

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ASPIRE APPARELS LTD.
Address of the Factory	: 198/1, Kabi Jashim Uddin Road, (2nd & 3rd Floor), Pagar Bat Tala, Tongi, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 16 th June, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 16 th June, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 16 th June, 2015
BKMEA Membership No.	: 1987

BASIC INFORMATION:

The assessed factory building is six storied dual system structure (Both RCC Beam-Column and flat plate structure). The following general information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column and flat plate frame system.
iii. Floor System	: RCC beam slab floor and flat plate slab floor system.
iv. Floor Area	: Total floor area is 16050 sft.
v. No. of Stories	: Six-Storey.
vi. Construction Year	: In phase. (2008-2009 and 2014-2015)
vii. Foundation Type	: Isolated footing foundation.
viii. Design Drawings	: Available document: Approval drawing, Partial structural drawing, As Build drawing of machine layout plan and Soil test reports. Not available- Full set of structural & architectural drawing, floor load plan.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick Aggregate (In column).
xi. Generator	: None.

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)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none">• Factory Engineer to review design, loads and columns stresses in area identified above. Verify in-situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for [the identified columns] or [100mm dia. cores from 4 columns].
Long Term (6-months)	: <ul style="list-style-type: none">• Protective coating should be applied on the exposed rebar and steel frame to protect them from corrosion.

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- Develop set of as-built drawings showing structure details, loading, dimensions, levels, Foundations and framing on Plan, Section and Elevation of the building.
- Produce floor load plan according to analytical report and manage floor load as per floor load plan.

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>	<ul style="list-style-type: none"> • All means of escape need to be free from any obstruction.
<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>	<ul style="list-style-type: none"> • 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. • Factory need to have proper testing plan & record of fire safety equipment. • 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. • 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>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • Fire license need to be revised with full area coverage of the factory building. • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. • All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.

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	<ul style="list-style-type: none"> • Factory needs to provide handrail on both sides of all the stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape route). • Factory need to have emergency backup power for critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Fire department pre-plan needs to be developed. • Factory needs to maintain minimum width of exit 0.9 m and height 2 m. • Final exit route-1 and 2 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 opening of production area at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have protected escape route till to reach safe refuse area. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Boiler room needs to be fire separated from finishing section with 4 hours fire rated enclosure and 2 hour rated opening. • All the stairs (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 provide the protected route from all though the stairway to the final exits. • 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. • 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. • Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline

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	<ul style="list-style-type: none"> • Factory needs to install proper standpipe system with having at least 100 mm dia of riser. • Install 1 riser per 1000 m² of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area. • 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. • Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection. • Factory needs to install standby generator with required backup power. • Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory. • Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900ltr x 75min=142500 liters water storage tank.
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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>	<ul style="list-style-type: none"> • Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection, etc.) of burning sign/insulation damage and take proper action including replacing cable or equipment where necessary.
<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>	<ul style="list-style-type: none"> • Ensure all distribution boards (including panel door) are earthed properly. • 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. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit.

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	<ul style="list-style-type: none"> • Ensure proper earthing connections at all electrical equipment. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Ensure inspection for all earthing systems is being completed and documented.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Install appropriate number and type of safety signage and fire-fighting equipment at substation room. Also ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction board for first aid and artificial respiration in the substation room. • Ensure in the substations room have adequate illumination level as per standard. • Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil. • Ensure distribution board has a minimum clearance of 1 m (39 in) in front. • 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. • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for electrical equipment and wiring where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the building to the building earthing system. • 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+(

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	20°C-40°C)} and take proper action.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical panel boards on an annual basis. • Ensure the substation room has adequate fire separation from the production area. • Provide adequate means of ventilation for the substation room based on the installed equipment considering fire barriers. • 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. • Ensure distribution boards have no opening and all live internal components are concealed properly. • Install circuit breaker in proper way or proper place to ensure safe installation. • Provide dedicated & adequate size of neutral with proper identification for each applicable circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Provide adequate covers on cable channel. • Ensure surface/exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Provide an emergency power generator with adequate capacity for the building. • Install separate distribution boards for lighting and power circuits.

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	<ul style="list-style-type: none">• Install lightning protection system on the building.
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