

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: C & A FASHION LIMITED
Address of the Factory	: Plot 61, 62 BSCIC Industrial Estate, Kalurghat .
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 19-August-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 19-August-14
BGMEA Membership No	: 1373

BASIC INFORMATION:

There is one building in the factory premises. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC Moment resisting frame structure.
- iii. Floor System : Beam- slab.
- iv. Floor Area : 59,966 sft
- v. No. of Stories : Seven storied.
- vi. Construction Year : 2005~2007
- vii. Foundation Type : Pile Foundation.
- viii. Design Drawings : Not Available.
- ix. Soil investigation Report : Available
- x. Construction Materials : RCC brick chips.
- 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. Under guidance from a qualified structural engineer, conduct destructive core testing to validate the in-situ concrete compressive strength of structural elements.
- ii. 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.
- iii. 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

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do not at any time exceed the factory floor load limits as described on the Floor Load Plans.

Mid Term (6 Weeks)

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- i. Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.
- ii. Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with the Alliance Standard Part 8 Sections 8.19 and 8.20
- iii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- iv. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- v. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- vi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of all buildings.
- vii. 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. Provide a protective coating to all structural elements that are constructed with MCAC and exposed to rainfall or other sources of water. Have the protective coating approved by the Alliance or a qualified structural engineer. In the alternative, provide a 2% slope on the exposed surfaces to prevent accumulation of water.
- ii. Apply for issuance of the Certificates of Occupancy and pursue the matter to obtain the same.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Find out the cause of overheating, overloading, or signs of burning and take proper action.</p> <p>Need to clean and free the generator room from dirt, debris, and improperly stored materials.</p>
Short Term (3 Weeks)	<p>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.</p> <p>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.</p> <p>Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal</p>

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	<p>protective equipment requirements, etc.</p> <p>Provide generator's frame earthing two points separately by proper size of conductors and properly earthed by a sufficient act of earth electrode.</p> <p>Light fixtures without protective covers is installed at required locations. Signs shall be posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p>
Mid Term (6 Weeks)	<p>Provide earthing of all equipments at required locations by appropriate size of earthing cables and connect to the required number of earth electrodes. Refer to the BNBG for the required number of electrodes.</p> <p>Remove multi looping of wiring/cables at circuit breakers and connect a single cable to a single port by the proper size of cable lugs within switchboards and/or distribution boards.</p> <p>Provide a distance of minimum 1 m (39 inch) clear in front of each panel board for operation and maintenance works.</p> <p>Exhaust Discharge In order to avoid the effects of heat from external sources one of the following methods shall be used to protect wiring systems: 1. Shielding 2. Placing sufficiently far from the source of heat. 3. Selecting a system with due regard for the additional temperature rise which may occur; 4. Local reinforcement or substitution of insulating material.</p> <p>Consult a qualified electrical engineer to install transformer proper location and provide means of ventilation for the transformer room.</p> <p>Ensure clear & Permanent identification marks are printed in all DBs, Switchboards, Sub-main boards & switches as necessary.</p>
Long Term (6 Months)	<p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system.</p> <p>Buildings over six-story or 20 m (65 ft) high shall have a minimum of one vertices vertical shaft of 200 mm x 400 mm size for every 1500 m² floor areas. Free and easy access to the electrical shaft room in each floor must be available for operation, maintenance and emergency shut downs.</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 Systems & Rotating Equipment and NFPA70B or a comparable standard.</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</p>

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	before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches etc. and between each phase and earth.
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored under the cutting tables at the noted locations.
Short Term (3 Weeks)	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p> <p>Relocate daycare to the ground floor with direct access to an exit enclosure or a maximum travel distance of 9 m (30 ft.).</p>
Mid Term (6 Weeks)	<p>Install fire alarm and detection system so that it will cover the entire floor area in accordance with NFPA 72. A person trained to contact the Fire Service and Civil Defense in the event of fire alarm activation shall be provided. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person.</p> <p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees.</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 lights are tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Provide 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>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 minutes once</p>

