Electrical Safety Assessment Report

Factory Assessed

TSS-FASHION

Telerchala, Mouchak, Kaliakor, Gazipur, Bangladesh.
24.0228444 N, 90.3003772 E

Date of Assessment	:	14 Oct 2021
Report Code	:	145_CP_2021_1170_TSS-FASHION_ESA_V00
Report Version	:	V00_14 October 2021
Name of the Assessor	:	Imtiaz Mahmud
Assessing Firm	:	CONCEPTS-PREVALENT JV

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1. Executive Summary

In order to promote a safe and sustainable Bangladeshi industrial sector, DIFE has undertaken a new project on “Preliminary Risk Assessment of Structural, Fire & Electrical Aspects of Selected Readymade Garment, Plastic and Chemical Factories” to ensure a safe working condition for the workers of those sectors. During the implementation of this project, a survey of the existing factory buildings of **TSS-FASHION** for electrical safety assessments was carried out on 14 October 2021 by Concepts-Prevalent JV. The safety assessment was conducted in accordance with Bangladesh National Building Code (BNBC) and other relevant Standards following some onsite non-destructive tests.

The production building is a 3-storied RCC building which consists of flat slab-column structure in GF to 1st floor and beam-column structure in 2nd floor. TSS-FASHION occupies the entire building. The Factory building is used as rental basis.

The sanctioned load of the industry was 48 KW. According to article 1.3.18.1 of BNBC 2020 (page-8-43), a load factor of at least 80% shall be applied to the estimated load for calculating the substation capacity. This requirement was not checked as it is out of the scope of this work and the calculation of the estimated load is a laborious job. However, the industry should be careful about this.

During the inspection, the electrical system of the building was assessed for 74 checkpoints to form an opinion regarding the level of compliance with respect to BNBC guideline of building assessment for **TSS-FASHION** factory.

1.1. Distribution of Checkpoints:

The checkpoints were categorized as below, based on the timeline of implementation. The following table and pie-chart show the distribution of checkpoints for the factory.

Sr. No.	Priority Levels	Implementation timelines	No. of Issues	% Share
1	**Immediate**	Action (remedy work indicated) can be carried out immediately	4	5.41%
2	**2 Weeks**	Action can be incorporated into an electrical safety management plan in 2 Weeks	7	9.46%
3	**6 Weeks**	Action (remedy work indicated) can be carried out within period of 6 Week	14	18.92%
4	**6 Months**	Action (remedy work indicated) can be carried out within period of 6 Months	10	13.51%
5	**On-going**	On-going activity - factory to implement on-going periodic inspections for these checkpoints.	1	1.35%
6	**Compliant**	Guideline requirement is generally compliant	16	21.62%
7	**N/A**	Checkpoint Not applicable to the factory	22	29.73%
		Total Check points	**74**	100%

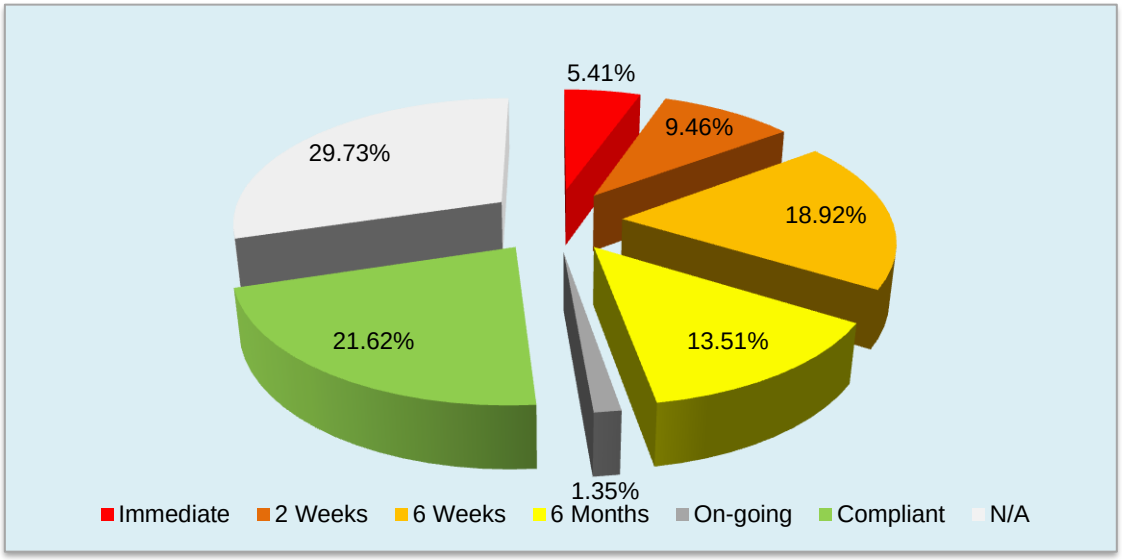


Figure 1: Distribution of Checkpoints based on Timeline of implementation

The non-compliances have been prioritized based on the timeline in which the corrective action can be implemented. As seen above, there are 5.41% non-compliances will not need much time to correct. So, authority should rectify them immediately. 9.46% of non-compliances need to be implemented in short term (2 Week), whereas 18.92% of non-compliances need Mid-term (6 Weeks) for corrective action. 13.51% of observations fall under long term (6 months) category for corrective action. Whereas 1.35% of non-compliances Ongoing. There are 21.62% of observations which show general compliance with BNBC guidelines. 29.73% of checkpoints were not applicable to the factory.

The checkpoints were categorized as below, based on the risk they possess. The following table and pie-chart show the distribution of checkpoints for the factory.

Sr. No.	Priority Levels	Description	No. of Issues	% Share
1	**Very High**	Issues/Checkpoints of **Very High** Risk/Priority Level	6	8.11%
2	**High**	Issues/Checkpoints of **High** Risk/Priority Level	17	22.97%
3	**Moderate**	Issues/Checkpoints of **Moderate** Risk/Priority Level	9	12.16%
4	**Low**	Issues/Checkpoints of **Low** Risk/Priority Level	4	5.41%
5	**Nil**	Issues/Checkpoints of **Nil** Risk/Priority Level	0	0.0%
6	**Compliant**	Compliant Issues/Checkpoints	16	21.62%
7	**N/A**	Checkpoint Not applicable to the factory	22	29.73%
		Total Check points	**74**	100%

