

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Balaka Stitch (Pvt) Ltd.
Address of the Factory	: 636, Sharifpur Road, National University, Gazipur, Bangladesh
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 14 th February, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 14 th February, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 14 th February, 2015
BGMEA Membership No.	: 4513.

BASIC INFORMATION:

The assessed factory building was a 5 Storey RCC building. In addition, there is a single storied undocumented non-engineered shed that covers 40% of the roof top. The structural system of the building is RCC beam column frame and beam slab floor system in 3rd and 4th floor, rest of the floor is RCC flat plate system with periphery beam. Balaka Stitch (Pvt) Ltd. operates on the ground floor and 1st floor and rest of the floors is occupied by another factory. The following general information were noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame and flat plate with periphery beam system.
iii. Floor System	: RCC beam slab floor and flat plate floor system.
iv. Floor Area	: Total floor area is 14,500 sft. (Ground to 2nd floor)
v. No. of Stories	: 5 Storey + Non engineering shed (40% of roof).
vi. Construction Year	: 2007-2008 (One phases).
vii. Foundation Type	: Isolated column footing foundation.
viii. Design Drawings	: Available.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Stone aggregate. (Column)
xi. Generator	: At ground in Separate shed.

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">• Building engineer to verify impact of the additional structure on roof in terms of strength and stability.• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
Long Term (6-months)	: <ul style="list-style-type: none">• Continue to implement load plan and manage floor loading.

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- Building engineer to check the capacity and stability of the lightweight roofs and make any necessary alterations.

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"> • 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. • 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"> • Needs to have as built drawing with floor machine layout showing means of escape with proper dimension. • Factory needs to have a valid fire license with the full occupied area & needs to be mentioned in the fire license. • 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

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	<p>direction of evacuation without the use of a key.</p> <ul style="list-style-type: none"> • Provide continuous guards and handrails on both sides of the stairs. • 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-3 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 boiler at ground floor 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. • Storage area needs to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Generator: Generator room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the main production floor at generator shed near production building. • Boiler: Boiler room need to be protected with 4 hours rated construction & 2 hours rated opening / door from the final exit route-3 as well as iron section located at ground floor. • All the exits connecting to the staircase-1, 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,

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	<p>including other tenanted floors of the building.</p> <ul style="list-style-type: none"> • 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 with having at least 75 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. • Install standard standpipe and hose system as well as fire pump system to ensure required hose pressure at the highest and most remote part of the building. • 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 dedicated fire pump with sufficient capacity and backup power as per NTPA Guideline. • 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 the cause (improper cable selection, improper protective device selection, improper termination, rusted connection, heat source etc.) 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+ 40°C) 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 all switchboards and distribution boards (including panel door) are earthed properly. • Remove all unused cables from distribution boards/box and make sure all necessary cables are properly

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	<p>terminated at its point of termination using appropriate size and type of lug.</p> <ul style="list-style-type: none"> • 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 <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, and provide graded rubber mats in front of all distribution boards. • Provide Instruction board for first aid and artificial respiration in generator room. • Provide two separate and distinct connections of earthing for each generator. • Ensure switchboards are installed in compliant locations in terms of height. • 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 avoid the use of multiple cables on incoming/outgoing side of MCB's/MCCB's and bus bar. • Replace wooden base with metal clad construction for mounting the lighting boards switch controls and circuit breaker. • Provide adequate support or mechanical guards for 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

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	<p>damage, multiple cables at single point,) of overheating { ambient+(20⁰C-40⁰C)} 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>	<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 to ensure that the equipment is in good working condition. • Ensure overhead service connections to the building are led via adequate size and type of service masts. • 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 provided as per list. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building confirming its requirements and adequacy.