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	<p>per year.</p> <p>Provide emergency egress maps for the all the mentioned locations at the entrance to each exit stair or main point of egress.</p> <p>Provide floor and stair designation signs at each floor entrance from the stair to the floor in English and Bengali.</p> <p>Install required identification signs at the noted locations. Signage and installation must comply with NFPA 14.</p> <p>Complete fire department per-planning activities with the local Fire Service and Civil Defense as per Alliance Standard section 13.</p> <p>Collect occupancy certificates for each of the buildings and shed from appropriate authority.</p>
<p>Long Term (6 Months)</p>	<ol style="list-style-type: none"> 1. Seal all the unprotected penetrations at the noted location with existing fire-rated construction. 2. Provide minimum 1.5 hrs fire rated door and replace all the openings with existing or 2 hour fire-rated construction wall. Also provide proper ventilation system as per BNBC Part-4 Section B2. <p>Replace the entire non-rated exit door with minimum 1.5 hrs fire-resistive rated door to protect the staircases (Staircase-1 & staircase-2). Keep fire doors closed at all times. If the factory wants to hold open the fire doors, install listed magnetic hold open devices and connect with the fire alarm control panel to close the doors automatically upon activation of the fire alarm. Also consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide side-hinged swing type doors in all means of egress.</p> <p>Install dedicated fire pump according to Alliance Standard and NFPA 20 with a minimum pressure of 450 kPa (65 psi) at the hydraulically most remote hose connection. Also install a stored water supply (tank) per NFPA 22 of adequate capacity to support demands.</p> <p>Provide unobstructed aisles with a minimum width of 0.9 m or 36 inches. Keep aisles free from any kind of obstructions.</p> <p>Modify or newly install the Standpipe System to meet the requirements of the required Standpipe System Class as per NFPA-14 (install class-I standpipe hose connection provisions for Fire Service & Civil defence and class-II hose connections for factory use at all required stair cases on each level). Also Consult a qualified fire protection engineer before modify or installing a new system.</p> <p>Provide minimum 2 hour fire rated wall and 1.5 hour fire rated door to separate the both staircases from the</p>

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	<p>production floor at ground floor.</p> <p>Install pull stations and call point at each egress point, smoke detectors in air handling equipment, visual and audible devices should be spaced appropriately based on occupancy type. Reference NFPA 72.</p> <p>Arrange sufficient training programs for fire fighting, first aid, and rescue training and prepare proper documents (trained certificated) and keep evidence for an Alliance review. Train-up sufficient number (25 %) of worker for fire fighting, rescue, first aid and emergency purposes.</p> <p>Provide minimum 2 hours fire rated construction wall to protect the staircase-2 from smoke, heat and fire.</p> <p>Provide minimum two exit stairs for the 4-storied building.</p> <ol style="list-style-type: none">1. Provide minimum 1.5 hrs fire-resistive rated door at the exit-entry point of main factory building to washing & drying shed on ground floor. The door will be opened from both the sides.2. Install Generators, HT switchgear, LT switchgears and others distribution boards in the appropriate area as per the Alliance standard.3. Install the transformer in the appropriate area as per the Alliance standard. <p>Provide illuminated exit signs with battery backup or emergency power continuous illumination.</p> <p>Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, re-entry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors.</p> <p>Protect the mentioned openings with required or existing fire rated construction.</p> <p>Install fire department connections where required and in compliance with the Alliance Standard Part 5 Section 5.5.4. Connections shall match the Fire Service and Civil Defense hose thread standard. It will allow fire department pumper vehicles to draw water from ground -level or underground water storage tanks. Also provide a provision to feed water from civil defense vehicle in the standpipe system.</p> <p>Install portable fire extinguishers throughout all new and existing facilities in accordance with BNBC Part 4 Section 4.10 and NFPA 10.</p> <p>Portable fire extinguishers are installed throughout the building at required locations and mounted at the correct height.</p>
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	<p>Replace the broken thread with a good thread.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers. The program must comply with the requirements of NFPA 10.</p> <p>Provide handrails on both sides of each stairway. Mount handrails at a height between 30 in. and 44 in.</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 (Alliance Standards Part 13 Section 13.1 Fire Safety Director).</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.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25.</p> <p>Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address the process of the request and approval of the authorities, necessary checks prior to approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of the permit and re-approval procedure, etc.</p> <p>Provide Exit signs with appropriate illumination levels and contrasting graphics in the ancillary 4-storied building and shed.</p> <p>Provide minimum 2 hour fire rated construction wall and 1.5 hour fire rated door for all the fabric store and accessories store of the main factory building and 4-storied ancillary building of the noted location.</p>
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