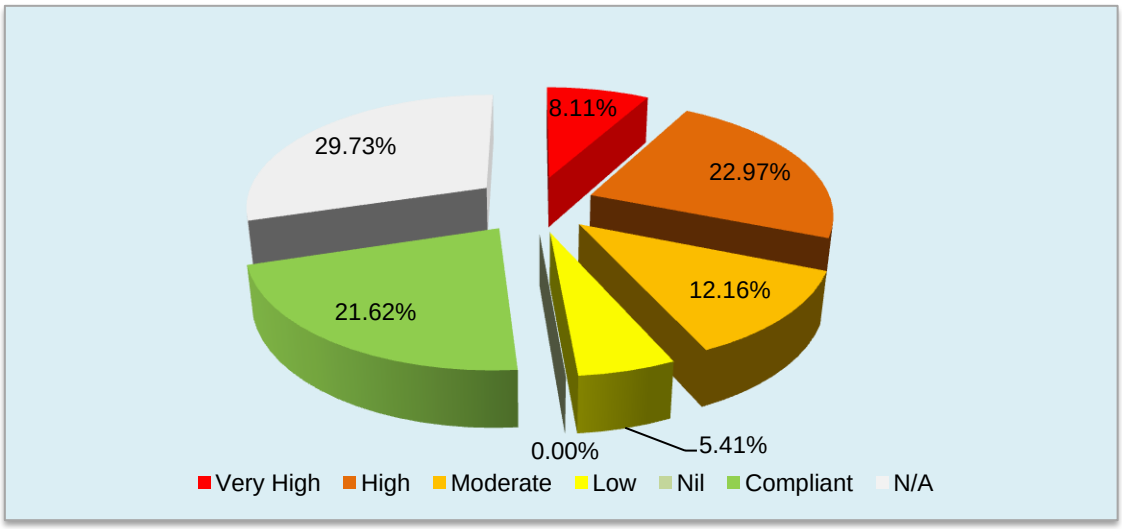


Figure 2: Distribution of Checkpoints based on risk level

Out of the 74 checkpoints 36 issues were observed in this factory which were not compliant with the guidelines, 16 issues were recorded as compliant. Further, 22 issues were not applicable to the factory.

The factory exhibited overall compliance in the following areas:

- The factory had proper connected load approval.
- Adequate ventilation observed in generator room.
- Generator room were adequately illuminated.
- Adequate manual changeover switch was used with the provision of interlocking capabilities.
- Some major non-compliance recorded during the audit is enlisted below:
- Electrical Single Line Diagram was not available.
- Unwanted materials were stored inside Generator room.
- No rubber mat was provided in front of all distribution boards.
- Generator room located inside the production building but fire rated wall and fire door were not available.

During the inspection it was found that, the factory does not conduct planed periodical inspections and testing for insulation, earth resistance, and operation test of all equipment. Periodical inspection and testing of all electrical equipment shall be carried out in accordance with BNBC of the installation and record should be maintained.

A summary of actions with associated priorities and timeframes are given at the end of this report.

Please note that these actions should be completed as soon as practically possible and certainly within the timeframe noted.

Our assumptions and limitations are also noted at the end of this report.

2. General Information

2.1. General Factory Information

Factory Name	**TSS-FASHION**					
Factory Address	Telerchala, Mouchak, Kaliakoir, Gazipur, Bangladesh.					
Factory ID	**DIFE: 1170** **BGMEA:**N/A **BKMEA:** N/A					
Date of Assessment	14 Oct 2021					
Name and Contact no. of Factory Owner / Director	Name: Md. Saiful Islam Contact: 01741186030					
Name and Contact no. of Factory Manager (Primary Contact)	Name: Md. Nayeb Ali (Manager-HR Admin & Compliance) Contact: 01706417674					
Email Address of Primary Contact	mdnayebali129@gmail.com					
Population of factory	Male	177	Female	118	Total	295

Figure 3: Opening meeting

2.2. Location and Co-ordinates

Co-ordinates: Latitude: 24.0228444 N Longitude: 90.3003772 E

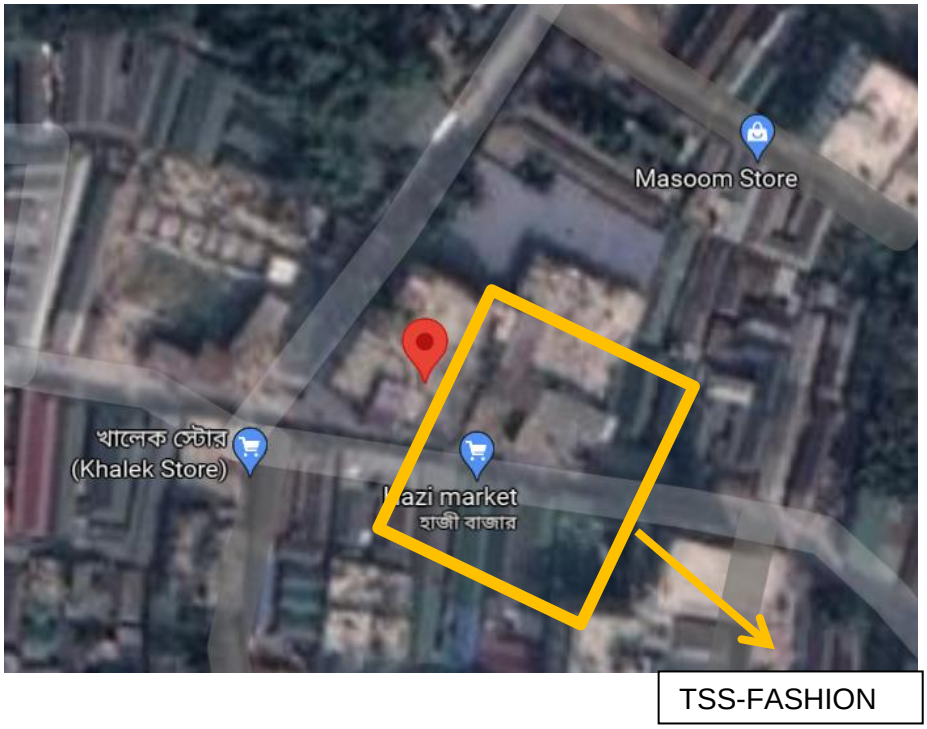


Figure 4: GPS coordinate from Google map

2.3. Exterior View of Factory Building

Figure 5: Exterior View of Factory Building

2.4. Site Layout

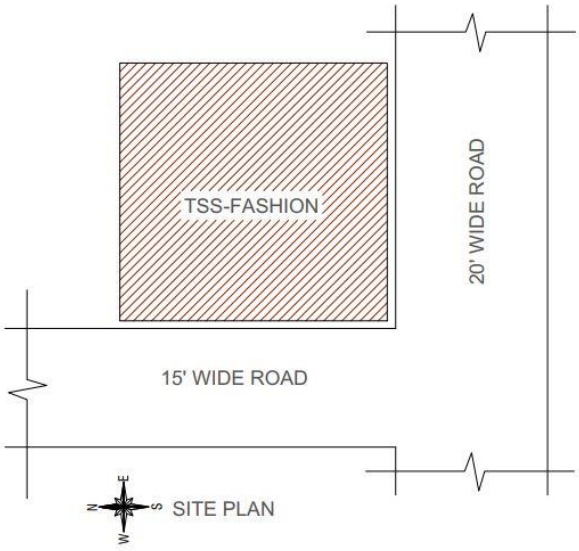


Figure 6: Site layout of the factory

2.5. Basic information of electrical system:

At **TSS-FASHION** there was one Diesel Generator capacity of 100 KW used as standby power source. 11KV REB line was fed to the oil type pole mounted transformer capacities of (25 x 3) KVA used as main power source. The power was fed to the Main MCCB Box/Generator room/Ground Floor rated 300A MCCB. The Main MCCB Box/Generator room/Ground Floor and Generator power was fed to COS/Generator room/Ground Floor. The COS/Generator room/Ground Floor power was fed to MDB/1st Floor. Then the Power was fed to DB/2nd Floor. Afterwards the power was distributed to loads.

