

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: DESH GARMENTS LIMITED
Address of the Factory	: 53/A, Kalurghat Heavy Industrial Area, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 16 Jun 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 14 May 2014

BASIC INFORMATION:

The present building is a single story Garments factory with beam-column frame system. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: RC beam column frame building
iii.	Floor System	: RC beam supported slab
iv.	Floor Area	: Building-GF:65000 sft and Ancillary: 5000 sft.
v.	No. of Stories	: Building- 01 story and Ancillary building-01 story
vi.	Construction Year	: 1980
vii.	Foundation Type	: Unknown
viii.	Design Drawings	: Not available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Reinforced concrete (Brick masonry infill between concrete structural elements.)
xi.	Generator	: Ground floor

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

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.

Mid Term: (6 Weeks) :

- i. 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.

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- ii. Have a qualified structural engineer confirm the live load capacity of the existing structural elements. Prior to further expansions of the building (vertical or horizontal), a qualified structural engineer should consider this existing capacity in determining whether the structure is capable of supporting the loads from the expansion. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- iii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- iv. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- v. 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.
- vi. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues. This should include removing the exposed portions of the vertical column reinforcing bars and coating any remaining exposed portions with a corrosion inhibitor.
- vii. Prior to any additional horizontal or vertical expansions of the building, have a qualified structural engineer assess the strength of the structural elements within the building constructed with MCAC. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.
- viii. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- ix. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the additions. Moreover, any further extension is completely prohibited without analyzing the structural impact of the expansion on the entire structure.
- x. Provide Certificates of Occupancy for review.
- xi. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- xiii. 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.

Long Term (6 Months)

: Under the guidance of a qualified structural engineer, remove deteriorated expansion joint material and provide new approved material at the expansion joint. The replacement expansion joint material should be able to accommodate building movement without causing structural distress.

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The recommendations for Fire Safety corrective actions are:

Immediate	NA
Short Term (3 Weeks)	Information on the location of designated smoking areas shall be posted on signs at the proper locations.
Mid Term (6 Weeks)	<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 in accordance with Alliance Standard Section 6.4.4.</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>Implement training programs in accordance with the Alliance Safety Training Curriculum.</p> <p>Develop a testing and maintenance program that ensures the emergency power for all egress lighting is tested at least once per year. If battery operated lights are used, these lights are tested on a monthly basis. Functional testing of battery powered lights is provided for a minimum 90 min once per year.</p> <p>Apply to appropriate authority in an expeditious manner for issuance of the Certificates of Occupancy for each building and ancillary structure was according to building use.</p> <p>Boiler License should be obtained and kept up-to-date.</p>
Long Term (6 Months)	<p>Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in).</p> <p>Install an automatic fire alarm and detection system for the facility. System shall comply with the Alliance Standard and NFPA 72. Consult a qualified fire protection engineer and/or authorized fire alarm company to design and install the system.</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. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Provide fire-resistive rated penetration protection for rated walls and assemblies in accordance with Alliance Standard Sections 4.7. Consult a qualified fire protection engineer to design the required penetration systems.</p> <p>Install fire extinguishers at locations and heights based on</p>

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	<p>hazard type per BNBC Part 4 and NFPA 10. Install fire extinguishers based on hazard type in accordance with BNBC Part 4 and NFPA 10.</p> <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 Defense as per Alliance Standard Part 5 Section 5.7.5 Monitoring. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defense can be set up, 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>Provide continuously illuminated exit signs at all required exits and along egress paths, especially where path has a change of direction. Exit signs may be illuminated either by lamps exterior to the sign or 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 0.2 cd/m² may also be used.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p>
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The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Find out the cause of overheating and consider replacement of conductors and equipment.
Short Term (3 Weeks)	<p>Provide two separate points earthing (grounding) provided for generator.</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> <p>Provide adequate cover on cable trench.</p> <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>

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Mid Term (6 Weeks)	<p>Provide a capacity information label which contains the current carrying capacity and size of main cable, rated capacity of circuit breaker and the busbar (with dimension). Display panel schedules posted on panels' door (inner side).</p> <p>Have a qualified electrical engineer develop an as-built single line diagram, detailing key components and the capacity of the electrical system.</p> <p>Provide capacity information labels for distribution boards.</p>
Long Term (6 Months)	<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>Ensure the generator room properly rated and physically separated from the remainder of the building.</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>Have a qualified electrical engineer; design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system. This is a violation of Section 2.9 of BNBC, 2006.</p>