

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory : **RT Classics Limited.**

Address of the Factory : 791, Askarabad, Mansurabad, D T Road, Chittagong,
Bangladesh

Present Status of the Factory : **Under Operation.**

Structural assessment conducted by : Alliance.

Date of Structural Inspection : 16-April-2014.

Fire & Electrical assessment conducted by: Alliance

Date of Fire & Electrical Inspection : 07 April 2014

Basic Information:

The present garment factory is a commercial building with beam-column frame system. The following general information was noted:

- i. Building Usage Type : Mixed Use Building
- ii. Structural System : All are RCC beam slab buildings.
- iii. Floor System : Beam slab.
- iv. Floor Area : Building-1: 44000sft,
Building-2: 55000sft,
Building-3: 36500sft.

- v. No. of Stories : Building-1: 6 storied with roof top tin shed,
Building-2: 6 storied,
Building-3: 6 storied and steel shed on roof top.
- vi. Construction Year : Building-1: 1992,
Building-2: 2004-2005,
Building-3: 2005-2006.
- vii. Foundation Type : Unknown.
- viii. Design Drawings : Building 1: Not available
Building 2 & 3: Available
- ix. Soil investigation Report : Not available
- x. Construction Materials : Building-1: Brick aggregate with 40 grade rebar.
Building 2 & 3: Brick aggregate with 60 grade rebar.
- xi. Generator : Ground floor

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

The recommendations for Structural Safety corrective actions are:

Immediate : NA

Short Term : NA

Mid Term (6 Weeks) :

- i. The factory owner has to engage QSEC to have better understanding of the strength of the concrete. Concrete strength shall be assessed by taking at least 4 nos. of 3 inch diameter cores from the area of concern. If cores are

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to be taken from column, it is advisable to take it from an upper level where the stresses are low.

- ii. Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies. Structural engineer shall also provide remediation documents if required.
- iii. Under guidance from a qualified structural engineer arrange geotechnical investigation at close vicinity of the structure and make the report available for review.
- 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.
- v. Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
- vi. Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 and take appropriate remedial measures.
- vii. 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
- viii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
- ix. Have a qualified structural engineer confirm that capacity to support the load is available. Load plans complying with Alliance Standard Part 8 Section 8.40.4.3 should also be developed.
- x. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- xi. Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
- xii. Repair the exterior facade system to prevent water intrusion.
- xiii. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3
- 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. Provide Certificates of Occupancy for review.

Long Term (6 Months) : 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.

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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove the combustible materials from under the cutting tables and maintain the space(s) clear of combustibles.
Short Term (3 Weeks)	Doors need to be kept unlocked in the direction of egress under all conditions. All hasps, locks, slide bolts, and other locking devices need to be removed where installed.
Mid Term (6 Weeks)	<p>Provide a posted occupant load sign for every assembly and production floor near the main exit or exit access doorway for the space.</p> <p>Consult a qualified fire protection engineer to design a central station or direct emergency connection as part of the building fire alarm system design. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defense can be set up, assign a person to contact the fire department in the event of fire alarm activation. Locate an annunciator in a constantly attended location to alert this person.</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 need to be tested on a monthly basis. Functional testing of battery powered signs needs to be provided for a minimum 90 min once per year.</p> <p>Need to 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 min once per year.</p> <p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees.</p> <p>Install stair designation signs at each floor entrance from the stairs to the floor in English and Bengali. Signs need to indicate the name of the stair and the floor level. Signs shall be posted adjacent to the door.</p> <p>All applicable permits and license shall be kept up to date including Boiler license, Boiler operator license and Electrician license.</p> <p>Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense.</p> <p>Need to collect occupancy certificate for the factory building as per building use from approving authority.</p>
Long Term (6 Months)	Provide a 2-hour fire-resistive rated assembly with 1.5-hour opening protection in line with the stair and extend 3.05 m (10 ft.) beyond the ends of the stair between the exterior exit stairs and the building to achieve the required separation. The rated assembly should be approved and/or