The sanctioned load of the industry was 48 KW.

Generator avg. running hour is 150 Hrs. /Month

Floor-wise electrical utilities:

Floor	Operations	Occupied By	Electrical Utilities
Generator room	Power supply	TSS-FASHION	Generator, Main MCCB Box/Generator room/Ground Floor, COS/Generator room/Ground Floor and PFI/Generator room/Ground Floor.
1st Floor	Finishing, Store and Office		MDB/1st Floor
2nd Floor	Sewing and Store		DB/2nd Floor

2.6. Brief overview of electrical systems:

Utility	Location	Capacity	Comments
Main MCCB Box/Generator room/Ground Floor	Generator room	300A TP MCCB	Fed from pole mounted Transformer
COS/Generator room/Ground Floor	Generator room	500A	Fed from Main MCCB Box/Generator room/Ground Floor and Generator
MDB/1st Floor	Finishing section	125A TP MCCB	Fed from COS/Generator room/Ground Floor
DB/2nd Floor	Sewing section	100A TP MCCB	Fed from MDB/1st Floor
Diesel Generator	Generator room	125 KVA	Used as standby power source
Gas Boiler	Boiler room	100Kg	Used for Steam supply

3. Detailed Observations of Checkpoints/Issues

1	**Does the facility have an updated Electrical Single Line Diagram?**	Risk Level	High
		Time line	6 Months
Section	Documentation		
Observation	Electrical Single Line Diagram was not available.		
Location	Documentation review		
Corrective Action	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.		
References	BNBC-1.3.15; Page-4575		

2	**Does the facility have updated 'As-built Electrical Layout Drawings' (Showing outlets for light, fan, appliances, motors, etc.)?**	Risk Level	Moderate
		Time line	6 Months
Section	Documentation		
Observation	There was no Electrical Layout drawing.		
Location	Documentation review		
Corrective Action	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 the existing installation. 3. As-built drawing to be approved by the engineer-in-charge.		
References	BNBC-1.3.15; Page-4575		

3	**Does the factory have proper approvals for substation and connected load from relevant authority?**	Risk Level	Compliant
		Time line	N/A
Section	Documentation		
Observation	The factory had proper connected load approval.		
Location	Documentation review		
Corrective Action	No action is required.		
References	BNBC-1.3.18.1; Page-4577		

4	**Is the substation located on the lowest floor, above ground, with direct access from the street for maintenance?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.2; Page-4577		

5	**Arrangements made for preventing storm water from entering transformer / switch room / substation areas?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.2; Page-4577		

6	**Are the Substation / Transformer located in a well-separated area and having proper working clearance around mainboards?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.3 (b); Page-4578		

7	**Is the transformer room and substation area and spacing compliant with minimum requirements mentioned in BNBC?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.3 & Table-8.1.23; Page-4578 and 4579		

8	**Are accessories of transformers like breathers, vent pipe, buchholz relay, silica gel etc. are in working condition and properly maintained?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	Transformer was pole mounted.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4618		

9	**Soak pits provided for transformers having large oil content (more than 2000 litters)?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	Transformer was pole mounted.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.3 (c); Page-4579		

10	**Sufficient Height of transformer room / substation? (should be 3.0- 3.6 meters)**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.18.3 (a); Page-4578		

11	**Adequacy of ventilation in substation / Generator room?**	Risk Level	Compliant
		Time line	N/A
Section	Substation		
Observation	Adequate ventilation observed in generator room.		
Location	Generator room		
Corrective Action	No action is required.		
References	BNBC-1.3.18.6 & BNBC-1.3.19.3; Page-4580 & 4582		

12	Adequacy illumination in substation / generator room?	Risk Level	Compliant
		Time line	N/A
Section	Substation		
Observation	Generator room was adequately illuminated.		
Location	Generator room		
Corrective Action	No action is required.		
References	BNBC-Table 8.1.10; Page-4528		

13	Are there any unwanted materials stored inside the transformer / generator room?	Risk Level	High
		Time line	Immediate
Section	Substation		
Observation	Unwanted materials were stored inside Generator room.		
Location	Generator room		
Corrective Action	All unwanted materials should be removed from substation / Generator room.		
References	BNBC-1.3.42.3 (v); Page-4617		

14	**Are there rubber mats provided in front of all distribution boards?**	Risk Level	High
		Time line	2 Weeks
Section	Substation		
Observation	No rubber mat was provided in front of all distribution boards.		
Location	All Distribution boards		
Corrective Action	Provide adequate rubber mats in front of all distribution panels.		
References	BNBC-1.3.42.3 (v); Page-4617		

15	**Is there any leakage in wet transformers observed?**	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	Transformer was pole mounted.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4617		

16	**Is there Fire protection provided (Fire extinguisher and smoke detector) in substation and Generator room?**	Risk Level	Moderate
		Time line	6 Weeks
Section	Substation		
Observation	Fire protection equipment (Fire extinguisher and smoke detector) were not provided in generator room.		
Location	Generator room		
Corrective Action	Install smoke detector / firefighting equipment in the substation / generator room.		
References	BNBC-1.3.42.3 (v) & BNBC-1.3.19.3; Page-4617 &4582		

17	**Are the number of changeover switches adequate and with interlocking capabilities?**	Risk Level	Compliant
		Time line	N/A
Section	Substation		
Observation	Adequate manual changeover switch was used with the provision of interlocking capabilities.		
Location	Generator room		
Corrective Action	No action is required.		
References	BNBC-1.3.19.4; Page-4583		

18	Is fire rated wall and fire door available in case of substation / generator room located inside the production building?	Risk Level	High
		Time line	6 Months
Section	Substation		
Observation	Generator room located inside the production building but fire rated wall and fire door were not available.		
Location	Generator room		
Corrective Action	1. Provide 4-hour fire rated walls all around the transformer / generator room on ground level. 2. Provide 2-hour fire rated door transformer / generator room on ground level.		
References	BNBC-2.6.2.6 (n); Page-4637		

