Name of the Factory	: BIVA APPAREL (PVT.) LTD.
Address of the Factory	: BSCIC Industrial Estate, Plot B, House # 409/410, Fatullah, Narayanganj-1400, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: TUV
Date of Structural Inspection	: 8th April, 2015
Fire Assessment Conducted by	: TUV
Date of Fire Inspection	: 8th April, 2015
Electrical Assessment Conducted by	: TUV
Date of Electrical Inspection	: 8th April, 2015
BKMEA Membership No.	: 1981

BASIC INFORMATION:

The assessed building was four Storey RCC structure where the structural system was beam column frame at ground floor and flat plate floor system from 1st to 3rd floor. BIVA APPAREL (PVT.) LTD. had occupied this building as rental basis. The following general information was noted:

i.	Building Usage Type	: Garment Factory.
ii.	Structural System	: RCC beam column frame system for GF and flat plate system for rest of the floor.
iii.	Floor System	: RCC beam slab floor system for GF and flat plate slab for rest of the floor.
iv.	Floor Area	: Total floor area is 15,092 sft. approx.
v.	No. of Stories	: 4 Storey.
vi.	Construction Year	: 2004-2005.
vii.	Foundation Type	: Shallow Foundation (Spread footing, as per structural drawing).
viii.	Design Drawings	: Partially available (factory building occupied two plots which were plot no. 409 and 410. Approval document was available at the factory from BSCIC on 7th April, 1999 for plot no. 409 and 21th may, 2001 for plot no. 410 which was for 4 storied Industrial building).
ix.	Soil Investigation Report	: Unavailable.
x.	Construction Materials	: Brick aggregate in column.
xi.	Generator	: At ground floor of the building.

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) : None.

Long Term (6-months) :

- As built architectural and engineering drawing to be prepared. As part of this process building engineer will be required to make a number of checks on the as-built construction.

- Building Engineer need to check the adequacy of structural considering lateral stability system.

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*	• The minimum clear width of the pathway should be 0.9 meter • Remove all temporary items from all escape routes, aisles and passageway. • Direct route of access to required exits should be provided through stairways which are maintained free of combustibles. • Place the extinguisher near the path of exit travel and easily accessible. • The hose pipe performance should be checked periodically and properly tagged. • All the combustible items must be keep away from electrical installations. • Fire drill should be conducted quarterly (4 times a year) in existing buildings as detailed under the Fire Safety Plan & should kept record properly.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• Replace all existing exit doors on evacuation routes, exit doors with side hinged type door, which swing outward and in the direction of travel. Swinging of the door should not constrict the width of the corridor / passage below 0.9 meter. • Remove all locking device from all egress door. All exit doors should be open-able from the side they serve without the use of a key. • Provide handrails on both side of each stairway with height of 0.9m measured from the nose of stair to the top of the handrail. • Doors in stair should be outward opening, side-swing, self-closing, non-lockable 1.5 hrs fire rated doors in all stair way encloses.

	• Prepare proper plan and design for 4 hrs fire rated barriers with 2 hrs fire rated doors at ground floor generators room, which located at the adjacent to North-East side evacuation route and South-East side evacuation route. • Prepare proper plan and design for 4 hrs fire rated barriers with 2 hrs fire rated doors at ground floor generators room, which located at the adjacent to North-East side evacuation route and South-East side evacuation route. • Prepare proper plan and design for 4 hrs fire rated barriers with 2 hrs fire rated doors at 2nd floor- Boiler room, which located at the adjacent to finishing section. • The egress paths should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for all corridors & exit doors. Aisles should be provided with a minimum 2 lux. • The stairway should be illuminated with emergency lighting with power back-up supply & illumination should be a minimum of 10 lux for stairway. • Produce design and plan for automatic detection system with automatic fire alarm. • Provide adequate nos. of smoke detectors to cover the whole factory building. • Prepare proper design and plan to install dedicated fire pump with alternate backup power supply. • Replace existing 1 inch hose pipe replace with 1.5 inch hose pipe to meet the requirement of RMG guideline. • Plan and design to provide dedicated water storage tank for firefighting operation • Visual fire alarm should be place at Generator room. • Implement to a single fire safety management system with approvals from all tenants in the factory building. • Obtain the boiler license from the proper issuing authority. • Obtain the boiler operator license from the proper issuing authority.

Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Provide 4 hrs fire rated barriers with 2 hrs fire rated doors at ground floor generators room, which located at the adjacent to North-East side evacuation route and South-East side evacuation route. • Provide 4 hrs fire rated barriers with 2 hrs fire rated doors at ground floor generators room, which located at the adjacent to North-East side evacuation route and South-East side evacuation route. • Provide 4 hrs fire rated barriers with 2 hrs fire rated doors at 2nd floor- Boiler room, which located at the adjacent to finishing section. • Install automatic detection system with automatic fire alarm. • Install dedicated fire pump with alternate backup power supply. • Provide sufficient number of hose pipe with respect to area and travel distance as per RMG guideline. • Provide dedicated storage tank for firefighting operation

(B): Recommendations for Electrical Safety corrective actions:

Immediate (*the factory should not continue to be occupied until these non-conformities have been rectified*):	• None.
Short Term (*Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity*	• Relocate switchboards away from gas stoves / sinks / washing area / laundry (> 2.5 m). • Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
Mid Term (*The remedial works indicated must be carried out within a period of 6 weeks)*	• 1. Provide updated SLD matching the existing installation at the factory. 2. SLD to indicate exact positions of all points of switch boxes and other outlets. 3. SLD to be approved by the engineer-in-charge. • 1. Provide updated Electrical layout drawing prepared

	after proper locations of all outlets for lamps, fans, fixed and transportable appliances, motors etc. 2. Drawings to indicate exact positions of all points of switch boxes and other outlets to match existing installation. 3. As built drawing to be approved by the engineer-in-charge. • All unwanted materials should be removed from transformer / Generator room. • Provide rubber mats of adequate size in front of all distribution panels. • Install smoke detection and provide firefighting equipment in the substation and generator room. • Provide and maintain clear and legible identifications numbers & names on all incoming and outgoing circuits of HT / LT panels. • 1. Exit signs should be illuminated either by lamps external to the sign or by lamps contained within the sign. 2. The source of illumination should be providing not less than 50 lux. • Individual Fuse protection should be provided to every 15/20 A socket. • 1. Remove all the inflammable materials from surrounding of electrical circuitry at MDBs/SDBs. 2. Ensure that all electric circuitry clean of inflammable materials. 3. Conduct periodic maintenance and maintain the records. • 1. Overhead service connections should be covered and meet the requirements mentioned in RMG Guidelines. 2. Provide supports for main service line complete with adequate insulation. • Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards. • Provide cable connections with properly soldered /

	welded lugs at (LT/MDB/DB/SDB)'s. Ensure that all the electrical connections are properly secured with lugs and glands. • Avoid looping and bunch of cable at MCCB/MCB or bus bar terminal, use individual circuit and over current device for every incoming and outgoing circuit at the distribution boards. • Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use load, voltage, number of phases. • Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box. • Seal the cable penetrations through walls adequately with fire resistive elements. • Provide separate earthing connection to electrical equipments. Ensure that earth potential provided for all parts of equipment / installation (other than live parts) and that continuous earth connection is provided back to the main intake supply earth. • Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.
Long Term (*The remedial works indicated must be carried out within a period of 6 months)*	• Provide 4 hour fire rated walls all around the transformer / generator room on ground level. • Relocate generator set in substation building / adjacent to substation room. • Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs). • Relocate the MDBs with easy access. Ensure that all MDBs / SDBs should have easy accessibility. • Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level). • Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted). • Provide the wiring in PVC conduits or in metallic GI pipes. Ensure that all electrical wiring should be

	covered in proper conduit pipes. • Seal the cable entry-exit points of (LT/MDB/DB/SDB)'s with non-flammable materials. In addition: 1. Ensure that HT / LT panels / Switchgears to be vermin / damp proof. 2. Ensure all unused holes / openings in DBs to be blocked properly. • 1. Provide the ECC to meet minimum cross-sectional area as per table 4.5. 2. Ensure that connections between conductors / equipments provided to durable electrical continuity and adequate mechanical strength and protection. 3. The continuous earth connection is provided back to the main intake supply earth. • Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels at roof top of building.