# INDUSTRIAL VISIT TO HVDC,PADGHE

**Date : 8th Dec 2025, 01:30PM to 04:00PM**

**Location: ±500KV 1500 MW HVDC TERMINAL STATION, PADGHE**

**Participants: 75 Students TY and Final Year (Electrical Engineering) + 5 Faculty Members**

## Introduction:

The industrial visit to the HVDC terminal station, padghe was organized for the students of TY and Final Year in the Electrical Engineering department. The visit aimed to provide an insight into the practical application of concepts learned in the classroom and to expose students to the functioning of a real-world HVDC station.

## Objective:

1. To familiarize students with the various components and operations of HVDC terminal station.
2. To Understand the role of instrumentation in monitoring and controlling the transmission process.
3. To observe safety protocols and practices followed in an industrial setting.

## Itinerary:

05:00 AM - 06:00 AM: Arrival and gathering of students.

06.00 AM - 01:30 PM: Travelling from DBATU, Lonere to HVDC, Padghe.

08:30 AM - 09:15 AM: Snacks & Refreshments at Wadkhal.

01:30 PM - 03:00 PM: Introduction to HVDC terminal station and Safety Briefing.

03:00 PM - 04:00 PM: Guided Tour of the station Facility with all students and faculty members.

## Overview of the Station:

- Control Room Visit.
- Inspection of Instrumentation Control Panels.
- Importance of Instrumentation in transmission
- Case Studies of Instrumentation Applications
- Practical Demonstration of Instrumentation Devices
- Q&A Session with station Engineers
- Feedback and Conclusion

## Objective And Learnings:

**Understanding HVDC Systems:** Gained knowledge of high-voltage direct current (HVDC) transmission, its role in long-distance, high-capacity electricity transfer, and advantages such as reduced transmission losses and enhanced grid stability. Students observed how HVDC links interconnect asynchronous power systems efficiently.

**Technical Principles and Component Familiarization:** Explored the working of converter transformers, thyristor valves, smoothing reactors, filter systems, and DC switchyards. Learned about AC to DC conversion (rectification) and DC to AC inversion, along with harmonic mitigation and system stabilization techniques.

**Operational Insights:** Observed end-to-end system control including SCADA and PLCC operations, handling continuous ±500 kV DC flow at 1,500 MW, and the operational benefits of bipolar configuration for reliability and zero ground current under normal conditions**.**

**Safety and Maintenance Awareness:** Understood high-voltage safety protocols, grounding and insulation requirements, emergency shutdowns, and preventive measures. Learned methods of fault management, component maintenance, and troubleshooting issues such as capacitor bank overheating and thyristor valve firing problems.

**Grid Integration and Network Benefits:** Recognized how HVDC stabilizes the Maharashtra grid, facilitates controlled power flow between asynchronous regions, and supports the integration of renewable energy sources while maintaining system reliability.

**Practical and Expert Interaction:** Engaged with substation engineers to discuss real-world challenges like DC line faults, converter performance, load balancing, and monitoring strategies. Connected academic concepts from electrical machines, power electronics, and power system engineering with practical operations.

**Enhanced Learning Outcomes:** Developed a comprehensive understanding of HVDC system operations, control, monitoring, and reliability strategies, along with awareness of engineering safeguards to minimize operational hazards.

**Following faculty accompanied the students for this visit:**

1. Prof. Ajinkya M. Bhaware
2. Prof. Pranit V. Patil
3. Prof. Pritam V. Gaikwad
4. Prof. Ravi R. Kundankar
5. Mrs. Pramila S. Padwal