19	Are all incoming and outgoing circuits of HT and LT panels clearly and permanently labeled with identifications numbers and name?	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no LT / HT panel.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4617		

20	Is there adequate signage of electrical danger / caution at substation?	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4617		

21	Is there cover provided on cable trench in substation room?	Risk Level	N/A
		Time line	N/A
Section	Substation		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4617		

22	Is the generator room suitably located (preferably adjacent to substation room)?	Risk Level	N/A
		Time line	N/A
Section	Generator		
Observation	There was no substation room		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.19.3; Page-4582		

23	Is the generator room area and spacing compliant with minimum requirements mentioned in BNBC?	Risk Level	Moderate
		Time line	6 Months
Section	Generator		
Observation	The generator room was not compliant with minimum area requirements mentioned in BNBC. The area was 11.459m2 and the spacing was 0.7m (enclosed room)		
Location	Generator room		
Corrective Action	Modify Area of generator room to meet requirements of Table 8.1.24, BNBC Guideline; the minimum recommended area is30.m2. Minimum recommended spacing between the Generator periphery and walls are- 1. The recommended spacing is 1.0 m for generator installed in an enclosed room. 2. The recommended spacing is 1.25 m from one to another generator for multiple generators in the room.		
References	BNBC-1.3.19.2 & Table-8.1.24; Page-4582 & 4583		

24	Is the generator located in with proper working clearance and easy access for maintenance?	Risk Level	Moderate
		Time line	6 Months
Section	Generator		
Observation	Proper working clearance and easy access was not maintained for generator maintenance.		
Location	Generator room		
Corrective Action	Provide and maintain proper clearance in all sides of generator for ease of maintenance.		
References	BNBC-1.3.19.2; Page-4582		

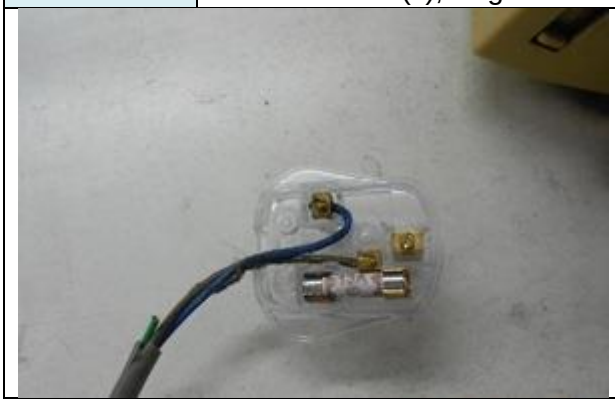
25	Is generator oil stored away from control panels in generator room?	Risk Level	Moderate
		Time line	Immediate
Section	Generator		
Observation	Generator oil was stored inside the generator room.		
Location	Generator room		
Corrective Action	Re-locate oil / fuel tanks away from control panels in generator room.		
References	BNBC-1.3.19.3; Page-4582		

26	**Are all EXIT signages properly illuminated and provided with at least 30 minute of power backup?**	Risk Level	Low
		Time line	2 Weeks
Section	Electrical distribution system		
Observation	Proper backup were not observed.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	1. Provide and maintain at least 10 lux illumination at floor level for exit sign. 2. Provide alternate / emergency backup for illuminating the exit signs for at least 30 minutes.		
References	BNBC-1.2.7.2 (c); Page-4539		

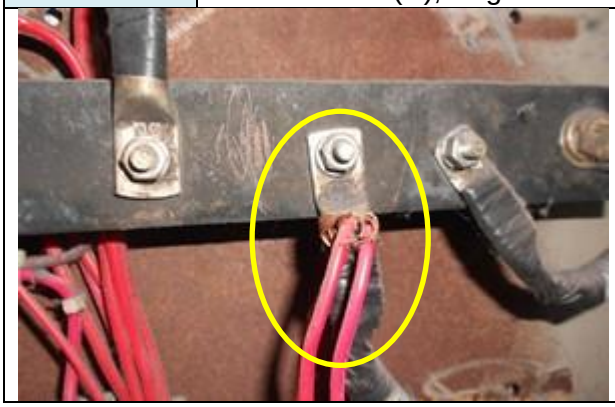
27	**Is there proper segregation of different end used loads (lighting / plug loads / sewing machine load / fan load /HVAC etc.)?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Proper segregation of different end used loads (lighting / plug loads / sewing machine load / fan load /HVAC etc.) found provided.		
Location	All distribution boards		
Corrective Action	No action is required.		
References	BNBC-1.3.4.3; Page-4556		

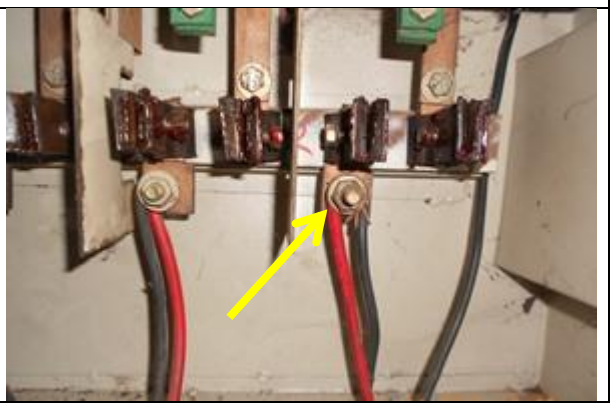
28	**Are there adequacies of all type of meters (Ammeter, Voltmeter etc.) at distribution boards (LT/MDB)?**	Risk Level	Moderate
		Time line	6 Weeks
Section	Electrical distribution system		
Observation	Ammeter and voltmeters were not available at MDB panel.		
Location	MDB/1st Floor		
Corrective Action	Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs).		
References	BNBC-1.3.42.3 (v); Page-4619		

29	**Are there dedicated circuits and fuse protection found for sockets/plugs feeding for 15/20A sockets?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Dedicated circuits and fuse protection found for sockets / plugs feeding for 15/20A sockets.		
Location	All Plug / Socket		
Corrective Action	No action is required.		
References	BNBC-1.3.3.2 (c); Page-4549		



30	**Are there cable sockets at cable end provided to stranded cables with cable size area >= 6mm2?**	Risk Level	High
		Time line	6 Months
Section	Electrical distribution system		
Observation	Cable lugs at cable end was not provided to stranded cables with cable size area >= 6mm2.		
Location	All Distribution boards		
Corrective Action	1. All stranded conductors > 6mm2 to be provided with cable sockets. 2. All stranded conductors < 6 mm2, at exposed end should be soldered / crimped.		
References	BNBC-1.3.9.2(D); Page-4569		





