

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Ananta Apparels Ltd
Address of the Factory	: Ananta Plaza, 136 Elephant Road, Bata Signal, Dhanmondi, Dhaka
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 12-May-14
Fire & Electrical assessment conducted by:	Alliance
Date of Fire Inspection	: 22-Apr-13
Date of Electrical Inspection	: 10-Jun-14

BASIC INFORMATION:

The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : Beam Column Frame systems.
- iii. Floor System : Beam Supported slab.
- iv. Floor Area : 208,000 Sft (total)
- v. No. of Stories : B+G+14+SR
- vi. Construction Year : 1991
- vii. Foundation Type : Unknown
- viii. Design Drawings : Not Available
- ix. Soil investigation Report : Available
- x. Construction Materials : Reinforced Concrete
- 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. 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.
- 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.

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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 insitu concrete compressive strength of structural elements. This assessment should be completed within 6 weeks.
 - ii. 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
 - iii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
 - iv. 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. Reduce storage loads as required.
 - 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 based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
 - viii. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - ix. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
 - x. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
 - xi. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.
 - 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. Provide Certificates of Occupancy for review
 - ii. Necessary remedial measure subjected to Detail Engineering Assessment is recommended.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all tripping hazards created by thresholds and gate structures; level the floor at these locations.
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	<p>Eliminate all parking in front of the 3rd Stair that discharges to the street.</p> <p>Rearrange the exiting on Floor 13 so that the production workers do not have to egress through the storage area.</p>
Short Term (3 Weeks)	<p>Limit the number of occupants on the Roof level canteen to 266 based on the available width of the stairs. Limit the number of occupants on the sewing Floors 7 and 8 to 320 and Floors 9-11 to 295 until the 3rd Stair is extended to these floors or automatic sprinkler protection is provided throughout the building. Limit the number of occupants on Floor 6 to 431 based on the available width of the stairs.</p> <p>Remove all locking devices from all egress doors and means of egress components.</p>
Mid Term (6 Weeks)	<p>Install a new automatic fire alarm and detection system. Once installed, arrange for direct connection of the fire alarm and detection system to a central station monitoring service or the Fire Service and Civil Defence. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up, a person trained to contact the Fire Service and Civil Defence 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>Post the occupant load for all assembly and production floor areas in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Emergency power for means of egress illumination shall be 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.</p> <p>Provide Stair designation signs at each floor entrance from the stair to the floor in English and Bengali. Signs shall indicate the name of the stair and the floor level. Signs shall be posted adjacent to the door.</p>
Long Term (6 Months)	<p>Limit occupant loads as described elsewhere in this report.</p>

	<p>Create an opening in the 3 ft. concrete wall adjacent to the 2nd stair on the lower floors to provide a second means of egress from this work area.</p> <p>Limit occupant loads as described elsewhere in this report.</p> <p>Replace all non-compliant doors in the means of egress with side-hinged swinging type doors.</p> <p>Remove all storage from the Main Stair discharge lobby and provide automatic sprinkler protection in this area (first phase protection). Remove the large gate from the loading area to the ground. Revise/replace the gate at the Main Stair/loading dock exit discharge point along the front (south) side of the building so that the doors within the gates swing out in the direction of egress, have panic hardware to release the door, and remove the bottom rail at the door to eliminate the trip hazard. Remove all storage from the 2nd Stair discharge areas. Provide fire-rated doors to separate the gas meter room from the stair discharge at the 2nd Stair discharge.</p> <p>Remove the existing sliding gates that separate the production floors from the stairs and replace them with automatic-closing, side-swinging, fire-rated doors in fire rated frames with latching panic hardware. These doors should be a minimum 39 inches (1 m) wide with a total opening of at least half the existing stair width to maintain the flow of pedestrian traffic. Fill in the windows on the Main Stair with 2-hr. rated construction materials to reduce the exposure from the factory floors. Fill in the windows on the factory floors that create an angular exposure to the Main Stair with 2 hr. rated construction materials.</p> <p>Provide a water supply system capable of serving the hydraulic demand for the automatic sprinkler/standpipe system as described above. This will require the installation of a fire pump and tank sized to meet the demands.</p> <p>Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. Devices should be part of an automatic fire alarm and detection system for the facility.</p> <p>Remove all existing single-station smoke alarm devices and replace with automatic smoke detectors that activate the fire</p>
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	<p>alarm system</p> <p>Provide standpipe systems in each stairwell capable of meeting the fire protection demand for hose connections and automatic sprinkler protection. The standpipe should be sized with a minimum 6 in. supply pipe and 3 in. drain pipe. The system should be designed to provide a demand of 1,000 gpm at 100 psi at the top of the each standpipe riser (500 gpm for the first riser and 250 gpm for the second and third). This system should be installed as part of the first phase of the overall fire protection system.</p> <p>Separate all hazard areas including the transformer room from the remaining portions of the facility with 1-hour fire-rated construction. This includes providing rated fire doors at all openings into these hazard areas.</p> <p>Provide 2-hour fire resistive rating for all vertical shafts (primarily plumbing and electrical shafts). The protection means can either be at each floor penetration or by the provision of a fire rated shaft enclosure.</p> <p>Remove all gates in the path of egress where installed at stair step.</p> <p>Revise the top step of the 3rd Stair so that the difference in height between steps is less than 2 in.</p> <p>Separate all material storage areas from the remaining portions of the facility with 1-hour fire-rated construction. Separate all hazard areas including the transformer room, generator, and boiler areas from the remaining portions of the facility with 1-hour fire-rated construction. This includes providing rated fire doors at all openings into these hazard areas.</p> <p>Provide an egress ramp for the basement level that meets the 1 in 8 slope requirement. Alternately, remove all production out of the basement area.</p> <p>Provide handrails on both sides of each stairway. Extend handrails down the entire length of each run of the stairs. Mount handrails at a height between 30 in. and 44 in.</p> <p>Provide additional emergency lighting fixtures to provide a</p>
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	<p>minimum lighting level of 2.5 lux for all aisles in production and storage areas.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>Provide automatic sprinkler protection throughout the facility in accordance with NFPA 13. The installation of sprinkler protection should be conducted in phases. The first phase would be to protect all storage areas, the entire basement, and the ground floor Main Stair discharge area.</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Need to clean and free the Sub station room from dirt, debris, and improperly stored materials.</p>
Short Term (3 Weeks)	<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>Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker, size of panel and permitted no. of CB, maximum permitted load connection capacity, etc.</p> <p>Provide protective covers for every naked light installed in areas that are used for storage.</p> <p>Install individual circuit breaker (MCCB) for every drawn circuit. The practice of “inserting multiple cable into single terminal of a breaker” must be avoided to avert loose connection. Consult a qualified electrical engineer to properly size the new overcurrent protection devices based on the capacity of the circuit. Ensure sufficient spare capacity is available within the distribution boards for the additional circuits.</p>
Mid Term (6 Weeks)	<p>Clear & Permanent identification marks should be printed in all DBs, Switchboards, Sub-distribution boards & switches as necessary. BNBC- Part 8 section 2.11.5.4.</p> <p>Provide electrical insulation mats in front of distribution boards, substation room etc.</p> <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 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> <p>Install phase separators between terminal connections at the noted locations.</p>

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Long Term (6 Months)	<p>Have a qualified electrical engineer to design a lightning protection system according to the BNBC requirements. Have a licensed electrician to install the designed system.</p> <p>Ensure the generator room properly rated and physically separated from the remainder of the building.</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>
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