

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Dawn Garments And Textiles Ltd.
Address of the Factory	: 1/1, Chandi Charan Bose Street, Wari, Dhaka-1203, Bangladesh,
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 19 th April, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 19 th April, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 19 th April, 2015
BGMEA Membership No.	: 511

BASIC INFORMATION:

The assessed factory building was a 6 Storey RCC building with a non-engineered shed at roof which covered 25% of roof area. The structural system of the building was beam column frame and beam slab floor system. All floors of the building occupied by Dawn Garments And Textiles Ltd. however a few retail private shops and an ATM booth is located at ground floor at front side of the factory building. The following general information were noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame structure system.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Plinth level area is 4916.5 sft. and total area of the factory is 29500 sft.
v. No. of Stories	: 6 Storey.
vi. Construction Year	: 1994-1995.
vii. Foundation Type	: Unknown.
viii. Design Drawings	: Unavailable.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick aggregate. (Identified by removing plaster)
xi. Generator	: At ground floor of the building.

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 column stresses in the areas identified above.• Engineer Verify in situ concrete stresses either by cores (100mm diameter) or existing cylinder strength data for all the columns or cores from a minimum of 4 non-critical columns.• Remedial action to be undertaken to prevent the seepage of water from pipes and other sources.

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- Long Term (6-months) :
- Continue to implement load plan.
 - Continue to monitor steel corrosion on an ongoing basis. Provide protective coating to cover the exposed rebar from corrosion.
 - Develop a full set of as-built drawing.

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"> • None.
<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"> • Factory need to have proper testing plan & record of fire safety equipment. • Lights in storage area needed to be installed with protective covers and conduits. • Install automatic fixed type heat detector and portable fire extinguisher at kitchen area. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9 m 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 have as built drawing with proper dimensions showing all the means of escape. • All the exit doors of staircase enclosure need to be replaced by side swinging fire rated doors so that the staircase remains free from smoke as well as the lockable doors can be opened easily in the direction of evacuation without the use of a key. • Provide handrail on both sides of the stairways. • Factory needs to be installed with adequate illuminated emergency light in the emergency escape route.
<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"> • Factory needs to have a proper pre-plan for fire service & civil department. • Factory needs to ensure minimum clear width of stair

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	<p>0.90 m as per minimum requirement.</p> <ul style="list-style-type: none">• Final exit route-1 need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected with generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have a 2 hours rated protected (Godown at GF) escape route till to reach safe refuse area.• Factory need to protect the childcare room by 3 hours fire rated construction with same rated opening from the working floor of the building.• Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors with the cutting section of ground floor.• Boiler: Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the working floor (Finishing & Iron section) of 1st floor of the building.• Generator: Generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door from stair-3 as well as from the final exit route-3 located at ground floor.• All the stairs need to be protected with fire and smoke resistant enclosures & opening (2 hours rated enclosure and 1.5 hour rated door)and provide a 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• Factory needs to install proper standpipe system having at least 100 mm diameter of riser according to NTPA guideline.
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	<ul style="list-style-type: none"> • Factory needs to install 1 riser per 1000 m² of floor area & 38 mm diameter of fabric hoses with variable nozzle. • 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 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 $1900 \times 75 = 142500$ 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 the cause of burning sign and take proper action including replacing cable or equipment where necessary. • 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+ 40⁰C) and take proper action.
<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 panel door of distribution boards are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.
<p>Mid Term</p> <p><i>(The remedial works indicated must be</i></p>	<ul style="list-style-type: none"> • 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

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<p><i>carried out within a period of 6 weeks)</i></p>	<p>front of all distribution boards.</p> <ul style="list-style-type: none"> • Provide Instruction board for first aid and artificial respiration in the substation room and generator room. • Ensure the substation room and generator room has adequate illumination level as per standard. • Fill the transformer breather with fresh Silica gel. • Provide two separate and distinct connections of earthing for each generator. • Ensure distribution boards are installed in compliant locations in terms of height and access. • Provide dedicated & adequate size of earthing with proper identification for each circuit. • Rewire to ensure single cable at busbar and/or circuit breaker terminal to avoid loose connection, overloading and separate controlling of each circuit/branch circuit. • Replace wooden bases with metal clad construction for mounting the lighting boards and switch controls. • Ensure all electrical wiring/cables are sized according to capacity of circuit breakers. • Provide mechanical guards for electrical equipment 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. • Ensure Lighting fixtures are supported from the structure properly. • 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+(20⁰C-40⁰C)} and take proper action.
<p>Long Term <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

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	<p>Measurement Program and record the related testing data.</p> <ul style="list-style-type: none">• Inspect electrical switchgear and panel boards on an annual basis.• Ensure substation room has minimum height & area as per NTPA Table-4.3 respectively.• Ensure the substation room has adequate fire separation from the production area.• Ensure the generator room has adequate fire separation from the production area.• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.• Ensure distribution boards have no opening and all live internal components are concealed properly.• Provide dedicated & adequate size of neutral with proper identification for each circuit.• Ensure each distribution board is provided with a circuit list and means of identification is obtained as per list.• Use non-combustible material to make cable channel and provide adequate covers on cable channel.• Provide proper cable terminator/conductor for stranded conductors.• Install lightning protection system on the building.
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