

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Western Dresses Ltd (5 Floor).
Address of the Factory	: Kunia, K.B Bazar, Targacha, Joydebpur, Gazipur, Dhaka
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 12 Jun 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 10 Jun 2014
BGMEA Membership No	: 1179

BASIC INFORMATION:

There are 8 buildings in the factory premises out of which one is main production building (those are connected by expansion joint) and seven are ancillary buildings. The buildings are named as: 1) Eight story main production building and 7 story main production building are connected with expansion joint, 2) Single story generator building, 3) Single story boiler building, 4) Single story finished good story building-1, 5) Two story finished goods store building-2, 6) Single story wastage store, 7) Single story ETP building, 8) Single story prefab generator shed. The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : Main factory building is a RCC building frame with infilled masonry walls. Existing foundations are RCC single column footings on group of piles. As per as-built drawings of SNA, main buildings are regular in configuration.
- iii. Floor System : Beam slab type in RCC Building
- iv. Floor Area : Total area of all buildings in the factory premises: 192193.42 sft. Building wise breakdown as follows:
1) Eight story main production building and 7 story main production building are connected with expansion joint: 178947.00 sft (Ground floor: 22368.42 sft, 1st floor: 22368.42 sft, 2nd floor: 22368.42 sft, 3rd floor: 22368.42 sft, 4th floor: 22368.42 sft, 5th floor: 22368.42 sft, 6th floor: 22368.42 sft, 7th floor: 4942.00 sft Roof: 17426.42 sft) 2) Single story generator building: 1564 sft, 3) Single story boiler building: 861 sft, 4) Single story finished goods store building-1: 5200 sft, 5) Two story finished goods store building-2: 4772.62 sft, 6) Single story wastage store: 428.70 sft, 7) Single story ETP building: 120 sft, 8) Single story prefab generator shed: 300 sft..
- v. No. of Stories : 1) Eight story main production building and 7 story main production building are connected with expansion joint: Stories above grade: 8, Stories below grade: 0, Occupied levels: 8, 2) Single story generator building: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 3) Single story boiler building: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 4) Single story finished goods store building-1: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 5) Two story finished goods store building-2: Stories above grade: 2, Stories below grade: 0, Occupied levels: 2, 6) Single story wastage store: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 7) Single story ETP building: Stories above grade: 1, Stories

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- below grade: 0, Occupied levels: 1, 8) Single story prefab generator shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1.
- vi. Construction Year : Factory personnel informed the date of construction as follows: 1) Eight story main production building and 7 story main production building are connected with expansion joint: Started in 2000 and finished in 2006, 2) Single story generator building: Started in 2000 and finished in 2006. No record of the date of the construction for the rest of the buildings was found
 - vii. Foundation Type : single column footings
 - viii. Design Drawings : Available.
 - ix. Soil investigation Report : Available
 - x. Construction Materials : RCC (brick& stone 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) :

- i. Have a qualified structural engineer provide further analysis and testing of the noted settlement and crack issues. If required, a remediation plan shall also be provided by the qualified structural engineer.
- ii. Have a qualified structural engineer evaluate the existing capacity of the columns within the columns with low FoS results. This evaluation should include destructive core testing to validate the in-situ concrete compressive strength.
- iii. "Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.
- iv. "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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- v. The management should ensure that the construction practices and safety being adhered to as per 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. "Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind and storm surge loading.
- viii. "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.
- ix. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
- x. Conduct detailed structural assessment by qualified structural engineer and carry out remedial action as necessary.
- xi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- 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.
- xiv. "Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.
- xv. Remove deteriorated expansion joint material and provide new approved material at the expansion joint.
- xvi. geotechnical investigation at close vicinity of the structure and make the report available for review.

