

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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Name of the Factory	: <b>Bando Fashion Ltd.</b>
Address of the Factory	: Bade Kalameshar KB Bazar, Gazipur, Dhaka, Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 28-May-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 19-June-14
BGMEA Membership No	: 3522

### **BASIC INFORMATION:**

There are five buildings in the factory premises, out of which one is the main production building and the other four are ancillary buildings. The buildings are named as follows: 1) Seven story RCC main production building 2) Four story office building, 3) Single story utility shed, 4) Single story Pump & wastage shed, 5) Single story security guard room. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: Moment-resisting frame
iii.	Floor System	: Monolithic slab beam system
iv.	Floor Area	: 201482 sft
v.	No. of Stories	: 1) Seven story RCC main production building 2) Four story office building 3) Single story utility shed 4) Single story Pump & wastage shed 5) Single story security guard room
vi.	Construction Year	: 1) Seven story RCC main production building with one roof top steel shed: Finished in 1996, 2) Four story office building: No information of construction date was found, 3) Single story utility shed: Finished in 2009, 4) Single story Pump & wastage shed: Start from April 2011 and finished in June 2011, 5) Single story security guard room: Finished in 1998.
vii.	Foundation Type	: The foundation consists of isolated and combined footings
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available.
x.	Construction Materials	: RCC & 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)	:

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- 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 is located onsite full time at the factory and is trained in calculating the operational load characteristics of the specific factory. The Factory Load Manager shall serve as an ongoing resource to RMG vendors and shall ensure that the factory operational loads do not ever exceed the factory floor loading limits as described on the Floor Loading Plans.
- iii. As part of the detailed assessment outlined elsewhere, conduct destructive core testing to validate the in-situ concrete compressive strength of structural elements.

### 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 Alliance Standard Part 8 Section 8.19 and 8.20.
- iii. 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.
- iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- v. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- vi. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
- viii. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and have it posted in all required location. Floor load plans should be visibly posted on all levels of all buildings.
- ix. "Have a qualified structural engineer prepare a load plan and provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan."
- x. "Remove deteriorated expansion joint material and provides new approved material at the expansion joint."

### Long Term (6 Months)

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- i. Provide a protective coating at the structural elements that are constructed with MCAC and that exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer. Alternatively, provide a 2% slope on the exposed surface to prevent the accumulation of water.

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- ii. Provide Certificates of Occupancy for review.
- iii. Retrofitting as per DEA report.

### The recommendations for Electrical Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>Investigate the causes of overheating &amp; burning. Repair and replace cables and equipment as required.</p> <p>Remove light fixtures without protective covers from storage areas or any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p>
<p>Short Term (3 Weeks)</p>	<p>Install proper covers on cable trenches.</p> <p>Establish a housekeeping program to keep the generator room clean and free of dirt, debris and improperly stored materials.</p>
<p>Mid Term (6 Weeks)</p>	<p>Install proper ventilation for the generator room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Install proper identification on emergency power switchboards, distribution boards and circuits.</p> <p>Separate the substation room with fire rated construction per Alliance standard section 3.4.2.1.3 &amp; 3.4.2.1.4</p> <p>Install distribution boards in compliant locations so that operation is not hampered due to limited access.</p> <p>As per BNBC section 2.11.5.4 install clear and permanent identification marks on all distribution boards, switchboards, sub main boards and switches.</p>
<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>Contract a qualified electrical engineer to design a lightning protection system according to the BNBC requirements. Contract a licensed electrician to install the designed system.</p> <p>Contract a qualified Electrical Engineer to design electrical cables sized according to capacity of circuit breakers. Replace as required.</p> <p>Connect all metal in the building to the building earthing system including re-bar, steel structure or metal water pipe.</p> <p>Install over current protection device (circuit breaker) for each and every load.</p> <p>Install metal enclosed distribution boards with a dead front construction.</p> <p>Remove multiple circuits/wiring landing at single circuit breakers within distribution boards. Install one circuit breaker per circuit.</p>

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	<p>Install dedicated neutral for each circuit.</p> <p>Install dedicated neutral for each circuit.</p>
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### The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	
Short Term (3 Weeks)	<p>Install side hinged outward swinging type fire-rated emergency exit doors in all buildings. Remove all hasps, locks, slide bolts, and other locking devices.</p>
Mid Term (6 Weeks)	<p>Post emergency egress maps at the entrances to each exit stair or main points of egress.</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 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 per year</p> <ol style="list-style-type: none"> <li>1) Obtain the BERC certificate required from Bangladesh Energy Regulatory Commission.</li> <li>2) Obtain permit for storing Class II flammable liquid from Explosive Department of Bangladesh.</li> </ol>
Long Term (6 Months)	<p>Provide 1 hr fire protective opening assemblies in 1 hr rated exit enclosures. Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosures.</p> <p>Install a class-III standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. All standpipe system installations shall be submitted for review by the Alliance for review prior to commencement of installation.</p> <p>Immediately reduce 109 occupants from 2nd, 4th and 5th floor of main building to meet the requirement with respect to stair width as per Alliance Standard. OR, provide an additional stairway with minimum width 0.9 m to meet the</p>

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	<p>requirement of total stair width. Otherwise, provide automatic sprinkler system throughout the building so that required stair width per occupant becomes 5 mm.</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>Current pump should be brought up to the Alliance Standard or install a pump dedicated for fire fighting or fire protection following the requirements of NFPA 20. Fire pump installation is to be tested for final acceptance in presence of Alliance and a final inspection of the installation shall be conducted by the Alliance prior to final acceptance. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 24 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance. This pump is to be connected to alternative power source like generator and the generator is to be connected with ATS (auto starter).</p>
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