

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

Name of the Factory	: <b>Rowa Knitwear Ltd.</b>
Address of the Factory	: Mariam Complex, Chowdhurybari, Vogra Gazipur Dhaka, Bangladesh
Present Status of the Factory	: <b>Under Operation</b>
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 18 May 2014
Fire & Electrical assessment conducted by:	Alliance
Date of Fire & Electrical Inspection	: 18 May 2014

### **BASIC INFORMATION:**

The present garment factory is a six storied building with RC flat plate system. The following general information was noted:

i.	Building Usage Type	: Garment Factory
ii.	Structural System	: RC flat plate
iii.	Floor System	: Flat plate
iv.	Floor Area	: Total area of all buildings: 64,335 Sft.
v.	No. of Stories	: Six stories (G+5)
vi.	Construction Year	: Main Production Building started in 2004 and finished in 2008.
vii.	Foundation Type	: Isolated footing
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: Brick aggregate 60 grade rebar.
xi.	Generator	: In another utility building.

### **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 (3 Weeks)	: 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.
Mid Term (6 Weeks)	: Engage a qualified structural engineer and carry out structural assessment to identify what remedial action is appropriate, which may include retrofitting. Reduction of load is required before any other remedial action is undertaken based on detailed structural assessment.
Long Term (6 Months)	: As part of the detailed engineering assessment detailed elsewhere, a structural engineer shall review and confirm the necessity for and adequacy of the referenced retrofitting details, recommending modifications to these details as necessary.

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### The recommendations for Fire Safety corrective actions:

<p>Immediate (3 to 6 Days)</p>	<p>Remove all stored materials in the stairwells at the noted locations.</p> <p>Means of egress must be full free and clear from impediments, obstructions, and stored materials immediately.</p>
<p>Short Term (3 Weeks)</p>	<p>Remove all hasps, locks, slide bolts, or other locking devices at the noted locations.</p> <p>Remove all combustibles stored underneath the cutting tables at the noted locations.</p>
<p>Mid Term (6 Weeks)</p>	<p>Occupancy certificate (mention occupancy type) for each building.</p> <p>Make aisles marking with proper direction and provide minimum clear width of 36 inch. Keep aisles free of obstruction.</p> <p>Training programs need to be implemented and documented in accordance with the Alliance Safety Training Curriculum.</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 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>Conduct fire drills on a quarterly basis as outlined in BNBC Part 4 Appendix A for all garment facilities with record keeping .These fire drills need to be conducted under the direction of a Fire Safety Director.</p> <p>Post occupant loads for every assembly and production floor in a conspicuous space near the main exit or exit access doorway for the space.</p> <p>Stair designation signs are provided at each floor entrance from the stair to the floor in English and Bengali. Signs indicate the name of the stair and the floor level. Signs are posted adjacent to the door.</p> <p>Complete and document fire department pre-planning activities with the local Fire Service and Civil Defense.</p>
<p>Long Term (6 Months)</p>	<p>Provide fire-resistive rated construction barriers at exit enclosures. Exits connecting three or fewer stories shall be enclosed with a minimum 1-hr fire resistance rating.</p> <p>Install Pull stations at egress points, smoke detectors in air handling equipment, visual and audible devices spaced appropriately based on occupancy type in the factory main building and ancillary shed building. Reference NFPA 72.</p> <p>Install fire extinguishers for the Fabric store. Also install</p>

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fire extinguishers at appropriate locations and heights based on hazard type per BNBC Part 4 and NFPA 10. Extinguishers shall be placed so that maximum travel distance to the nearest unit shall not exceed 30 m (100 ft.).

Set up a Fire alarm and detection system central station monitoring service or direct connection to the Fire Service and Civil Defense. Assign a person at the facility to contact the fire department in the event of fire alarm activation.

Provide side-hinged swinging type doors for all means of egress.

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 fire-resistance rated, which in this case is 2-hour.

Provide re-entry to floor levels from the stairwells in accordance with Allainace Standard Section 6.8.3.

Provide fire-resistive rated construction barriers between hazard types. Minimum 1-hr fire-rated wall and door for boiler room and minimum 1-hr fire rated door for fabrics store room.

Establish an inspection, testing, and maintenance program for all fire extinguishers in accordance with NFPA 10.

Install appropriate means of illumination at the noted locations. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs, which provide evenly illuminated letters having a minimum luminance of 0.2 cd/m<sup>2</sup>, may also be used.

Provide an emergency power source for illuminated exit signs, either by battery back-up or by connecting to the emergency power system.

Install continuous illuminated exit sign at all exit points. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5 lux. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2 cd/sq.-m may also be used.

Create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry out the required duties.

Develop a hot work permit program. The program must comply with the requirements of NFPA 51B

Providing handrails on the other side of each stairway.

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	<p>Separation of boiler rooms from the production floors with properly rated fire doors &amp; protection of penetrations</p> <p>Need required number of people (trained and certified) in firefighting, first aid, and rescue training by the appropriate authority accordance with the Alliance Safety Training Curriculum.</p> <p>Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work.</p> <p>Install required fire rated door assemblies at all exits. Provide required fire-resistive rated opening protection (Door, Window, Hatch Cover etc.) at openings and penetrations through fire rated walls and/or assemblies. Consult a qualified fire protection engineer to design the required rated opening protection.</p> <p>Provide parapets or guards for all occupiable roofs with a minimum height of 1067 mm (42 in.) as required by Alliance Standard Part 6 Section 6.12.2.4.</p> <p>A fire pump shall be provided for the building in accordance with the Alliance document Section 5.5 and NFPA 20. The water supply will also need to be upgraded to serve the required fire pump and standpipe systems. All new installations and design requirements outlined in BNBC Part 4 Chapter 4 for water supplies shall be replaced by the requirements of NFPA 20 (fire pumps), NFPA 22 (water tanks), and NFPA 24(underground water mains).The Owner shall contact the Alliance prior to conducting the final acceptance testing of the fire pump installation to allow the Alliance to witness this test. A final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance.</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 fully lint is 13 mm (½ in.) over a maximum of 46.5 m<sup>2</sup> (500 ft<sup>2</sup>). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm ( ¼ in.)</p>
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### The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	Ensure the generator room clean and free of dirt, debris, and improperly stored materials.
Short Term (3 Weeks)	<p>Ensure light fixtures without protective covers are not installed in storage areas or in any area where the Inspector of the Factories Rules (1.5.3.5) Part 53 disallows these fixtures.</p> <p>Ensure proper identification of emergency power switchboards, distribution boards, and circuits.</p> <p>Install security measures to ensure access to the substation is restricted.</p>
Mid Term (6 Weeks)	<p>Ensure distribution boards are metal enclosed with a dead front construction.</p> <p>As per BNBC section 2.11.5.4 ensure clear and permanent identification marks are painted in all distribution boards, switchboards, sub main boards and switches.</p> <p>Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for distribution boards.</p> <p>Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm<sup>2</sup> or greater.</p> <p>Make adequate size of cable trench &amp; provide adequate cover on cable trench.</p> <p>Provide Shielding or additional insulation for wiring exposed to external heat sources.</p>
Long Term (6 Months)	<p>Install lightning protection system on the building.</p> <p>Provide wire or cable shaft for the whole building. Wiring and cables are arranged in shaft for ease of inspection and maintenance.</p> <p>Ensure appropriate size for generator room in order to properly access the generator to perform routine maintenance activities</p> <p>Ensure the generator room properly rated and physically separated from the remainder of the building.</p> <p>Ensure over-current protection device (circuit breaker) for each and every loads.</p>