

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Silver Apparels Ltd.
Address of the Factory	: Zirabo, Ashulia, Savar, Dhaka, Bangladesh
Present Status of the Factory	: Under operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 14 June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 14 June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 14 June, 2015
BGMEA Membership No.	: 5867

BASIC INFORMATION:

The present garment factory is an industrial building with RCC beam column frame structure. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column system.
iii. Floor System	: RCC Beam slab.
iv. Floor Area	: Floor area is (12506 sft x 6) = 75036 sft for main factory building.
v. No. of Stories	: 6 storied
vi. Construction Year	: 2014.
vii. Foundation Type	: Isolated Footing Foundation
viii. Design Drawings	: Available document: Approval plan, structural drawing, Architectural design drawing, soil test report, machine layout plan. Not available: floor load plan, material test reports.
ix. Soil Investigation Report	: Available
x. Construction Materials	: Brick aggregate.
xi. Generator	: Outside the factory building at the factory premises.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

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

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: N/A
Long Term (6-months)	: 1. Remedial action to be undertaken to prevent the intrusion of water from pipes and other sources.

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The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>Factory needs to remove all temporary obstruction from aisles and exit route for easy movement and safe discharge.</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p>	<p>Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for.</p> <p>Factory need to have proper testing plan & record for fire safety equipment.</p> <p>Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat. Lights in storage area needed to be installed with protective covers and conduits.</p> <p>Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Factory needs to have valid fire licenses covering the full area of the factory premises.</p> <p>All the exit doors need to be replaced by side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key.</p> <p>Factory needs to provide handrail on both sides of all the stairways.</p> <p>Factory needs to be installed with adequate illuminated emergency lighting in floors, exits& stairs.(escape route).</p> <p>Factory need to have emergency backup power for critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Fire department pre-plan needs to be developed.</p> <p>Factory needs to maintain minimum width of exit 0.9 m and height 2 m.</p> <p>Final exit route-2 (stair- 1 and 2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected from bonded ware</p>

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	<p>house at ground floor with a rated lobby by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</p> <p>Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors.</p> <p>Bonded ware house at ground floor needs to be protected with rated enclosure and lobby from final exit (stair-1 and 2 route) Boiler, generator and sub-station room needs to be protected with 4 hours rated construction and 2 hours rated opening/doors from adjacent main production building located at different sheds.</p> <p>Stair-1 and 2 need to be protected with fire and smoke resistant enclosures and opening (2 hours rated enclosure and 1.5 hour rated door) and needs to provide protected lobby at ground floor with bonded ware house (with 4 hours rated enclosure and 2 hours rated door) and provide the protected route from all though the stairway to the final exits.</p> <p>Stair-3 need to be protected by closing all opening with 2 hours rated construction within 3m (both side) of the stair and fitted 1.5 hours rated doors/opening at each floor level entrance except ground floor with 2 hours rated enclosure & 1hour rated auto closing door.</p> <p>Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</p> <p>The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.</p> <p>Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.</p> <p>Factory needs to install proper standpipe system withhaving at least 100mm dia of riser.</p> <p>Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses</p> <p>Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</p>
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	<p>Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.</p> <p>Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.</p> <p>Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.</p>
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(B): Recommendations for Electrical Safety Corrective Actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating ($> \text{ambient} + 40^{\circ}\text{C}$) and take proper action</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p>	<p>Ensure all distribution boards (including panel door) are earthed properly.</p> <p>Install circuit breaker in proper way and proper place to ensure safe installation.</p> <p>Remove all unused cables from distribution boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug.</p> <p>Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.</p> <p>Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</p> <p>Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.</p>
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<p>Install appropriate number and type of safety signage and fire-fighting equipment at substation and generator room. Also ensure graded rubber mats are provided in front of all distribution boards.</p> <p>Provide Instruction board for first aid and artificial respiration in the substation room and generator room.</p>

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	<p>Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil.</p> <p>Provide two separate and distinct connections of earthing for each generator</p> <p>Ensure distribution boards have a minimum clearance of 1 m (39 in) in front.</p> <p>Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous earth path is back to main building intake.</p> <p>Rewire to ensure each incoming supply to an MCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's.</p> <p>Ensure all electrical wiring/cables are sized according to capacity of circuit breakers.</p> <p>Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</p> <p>Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(20°C-40°C)} and take proper action.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<p>Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</p> <p>Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</p> <p>Inspect electrical panel boards on an annual basis.</p> <p>Ensure substation room has minimum area as per NTPA Table-4.3. Ensure underground cables for electrical distribution in the premises are encased in GI or PVC pipes and laid in earth trenches of sufficient depth as per mentioned standard.</p> <p>Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.</p> <p>Ensure distribution boards have no opening and all live internal components are concealed properly.</p>

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	<p>Provide dedicated & adequate size of neutral with proper identification for each circuit.</p> <p>Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</p> <p>Provide adequate support or mechanical guards for electrical wiring.</p> <p>Provide adequate covers on cable trenches and cable channels. Provide proper cable terminator/connector for stranded conductors at its point of termination.</p> <p>Install separate distribution boards for lighting and power circuits.</p> <p>Install lightning protection system on the building.</p>
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