

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Bds Alliance Ltd.
Address of the Factory	: Chawkpara, Mawna, Sreepur, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 17 th February, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 17 th February, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 17 th February, 2015
BGMEA Membership No.	: 5398.

BASIC INFORMATION:

The assessed factory building was a single storied non-Engineered roof truss corrugated iron (CI) shed supported by RCC column. In addition, there are few ancillary non-engineered small sheds, which are used as office, generator room, dining and boiler room. Bds Alliance Ltd. operates in the entire building. The following information was noted:

- i. Building Usage Type : Garments Factory.
- ii. Structural System : RCC columns with roof truss system.
- iii. Floor System : Roof truss CI shed.
- iv. Floor Area : Total floor area 12480 sft.
- v. No. of Stories : Single storey.
- vi. Construction Year : 2012.
- vii. Foundation Type : Isolated footing foundation.
- viii. Design Drawings : Available: Architectural drawing, Structural drawing (inconsistent with existing structure), and approval plan.
- ix. Soil Investigation Report : Available.
- x. Construction Materials : Brick Aggregate.
- xi. Generator : Separate Structure.

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:

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| Short Term (Immediate) | : None. |
| Mid Term (6-weeks) | : <ul style="list-style-type: none">• Building Engineer to check the lateral stability of roofing system. |
| Long Term (6-months) | : <ul style="list-style-type: none">• Building Engineer should prepare full set of structural drawings according to the existing condition. |

The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

Immediate <i>(the factory should not continue to be</i>	N/A
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<p><i>occupied until these non-conformities have been rectified):</i></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"> • 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. • All the firefighting equipment's need to test with proper documents. • Lights in storage area needed to be installed with protective covers and conduits. • Ensure adequate exit signs in all floors so that it is visible from all positions. • Potable fire extinguisher needs to be of an approved type and installed as per manufacturer's instruction and placed near the path of exit travel where easily accessible. Portable fire extinguisher needs to be installed in private and public buildings as per specification and requirements of BDS 825:1991 (BDS 825:91). • Kitchen area should be fixed with fixed temperature type detectors and portable fire extinguishers as per guideline. • 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 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. • Illuminated emergency light needs to be covered in floor, exits and aisles. The intensity of illumination by means of escape lighting needs to be equal or more than 10 lux. The aisles need to be illuminated with escape lighting to a level of not less than 2.5 lux at floor level.

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	<ul style="list-style-type: none"> • 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. • Emergency back-up power needs to be connected for (a) exit sign, (b) fire alarm and detection system, (c) emergency lighting, (d) automatic fire detection and alarms systems.
<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. • Factory needs to maintain minimum width of exit 0.9 m. • Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors. • Generator room needs to be fire separated with 4 hours fire rated enclosure and 2 hours rated opening having direct access from outside. • 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 detection and alarm system at required location. • Need to Install 75 mm diameter standpipe and hose system in the factory building. • 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. • Ensure the minimum pressure for standpipes supplying a 50 mm 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 install Siamese connection after installation of stand pipe and hose system and fire pump. • 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

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	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"> 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 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 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"> 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 each generator. 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 has a dedicated supply from bus bar. Avoid the use of multiple cables on outgoing side of MCB's. Replace wooden panel with metal clad construction for

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	<p>mounting the circuit breaker.</p> <ul style="list-style-type: none"> • 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+(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 panel boards on an annual basis. • 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 applicable circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Ensure wiring systems are selected and erected so that no damage is caused by the ingress of water. • Provide proper cable terminator/connector for stranded conductors at its point of termination.