Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: 3S International Ltd.
Address of the Factory	: 144/1 Alubdi, Pallabi, Miirpur-12, Dhaka-1216.
Present status of the factory	: Under Operation.
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-10-11
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-10-11
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-10-11
BGMEA Membership No.	: 6052

BASIC INFORMATION:. The factory building is a three storied dual system structure, where 1st floor to 2nd floor is RCC flat plate system and Ground floor is beam column frame system. The following general information was noted:

i. Building Usage Type	: Garment Factory
ii. Structural System	: RCC dual system
iii. Floor System	: RCC Beam Slab and Flat Slab
iv. Floor Area	: Floor area is 12021 sq. ft. (total) for main factory building.
v. No. of Stories	: 3- Storied.
vi. Construction Year	: 2010 (verbal information of factory representative).
vii. Foundation Type	: Foundation is pile foundation as per drawing, the recommendation of soil test report agrees with foundation Drawing.
viii. Design Drawings	: Available- structural (mismatch) design drawing, approval plan. Not available: architectural design drawing, floor load plan as built machine layout plan, and material test report were not available.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Brick Chips. (column, beam)
xi. Generator	: Separate shed.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Building Engineer to survey column locations and compare with structural drawings. Updated drawings to be prepared showing the correct as constructed layout. 2. Engineer to inspect whether water proofing material is applied or where it can be maintained. For both durability and serviceability, waterproofing on the roof slab is recommended. Moreover the roof slab drainage system and leakage of pipes should be investigated.
Long Term (6-months)	: 1. Structural engineer should prepare as built structural drawing, and update calculations showing the structural adequacy of the

floor system taking into account the factory design imposed loading and the as built structure.

2. Provide protective coating to cover the exposed rebar from corrosion.

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

(A): Recommendations for Fire Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity*	• 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. • 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. • 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.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • 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).
Long Term (The remedial works indicated must be carried out within a period of 6 months)	• Fire department pre-plan needs to be developed. 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 from wastage store room at ground floor, also need to have a protected escape route till to reach safe refuse area. • Storage area need to be protected with 4 hours rated construction & 2 hours rated opening or doors. • Boiler : • Boiler room needs to be fire separated with the working area (sewing section and finishing section) by 4 hours rated construction and 2 hours rated opening. • All the stairs need to be protected with fire and smoke resistant enclosures and opening (1 hours rated enclosure and 0.75 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 with having at least 75 mm dia of riser. • 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.

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	N/A
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)*	• Ensure all distribution boards (including panel door) are earthed properly. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Ensure graded rubber mats are provided in front of all distribution boards. • 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. • 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. • Connect all metal in the building to the building earthing system.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• 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 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. • 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 proper cable terminator/connector for stranded conductors at its point of termination. • Provide an emergency power generator with adequate capacity for the building. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building.