

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Sterling Rinse Effects Ltd
Address of the Factory	: Ward # 07, Holding No. C-3, Biswashpara, Candara, Kaliakoir, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 01-June-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 26-April-14

BASIC INFORMATION:

The present garment factory comprises of four Main Buildings and seven Ancillary Buildings. The following general information was noted:

i.	Building Usage Type	: Garments Factory
ii.	Structural System	: 1. Shed-01: A portion of this building is a RCC frame structure with monolithic slabs and beams at each story, and another portion consists of steel roof trusses supported on brick masonry. 2. Shed-02: The structure consists of steel roof trusses supported on steel columns. 3. Shed-03: The structure consists of steel frames with steel metal decks on the roof. 4. Main Building 04 (Sample Seraping): The structure consists of a RCC frame.
iii.	Floor System	: Beam supported slab in RCC portion
iv.	Floor Area	: 31,661 sft.
v.	No. of Stories	: 1) Single story Irondy Seraping main production shed: Stories above grade: 1, Stories below grade: 0, 2) Single story wrinkle shed: Stories above grade: 1, Stories below grade: 0, 3) Single story wet process shed: Stories above grade: 1, Stories below grade: 0, 4) Single story RCC sample seraping building: Stories above grade: 1, Stories below grade: 0, 5) Single story generator shed: Stories above grade: 1, Stories below grade: 0, 6) Single story boiler shed: Stories above grade: 1, Stories below grade: 0, 7) Single story pump shed: Stories above grade: 1, Stories below grade: 0, 8) Single story dining shed: Stories above grade: 1, Stories below grade: 0, 9) Single story security shed: Stories above grade: 1, Stories below grade: 0, 10) Single story childcare and medical shed: Stories above grade: 1, Stories below grade: 0, 11) Single story RMS shed: Stories above grade: 1, Stories below grade: 0.
vi.	Construction Year	: 2007-2008
vii.	Foundation Type	: Isolated footing
viii.	Design Drawings	: Available
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RC materials with steel
xi.	Generator	: Ground floor in ancillary building

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

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) : NA

Mid Term (6 Weeks) :

- i. Have a qualified structural engineer provide further analysis and testing of the noted settlement and crack issues. If required, a remediation plan shall also be provided by the qualified structural engineer.
- ii. Complete further testing on areas of deterioration in order to understand the level of corrosion and weakening of the member and have a qualified structural engineer develop a remediation plan.
- iii. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
- iv. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
- v. Have a qualified Structural Engineer prepare the design report and submit to BV for review.
- vi. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
- 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 and storm surge.

Long Term (6 Months) :

- i. 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. Or provide 2% slope on the exposed surface to prevent accumulation of water.
- ii. Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same.

The recommendations for Electrical Safety corrective actions are:

