. The main door of the building is a metal made sliding gate and the windows are of sliding glass in aluminum frame.
- iii. Floor System : RCC Moment resisting main building
- iv. Floor Area : 118754.00 sft
- v. No. of Stories : 4 storied and 2 storied main building
- vi. Construction Year : 1997~1999 (All buildings and sheds)
- vii. Foundation Type : Unknown
- viii. Design Drawings : Available.
- ix. Soil investigation Report : Available.
- x. Construction Materials : Reinforced MCAC frame
- 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 : N/A
- Short Term: (3 Weeks) :

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- 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 loading limits as described on the Floor Loading Plans.

Mid Term (6 Weeks)

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- i. Have a qualified structural engineer provide further testing and analysis of cracking in columns or walls and provide a remediation plan to correct noted issues.
- ii. "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.
- 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. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- v. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- vi. 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.
- vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- viii. Engage a qualified structural engineer to develop the required documents (i.e design report) to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20
- 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 and post it at all required locations.
- xi. Remove deteriorated expansion joint material and provide new approved material at the expansion joint.
- xii. 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 (6 Months)

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- i. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same..

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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<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 (1.6.3.7) Part 53 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> <p>Find out the cause of overheating, overloading, or signs of burning and take proper action. Consider replacement of equipment immediately if necessary.</p>
Short Term (3 Weeks)	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits</p> <p>.Provide two separate points of earthing (grounding) by distinct connections for each generator.</p>
Mid Term (6 Weeks)	<p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and/or distribution boards.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Separate the multiple cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements.</p> <p>Recommend engaging a licensed electrician or electrical contracting firm to rectify all non-conforming and unsafe electrical works throughout the entire complex.</p> <p>Ensure all electrical wiring/cable is properly terminated at its point of termination.</p>
Long Term (6 Months)	<p>Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements.</p> <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>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</p>

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	<p>Systems & Rotating Equipment and NFPA70B or a comparable standard.</p> <p>Establish an inspection testing, and maintenance program for the Uninterruptable Power Supply (UPS) and associated components. The program must based on the following:</p> <ol style="list-style-type: none"> (1) Manufacturer's recommendations (2) Manufacturer's instruction manuals (3) Minimum Requirements of NFPA 111 Chapter 8 (4) Minimum Requirements of NFPA 70B Chapter 28
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Keep means of egress continuously free and clear of all obstructions or impediments to full instant use in the case of fire or other emergency.</p>
Short Term (3 Weeks)	<p>Remove existing gates and doors in the means of egress including all locking devices. Install doors with approved panic hardware that cannot be locked in the direction of egress under any conditions.</p> <p>Remove all combustibles stored underneath the cutting tables.</p>
Mid Term (6 Weeks)	<p>Posted the occupant load for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Verify emergency power for egress lights at least once per year. If battery operated lights are used, test them monthly. Perform annual functional testing of battery powered lights for at least 30 minutes. Ref. 10.12.2.3.</p> <p>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 signs must be tested on a monthly basis. Functional testing of battery powered signs must be provided for a minimum of 90 min once per year.</p> <p>Develop an emergency evacuation plan which includes 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.</p> <p>"Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense as per Alliance Standards. Until that time that monitoring can be set up, arrange a monitoring system using factory's own central detection system and personnel. A person shall be assigned to contact the fire department in the event of fire alarm activation. An announcer shall be located in a constantly attended location (such as a fire control room) to</p>

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	<p>alert this person.</p> <p>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 requirements.</p> <p>Impart training in accordance with the Alliance Safety Training Curriculum and keep record with proper documentation.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Install required identification signs at the noted locations. Signage must comply with NFPA 14.</p> <p>Apply to CDA for issuance of occupancy certificate and pursue the matter to expedite.</p> <p>Apply to Bidyut Paridaptor for electrician license. Update fire license from Fire Service and Civil Defense for additional used area. Apply to CDA for approval of the unapproved ancillary buildings.</p>
<p>Long Term (6 Months)</p>	<p>Install a pump dedicated for fire protection following NFPA requirements. 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. Acceptance testing of the installation shall be in accordance with NFPA testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance.</p> <p>Install fire alarm system per NFPA 72. Include listed pull stations at all entrances to exits. Install strobes and horns for complete notification. Install area smoke detectors throughout E, G2 & J occupancies per Section 5.7.3. Provide adequate number of detectors based on coverage of a detector specified by manufacturer. Maximum possible coverage of a detector is 900 sft (if not confined by bays) as per NFPA 72. Each zone indicated in control panel shall cover 22500 sft area or less.</p> <p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit 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.</p> <p>Train and certify at least 25 percent of workers in fire fighting, first aid and rescue by the proper authority.</p> <p>Provide opening protectives at all windows and other openings on all the fire rated wall across the entire premises. Close these openings if they are not required.</p>

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	<p>Provide fire doors with required rating where needed.</p> <p>Install standpipe system at required locations. Standpipe system must comply with NFPA 14.</p> <p>Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosures. Install approved fire doors that are listed, permanently labeled, automatic-closing, in compatible fire-rated frames with latching hardware.</p> <p>Replace all collapsible and sliding doors in means of egress with side-hinged swinging type doors of proper width and rating.</p> <p>Construct an exit passageway to provide a protected egress path from the stairs to an exterior exit discharge. Walls, floors and ceilings of the passage shall be fire rated, equal to the stair.</p> <p>Remove existing aisle markings and draw new markings to fulfill the minimum aisle width requirement. Relocate the machines accordingly if necessary.</p> <p>Provide handrails on both sides of each stairway. Provide intermediate handrail when the stair width exceeds 2.2m (87 in). Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.).</p> <p>Install fire department connections where required in accordance with the Alliance Standard. 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.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>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.</p> <p>Install appropriate means of illumination at the noted locations. The means of egress paths shall be illuminated at all times the building is occupied. Illumination shall be a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum 2.5 lux.</p> <p>Fire extinguishers shall be inspected, tested, and maintained in accordance with NFPA requirements.</p> <p>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. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of</p>
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	<p>46.5 m2 (500 ft2). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.).</p> <p>Develop a NFPA-compliant hot-work permit program. In general, this program should address process of request and approval authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedure, duration and expiry of permit and reapproval procedure, etc.</p> <p>Install a pump dedicated for fire fighting or fire protection following NFPA requirements. Then establish required inspection, maintenance, and testing program for the fire pump.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with NFPA requirements.</p> <p>Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2cd/m2 may also be used.</p> <p>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</p> <p>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. (4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard." (4) Ensure all testing of fire protection equipment is conducted in accordance with Alliance Standard.</p>
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