

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Benchmark Apparels Ltd.
Address of the Factory	: Khoaznagar, Azimpara, Karnaphully, Chittagong, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 17-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 17-June-14
BGMEA Membership No	: 4758

BASIC INFORMATION:

There are 6 buildings in the factory premises out of which one is main production building and five are ancillary buildings. The buildings are named as: 1) Three story RCC main production building, 2) Single story child care building, 3) Single story generator shed, 4) Single story generator building, 5) Single story security building, 6) Single story pump building. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: Moment Resisting RCC Frame
iii.	Floor System	: Monolithic beam slab and regular framing
iv.	Floor Area	: 53521 sft
v.	No. of Stories	: 1) Three story RCC main production building, 2) Single story child care building, 3) Single story generator shed, 4) Single story generator building, 5) Single story security building, 6) Single story pump building
vi.	Construction Year	: 2006-2013
vii.	Foundation Type	: Foundation is isolated footing
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available.
x.	Construction Materials	: Reinforced Concrete & Steel
xi.	Generator	: Ground Level

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.

Mid Term (6 Weeks)

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- i. The uploaded FoS calculation shows that all columns are safe for existing three storied building but for proposed six storied building FoS for corner column is below acceptable limit (i.e. 1.86). For extending upto six storey (as per approval), the structure is needed to be evaluated by a qualified structural engineer to establish the proper remedial action for the corner column, which may include retrofitting. Assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.
 - ii. Engage a qualified structural engineer to provide additional investigation into the areas of cracking and provide a remediation plan if required.
 - iii. Have a qualified structural engineer prepare the design report.
 - iv. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - v. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
 - vi. 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 Sections 8.19 and 8.20.
 - vii. Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate these water tanks. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
 - viii. Have a qualified structural engineer confirm that the capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
 - ix. Engage a qualified structural engineer and assess the building against seismic and wind load conditions, and if there are any deficiencies, make the remediation accordingly.
 - x. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading and storm surge.
 - xi. Conduct a detailed structural assessment by a qualified structural engineer and carry out remedial action as necessary. As part of the detailed assessment outlined elsewhere, conduct destructive core testing to validate the in-situ concrete compressive strength of structural elements.
 - xii. Have a qualified structural engineer develop Floor Loading Plans as 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 and have them posted in all required locations. Floor load plans should be visibly posted on all levels of all buildings.
 - xiv. Have a qualified structural engineer prepare a load plan for each floor and have the floors marked for designating storage areas as per the developed load plan.
 - xv. Have the exterior façade repaired to ensure the prevention of dampness.

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- xvi. Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
 - xvii. Remove deteriorated expansion joint material and provide new approved material at the expansion joint.
 - xviii. Have a qualified structure engineer identify the locations where an expansion joint is needed and then have a remediation plan developed.
- Long Term (6 Months) :
- i. "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."
 - ii. Provide Certificates of Occupancy for review.
 - iii. Retrofitting as per DEA.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Investigate causes of overheating and repair and replace as required.
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Install proper ventilation for the generator room.</p> <p>Install proper identification for emergency power switchboards, distribution boards, and circuits.</p> <p>Consult with an expert fire protection engineer and make sure the generator room is fire rated as per Alliance Standard Sections 3.4.2.1.3 and 3.4.2.1.4.</p> <p>Provide capacity information labels (maximum current rating, number of circuit breakers, etc.) for distribution boards.</p> <p>Use conduit expansion fittings for conduit runs that span a building expansion joint.</p> <p>Install proper illumination in the generator room.</p> <p>Consult with an expert electrical engineer to determine the appropriate number of down conductors according to BNBC based on the building size. Make modifications as require to ensure that the building is secured against lightning.</p> <p>Consult with an expert electrical engineer to verify that air termination network vertical and horizontal conductors are appropriately spaced. Prepare a drawing for lightning protection, including a risk index, and make modifications as required to secure your system against lightning.</p> <p>Provide two separate points of earthing for the generator.</p>

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<p>Long Term (6 Months)</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> <p>Connect all metal in the building to the building earthing grounding system, such as metal rebar in concrete, the metal frame of the building or metal water pipes.</p> <p>Consult with a qualified electrical engineer and then replace undersized electrical wiring, with wiring sized according to the capacity of the circuit breakers.</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>Develop an electrical maintenance program that includes inspections and testing of the electrical systems. Reference NFPA 70 for example program requirements.</p> <p>Inspect electrical switchgear and panel boards on an annual basis to ensure that the equipment is in good working condition.</p> <p>Complete thermographic scans at least on a three year cycle. Thermographic scans shall be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA 70B, or a comparable standard.</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>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrances.</p> <p>Ensure switchboards and/or distribution boards are provided with physical means to prevent the installation of more over current devices than the number for which the panel board was designed, rated, and listed following NFPA 70 section 408.54.</p> <p>Consult with an expert electrical engineer to evaluate whether lightning protection ground terminals are bonded to the building or structure grounding and prepare a drawing for lightning protection, including a risk index. Perform required modifications to secure the system against lightning.</p> <p>Identify all wiring with separate color codings, marking tape, tagging, or other approved means.</p> <p>Install cable joints through porcelain/PVC connectors with PIB tape wound around the joint in respect of conductivity, insulation, and mechanical strength.</p>
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	
Short Term (3 Weeks)	
Mid Term (6 Weeks)	<p>Develop an emergency evacuation plan which includes the duties and responsibilities of various people/groups, interfacing between groups and the fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc., including 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>Post 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>Develop a testing and maintenance program that ensures the operation of all exit signs is verified at least once per year. If battery-operated signs are used, these lights shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum of 90 minutes, once per year.</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 Part 4 Appendix A.</p> <p>Apply to Bangladesh Energy Regulatory Commission for the BERC license, Bidyut Paridaptor for the electrician license, and CDA for approval of the unapproved ancillary buildings and shed.</p>
Long Term (6 Months)	<p>Provide 1 hour fire protective opening assemblies in 1 hour rated exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1 hour fire-resistance rating.</p> <p>Provide an automatic fire alarm and detection system as per the Alliance Standard. Pull stations at egress points, smoke detectors in required locations throughout the buildings, visual and audible devices must be spaced appropriately and directly connected to the fire alarm system for automatic activation based on the occupancy type in accordance with</p>

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	NFPA 72.
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