

Industrial Visit Report

Name of Industry: Thermal Power Station, Wanakbori (GSECL)

Date of Visit: 14/03/2023

Faculty Coordinators: Prof. Chintan R Patel

Class: 2nd Year EE (2nd year EC & ME students also joined)

Number of Visitors: 56 students + 3 Faculty Members

Department of Electrical Engineering has organized an industrial visit to Thermal Power Station, Wanakbori (GSECL) for 2nd-year students. 18 EE and 38 other students along with 3 faculty members visited the thermal power station on above mentioned date. WTPS has 7 units each of 210 MW and one unit of 800 MW. So, the total installed capacity of the plant is 2270 MW. Following sections of the WTPS had been visited.

- 1) Training Center
- 2) Coal and ash handling plant
- 3) Boiler section
- 4) Turbine/Generator floor
- 5) Electrical control room (Unit No.1)
- 6) Cooling tower
- 7) Switch yard (220 kV & 400 kV)

At the training center, Mr. B A Patel explained the working cycle of the thermal power station. Students visited various small-scale models of equipment used in the power plant. We collected very important practical data like temperature, pressure, the quantity of coal, etc. used for power generation.

We visited the coal and ash handling plant where Mr. Himanshu Parlekar, Deputy Engineer and EE-GCET alumnus of 2002 batch guided us for the visit to power house. The 210 MW unit was operated at full load, generating around 210 MW power when we visited. It was consuming 150-160 tons of coal per hour to generate electricity. So, a bulk amount of coal is transported by railway and with the help of a Wagon Tripler coal is transferred to the coal storage area. To start the ignition of the boiler residual furnace oil (RFO) or light diesel oil (LDO) is used which is transported by tanker wagon by railway. After the combustion of coal in a boiler furnace, ash is produced which is collected and treated by an ash handling plant. The ash is used for many industrial applications like the production of cement, ceramic, etc.

At the boiler section, we visited the FD fan, ID fan, PA fan, APH, boiler furnace area, and other auxiliary devices essential for boiler operation. Each boiler unit has 2 FD fans, 2 ID fans, and 2 PA fans.

At the turbine/generator floor, students visited the HP, IP, and LP sections of the turbine coupled with the generator. Superheated steam at 140 kg/cm² pressure and 545° C temperature is fed to the turbine. The generator has a capacity of 210 MW at 15.75 kV, 9050 A.

The control room of the power plant is the brain of the entire plant. We visited the control room of unit no. 3. It is equipped with a DCS facility provided by ABB Ltd. All the important data were displayed in real-time mode like MW, MVAR, frequency, power factor, phase current, etc. on the display screen.

There are 7 natural draught cooling towers (NDCT) used for cooling of circulating water of the condenser. Water is sprayed at a height of 21 meters in the tower and due to the natural draught of air, its temperature is reduced by 10° C and this water is pumped into condenser tubes for condensation of steam exhausted from the LP turbine.

Mr. Naitik Gandhi, Junior Engineer and EE-GCET alumnus of the 2016 batch accompanied us to the switchyard of WTPS. Switchyard consists of two sections, 220 kV and 400 kV. The voltage of units no. 1, 2, and 3 is stepped up from 15.75 kV to 220 kV and the power is transmitted at 220 kV level. There are 7 outgoing transmission lines at 220 kV voltage level. The voltage of units no. 4, 5, 6, and 7 is stepped up from 15.75 kV to 400 kV and the power is transmitted at 400 kV level. There are 4 outgoing transmission lines at 400 kV voltage level.

The visit was very fruitful as we observed each of the energy conversion stages used in the power plant starting from the fuel section to the switch yard. We collected very important information like practical data which are not available in books and other literature. Many of our doubts are cleared by the discussion with experts of the plant.

