

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Tusuka Processing Ltd
Address of the Factory	: Konabari, Neelnagar, Gazipur Gazipur Dhaka, Bangladesh
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 8-Dec-13
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 19-Jan-14
BGMEA Membership No	: 5132

BASIC INFORMATION:

There are 04 building in the factory premises in which 02 main production building and 2 are ancillary buildings. The buildings are named as: Building 1: Basement + 9 stories; Building 2: 4-stories (partially 2-stories), Building 3: 2 stories R.C building; Building 4: 1 story shed building. The following general information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: For 9 & 4 story: Frame work of the building is composed of R.C. beam supported slab, R.C. column and R.C. isolated footing. For 2 story: Frame work of the building is composed of R.C. beam supported slab, R.C. column, R.C. isolated footing and roof is cover by corrugated iron sheet. For 1 story: Frame work of the building is composed of R.C. column, R.C. isolated footing and roof is cover by corrugated iron sheet.
iii.	Floor System	: RCC beam column and steel frame system
iv.	Floor Area	: Building 1: 195,750 Sft(approx); Building 2: 26,320 Sft. Building 3: 7,200 Sft; Building 4: 19,680 Sft.
v.	No. of Stories	: Building 1: Basement + 9 stories; Building 2: 4-stories (partially 2-stories). Building 3: 2 stories R.C building; Building 4: 1 story shed building.
vi.	Construction Year	: 2004 (all buildings)
vii.	Foundation Type	: RC isolated footings
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available.
x.	Construction Materials	: Reinforced Concrete frame.
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 : N/A

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Short Term: (3 Weeks) :

- i. Develop A program shall be developed 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 that it is enforced.

Mid Term (6 Weeks) :

- i. Based on the findings of the Review Panel investigation, the following recommendations are provided and should be implemented:
 1. Adequate "propping" shall be completed in the red and yellow shaded areas (per attached "propping plan") of Part C (9-story building) from basement to second floor roof within 7 days from date of Review Panel Report (September 2, 2014). Yellow shaded area at the eastern part of Part C should not be used until the recommendation of the DEA (per item 6) are implemented.
 2. Adequate "propping" shall be completed in the red shaded area (per attached "propping plan") of Parts D, A and A1 (9-story building) at the ground floor within 7 days from date of the Review Panel Report (September 2, 2014).
 3. Overhead water tank on the roof of Part C should be immediately demolished.
 4. Operations in Parts A through D in the 9-story building other than mentioned in item 1 above (all per attached "propping plan") may continue after necessary propping as mentioned in item 2 above. However, the live load during the operations shall not exceed 1 kN/m² (20 psf) and all storage loads should be removed from floors except ground floor.
 5. Under the present situation the building has to be carefully monitored by a group of qualified structural engineering consultants.
 6. An urgent Detailed Engineering Assessment (DEA) shall be conducted including soil investigation within 7 days and completed by November 15, 2014 under the supervision of a team of certified professional structural engineers. The DEA has to be peer reviewed by a competent institution and the DEA along with CAP and the review report have to be submitted to the Alliance Dhaka office for early approval. Failing to do so within the stipulated time will lead to evacuation of multiple floors by the Alliance.
- ii. Engage a qualified structural engineer to provide additional investigation into the capacity of the Building 2 grade beams and provide a remediation plan if required.
- iii. 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
- iv. Design load case shall be collected from the concerned firm. Or engage a qualified structural engineering firm to analyze the building's seismic load adequacy according to the BNBC 2006 requirements
- v. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

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- vi. A qualified structural engineer shall be engaged to prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vii. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- viii. 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.
- ix. Complete further testing on areas and have a qualified structural engineer develop a remediation plan.
- x. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures for the 2 and 4 story buildings. This assessment should be conducted as part of the Detailed Engineering Assessment (DEA) outlined elsewhere via the column FoS question and should include destructive core testing for compressive strength of the concrete for the columns.
- xi. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- xii. Load plans must be prepared by a qualified engineer and posted clearly on each floor and as necessary to distribute floor loads to comply with the floor loading plans as per Alliance Standard Part 8 Section 8.20.5.3
- xiii. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan

Long Term (6 Months) :

