

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Rishal Garments Ltd
Address of the Factory	: Sharoj Tower, Plot No, M-4/2, Section-14, Mirpur, Dhaka, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 27 May 2014
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 20 May 2014

BASIC INFORMATION:

There is only one building in the factory premise which is thirteen storied main building; The following general information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : G.F to 3rd floor are RCC column with flat slab, Remaining are RCC frame structure(MRF)
- iii. Floor System : RCC plat slab (G.F to 3rd floor). RCC beam slab (4th to 12th floor).
- iv. Floor Area : 81900 sft.
- v. No. of Stories : 13,
- vi. Construction Year : 2006
- vii. Foundation Type : Pile foundation
 - i. Design Drawings : Available
 - ii. Soil investigation Report : Available
- iii. Construction Materials : main building (brick chips and stone chips)
- iv. 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
Short Term (3 to 4 Weeks)	<ol style="list-style-type: none">1. 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.2. 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

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	it is enforced
Mid Term (6 Weeks)	<ol style="list-style-type: none"> 1. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition. 2. Have a qualified structural engineer prepare a credible design report based on the requirements of Part 8 Section 8.19 of the Alliance Standard. 3. 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 Sections 8.19 and 8.20 4. Engage a qualified structural engineer to confirm satisfactory structural performance of the building under wind loading. 5. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard 6. Complete all outstanding action items from the previous assessment. 7. Have a qualified structural engineer confirm that the capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed. 8. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3 and post them to each floor as required. 9. Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan. 10. Have the full identity of the geotechnical engineer mentioned in the geotechnical report. 11. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
Long Term (6 Months)	<ol style="list-style-type: none"> 1. Repair the exterior façade system to prevent water intrusion. 2. Provide a protective coating on the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have the protective coating approved by the Alliance or a qualified structural engineer, or provide a 2% slope on the exposed surface to prevent accumulation of water. 3. Organizations have to apply for certificate of occupancy and obtain same as soon as possible from concerned authority.

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations.
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Short Term (3 Weeks)	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. Doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions. Doors may be provided with locking hardware from the ingress side provided that a panic bar is installed on any door with an occupant load exceeding 49 persons. The re-entry provisions of section 6.8.3 must be met.</p>
Mid Term (6 Weeks)	<p>Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees in accordance with Alliance Standards.</p> <p>Develop a testing and maintenance program that ensures the operation of all means of egress lighting is verified at least once per year. If battery-operated lights are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lights shall be provided for a minimum of 90 minutes once per year.</p> <p>Develop a testing and maintenance program that ensures the emergency power for exit signs is verified at least once per year. If battery-operated signs are used, these signs shall be tested on a monthly basis. Functional testing of battery powered signs shall be provided for a minimum 90 min once per year.</p> <p>Impart training in accordance with Alliance Safety Training Curriculum, and keep records 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 as per Alliance Standard. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defense can be set up, a person trained to contact the Fire Service and Civil Defense in the event of fire alarm activation shall be provided. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person.</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>Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in accordance with Alliance Standards.</p> <p>Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with Alliance Standards.</p>

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	<p>Apply to BERC for a waiver certificate for an additional 419 KW.</p> <p>Apply to RAJUK for issuance of an occupancy certificate and pursue expedition of the matter.</p>
<p>Long Term (6 Months)</p>	<p>Remove existing aisle markings and draw new markings fulfilling the minimum aisle width requirement. Relocate the machines accordingly, if necessary.</p> <p>Provide 1.5 hour fire protective opening assemblies in 2 hour rated exit enclosures. Exits connecting four or more stories shall be enclosed with a minimum 2 hour fire-resistance rating. Exits shall be enclosed with the same fire-resistance rating as the floor penetrated, but will not need to exceed 2 hours.</p> <p>Replace all sliding steel doors in means of egress with side-hinged, swinging-type doors of proper width and rating in accordance with Alliance Standards.</p> <p>Provide a rated exit passageway (i.e. a protected path of egress) from the exit enclosure to the public way. The rating of the exit passageway is to be equal to the fire rating requirement of the exit that is being served and shall not be less than 1 hour fire-resistance rated.</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 the Alliance. All installation and design requirements outlined in BNBC Part 4 Chapter 4 shall be replaced by the requirements of NFPA 13. Pipe schedules shall not be used to size pipe. All systems shall be hydraulically calculated to meet the required NFPA design requirements.</p> <p>Install a NFPA-compliant standpipe system at required locations designed by a qualified fire protection engineer. All standpipe system installations and hydraulic calculations shall be submitted for review by the Alliance prior to the commencement of installation.</p> <p>Provide fire-resistive rated construction barriers for exit enclosures in accordance with Alliance Standard Sections 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install a pump dedicated for fire protection following the requirements of NFPA 20. The fire pump installation is to be tested for final acceptance in the presence of the Alliance and a final inspection of the installation shall be conducted</p>