Long Term (6 months) :

- i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- ii. Repair the exterior façade system to prevent water intrusion.
- iii. 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.
- iv. Provide Certificates of Occupancy for review

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Find out the cause of overheating and take proper action
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Short Term (3 Weeks)	<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>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>Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker, size of panel and permitted no. of CB, maximum permitted load connection capacity, etc.</p> <p>Install phase separators between terminal connections at the noted locations.</p>
Mid Term (6 Weeks)	<p>Provide means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm² or greater.</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>

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Remove all combustibles stored underneath the cutting tables at the noted locations also establish a housekeeping program to keep these areas continuously clear.</p>
Short Term (3 Weeks)	<p>Remove existing gates and doors in the means of egress including all locking devices. Install doors with approved panic hardware that cannot be locked in the direction of egress under any conditions.</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>
Mid Term (6 Weeks)	<p>Develop an emergency evacuation plan which includes duties and responsibilities of various people/groups, interfacing between groups and fire brigade, headcount and identification of trapped victims, physically disabled people and their rescue, etc. and all components required by the Alliance Standards and communicate the plan to all</p>

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	<p>employees.</p> <p>Verify emergency power for egress lights at least once per year. If battery operated lights are used, test them monthly. Perform annual functional testing of battery powered lights for at least 30 minutes. Ref. 10.12.2.3.</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 signs are to be tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year.</p> <p>Impart training in accordance with Alliance Safety Training Curriculum and keep record with proper documentation.</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>Apply to Bangladesh Energy Regulatory Commission for license.</p> <p>Apply to Gazipur City Corporation for issuance of occupancy certificate and pursue the matter to expedite.</p> <p>Install required NFPA-compliant identification signs at the noted locations.</p> <p>Complete fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Install signage both in Bengali and English adjacent to each stair door and floor level indicating the stair name and the floor level at the noted locations.</p>
<p>Long Term (6 Months)</p>	<p>Provide a shaft enclosure of 2 hr rating by constructing the enclosure with rated material of required thickness. Protect the openings of shaft enclosure by providing 1.5 hr rated opening protectives.</p> <p>Close/seal all non-rated openings or provide fire rated protections within 10 ft from steel stairs.</p> <p>Install an automatic sprinkler system throughout the building designed by a qualified fire protection engineer.</p> <p>The hydraulic design of the sprinkler system has to be pre-approved by CoE of Alliance. The test and performance report of the installed system has to be submitted to Alliance for review. Final inspection and testing shall be</p>

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	<p>witnessed by Alliance.</p> <p>Install a NFPA-compliant class-I standpipe system at required locations designed by a qualified fire protection engineer. The hydraulic calculations must be reviewed by Alliance prior to start of work.</p> <p>Provide 2 hr fire-resistive rated construction barriers at exit enclosures. Fit outward opening, side-swinging, self-closing, non-lockable fire doors of 1.5 hr in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Install a listed fire pump system per NFPA 20. Arrange water storage tank according to NFPA 22. Submit product data, drawings and hydraulic calculations and secure Alliance approval before purchase and construction. 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 of the installation. Acceptance testing of the installation shall be in accordance with NFPA testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance.</p> <p>Train and certify at least 25 percent of workers in fire fighting, first aid, and rescue by the appropriate authority.</p> <p>Install listed fire stop systems at every penetration through fire rated walls and floors. Install fire doors in doorways through rated walls. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Replace all collapsible, sliding, roll-down gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating.</p> <p>Provide 1.5 hr fire protective opening assemblies in 2 hr rated exit enclosures. Install approved fire rated doors that are listed, permanently labeled, automatic-closing, in compatible fire rated frames with latching hardware.</p> <p>Construct 2 hr rated construction for the open exit passageway.</p> <p>Provide rated exit passageway i.e. protected path of egress from the exit enclosure to the public way. The rating of the exit passageway is to be equal to fire rating requirement of the exit that is being served and shall not be less than 1 hr fire-resistance rated.</p> <p>Every door in a stair enclosure serving more than 5 stories</p>
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	<p>shall be provided with re-entry unless it meets the following requirements. Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, reentry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors. When the discharge floor is determined to be a required re-entry floor using the above requirements, re-entry does not have to be provided back into the building on this level.</p> <p>Fire extinguishers are to be inspected, tested, and maintained in accordance with NFPA requirements.</p> <p>Provided parapets or guards for all occupied roofs of a minimum height of 1067 mm (42 in).</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Alliance Standard 3.4.2.1. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install illuminated exit signs were 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>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.).</p> <p>Establish a NFPA-compliant inspection, maintenance, and testing program for the standpipe and hose system.</p> <p>Establish an inspection, maintenance, and testing program for the fire pump. Program must comply with NFPA 25.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p>
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