Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ASIA COMPOSITE MILLS LTD.
Address of the Factory	: Mawna, Sreepur, Gazipur Bangladesh.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-05
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-05
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-05
BKMEA Membership No.	: 1957

BASIC INFORMATION: The present garment factory is a factory building with steel beam column, rafter, purlin and pre-fabricated steel structure. The following general information was noted:

i. Building Usage Type	: Garment factory.
ii. Structural System	: Steel beam column, rafter, purlin and pre-fabricated steel structure.
iii. Floor System	: Steel beam column, rafter, purlin and pre-fabricated steel structure with .5mm profile sheet.
iv. Floor Area	: Floor area is (GF=140000 x 1) = 140000 sft for main factory building.
v. No. of Stories	: Single storied pre-fabricated shed.
vi. Construction Year	: 2004 to 2005.
vii. Foundation Type	: Could not be verified since no structural design documents Not available.
viii. Design Drawings	: Not available: Approval plan, structural drawing, Architectural drawing, Machine layout plan and material test report has not been found.
ix. Soil Investigation Report	: Available.
x. construction Materials	: Steel beam , column
xi. Generator	: Ground floor in separated shed.

RECOMMENDATIONS FOR CORRECTIVE ACTION: Corrective action for structure are,

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Design should be checked by the Building Engineer to confirm that it includes an appropriate lateral stability system and, if required, the steel frame should be upgraded to support code vertical and wind loads.
	2. Structural engineer to prepare full set of structural drawing, as built drawing and prepare/update calculations showing the structural adequacy of the floor system and the as built structure.

Long Term (6-months) : 1. Provide vertical bracing if required.

2. Develop set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings.

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*	• 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. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct need to be at least 2.9 m and when used as a storage facility there needs to have 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 have as built drawing with proper dimensions showing all the means of escape. • Factory needs to have as built drawing with proper dimensions showing all the means of escape. • Factory manager or director needs to arrange fire safety training for the workers of the factory from proper authority time to time. Factory need

	to arrange in house fire training within short term (1-2 weeks). • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs. (Escape route). • Factory need to install sufficient capacities standby generator and connected to supply power for staircase and corridor Lighting, fire lifts, standby fire pump, pressurization fans and blowers, smoke extraction and damper systems in case of failure of normal electricity supply and must having the minimum capacity to serve for 1 hour with the NTPA requirements.
Long Term (The remedial works indicated must be carried out within a period of 6 months)	• Factory needs to have a proper pre-plan for fire department. • Factory needs to have a proper pre-plan for fire department. • Basement staircase needs to be encased and placed near the outer edge of the basement with materials of 4 hours fire resistance. The stair needs to be separated from the basement in such a way that smoke from a fire in the basement not enter the ground and upper floors. Communication with the basement in case of emergency needs to be maintained through a lobby provided with a fire resisting self-closing door of 2 hours fire resistance. • 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 be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• Find out cause (improper cable selection, improper protective device selection, improper termination, rusted connection.) of burning sign and insulation damage 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+ 400C) and take proper action.
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. • 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 inspection of all earthing system is being completed and documented.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Post appropriate type of safety signage at substation and generator room and ensure graded rubber mats are at required location. • Provide Instruction board for first aid and artificial respiration in the substation room and generator room. • Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil. • 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. • Connect all metal in the shed to the main 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.

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 switchgear and panel boards on an annual basis • 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. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the shed and building.