

Report on “Industrial visit to 400/220KV Electrical Substation, Jangaon”

Title of the Event: Industrial Visit

Held on: 7th May 2025

Coordinators: Mr. P. Varun Krishna, Asst. Prof., Mr.D. Ramesh, Asst. Prof

Convener: Dr. M. Prasad, Assoc. Professor, HOD-EEE

As part of the B. Tech. Electrical Engineering curriculum, an industrial visit was organized to a 400/220 KV Electrical Substation on 7th may 2025 to give students practical exposure to high-voltage power transmission systems. The objective was to enhance theoretical knowledge by observing the real-time functioning of equipment used in electrical power transmission and distribution.

On 7th may 2025 around 9.30 students of II- & III-Year B. Tech. Assembled in classroom, HOD of EEE Dept. briefed about the importance of this visit, safety norms. At 10:00 AM College bus started from campus with a total strength of 55 (Two faculty, one DEO, 28 second year and 24 third year students) to 400/220 KV Substation located at Jangaon.

Around 11:20 AM bus reached to substation, students took small break of 10 minutes. At 11:30 AM two Assistant Engineers from TG Transco. Prashanth and Parasuram gave introduction about substation and working of different electrical equipment which are present in substation. This demonstration continued till 01:00 PM. After lunch around 1:30 PM Engineers from TG Transco. guided students to substation visit. They explained about all equipments which are present in substation by showing them physically in the field and they also cleared doubts raised by students and faculty.

Substation Overview

The substation visited is a critical node in the regional power transmission network, stepping down voltage from 400 kV to 220 kV for further transmission and distribution. It is managed by TG Transco.

Key Features:

- **Voltage Levels:** 400 kV(input), 220kV(output)
- **Type:** Outdoor Air Insulated Substation
- **Function:** Inter connects regional grids and facilitates load distribution

Equipment Observed:

Power Transformers: Step-down 400kV to 220kV, Ratings: 500MVA and above, Cooling: Oil-cooled with radiators and fans, Protection: Buchholz relay, differential protection

Circuit Breakers: SF6 circuit breakers (commonly used at 400kV), Purpose: Interrupt fault currents and isolate equipment

Current and Potential Transformers (CTs & PTs): For measurement and protection purposes

Bus bars: High-conductivity aluminum or copper, Connect various incoming and outgoing feeders

Isolators and Earth Switches: Used for maintenance isolation, Ensures safety during repair

Control and Relay Panels: Located in the control room, Includes SCADA monitoring, protection relays, and alarms

Lightning Arresters: Protects equipment from voltage surges due to lightning

Protection and Automation: The substation uses advanced protection schemes and SCADA (Supervisory Control and Data Acquisition) systems to monitor and control operations remotely. The relay panels are designed to trip circuit breakers during abnormal conditions such as over current, earth fault, and differential protection triggers.

Safety Measures: Earthing system for all equipment, Personal protective equipment (PPE) was mandatory
Signboards and restricted access zones in high-voltage areas

Learning Outcomes: Students gained insights into, High-voltage equipment operation and layout, Protection schemes and real-time SCADA monitoring, Importance of regular maintenance and safety protocols

The visit to the 400/220 kV substation was highly informative and instrumental in bridging the gap between classroom theory and practical applications. It provided a clear understanding of the infrastructure and processes involved in bulk power transmission. We are thankful to both the engineers of TG Transco for the contribution of their valuable time. Around 2:50 PM bus departed from substation and reached to campus at 4:15 PM. Students were felt happy about this industrial visit expressed their happiness by thanking both management and principal for providing this opportunity.