

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Bay T-Shirt Ltd.
Address of the Factory	: Gafur Super Complex (2nd Floor) Enayetpur, Panchaboti, Fatullah Narayangonj-1400 Bangladesh.
Present Status of the Factory	: Under operation
Structural Assessment Conducted by	: ACCORD
Date of Structural Inspection	: 2014-03-16
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-13
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-13
BKMEA Membership No.	: 914

BASIC INFORMATION:

The present Garment factory is a commercial building with beam column frame structural system. The following information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: R.C.C Building.
iii. Floor System	: Flat slab on Ground and 1st Floor, Moment Frame System with Beams and slabs on 2nd to 5th Floors. Shallow beams of 150mm Down stand, 950mm wide.
iv. Floor Area	: Total floor Area=1035 sqm, 2nd floor=825 sqm, Roof Floor=200 sqm, Generator room = 10 sqm
v. No. of Stories	: One number of 6-storied reinforced concrete buildings with Basement floor.
vi. Construction Year	: 2003
vii. Foundation Type	: Deep Foundation
viii. Design Drawings	: Available (But, not matching)
ix. Soil Investigation Report	: Not mentioned in Accord report.
x. Construction Materials	: Not mentioned in Accord report.
xi. Generator	: At Single Storied pre-fabricated steel shed.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

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

Short Term (Immediate)	: 1. Maintain current use of the floors and don't change use or increase occupation, either of which could increase loading. 2. Building Engineer to verify whether the perimeter columns are free standing or merge with structural retaining walls at basement level. Floors to be cleared in the vicinity of the external columns 3. Excess material from roof to be removed. 4. A Building Engineer should check the new stability system for the building as it does not match the permit drawings. 5. Building engineer to check, collect information and produce accurate and complete as-built documentation.
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- Mid Term (6-weeks) :
1. Produce and actively manage loading plans for all floors within the factory giving consideration to floor capacity and column capacity.
 2. Verify in-situ concrete stresses either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns.
 3. Detail Engineering Assessment to be completed.
 4. A Building Engineer to complete the assessment of the stability system and make recommendations based on his findings.
 5. Provide a copy of new drawings to Building Owner to keep as records.
 6. Sections of plaster finish to beams to be removed to investigate if cracks penetrate the building structure.
 7. Manage drainage from above levels and water tanks to downpipes to avoid structural corrosion due to continuous moisture. Vegetation to be removed.
 8. Building Engineer to inspect and make recommendations on steel truss supports to resist high wind loading.

- Long Term (6-months) :
1. Continue to implement load plan
 2. Building Engineer needs to check existing flat slab system. Lateral system is required to ensure stability of the structure.
 3. Building Engineer to carry out design check on beams to confirm that these cracks are non-structural.
 4. Building Engineer to prepare Allowable Floor Loading Plans.
 5. Continue to check for water damage and vegetation growth.
 6. Implement Building Engineer's recommendations.

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>N/A</p>
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<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. 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 floor machine layout showing means of escape with proper dimension. • Factory need to valid fire licenses with full area covering. • The entire exit doors (collapsible) 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. • Factory need to provide handrail on both sides of each stairways. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route). • Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of failure of power supply.
<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 department. • Both the final exit routes of stairs-1 & stairs- 2 need to be protected by providing 2 hour rated enclosure with 1.5 hour rated fire doors in each floor level entrance (i.e. exits connecting with staircase) including ground floor and need to have the protected route (i.e. need to separate from the market at ground floor) till to reach safe discharge area. • Storage area (Accessories store at 2nd floor) need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors from the finishing section of 2nd floor of the factory. • Boiler room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside. • All the exits connecting to the staircase-1 and staircase-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 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

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	<p>building.</p> <ul style="list-style-type: none"> • Factory needs to be installed with control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory needs to install proper standpipe system with having at least 100 mm dia of riser. • Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 kPa and 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 needs 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"> • Ensure there is no break in the neutral wire in the form of a switch or fuse unit throughout the wiring installation. • 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. • Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) of burning sign/insulationdamage and take proper action including replacing cable or equipment where necessary.
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<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. • 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 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 generator 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 generator room. • Ensure in the generator room have adequate illumination level as per standard. • Provide two separate and distinct connections of earthing for generator. • Ensure distribution boards are installed in compliant locations in terms of height. • Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake. • Rewire to ensure each incoming supply to an MCB has a dedicated supply from busbar. Avoid the use of multiple cables on outgoing side of MCB's. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.

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	<ul style="list-style-type: none"> • Provide emergency power connection for life safety loads (fire alarm, fire pump, emergency lighting, exit signage, etc.) temporarily within 6 weeks and find out a permanent solution within 6 months • 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+(200C-400C)} 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 switchgear and panel boards on an annual basis. • Ensure overhead service connections to the building are led via adequate size and type of service masts. • Provide adequate means of ventilation for the substation room based on the installed equipment considering fire barriers. • Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities. • Replace distribution boards with metal enclosed body. • Ensure panel boards have no opening and all live internal components are concealed properly. • Install panel boards in proper way or proper place to ensure safe installation. • 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 provided as per list. • Use noncombustible material to make channel and/ or cable trench and provide adequate covers on cable channel. • Ensure surface/exposed wiring are run either horizontally or vertically with proper • Provide proper cable terminator/connector for stranded conductors at

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	<p>its point of termination.</p> <ul style="list-style-type: none">• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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