INDUSTRIAL VISIT REPORT

School/Department: **SOET (EE)** **16/09/25**

Name of company:	**High-voltage Direct Current Grid, MSEB**
Address:	Padgha, Maharashtra 421101.
Contact Person Name: Dy. Ex. Sunil Shenava	**Email-Id: adee7300@mahatransco.in**
Date of Visit:	**13th Sep, 2025**
Year/ Sem: VII	
Total Number of Students:	**16**
Accompanying Faculty (Name and Designation)	**Prof. Shaikh Sameer**

DETAILS OF VISIT:

Aims/Objectives:	1. To expose students to actual working environment within a typical HVDC station along with detailed functioning of all major components used to deliver reliable power to designated load centers. 2. To acquaint students with latest technological advances in the field of High Voltage Direct Current Transmission and help them identify the PADGHE- CHANDRAPUR project as a milestone in the history of Maharashtra and a nation as a whole.
Description of visit:	The Chandrapur–Padghe HVDC transmission system is an HVDC connection between Chandrapur and Padghe (near Mumbai) in the state of Maharashtra in India, which was put into service in 1999. It connects the coal-fired Chandrapur Super Thermal Power Station to the major load centre of Mumbai. The project has a 752 kilometres (467 mi) long bipolar overhead line. The transmission voltage is ±500 kV and the maximumtransmission power is 1,500 megawatts. The scheme uses thyristor valves, arranged in a single twelve pulse bridge per pole. The project was built by ABB and BHEL, and is owned by Maharashtra State Electricity Board (MSEB). The eastern (Chandrapur) converter station is located 20 kilometers (12 mi) from the Chandrapur back to back HVDC station. The close proximity of the two converter stations meant that the control systems needed to be carefully coordinated, a task made more challenging by the fact that the two stations were built by different manufacturers. To address this problem a series of joint simulation studies, involving the control equipment from both converter stations connected to a common simulator, was performed.

±500 KV HVDC Padghe Plant Specification:

- Commissioning year: 1999
- Power rating: 1,500 MW
- No. of poles: 2
- AC voltage: 400 kV (both ends)
- DC voltage: ±500 kV
- Length of overhead DC line: 752 km
- Main reason for choosing HVDC: Long distance, network stability,environmental concerns.
- Application: Connecting remote generation

INSIDE THE CONTROL ROOM: The visit started off with an introduction to the heart of the HVDC station i. e the control system room where Mr. Sunil Shenava explained in detail the functioning of bipolar poles at either end. The operator workstation is a place where the human machine interface through SCADA is provided. This workstation was a part of the control room and students got to see how monitoring and control was being executed to ensure reliability and optimality in power operations.

BIRD EYE VIEW OF MASSIVE CONVERTER INSTALLATION:
At the other side of the control room, a small glass sealed off window has been provided for visitors to view the converter installations. These massive structures occupied a huge space and were connected to transformer via bushings. The converters used in Padghe are water cooled with a dedicated cooling tower on the outside. As mentioned the converters are completely sealed off from the outside world as a security and protection measure.

THE SWITCHYARD:
All the remaining components are installed in the switchyard. These would include RLC filters both AC and DC type, CTs and PTs, Transmission lines, buses, circuit breakers, converter transformers, isolators etc.

Outcome of visit

COs addressed:

CO1: Students will know features, operation, components, applications andconfigurations of HVDC transmission system.

CO2: Students will be able to analyze 6 pulse and 12 pulse converter circuitsand evaluate their parameters.

PSOs addressed:

PSO1: Develop models, design, analyse and assess the performance of different types of electrical machines, control systems and generation, transmission, distribution, protection mechanisms in power systems.

PSO2: To empower the students with engineering concepts along with aptitude skills for developing competency to succeed in competitive examinations.

POs addressed:

PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solutionof complex engineering problems.

PO3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO9 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Dr. Afzal Shaikh	Dr. Rajendra B. Magar	Dr. Ramjan Khatik
HOD, ECE	Dean, AIKTC-SoET	Director, AIKTC