

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Stitch Apparels Ltd.
Address of the Factory	: 170, Baizid Bostami I/A, Nasirabad, Chittagong.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: TÜV SÜD Bangladesh (Pvt.) Ltd.
Date of Structural Inspection	: 2015-02-27
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-09-01
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-09-01
BGMEA Membership No.	: 4485

BASIC INFORMATION: The present garment factory is RCC beam column frame slab system. The following general information was noted:

i. Building Usage Type	: Garment factory
ii. Structural System	: RCC beam column slab system.
iii. Floor System	: RCC beam slab system.
iv. Floor Area	: The typical plinth area is 7500 sq. ft. and total production floor is 45000 sq. ft.
v. No. of Stories	: 6 Storey (Including partial shed on 5th floor).
vi. Construction Year	: 1st Phase: Construction started in 2007. 2nd Phase: Construction started in 2011.
vii. Foundation Type	: Cast-in-situ foundation.
viii. Design Drawings	: Available (approval for a 6-storied RCC building from Chittagong Development Authority (CDA) on 23rd July, 2006 for residential use.)
x. construction Materials	: Stone Aggregated.
xi. Generator	: Southern side of ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION: Columns were found highly stressed due to over load and big tributary area which may pose high risk to operations in the factory. During the assessment, other non-conformities were found. Mid-term and long term corrective actions are recommended. **Corrective action for structure are,**

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Factory Engineer to review design, loads and columns stresses in area identified above. 2. Verify in situ concrete stresses either by 100mm dia. cores or existing cylinder strength data for G7 column.
Long Term (6-months)	: 1. Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.

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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>N/A</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>	<ul style="list-style-type: none"> • Factory needs to conduct fire drill quarterly (4 times a year) under the fire safety plan and needs to kept the written record of such drills 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 are needed to be installed with protective covers and conduits. • All required means of exit or exit access in buildings or areas requiring more than one exit shall be signposted. The signs shall be clearly visible at all times, where necessary supplemented by directional signs.
<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 needs to be updated for full occupied area. • 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. • 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). • 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. • Final exit route-1 (stair-1 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance including ground floor escape route till to reach safe refuse area.

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	<ul style="list-style-type: none">• Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors.• Generator room need to be protected by 4 hours rated construction with 2 hours rated opening / door.• Boiler room need to be protected with 4 hours rated construction with 2 hours rated opening / door.• All the exits connecting to the staircases 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 building.• Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.• Install proper standpipe system having at least 100 mm diameter of standpipe..• 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 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 \square 75 =
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	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>	N/A
<p>Short Term <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 panel 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. • 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 is being completed and documented for all earthing system.
<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"> • Post safety signage in the generator room and ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction boards for first aid and artificial respiration in the generator room. • Ensure generator room has adequate illumination level for working as per standard. • Provide two separate and distinct connections of earthing for the generator.

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	<ul style="list-style-type: none"> • Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth bus bar of distribution boards and ensure continuous earth path is back to main building intake. • Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of MCB's/ MCCB's. • Replace wooden bases are used with metal clad construction for mounting the circuit breakers. • 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.
<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. • Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers. • Ensure panel 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 provided as per list. • Provide adequate covers on cable channel. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits.

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	<ul style="list-style-type: none">• Ensure Lighting fixtures are supported from the structure properly• Install lightning protection system on the building.
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