

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Smart Jeans Ltd
Address of the Factory	: 9/10, FIDC Road, Kalurghat Heavy I/A, Chittagong
Present Status of the Factory	: Under operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 2-Nov-2013
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 2-Nov-2013.
BGMEA Membership No	: 4404

BASIC INFORMATION:

There is one main building & three (3) Ancillary Buildings 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 Supported slab.
- iv. Floor Area : 93,000 sft
- v. No. of Stories : Main Building: Five storied. Ancillary-1: 3 storied, Ancillary-2: 2 storied, Ancillary-3: shed building.
- vi. Construction Year : 2004
- vii. Foundation Type : Mat Foundation.
- viii. Design Drawings : 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. 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) :

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

- i. 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
- ii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- iii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- iv. Have a qualified structural engineer develop Floor Loading Plans as per the requirements of Part 8
- v. 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>Ensure the generator room is clean and free of dirt, debris, and improperly stored materials.</p> <p>Ensure switchboards and distribution boards are free of dirt.</p> <p>Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room.</p> <p>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.</p>
Short Term (3 Weeks)	<p>Ensure proper ventilation for generator room.</p> <p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>Provide shielding or additional insulation for exposed wiring within 36 inches to external heat sources.</p> <p>Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Provide additional light fixtures at substation room to increase</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>illumination levels provided in the BNBC.</p> <p>Ensure generator room is properly illuminated with adequate number of lighting equipment.</p> <p>Provide covers for cables & electrical equipment where necessary.</p> <p>Install appropriate type and number of firefighting equipment according to fire class of the materials inside the generator room.</p>
Mid Term (6 Weeks)	<p>Provide earthing of equipment at required locations and connect to required number of electrodes.</p> <p>Connect all metal in the building to the building earthing/grounding system such as metal rebar in concrete, metal frame of building, or metal water pipe.</p> <p>Ensure emergency power switchboards, distribution boards, and circuits are permanently marked so they will be readily identified as a component of an emergency circuit or system.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical wiring and cables are sized according to capacity of circuit breakers.</p> <p>Ensure all switchboards and distribution boards are in compliant locations.</p> <p>Remove multi looping of cables at circuit breakers within switchboards.</p> <p>Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water.</p> <p>Complete an analysis/test on transformers to identify harmful substances. If it contains harmful substances, replace the transformer oil.</p> <p>Ensure the means of identification is obtained by separate color coding, marking tape, tagging, or other approved means.</p> <p>Provide covers to conceal all live internal components of switchboards and distribution boards.</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>Install security measures to ensure access to the substation is restricted.</p> <p>Provide two separate earthing (grounding) points for the generator.</p> <p>Install phase separators between terminal connections at the noted locations.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</p> <p>Complete an oil analysis on applicable transformers at appropriate</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>intervals based on voltage and power.</p> <p>Ensure inspection, maintenance, and testing procedures of the emergency generator are being completed and documented.</p>
Long Term (6 Months)	<p>Provide adequate fire rating for substation room and make it separated from rest of the building.</p> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Ensure switchboards and distribution boards provided with physical means to prevent the installation of more over current devices than that number for which the panel board was designed, rated, and listed.</p> <p>Provide grounding (earthing) for switchboards and distribution boards.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and distribution boards.</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 Systems & Rotating Equipment and NFPA 70B or a comparable standard.</p> <p>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.</p> <p>Provide adequate grounding (earthing) for transformer.</p>

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations as soon as possible.
Short Term (3 Weeks)	Remove all locking devices from all egress doors and means of egress components in accordance with Alliance Standard Section 6.8. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