31	**Any cable / wire found exposed or open live? Cable ends / sockets have improper connections?**	Risk Level	Very High
		Time line	Immediate
Section	Electrical distribution system		
Observation	Exposed / open wires were found.		
Location	MDB/1st Floor		
Corrective Action	All strands cables at exposed ends should be properly soldered / crimped and insulated.		
References	BNBC-1.3.9.2 (d); Page-4569		

32	**Does the factory have overload protection, isolators and short circuit protection implemented in LT panels?**	Risk Level	N/A
		Time line	N/A
Section	Electrical distribution system		
Observation	There was no LT panel.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.20.2. C (v) & 1.3.30; Page-4587 & 4595		

33	**Are there (MDBs) main distribution boards suitably located with easy access?**	Risk Level	High
		Time line	6 Weeks
Section	Electrical distribution system		
Observation	Main distribution boards were not suitably located with easily access.		
Location	MDB/1st Floor		
Corrective Action	Relocate the distribution boards with easy access. Ensure that all distribution boards should have easy accessibility.		
References	BNBC-1.3.29 & 1.3.42; Page-4594 & 4615		

34	**Is there Electrical service shaft provided in building above height of 20 m (6 stories)?**	Risk Level	N/A
		Time line	N/A
Section	Electrical distribution system		
Observation	Electrical Service shafts were not needed because the factory building height was less than 20m.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.13.1; Page-4571		

35	**Is there energy meter installed at a convenient height (above 1.5 m) and provided with adequate protection?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Energy meter was properly installed at convenient height.		
Location	Outside the Generator room		
Corrective Action	No action is required.		
References	BNBC-1.3.23; Page-4588		

36	**Is there adequacy of emergency power capacity essential lighting, one lift, fire pumps etc.?**	Risk Level	Moderate
		Time line	6 Months
Section	Electrical distribution system		
Observation	No emergency power backup found for essential lighting.		
Location	The Factory building		
Corrective Action	Review capacity of standby generator on basis of loads for essential lighting / AC / Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small.		
References	BNBC-1.3.19.2; Page-4582		

37	**Are there any inflammable materials found surrounding electric circuitry at MDBs / SDBs?**	Risk Level	High
		Time line	Immediate
Section	Electrical distribution system		
Observation	Inflammable materials found stored surrounding electric circuitry.		
Location	MDB/1st Floor		
Corrective Action	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.		
References	BNBC-1.3.26.3 (d); Page-4590		

38	**Is there suitable & non-flammable supporting provided on light fittings, esp. in store areas?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Suitable & non-flammable supporting was provided on light fittings.		
Location	All accessible floors / buildings and Store areas within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.42.3 (iv); Page-4621		

39	**In case of switchboards located outside the building / exposed to weather, are they provided with weather proof outer casing?**	Risk Level	N/A
		Time line	N/A
Section	Electrical distribution system		
Observation	There were no switchboards located outside the building.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.26.3 (f); Page-4590		

40	**Does the building with all lifts have a standby generator?**	Risk Level	N/A
		Time line	N/A
Section	Electrical distribution system		
Observation	There was no lift installed inside the factory building.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.19; Page-4581		

41	**Are the electrical installations away from gas stoves, sinks or within 2.5m of any washing unit and the sources of water?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Electrical installations were away from sinks within 2.5m of any washing unit and the sources of water.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.26.3 (e); Page- 4590		

42	**Are the area around open type switchboards dry and properly ventilated, away from storage batteries and with no exposure to chemical fumes?**	Risk Level	N/A
		Time line	N/A
Section	Electrical distribution system		
Observation	There were no open type switchboards.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.26.3 (c); Page- 4590		

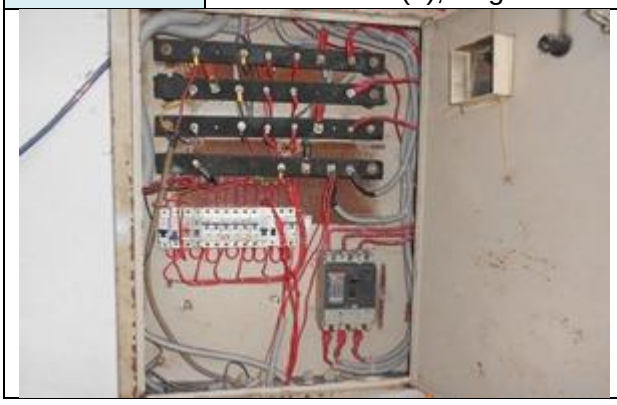
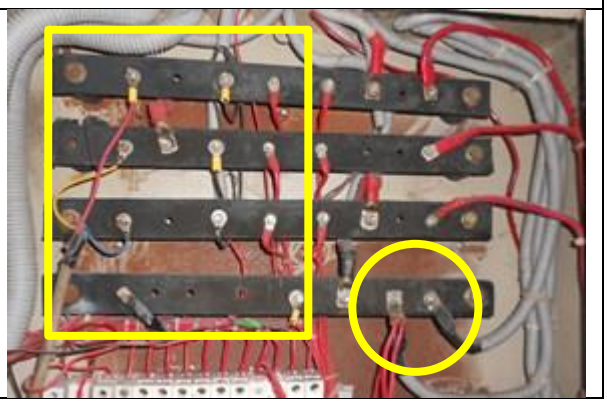
43	**Is there insulated support provided for high overhead service entries?**	Risk Level	Low
		Time line	6 Weeks
Section	Electrical distribution system		
Observation	Proper support was not provided for high overhead service entries.		
Location	From pole to Generator room		
Corrective Action	1. Overhead service connections should be covered and meet the requirements mentioned in BNBC. 2. Provide supports for main service line complete with adequate insulation.		
References	BNBC-1.3.26; Page- 4590		

44	**Are there any steams / heat source pipeline passing nearby electrical cables?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical distribution system		
Observation	Electrical cables were not passing steam / heat source pipeline.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.14 (i); Page-4575		

45	**Is there proper signage of Danger / 415 V on electrical panels?**	Risk Level	Low
		Time line	2 Weeks
Section	Electrical panels		
Observation	Proper signage of Danger / 415V found missing.		
Location	All Distribution boards		
Corrective Action	The electrical panels to be of metal case and should be marked with “Danger 415 Volts” and identified with proper phase marking and danger signage.		
References	BNBC-1.3.29 (c); Page-4594		

46	**Is there installation of switchboards / panel boards is at proper height, easy and accessible location?**	Risk Level	High
		Time line	6 Weeks
Section	Electrical panels		
Observation	The switchboards / panel boards were not installed at proper height, easy and accessible location.		
Location	Generator room		
Corrective Action	Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level).		
References	BNBC-1.3.29; Page-4594		

