

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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| Name of the Factory | : Rowshan Apparels Ltd. |
| Address of the Factory | : 5773, Dakshin Khan, Chairman Bari, Uttara, Dhaka, Bangladesh. |
| Present Status of the Factory | : Under Operation |
| Structural assessment conducted by | : Alliance |
| Date of Structural Inspection | : 16-June-14 |
| Fire & Electrical assessment conducted by | : Alliance |
| Date of Fire & Electrical Inspection | : 16-June-14 |
| BGMEA Membership No | : 4227 |

BASIC INFORMATION:

The present garment factory is comprises of one five story Main Building and one ancillary single story building. The following general information was noted:

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| i. | Building Usage Type | : Garments Factory with mixed use |
| ii. | Structural System | : RCC Beam-Column frame system |
| iii. | Floor System | : Beam supported slab system |
| iv. | Floor Area | : 38030 SF (Approx). |
| v. | No. of Stories | : Five story-Main Building and One story-Ancillary Building |
| vi. | Construction Year | : 2005 |
| vii. | Foundation Type | : Isolated Column Footing |
| viii. | Design Drawings | : Available |
| ix. | Soil investigation Report | : Available |
| x. | Construction Materials | : Reinforced Concrete |
| xi. | Generator | : Unknown |

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 loading limits as described on the Floor Loading Plans.

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Mid Term (6 Weeks)

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- i. Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.
 - ii. 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.
 - iii. Have a qualified structural engineer confirm that capacity to support the load is available. Load plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
 - iv. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
 - v. 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.
 - vi. Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
 - vii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
 - viii. Have a qualified structural engineer prepare credible as-built document based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
 - ix. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
 - x. Factory Owner must respond to any exception noted in the assessment report.
 - xi. Have a qualified structural engineer prepare load plans for each floor documenting the actual maximum operational loading as suggested in Alliance standard and take appropriate remedial measures.
 - xii. Have a qualified structural engineer prepare load plans including the information required in section in 8.20 of the Alliance standard. Post load plans once prepared.
 - xiii. Have a qualified structural engineer prepare acceptable loading limits in load plans including the information required as per Alliance standard. 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)

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- i. Provide Certificate of Occupancy for Review.
 - ii. 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.

The recommendations for Electrical Safety corrective actions are:

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| Immediate (3 to 6 Days) | Remove all combustible materials from inside the substation room. Keep the generator room clean and free of unnecessary materials. Also establish a routine cleaning program to keep the room clean and keep the records of the activities. |
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| | Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room. |
| Short Term (3 Weeks) | |
| Mid Term (6 Weeks) | <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 done 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>Keep the provision for installing ventilation fans (minimum dia 18”) for forced ventilation of the generator room.</p> <p>Keep the provision for minimum 1 meter clearance in front of the panels and distribution boards for ease of access to operate.</p> <p>Install two distinct earth connections of minimum 35 sqmm for generator frame earthing.</p> <p>Provide sufficient means of ventilation for the substation room. Consult a qualified electrical engineer to determine the required ventilation rates based on the installed equipment. Provide louvers on openings for natural ventilation to prevent storm water from entering.</p> <p>Provide permanent identification marking mentioning name of panels (i.e. "MDB-1,1st 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 a capacity information label which contains the current carrying capacity and size of main cable, rated capacity of circuit breaker and the bus bar (with dimension). Display panel schedules posted on panels’ door (inner side).</p> <p>Keep (at least 1 meter) clearance around the generator for ease of maintenance work while installed the generator.</p> <p>Provide additional light fixtures in generator room so that there is a minimum of 150 lux on all sides of the generator.</p> <p>Provide covers or blanks to conceal all live internal components of switchboards and/or distribution boards.</p> <p>Provide additional light fixtures to increase illumination levels provided in the BNBC. Also, provide support for the cable using conduit or cable tray.</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 disallows these fixtures. Install signs posted in Bengali and English, indicating this prohibition at all entrances to these areas.</p> |

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| | <p>Install instrumentation devices (Ammeter, Voltmeter, etc) on main electrical panels. Also, replace/repair faulty lamps and meters where necessary and provide connection to indicator lamps through protective device (fuse box).</p> <p>Provide electrical insulation mats in front of distribution boards.</p> |
| <p>Long Term (6 Months)</p> | <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>Provide earthing of equipment at required locations and connect to required number of electrodes. Refer to the BNBC for required number of electrodes.</p> <p>Check all the cable and circuit breaker for sorting 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> <p>Provide eathing connection to all exposed-conductive parts(metal) related to/in close proximity to electrical equipments/installation and utility service such as metallic water/gas/steam pipes etc. such that all the metals remain at a substantially same potential of building earthing system.</p> <p>Provide individual connection to circuit breakers from bus bar using cables of appropriate size.</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>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>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>Provide vertical cable shaft/ladder for supporting the main cables. Cable shall be passed through a floor or wall using cable tray (with metal cover) or rigid conduit with proper support. The openings remaining after passing of the cables</p> |

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| | <p>should be sealed according to the degree of fire resistance prescribed for the respective element of building construction before penetration.</p> <p>Remove the un-terminated cables from distribution board or terminate each cable in spare circuit breakers for future use.</p> <p>Terminate cables providing copper cable-socket, copper nut- bolt, copper washer.</p> <p>Use PVC connector with PIB tape wound around with a junction box for every cable joints.</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power.</p> <p>Install phase separators between terminal connections. Verify phase separators are installed at all remaining locations</p> |
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The recommendations for Fire Safety corrective actions are:

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| Immediate (3 to 6 Days) | Keep areas beneath cutting tables clear of combustibles at all times. |
| Short Term (3 Weeks) | Doors shall be kept lock free in the direction of egress under any conditions. All hasps, locks, slide bolts, and other locking devices need to be removed where installed. |
| Mid Term (6 Weeks) | <p>The occupant loads shall be posted 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>Develop a testing and maintenance program that ensures the emergency power for all 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 90 min once per year.</p> <p>All applicable permits and license shall be up to date including BERC waiver certificate.</p> |
| Long Term (6 Months) | Install initiating devices and notification appliances as required by the Alliance Standard and NFPA 72. This includes electrical supervision of all valves controlling fire protection systems (sprinklers, fire pumps, water supplies, |

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| | <p>etc.). Connect devices to an automatic fire alarm and detection system for the facility. All fire alarm installations shall be submitted for review by the Alliance prior to commencement of installation.</p> <p>Modify or install the standpipe System (Class-I and class-II). Consult a qualified fire protection engineer before modifying or installing a new system. Standpipe system must comply with NFPA 14.</p> <p>Rooms used for generator and oil-filled transformer shall be separated from the surrounding occupancy with a minimum 2-hour fire rated construction with 1.5-hour fire rated opening protections. Boiler room and storage area need to be separated from the surrounding occupancy with a minimum 1-hour fire rated construction with 0.75-hour opening protection. Exhaust of the generators shall in accordance with NFPA 37 and shall be discharged to the exterior of the building in a safe location. Consult a qualified fire protection engineer to design the required rated construction barrier.</p> <p>Install 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 demands as per NFPA 22. Once new fire pump is installed, establish an inspection, testing, and maintenance program for the fire pump. Program must comply with NFPA 25.</p> |
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