	<p>by the Alliance prior to final acceptance. 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.</p> <p>Install manual pull stations at egress points, smoke detectors in air handling equipment, and visual and audible devices. These must be spaced appropriately based on occupancy type in accordance with NFPA requirements.</p> <p>Train and certify at least 25 percent of workers in firefighting, first aid, and rescue by the proper authority.</p> <p>Provide opening protectives at all windows and other openings on all the fire rated walls across the entire premises. Close these openings if they are not required. Protect the penetrations of fire resistive rated assemblies with a listed through penetration fire stop system tested in accordance with ASTM E814. Consult a qualified fire protection engineer to design the required opening protective's or penetration systems.</p> <p>The unprotected penetrations on the slab shall be sealed or protected following the requirement of Alliance Standards.</p> <p>Protect the exit passageway with protective opening assemblies. Interior exit stairway termination must be in accordance with Alliance Standards.</p> <p>Provide fire-resistive rated construction barriers between hazard types following Sections 3.4 and 4.5 of Alliance Standard. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Provide handrails on both sides of each stairway. Intermediate handrails shall be provided when the stair width exceeds 2.2 m (87 in.). Mount new handrail at a height consistent with existing height (between 30 in. and 44 in).</p> <p>Install appropriate means of illumination at the noted locations. The means of egress paths shall be illuminated at all times the building is occupied. Illumination shall be a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum 2.5 lux.</p> <p>Provide fire-resistive rated construction barriers between the generator room and childcare area in accordance with the Alliance Standard Section 3.4.</p> <p>Relocate the steam iron pipe and any other obstructions to keep the height with projection within the allowable limit.</p>
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	<p>Headroom, clear ceiling height shall be provided as per requirement.</p> <p>Provide a uniform slope/ramp for the walking surface. Slope should not exceed 1 in 20 in the direction of travel. Any changes in elevation (protrusions or lips) must not exceed 1/4 in.</p> <p>Provide re-entry to floor levels from the stairwells in accordance with Alliance Standard Section 6.8.3.</p> <p>Establish an inspection, testing, and maintenance program for all fire extinguishers and prepare proper documentation. Program must comply with NFPA 10.</p> <p>Develop a NFPA-compliant hot-work permit program. In general, this program should address the process of request and approval from authorities, necessary checks prior to approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedures, etc.</p> <p>Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2cd/m² may also be used.</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:

Immediate (3 to 6 Days)	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 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.
Short Term (3 Weeks)	Provide covers or blanks to conceal all live internal components of switchboards and/or distribution boards.

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	<p>Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector of the Factories Rules disallows these fixtures.</p> <p>Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc.</p> <p>Ensure distribution boards have a minimum clearance of 1 m (39 in) in front.</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>Indoor electrical installations that are accessible to unqualified persons shall be made with metal-enclosed equipment. Switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment shall be marked with appropriate caution signs. Entrances to rooms and other guarded locations that contain exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. Caution, warning, danger signs or labels should meet the following requirements: (1) The marking shall adequately warn of the hazard using effective words and/or colors and/or symbols. American National Standards Institute ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for suitable font sizes, words, colors, symbols, and location requirements for labels. (2) Shall be permanently affixed to the equipment or wiring method and shall not be hand written. Exception, portions of labels or markings that are variable, or that could be subject to changes, shall be permitted to be hand written and shall be legible. (3) The label shall be of sufficient durability to withstand the environment involved. ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for the design and durability of safety signs and labels for application to electrical equipment</p>
Mid Term (6 Weeks)	<p>Provide two separate points of earthing (grounding) for generator.</p> <p>Ensure switchboards and/or 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>Provide dedicated neutral for each circuit.</p> <p>Underground service cables are laid in conformity with the requirements of concealed wiring.</p> <p>Consult with an expert fire protection engineer and make sure the generator room is fire rated as per Alliance Standard.</p>

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	<p>Provide adequate cover on cable trenches.</p> <p>Consider replacing transformers that contain harmful substances to reduce health hazards.</p> <p>Lead telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance.</p>
Long Term (6 Months)	<p>Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements.</p> <p>Have a licensed electrician install the designed system.</p>