Industrial Visit Report

on

220/132/33 kV, MSETCL Baramati Substation, Baramati, Dist. Pune

Date: 15th April 2025

TY B. Eng. Electrical Student & Teacher with 220/132/33 kV, MSETCL Baramati Substation staff

Prepared by: - Mr. Swaraj Kalyan Dhumal

Industrial Visit Report: 220/132/33 kV, MSETCL Baramati Substation, Baramati, Dist. Pune

Date of Visit: 15th April 2025
Organized By: Department of Electrical Engineering, VPKBIET, Baramati
Location: 220/132/33 kV, MSETCL Baramati Substation, Baramati, Dist. Pune
Co-ordinator: Mr. S. K. Raskar, Mrs. S. D. Rokade
Number of Students Participated: 46

Introduction:

An industrial visit to the 220/132/33 kV MSETCL Substation at Baramati, Dist. Pune, was organized on 15th April by the Department of Electrical Engineering, VPKBIET, Baramati. The visit aimed to provide practical exposure to students regarding the functioning and operation of high-voltage substations and their importance in electrical power transmission and distribution systems.

Objectives of the Visit:

i. To understand the practical working of a high-voltage substation.
ii. To study the components of a substation such as circuit breakers, transformers, isolators, CTs, PTs, bus bars, etc.
iii. To observe the protection and control mechanisms employed in real-time power systems.
iv. To gain insights into the operation, maintenance, and safety protocols of substations.

Visit Overview:

The visit commenced with a briefing by substation engineers, explaining the layout, key components, and operational significance of the 220/132/33 kV substation. Students were divided into groups and guided through different sections of the substation, where they interacted with engineers and observed various equipment in operation.

Topics Covered:

Power System II

1. **Single Line Diagram Explanation:** The substation's single-line diagram was presented and explained in detail, highlighting power flow, voltage levels, and major components Such as transformers, circuit breakers, and bus bars.

2. **Faults and Their Types:**

i. Symmetrical Faults: Three-phase faults that affect all phases equally, causing Severe system instability.

ii. Unsymmetrical Faults: Include single-line-to-ground, line-to-line, and double-Line-to-ground faults, which cause unbalanced system conditions.

Substation Overview:

The 220/132/33 kV MSETCL substation is a crucial node in the transmission network of the Maharashtra State Electricity Transmission Company Ltd. It plays a significant role in stepping down high-voltage power from 220 kV to 132 kV and 33 kV for regional distribution. The substation consists of:

- Power Transformers: For voltage step-down.
- Circuit Breakers and Isolators: For safe operation and isolation during faults or maintenance.
- Busbars and Transmission Lines: For power flow management.
- Control Room: Housing SCADA systems and protection relays.

Conclusion:

The industrial visit to the 220/132/33 kV MSETCL Baramati Substation was highly informative and beneficial for the students. It provided a real-world perspective to the theoretical knowledge gained in classrooms. The visit enhanced students' understanding of electrical power systems and encouraged them to explore career opportunities in the power sector.

Student Questions During Industry Interaction:

1. What is a total installed capacity of the 220kv substation?

   - 220/132/33 kv.

2. How many transformers are present and what are their ratings?

   - Total 4 Power Transformer

   Ratings

   i. ICT 220/132 kv 100MVA make VAJAI

   ii. ICT 220/132 kv 100MVA make VAJAI

   iii. 220/33kv 50 MVA make EMCO

   iv. 220/33kv 50 MVA make BBL.

3. What is the fault level rating of the substation?

   i. 3phase - 26805 amp

   ii. 1 phase - 29795 amp.

4. Where is PT potential Transformer located?

   - It is installed mainly Bus bar in parallel with each phase.

5. Is smart Sensor installed in the substation?

   - Yes, Camera and thermal sensors are installed.

6. Are lightning arresters installed? What types?

   - Yes, At the incoming and outgoing line for prevention of switching surge and lightning stroke, Type - Metal Oxide Lightning Arrester.

7. What types of circuit breaker are used?

   i. For 33k Line Vacuum CIRCUIT BREAKER

   ii. For 220KV, 132KV SF6 CIRCUIT BREAKER.

8. What protection scheme are in place for transformer?

   i. Buchholz relay

   ii. Pressure relies valve [PRV]

   iii. Breather

   iv. Nitrogen cooling system.

9. What are the types of power transformer?

   i. ICT - Interconnected Transformer

   ii. Distribution Transformer.

Industrial Visit Highlights:

Mrs. Tushar Walimbe and Mr. Dheeraj Dehankar are explaining students about 220/132/33 kV, MSETCL Baramati Substation

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MAHA TRANSCO
Maharashtra State Electricity Transmission Co. Ltd

MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO.LTD.

E.H.V (O & M) DIVISION , BARAMATI.

SINGLE LINE DIAGRAM OF 220/132/33 KV SUB-STATION BARAMATI (DIST-PUNE).

D.O.C. 24-01-1992 SUB STATION CODE - 218024 (H298)

LA | ISOLATOR | TRANSFORMER | CT | 220 KV
CC | CT | EARTH TRANSFORMER | EARTH ISOLATOR | 132 KV
VT | PT | CIRCUIT BREAKER | HRC CUT OUT FUSE | 33 KV

POSITION AS ON DT:-31-01-2021

Fault Level

3Ph-26805 Amp

1Ph- 29795 Amp