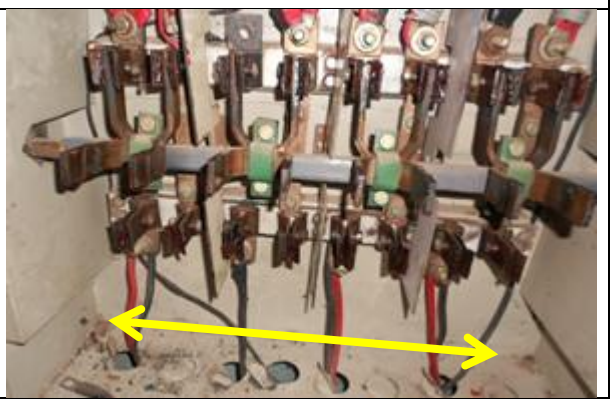

47	**Is there over current protection device installed at all distribution panels?**	Risk Level	Very High
		Time line	6 Weeks
Section	Electrical panels		
Observation	Over current protection device was not installed.		
Location	MDB/1st Floor		
Corrective Action	Over current protection devices (Circuit breakers) should be installed at all distribution panels.		
References	BNBC-1.3.30 (a); Page-4595		

48	Is there proper working clearance provided near distribution panels?	Risk Level	Moderate
		Time line	6 Months
Section	Electrical panels		
Observation	Proper working clearance was not provided near distribution panels.		
Location	All Distribution boards		
Corrective Action	Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards.		
References	BNBC-1.3.29; Page-4594		

49	Are switchboards / panel boards made by non-flammable material?	Risk Level	Compliant
		Time line	N/A
Section	Electrical panels		
Observation	Switchboards / Panel boards made by non-flammable material.		
Location	All distribution / switch boards		
Corrective Action	No action is required.		
References	BNBC-1.3.42; Page-4615		

50	**Are electrical connections properly secured with lugs and glands?**	Risk Level	High
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Cable connections provided without proper lugs and glands.		
Location	All Distribution boards		
Corrective Action	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.		
References	BNBC-1.3.9.2 (d); Page-4569		

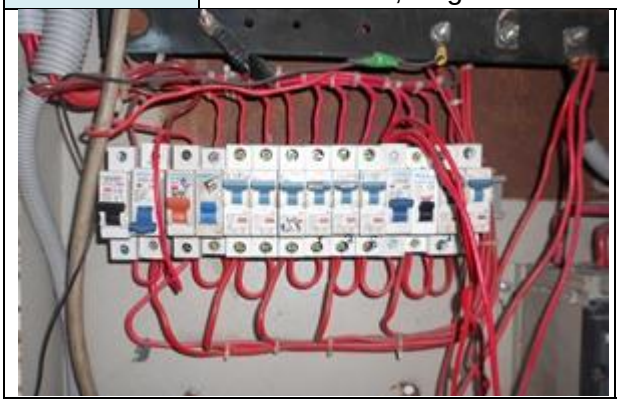
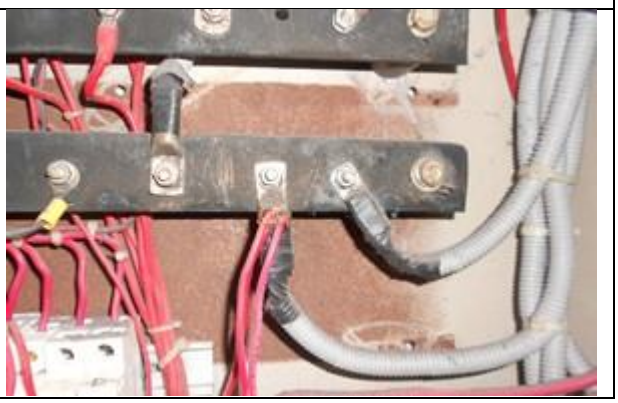


51	**Are power and telecommunication / LAN / antenna cables laid separately?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical wirings		
Observation	Power and telecommunication cables were laid separately.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.14 (f); Page-4574		

52	Are Wiring systems being selected and erected so that no damage is caused by the ingress of water?	Risk Level	Compliant
		Time line	N/A
Section	Electrical wirings		
Observation	Wiring systems were properly selected and erected so that damage was not caused by the ingress of water.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.6; Page-4563		

53	Are cables / wires and MCB / MCCB selected with suitable rating for desired application?	Risk Level	Very High
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Cables were not selected according to size of MCB / MCCB with suitable rating for desired application.		
Location	All Distribution boards		
Corrective Action	Select conductors with adequate sizing without exceeding permissible thermal limits for insulation.		
References	BNBC-1.3.30; Page-4595		

54	**Is there Any cross-circuiting (Looping, Bunching at MCCB/MCB or Bus bar terminal) observed in the panels?**	Risk Level	Very High
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Looping & Bunching at MCCB / MCB or Bus bar terminal was observed.- Multiple cables terminated to a single pole of MCCB, MCB or Bus bar. Loop connection has used powering multiple MCCBs / MCBs.		
Location	All Distribution boards		
Corrective Action	Avoid looping / 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.		
References	BNBC-1.3.4.3; Page-4556		

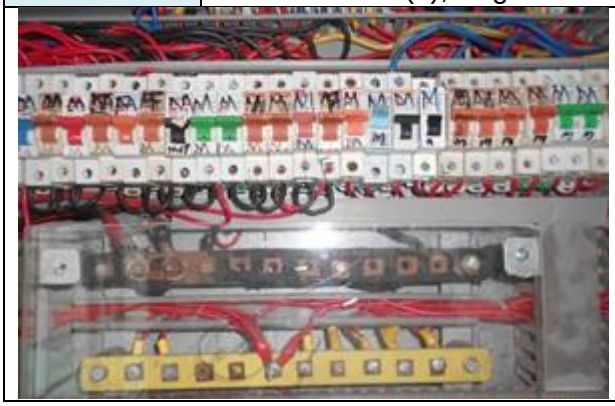



55	**Is wiring diagram/ circuit list with proper current ratings are available on every distribution boards?**	Risk Level	Low
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Wiring diagram / circuit list with proper current ratings were not available.		
Location	All Distribution boards		
Corrective Action	Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases.		
References	BNBC-1.3.29 (d); Page-4594		


56	**Are there non-standard cable joints observed in electrical circuit?**	Risk Level	Very High
		Time line	2 Weeks
Section	Electrical wirings		
Observation	Standard cable joint was not provided in electrical circuits.		
Location	All Distribution boards		
Corrective Action	Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.		
References	BNBC-1.3.9.2 (e); Page-4569		

