

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

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Name of the Factory	: <b>Color City.</b>
Address of the Factory	: Nayapara, Kashimpur, Gazipur, Dhaka, Bangladesh.
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 15-Feb-15
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 15-Feb-15
BKMEA Membership No	: 1995

### **BASIC INFORMATION:**

There are nine buildings in the factory premises out of which one is main production building and eight are ancillary buildings. The buildings are named as: 1) Color City Ltd. (Color City Ltd. consists of four parts. Following three parts are main building and Number 9 is ancillary: - RCC Store & Office building, - RCC Stenter Building, - PEB Production shed.) 2) Thermal Boiler Shed, 3) Generator shed, 4) Forklift Maintenance Building, 5) Rainwater Harvesting Building, 6) Effluent Treatment Plant (ETP), 7) ETP Monitoring Building, 8) Boiler & WTP Shed. 9) RCC Chemical Dosing Building. The following general information was noted:

i. Building Usage Type	: Garments Factory
ii. Structural System	: Office & Store Building, Stenter Building, Chemical Dosing Building, Forklift building, Rainwater Harvesting Building, ETP Monitoring Building: RCC moment resisting frame structures with monolithic beams and slabs. Rainwater harvesting building is in under construction. Production Shed, Thermal boiler shed, Boiler & WTP building: Braced PEB steel frame structure. Generator shed: PEB steel frame structure
iii. Floor System	: RCC Structure with beam and column & PEB building
iv. Floor Area	: 679327 SF
v. No. of Stories	: 1) Color City Ltd: ( - RCC Store & Office building: Stories above grade: 6, below grade: 0, - RCC Stenter Building: Stories above grade: 3, below grade: 0, - PEB Production Shed: Stories above grade: 1, below grade: 0, 2) Thermal Boiler Shed: Stories above grade: 1 (G+M), below grade: 0, 3) Generator shed: Stories above grade: 1, below grade: 0, 4) Forklift Maintenance Building: Stories above grade: 1, below grade: 0, 5) Rainwater Harvesting Building: Stories above grade: 3, below grade: 1, 6) Effluent Treatment Plant (ETP): It's a treatment Plant having a height of a single storied building, 7) ETP Monitoring Building: Stories above grade: 2, below grade: 0, 8) Boiler & WTP Shed: Stories above grade: 1, below grade: 0, 9) RCC Chemical Dosing Building: Stories above grade: 2, below grade: 0;
vi. Construction Year	: 2011-2014
vii. Foundation Type	: Unknown
viii. Design Drawings	: Available.
ix. Soil investigation Report	: Available.
x. Construction Materials	: Reinforced Concrete & Steel
xi. Generator	: Ground Floor

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### **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) :

- i. Have a qualified structural engineer provide further testing and analysis of cracking in walls and provide a remediation plan to correct noted issues.
- ii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- iii. "Six storied Office & Store Building: Update the design report as per standard (Alliance Standard Part 8 Section 8.19 and 8.20) under guidance of a qualified structural engineer.
- iv. Thermal & Boiler shed: Update the design report as per standard (Alliance Standard Part 8 Section 8.19 and 8.20 and BNBC 2006) under guidance of a qualified structural engineer.
- v. For rest of the buildings (except PEB Production Shed) engage a qualified structural engineer to develop the required documents (i.e. design report) to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20."
- vi. As the design report is not as per standard, further revision of design report is needed including confirmation of capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
- vii. "Six storied Office & Store Building: Under guidance of a qualified structural engineer update the design report to comply with the seismic and wind requirements stated in the 2006 BNBC.
- viii. Thermal & Boiler shed: Under guidance of a qualified structural engineer update the design report to comply with the seismic and wind requirements stated in the 2006 BNBC.
- ix. For rest of the buildings (except PEB Production Shed) have a qualified structural engineer document (i.e design report) compliance with the seismic and wind requirements stated in the 2006 BNBC."
- x. "Six storied Office & Store Building: Under guidance of a qualified structural engineer update the design report to comply with the seismic and wind requirements stated in the 2006 BNBC.