<p>Mid Term (6 Weeks)</p>	<p>Arrange for direct connection of the fire alarm system to a central monitoring station or Fire Service and Civil Defense. 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 annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person.</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.</p> <p>Post emergency egress maps at the entrance to each exit stair or main point of egress as per Alliance Standards Part 13 Section 13.4 Evacuation Plan.</p> <p>Upon installation of compliant standpipe system, include required identification signs at the noted locations. Signage must comply with NFPA 14.</p> <p>Provide handrails on both sides of each stairway. Provide intermediate handrail when the stair width exceeds 2.2m (87 inch). Provide handrail of height between the range 865 mm (34 in.) and 965 mm (38 in.).</p> <p>Post the occupant loads for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations.</p>
<p>Long Term (6 Months)</p>	<p>Provide fire-resistive rated opening protection and walls for the lifts in accordance with Alliance Standard Sections 4.6. Consult a qualified fire protection engineer to design the required opening, walls or penetration systems.</p> <p>Remove existing gates and unrated doors at exit enclosures. Install approved fire rated doors that are listed, permanently labeled, automatic-closing, incompatible fire rated frames with latching hardware.</p> <p>Install automatic fire alarm system including a listed fire alarm control panel. Install smoke and heat detectors per NFPA 72. Automatic detectors should be tied into the fire alarm system. Alarm system should initiate occupant notification upon activation of detectors in addition to the manual fire alarm stations. Include listed pull stations at all entrances to exit stairs, and at all exits. Install strobes and horns for complete notification. Automatic area smoke detectors are required throughout G2 buildings per Section 5.7.3.6. All fire alarm installations shall be submitted for review by the Alliance for review prior to commencement of installation.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance.</p> <p>Install fire-resistive sealant products to provide the required degree of protection for penetrations in rated walls and assemblies in</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>accordance with the standard.</p> <p>Protect all egress stairs with a shaft enclosure including 2-hour fire-rated construction. Factory will need to install fire rated door assemblies at all exits (1.5 hour rating). Fire doors assemblies shall conform to NFPA 252, BS 476 Part 22, EN 1364-1, GB 12955-2008, or IS 3614. Part II. Doors must remain in closed position or be of self-closing type. 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.</p> <p>Install a fire pump dedicated for fire fighting or fire protection following the requirements of NFPA 20 as identified in Alliance Standard Section 5.5.1.</p> <p>Route exits directly to the exterior or provide an exit passageway in accordance with Alliance Standard Section 6.15 or an Egress Court in accordance with Alliance Standard Section 6.17.2 for non-compliant arrangements. Consult a qualified fire protection engineer to design and/or approve the required exit passageway or egress court.</p> <p>Fire pump installation is to be tested for final acceptance in presence of Alliance representative and a final inspection of the installation shall be conducted by the Alliance representative 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 24 testing requirements.</p> <p>Provide training and certification for the required number of people (25% of total workers) in fire fighting, first aid, and rescue training by an appropriate authority in accordance with the Alliance Safety Training Curriculum.</p> <p>Replace existing exit doors with side hinged swinging type doors per Alliance Standards Part 6 Section 6.8 Doors and Gates.</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>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>All penetrations through fire rated assemblies shall be protected/sealed with a listed through penetration fire stop system tested in accordance with ASTM E814. Confirmation should be provided that any materials used can conform to standard as per Alliance Standard Section 4.7 Penetrations..</p> <p>During installation of fire rated door assemblies assure that every door in a stair enclosure serving more than 5 stories is provided with re-entry unless it meets the requirements of Alliance Standards Part 6 Section 6.8.3.1.</p> <p>Upon installation of compliant standpipe system, fire department (Siamese) inlet connections should be installed to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet connections shall be provided to</p>
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>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. Signage for standpipe system is not in compliance with NFPA 14 Chapter 6.</p> <p>Provide an emergency power source (battery back-up or connection to emergency power system) for illuminated exit signs.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Table 4.4.1 of Alliance Standard or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B as per Alliance Standards Part 13 Section 13.4 Hot Work Permit and NFPA 51B.</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 as per 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. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m² (500 ft²). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.). As per Alliance Standards Part 13 Section 13.6 Housekeeping.</p> <p>Establish an inspection, testing, and maintenance program for the standpipe system. Program must comply with NFPA 25.</p> <p>Produce, establish and enforce a written policy and procedure for housekeeping to ensure scheduled cleaning of all floors, walls, ceilings, air ventilation systems and other building components. Ensure the timely removal of defective, waste and rubbish materials is included. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m² (500 ft²). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.).</p>
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