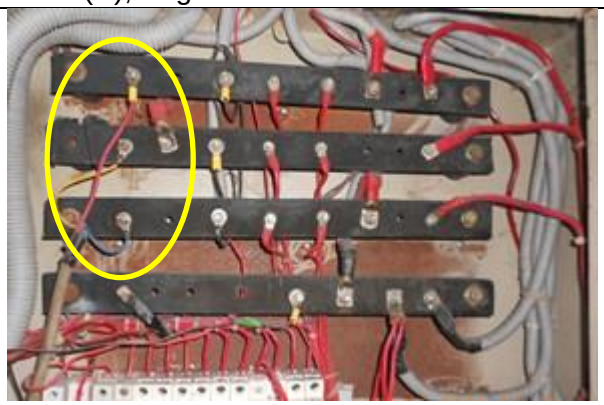
57	**Are there cable penetrations from wall adequately covered and sealed?**	Risk Level	Moderate
		Time line	2 Weeks
Section	Electrical wirings		
Observation	Cable penetrations from wall was not adequately covered and sealed.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	Seal the cable penetrations though walls adequately with fire resistive elements.		
References	BNBC-2.1.2.4; Page-5006		

58	**Are there common neutrals observed for more than one circuits?**	Risk Level	High
		Time line	6 Months
Section	Electrical wirings		
Observation	Common neutral used for more than one circuit.		
Location	All Distribution boards		
Corrective Action	Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).		
References	BNBC-1.3.4.3 (n); Page-4558		



59	**Are openings properly sealed with appropriate degree of fire resistance, in case of wiring passing through building structure (walls, roof, floors, and partitions)?**	Risk Level	N/A
		Time line	N/A
Section	Electrical wirings		
Observation	There was no adequate seal found in openings.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-3.1.9.1; Page-2757		

60	**Are all fixed machines connected with flexible wires / cable or temporary cords?**	Risk Level	High
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Flexible cables were used instead of fixed cable to connect fixed machines.		
Location	MDB 1st floor		
Corrective Action	1. Replace all flexible cables / wires with fixed wiring. Avoid use of flexible wires / cords for fixed machines. 2. Flexible cords may only be used for the connections of all portable equipment.		
References	BNBC-1.3.9.2 (C); Page-4569		



61	**Is electrical wiring properly covered in conduit pipes?**	Risk Level	Compliant
		Time line	N/A
Section	Electrical wirings		
Observation	Electrical wiring was properly covered in conduit pipes.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.9.1 & 1.3.6; Page-4566 & 4561		

62	Is cable entry-exit point to the panel properly sealed?	Risk Level	Very High
		Time line	6 Weeks
Section	Electrical wirings		
Observation	Cable entry exit points were not sealed properly.		
Location	All Distribution boards		
Corrective Action	Seal the cable entry-exit points of (LT/MDB/DB/SDB) 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.		
References	BNBC-1.3.42; Page-4618		

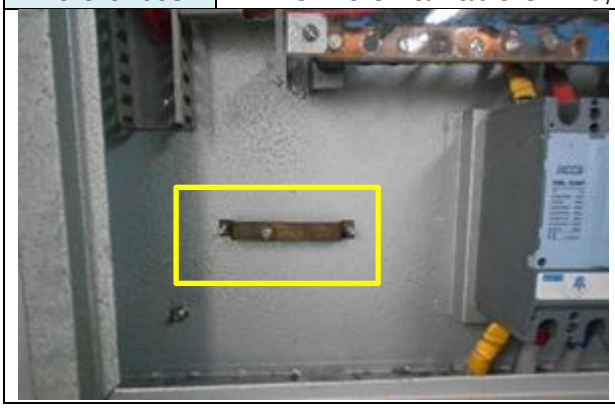
63	Are cables taken through areas where they are damaged or chemically affected?	Risk Level	Compliant
		Time line	N/A
Section	Electrical wirings		
Observation	Cable was away from areas where they could damage or chemically affected.		
Location	All accessible floors / buildings and sections within the factory area		
Corrective Action	No action is required.		
References	BNBC-1.3.42; Page-4619		

64	Is there proper grounding / earthing of transformer provided?	Risk Level	N/A
		Time line	N/A
Section	Earthing System		
Observation	There was no transformer installed inside the factory.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v), Electricity Rule-2020; clause-46; Page 11243-11245		

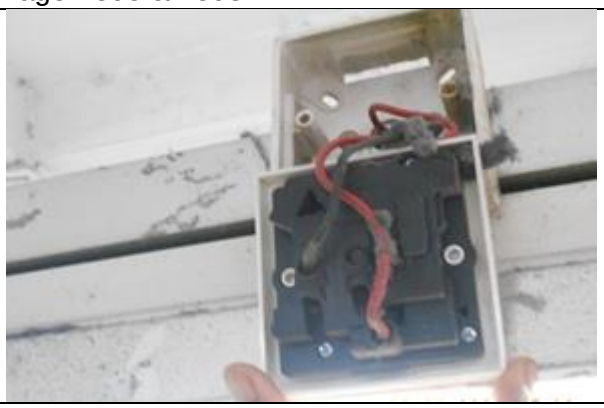
65	**Is there proper grounding / earthing of generator provided?**	Risk Level	High
		Time line	6 Weeks
Section	Earthing System		
Observation	There was no grounding / earthing of generator provided		
Location	Generator room		
Corrective Action	Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.		
References	BNBC-1.3.42.3 (v), Electricity Rule-2020; clause-46; Page 11243-11245		

66	**Is there earthing with separate earth pits for HT & LT panels in transformer room provided?**	Risk Level	N/A
		Time line	N/A
Section	Earthing System		
Observation	There were no HT & LT panels.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v), Electricity Rule-2020; clause-46; Page 11243-11245		

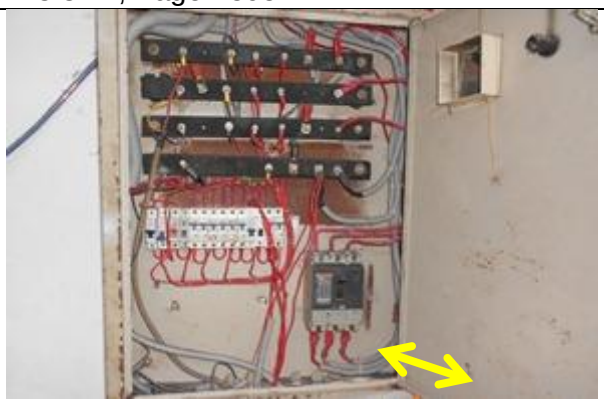
67	**Is there Earth Continuity Conductor (ECC) adequately & dedicated to circuit provided?**	Risk Level	High
		Time line	6 Weeks
Section	Earthing System		
Observation	There was no Earth Continuity Conductor (ECC) provided for all electrical circuits		
Location	All Distribution boards		
Corrective Action	1. Provide the ECC to meet minimum cross-sectional area as per table 8.1.26 2. Ensure that connections between conductors / equipment 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.		
References	BNBC-1.3.32 & Table-8.1.26; Page-4595 & 4598		



68	**Is there separate earthing provided on all electrical equipment?**	Risk Level	High
		Time line	2 Weeks
Section	Earthing System		
Observation	There was no separate earthing provided on all electrical equipment		
Location	All electrical equipment		
Corrective Action	Provide separate earthing connection to all electrical equipment. 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.		
References	BNBC-1.3.32 & Table-8.1.26; Page-4595 & 4598		