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- xi. Thermal & Boiler shed: Under guidance of a qualified structural engineer update the design report to comply with the seismic and wind requirements stated in the 2006 BNBC.
- xii. For rest of the buildings (except PEB Production Shed) have a qualified structural engineer document (i.e. design report) compliance with the seismic and wind requirements stated in the 2006 BNBC."
- xiii. Follow the Construction Practices and Safety requirements of Section 9 to maintain a accident free workplace.
- xiv. "Update the design reports based on the requirements of Part 8 Section 8.19 of the Alliance Standard and BNBC 2006 section 1.9.
- xv. Also, have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard for rain water harvesting building, generator shed and boiler & WTP shed."
- xvi. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- xvii. "Have a qualified structural engineer develop Floor Loading Plans for the multistory Office & Store building, stenter building, chemical dosing building as per the requirements of Part 8 Section 8.20.5.3
- xviii. In case of remaining multistory structures, if they are supposed to use for production or storage purpose in future, floor load plans should be prepared for them also."
- xix. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Once Prepared do post them on each level of the building as required.
- xx. "Have a qualified structural engineer develop Floor Loading Plans for the multistory Office & Store building, stenter building, and chemical dosing building as per the requirements of Part 8 Section 8.20.5.3. Provide signage or the appropriate physical markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xxi. In case of remaining multistory structures, if they are supposed to use for production or storage purposes in future, floor load plans should be prepared for them also. After that, areas of storage should be physically marked to show acceptable loading limit."

Long Term (6 Months) : NA

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

Immediate (3 to 6 Days)	Find out the cause of the burning signs and replace the equipment with good ones if necessary.  Disconnect the panel from the electrical service and clean interior components of all dust and debris. Seal all openings within the enclosure to prevent dust and debris from entering.
Short Term (3 Weeks)	Ensure distribution boards are metal enclosed with a dead front construction.  Ensure distribution boards have clear identification markings.
Mid Term (6 Weeks)	All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system. The

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	<p>required marking can be by color code, the words “emergency system,” or any other method that identifies the box or enclosure as a component of the emergency system.</p> <p>Install distribution boards in compliant locations so that operation is not hampered due to limited access.</p> <p>Provide clearance of at least 1 m (39 in) in front of distribution boards.</p> <p>Provide capacity information labels (maximum current rating, number of circuit breakers, etc.) for distribution boards.</p> <p>Ensure 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.</p>
<p>Long Term (6 Months)</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.</p> <p>Ensure panel boards are not installed within 2.5 m of the printing unit/washing unit.</p> <p>Remove multi looping of cables at circuit breakers within the distribution boards.</p> <p>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBG for required number of electrodes.</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 should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems &amp; Rotating Equipment and NFPA70B 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>Ensure the means of identification are obtained by separate color codings, marking tape, tagging, or other approved means.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrances.</p> <p>Lighting and socket circuits must be separated at the noted locations. Have a qualified electrician separate the lighting and sockets into separate circuits.</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>Post emergency egress maps/fire evacuation maps at the entrance to each exit stair or main point of egress.</p> <p>Provide fire-resistive rated assemblies at the required exit access corridors or close those non rated openings or install automatic sprinkler system at the noted locations.</p> <p>Establish maintenance program that includes the requirements established in NFPA 25.</p> <p>Remove all hasps, locks, slide bolts or other locking devices at the noted locations.</p>
Long Term (6 Months)	<p>Provide fire-resistive rated assemblies at the required exit access corridors or close those non rated openings or install automatic sprinkler system at the noted locations.</p> <p>Get the hydraulic calculation of the installed standpipe and sprinkler system and verify the capacity of the installed fire pump. Also obtain approval from Alliance regarding the installation of fire pump.</p>