- i. Certificate of Occupancy shall be obtained from appropriate authority.
- ii. Depending on the findings of the Detail Engineering Assessment, permanent remedial measures should be conducted for the safety of the building.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Light fixtures without protective covers (otherwise known as naked lights) shall not be allowed in storage areas or in any area where the Inspector of the Factories Rules (1.6.3.7) Part 53 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> <p>Find out the cause of overheating, overloading, or signs of burning and take proper action. Consider replacement of equipment immediately if necessary.</p>
Short Term (3 Weeks)	<p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits</p> <p>.Provide two separate points of earthing (grounding) by</p>

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	distinct connections for each generator.
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 capacity information labels (Maximum current rating, no of circuit breakers etc.) for switchboards and/or distribution boards.</p> <p>Consult with a qualified Electrical Engineer and ensure electrical cables are sized according to capacity of circuit breakers.</p> <p>Separate the multiple cables either using proper size of circuit breakers or connecting separately on bus bars as per requirements.</p> <p>Recommend engaging a licensed electrician or electrical contracting firm to rectify all non-conforming and unsafe electrical works throughout the entire complex.</p> <p>Ensure all electrical wiring/cable is properly terminated at its point of termination.</p>
Long Term (6 Months)	<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>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>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>Establish an inspection testing, and maintenance program for the Uninterruptable Power Supply (UPS) and associated components. The program must based on the following:</p> <ol style="list-style-type: none"> (1) Manufacturer's recommendations (2) Manufacturer's instruction manuals (3) Minimum Requirements of NFPA 111 Chapter 8 (4) Minimum Requirements of NFPA 70B Chapter 28

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The recommendations for Fire Safety corrective actions are:

Short Term (3 Weeks)	Remove all hasps, locks, slide bolts, or other locking devices at the locations where needed.
Mid Term (6 Weeks)	<p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Occupant load signage should be posted for every assembly and production floor, at a conspicuous space near the main exit or exit access doorway for the space.</p>
Long Term (6 Months)	<p>Replace with side-hinged swinging type door. Position the door so it shall open in the direction of egress without obstructing other paths of egress.</p> <p>Install a new automatic fire detection alarm system throughout the factory in accordance with NFPA 72; including means of system trouble or alarm notification.</p> <p>Penetration of fire-resistive rated assemblies shall be protected with fire resistant protective assemblies. Need to be redone as per standards according to ASTM E814.</p> <p>Install an automatic sprinkler system throughout the building in accordance with NFPA 13 designed by a qualified fire protection engineer. Building-1 (Nine storied) height is more than 75 feet.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. Standpipe system must comply with the requirements of NFPA 14.</p> <p>Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Section 6.3.1.2. . Consult a qualified fire protection engineer to design the required rated construction barriers</p> <p>Install a dedicated fire pump for the facility in accordance with NFPA 20. Also, to supply the demands of the connected fire protection systems along with a stored source of water sufficient to meet the demands in accordance with NFPA 22. 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 by the Alliance as per clause 5.5.5. Acceptance testing of the installation shall be in accordance with NFPA 20, 22, and 25 testing requirements. Documentation of all testing shall be submitted to the Alliance for review prior to final acceptance by the Alliance.</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</p>

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	<p>commencement of installation</p> <p>Provide required fire rated construction 10 ft beyond the ends of the exterior stairs. Enclose any openings (windows, etc.) with required fire rated construction within that 10 ft wall section. The rated assembly should be approved and/or designed by a qualified fire protection engineer</p> <p>Provide fire-resistive rated opening protection for rated walls of the lifts in accordance with Alliance Standard Sections 4.6. Consult a qualified fire protection engineer to design the required opening protectives or penetration systems.</p> <p>Replaced all non- compliant doors and frames in the egress with side-swinging doors. Replacement doors shall be listed, approved, self –closing, fire rated door assemblies (door and frame) with latching panic hardware.</p> <p>It should be monitored by central station monitoring service or directly connected to fire service & civil defense.</p> <p>Provide Fire Department (Siamese) connections in accordance with Alliance Standard Section 5.5.4. Connections shall match the Fire Service and Civil Defence hose thread standard.</p> <p>Install an additional handrail to each stairway where only one is currently installed as per the height and distance requirements set out in the standard.</p> <p>Produce, establish and enforce a written policy and procedure for housekeeping to ensure scheduled cleaning of all floors, walls, ceilings, air ventilation systems and other building components. Ensure the timely removal of defective, waste and rubbish materials is included. 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>Install signage at required locations and on required equipment. Signage must comply with NFPA 14.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25.</p>
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