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	<p>designed by a qualified fire protection engineer.</p> <p>All roll-down, collapsible, sliding gates and shutters in the means of egress shall be replaced with required fire rated outward opening side-hinged swinging self-closing type doors as per Alliance standard section: 6.8. Doors will be free from general locking arrangement.</p> <p>Need to install fire rated door assemblies at all exits. Provide fire-resistive rated (0.75-hour for boiler room and 1.5 hour for generator room) opening protection (Door, Window, Hatch Cover etc.) at opening and penetration through fire rated walls and/or assemblies or closed the unprotected openings by fire-restrictive rated barrier as per requirements. Consult a qualified fire protection engineer to design the required rated opening protection.</p> <p>Modify or install the standpipe System (Class-I and class-II) to meet the requirements of Alliance standard's section 5.4 Consult a qualified fire protection engineer before modify or installing a new system.</p> <p>Provide a dedicated fire pump in accordance with NFPA 20 to supply the demands of water to the connected fire protection systems along with a stored source of water sufficient to meet the requirements as per NFPA 22.</p> <p>Consult a qualified fire protection engineer to design the required manual and automatic fire alarm system for the building. Reference NFPA 72.</p> <p>Need to provide 2-hour fire-resistive rated construction barriers at exit enclosures with 1.5-hour fire-rated opening protection (Door, window etc.). The new fire rated doors are required to be side-hinging swinging outward opening type, with auto closure and panic bar and without locking arrangement. Minimum width of new fire rated door is required to be 1.00 m. Doors need to be free from general locking arrangements. Consult a qualified fire protection engineer to design the required rated construction barriers with opening protection.</p> <p>As per Alliance Standard Part 3 Sections 3.6.2.4: Non-rated construction shall not be allowed for high-rise building. The tin shed roof construction is required to be removed and replaced with appropriate protected construction in accordance with the required building construction type.</p> <p>Provide the required fire resistive rated fire barrier separation with required opening protection for the noted hazardous rooms. Locate the generators in a fire resistive rated enclosure and rearrange generator exhaust to discharge to the exterior of the building in a safe location in accordance with NFPA 37. Consult a qualified fire protection engineer to design the required rated construction barriers.</p> <p>Fire department (Siamese) inlet connections need to be provided to allow fire department pumper equipment to supplement the fire protection systems. Consult a qualified</p>
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	<p>fire protection engineer to design the required fire department connections.</p> <p>Install handrails on the both sides of the stairs at a minimum height of 865 mm (34 in.) and a maximum height of 965 mm (38 in.) as measured from the leading edge of the tread. The spacing between vertical members will not exceed 200 mm (8 in.).</p> <p>Install a parapet on the occupied roofs with a minimum height of 1067 mm (42 in.).</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers. Program needs to comply with the requirements of NFPA 10 chapter 7.</p> <p>Modify the egress arrangement to maintain a minimum ceiling height in the means of egress of 2.3 m (7 ft 6 in.) with projections from the ceiling not less than 2.03 m (6 ft 8 in.).</p> <p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</p> <p>Establish an inspection, maintenance, and testing program for the standpipe and hose system. The Program needs to be complying with the requirements of NFPA 25 Chapter 6 Standpipe and Hose Systems Table 6.1.1.2.</p> <p>Develop a hot work permit program. The program must comply with the requirements of NFPA 51B.</p> <p>Provide training of required number of people and certified in firefighting, first aid, and rescue training by the appropriate authority.</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>
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The recommendations for Electrical Safety corrective actions are:

<p>Immediate (3 to 6 Days)</p>	<p>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.</p> <p>Install a sign that provides details on electrical shock first aid procedures. Signage should also include instructions on artificial respiration.</p>
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<p>Short Term (3 Weeks)</p>	<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>Make sure minimum of 1 m (39 in) clearance is available in front of the panels for ease of maintenance and operation.</p> <p>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 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 two distinct earth connections of minimum 35 sqmm for generator frame earthing.</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>Calculate and display the information of the capacity & panel-schedule of the distribution boards and then provide a physical means to prevent the installation of additional circuit breakers.</p>
<p>Mid Term (6 Weeks)</p>	<p>Provide permanent identification marking mentioning name of panels (i.e. "" MDB/5th floor "") & danger signage (mentioning the voltage level ; i.e. 440 Volts), on a durable material sheet posted on panels’ door(outer side).</p> <p>Provide electrical graded rubber mats with the specifications of 650 V-protection and required area (accommodating at least two people or depending on the panels’ length).</p> <p>Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment.</p> <p>Provide a capacity information label which contains the current carrying capacity and size of main cable, rated capacity of circuit breaker and the busbar (with dimension).Display panel schedules posted on panels’ door (inner side).</p> <p>Provide copper lugs for cable termination at bus- bars and circuit breakers (MCCB), punched with proper crimping tool and hydraulic puncher.</p> <p>Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system.</p>

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Long Term (6 Months)	<p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements.</p> <p>Construct generator room keeping sufficient clearance as per the requirement specified in BNBC 2006 Table 8.2.9 or keep at least 1 meter clearance around the generator for routine maintenance activities so that maintenance personnel can easily carry out regular inspection and maintenance work of the generator.</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>Check all the cables and circuit breakers and sort out the higher rated circuit breakers. The rated current of a protective device (MCB, MCCB, fuse) must not exceed the current carrying capacity of any conductor in the circuit</p>
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