Immediate (3 to 6 Days)	<p>Survey all storage areas to identify all light fixtures without protective covers. 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. Provide protective covers for all light fixtures in storage areas.</p> <p>Consult with a qualified electrical engineer to determine the cause of the overheating and identify the required</p>
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>remediation work based on the qualified electrical engineer's findings.</p> <p>Remove all dirt, debris, lint, water, oil, and improperly stored materials from the substation room.</p>
Short Term (3 Weeks)	<p>Survey all wiring systems to identify any additional areas of non compliance. Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water. Consult a qualified electrical engineer for means and methods to protect the wiring systems. Ensure all damaged conduit is replaced in order to protect the wiring/cables.</p>
Mid Term (6 Weeks)	<p>Ensure the generator room is properly rated and physically separated from the remainder of the building. Consult a qualified fire protection engineer to determine required rating and remediation work.</p> <p>Ensure generator exhaust is discharged to the exterior of the building in a safe location and away from all building openings.</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>Provide clearance of at least 1 m (39 in) in front of switchboards and/or distribution boards. Consult an electrical engineer if distribution boards require relocation in order to provide sufficient clearance.</p> <p>Provide adequate cover on cable trenches to prevent the accumulation of dust and debris and to also prevent damaging the conductors. Cable trench covers should be of non combustible material and of sufficient strength to prevent damage to the conductors. If no cable trench is provided for loose laid wiring, consult a qualified electrical engineer to determine an appropriate protective covering to install.</p> <p>Consult with a qualified electrical engineer and the generator manufacturer to determine the required ventilation rates for the room and install the appropriate cross flow ventilation system.</p> <p>Consult with a qualified electrical engineer in order to determine capacity of each distribution board. Provide capacity information labels (Maximum current rating, no of circuit breakers etc.) for Switchboards and/or distribution boards.</p> <p>Provide identification/tagging mentioning the equipment/machines’ name (i.e. Sewing machine line-1 or Lighting line-2) and type of conductor (i.e.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>L1,L2,L3,N,PE)for every cable at its termination point or maintain the color-code at its termination point (providing colored cable-sleeves) for identification of conductor-type (i.e. Red/Yellow/blue for phase cable, Black for neutral cable, Green for earthing cable). Labeling-cable-tie/Marker-tie can be used for cable identification. Consult a qualified electrical engineer for guidance on proper wire/cable identification.</p> <p>Provide additional light fixtures to increase illumination levels provided in the BNBC so that adequate illumination is provided in order to safely complete maintenance activities.</p> <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>As per BNBC section 2.11.5.4 ensure clear and permanent identification marks are painted on all distribution boards, switchboards, sub main boards and switches.</p> <p>Survey all distribution boards to identify which distribution boards require cleaning. 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>Survey all switchboards and/or distribution boards to ensure all internal components are properly concealed. Replace missing covers or blanks to conceal all of the live internal components of the distribution boards.</p> <p>Survey all wiring and conduit to identify all locations where it is not properly supported and protected from physical damage. Provide adequate supports for electrical wiring and conduit. Consult a qualified electrical engineer for required remediation work and selection of appropriate materials.</p> <p>Survey all equipment, fixtures, etc to identify all unsecured connections. Ensure electrical connections at equipment, fixtures, etc. are properly secured.</p> <p>Consult a qualified electrical engineer to determine the required work to install meters on the main electrical equipment where required.</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>Survey all electrical equipment for additional areas of non compliance. Provide earthing of equipment at required locations and connect to the required number of electrodes. Consult with a qualified electrical engineer for required number of electrodes and sizing of earthing conductors.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>Survey all switchboards/distribution boards for other locations of non compliance. Consult a qualified electrical engineer in order to determine compliant locations and required remediation work. Ensure switchboards and/or distribution boards are not installed above gas stoves or sinks or within 2.5m of any washing unit in washing rooms or laundries.</p> <p>Survey the entire building to identify all locations of non compliance. Connect all metal in the building to the building earthing/grounding system, such as metal rebar in concrete, metal frame of building, or metal water pipe. Consult a qualified electrical engineer to ensure remediation work is completed properly.</p> <p>Survey all switchboards/distribution boards for other locations of non compliance. Consult a qualified electrical engineer in order to determine compliant locations and required remediation work. Install switchboards and distribution boards in compliant locations so that operation is not hampered due to limited access.</p> <p>Survey all distribution boards to identify all locations of non compliance. Provide grounding (earthing) for switchboards and/or distribution boards as per BNBC section 2.8.1. Consult a qualified electrical engineer to determine the appropriate size and methods of grounding locations and conductor size.</p> <p>Ensure the substation room is properly rated and physically separated from the remainder of the building. Consult a qualified fire protection engineer to determine required rating and remediation work.</p> <p>Have a qualified electrical engineer update the as-built drawings for the electrical system.</p> <p>Complete thermographic scans at least on a three year cycle. Thermo graphic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA 70B or a comparable standard.</p> <p>Install telecommunication or antenna cables separately to the main point of service. Power and telecommunications cables must have separate entrance. Consult a qualified electrical engineer to identify required remediation work.</p> <p>Ensure switchboards and/or distribution boards provided with physical means to prevent the installation of more over current devices than that number for which the panel board was designed, rated, and listed following NFPA 70 section 408.54.</p> <p>Survey all distribution boards to identify circuits with that are not provided with a dedicated neutral. Consult a</p>
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Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

	<p>qualified electrical engineer to properly size the dedicated neutral for each missing location.</p> <p>Survey all wiring to identify all areas of non compliance. Ensure cable joints through porcelain/PVC connectors with PIB tape wound around joint.</p> <p>Complete an oil analysis on applicable transformers at appropriate intervals based on voltage and power.</p>
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The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	
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.</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. The evacuation plan shall include provisions to assist physically disabled persons. A list of all employees with physical disabilities shall be kept by the Fire Service Director.</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>Develop a testing and maintenance program that ensures the operation of all means of egress lights 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>Fire drills shall be conducted under the direction of a Fire Safety Director. All other requirements for fire drills shall be conducted in accordance with BNBC requirements.</p> <p>Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address the process of request and approval of authorities, necessary checks prior to approval, standby fire watch and fire fighting equipment, sounding of alarm procedure, duration and expiry of permit and reapproval procedure, etc.</p>

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Long Term (6 Months)	<p>An automatic fire alarm and detection system is available in the factory, but currently there is no monitoring company in Bangladesh. Fire service and civil defense is not capable of monitoring fire alarm and detection systems of the factories.</p> <p>Provide fire-resistive rated assemblies at the required exit access corridors. The rated assembly should be approved by a qualified fire protection engineer. Window and glass block assemblies are to be tested for fire rating following NFPA 257.</p>