69	**Is there earthing provided to all distribution board for its body & door?**	Risk Level	High
		Time line	2 Weeks
Section	Earthing System		
Observation	ECC for Panel body and door found missing.		
Location	All Distribution boards		
Corrective Action	Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.		
References	BNBN-1.3.32.1; Page-4595		



70	**Is there lightning protection is adequately installed at building roof top?**	Risk Level	High
		Time line	6 Months
Section	Lightning Protection System		
Observation	Lightening protection system was not installed at building roof top.		
Location	Building roof top		
Corrective Action	Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels.		
References	BNBC-1.3.32 & 1.24; Page-4602& 2657		

71	Is there adequate and separate earthing system provided for lightning protection?	Risk Level	N/A
		Time line	N/A
Section	Lightning Protection System		
Observation	There was no lighting protection system installed.		
Location	N/A		
Corrective Action	N/A		
References	BNBC- 1.3.33.6; Page- 4606		

72	Does the factory conduct planned periodical inspections and testing for insulation, earth resistance, operation test of all equipment?	Risk Level	High
		Time line	ongoing
Section	Periodical inspection		
Observation	The factory did not conduct periodical inspections and testing for insulation, earth resistance, operation test of all equipment yet.		
Location	Documentation review		
Corrective Action	Conduct Planned Periodical inspection and testing (insulation, earth resistance, and operation test) of all electrical equipment to ensure proper operability of the installation and record should be maintained.		
References	BNBC-1.3.42.2 & 1.3.42.3 (iii), (iv); Page-4615 & 4616		

73	Proper cleanliness maintained in substation?	Risk Level	N/A
		Time line	N/A
Section	Periodical inspection		
Observation	There was no substation.		
Location	N/A		
Corrective Action	N/A		
References	BNBC-1.3.42.3 (v); Page-4617		

74	Any signs of overloading or abnormal temperature? Any hot spots observed in thermography which need attention?	Risk Level	Compliant
		Time line	N/A
Section	Thermography		
Observation	Any signs of overloading or abnormal temperature were not found in the factory.		
Location	All distribution boards		
Corrective Action	No action is required.		
References	Good Practices		

4. DIFE Summary

Name of the Factory	:	**TSS-FASHION**
Address of the Factory	:	Telerchala, Mouchak, Kaliakor, Gazipur, Bangladesh.
Present Status of the Factory	:	Under operation
Electrical Assessment Conducted by	:	Concepts-Prevalent JV
Date of Electrical Inspection	:	14 October 2021

4.1. Recommendations for corrective actions

A. Immediate: 4

I. All unwanted materials should be removed from Generator room.
II. Re-locate oil / fuel tanks away from control panels in generator room.
III. All strands cables at exposed ends should be properly soldered / crimped and insulated.
IV. 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."

B. Short term (2 Week): 7

I. Provide adequate rubber mats in front of all distribution panels.
II. 1. Provide and maintain at least 10 lux illumination at floor level for exit sign.
2. Provide alternate / emergency backup for illuminating the exit signs for at least 30 minutes."
III. The electrical panels to be of metal case and should be marked with “Danger 415 Volts” and identified with proper phase marking and danger signage.
IV. Provide cable joints of porcelain / PVC connectors with PIB tape wound around before placing the cable in the box.
V. Seal the cable penetrations though walls adequately with fire resistive elements.
VI. Provide separate earthing connection to all electrical equipment. 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.
VII. Provide adequate earthing to body and doors to all MDBs / DBs. Ensure that all electrical panels provided with proper and separate earth potential.

C. Midterm (6 Weeks): 14

I. Install smoke detector / firefighting equipment in the generator room.
II. Provide calibrated Ammeters / Voltmeters at distribution boards (LT/MDBs).
III. Relocate the distribution boards with easy access. Ensure that all distribution boards should have easy accessibility.
IV. 1. Overhead service connections should be covered and meet the requirements mentioned in BNBC.
2. Provide supports for main service line complete with adequate insulation."
V. Provide and maintain easy access and proper height of switchboard / panel boards (< 2m from floor level).
VI. Over current protection devices (Circuit breakers) should be installed at all distribution panels.
VII. 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.
VIII. Select conductors with adequate sizing without exceeding permissible thermal limits for insulation.
IX. Avoid looping / 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.
X. Provide circuit diagram /circuit list with proper current ratings and fuse size, marking for DBs identifying end use, voltage, no. of phases.
XI. 1. Replace all flexible cables / wires with fixed wiring. Avoid use of flexible wires / cords for fixed machines.
2. Flexible cords may only be used for the connections of all portable equipment."
XII. Seal the cable entry-exit points of (LT/MDB/DB/SDB) 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."
XIII. Provide proper separate earthing/grounding to generator. Ensure that generator body frame to have two separate and distinct connections to the earth / ground.
XIV. 1. Provide the ECC to meet minimum cross-sectional area as per table 8.1.26
2. Ensure that connections between conductors / equipment 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.

D. Long-term (6 Months): 10

I. 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."

II. 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 the existing installation.
3. As-built drawing to be approved by the engineer-in-charge."

III. 1. Provide 4-hour fire rated walls all around the transformer / generator room on ground level.
2. Provide 2-hour fire rated door transformer / generator room on ground level. "

IV. "Modify Area of generator room to meet requirements of Table 8.1.24, BNBC Guideline; the minimum recommended area is30.m2.
Minimum recommended spacing between the Generator periphery and walls are-
1. The recommended spacing is 1.0 m for generator installed in an enclosed room.
2. The recommended spacing is 1.25 m from one to another generator for multiple generators in the room."

V. Provide and maintain proper clearance in all sides of generator for ease of maintenance.

VI. 1. All stranded conductors > 6mm2 to be provided with cable sockets.
2. All stranded conductors < 6 mm2, at exposed end should be soldered / crimped."

VII. Review capacity of standby generator on basis of loads for essential lighting / AC / Equipment / Services. Replace generator with larger capacity or install second generator if review indicates existing unit is too small.

VIII. Provide proper clearance of 0.8 - 1.0 m in front of all distribution panels/switchboards.

IX. Each circuit should have a separate neutral (use of common neutral for more than one circuit shall not be permitted).

X. Provide adequate protection against lightning depending on the probability of a strike and acceptable risk levels.

5. Disclaimer

This Assessment Report intends to help the factory or building authority to understand the current safety conditions under the prevailing system and to identify corrective actions that must be taken to bring his/her factory in compliance with building, fire and electrical safety regulations. At the time of the audit/ survey, all the systems were working as intended, as produced by the Company to the auditors. The above result reflects the Concepts-Prevalent JV's findings at the time and place of inspection.

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