

Industrial Visit Report
on
Bhatghar Hydro Electric Power Station,
Bhor, Dist. Pune

Date: 12 September 2024



TE Electrical Student & Teacher with Bhatghar Hydro Electric Power Station staff

Industrial Visit Report: Bhatghar Hydro Electric Power Station, Bhor

Date of Visit: 12th September 2024

Organized By: Department of Electrical Engineering, VPKBIET, Baramati

Location: Bhatghar Hydro Electric Power Station, Bhor Dist. Pune

Co-ordinator: Mr. Dipak S. Yeole, Mrs. P. N. Jaiswal

1. Introduction:

As part of the curriculum for the Electrical Infrastructure Design and Construction of Buildings and Maintenance (EIDCBM), Electrical Machine II (EM II) course as per SPPU, Pune, an industrial visit was organized to the Bhatghar Hydro Electric Power Station, Bhor, on 12th September 2024. The visit aimed to provide students with practical exposure to the workings of a hydroelectric power plant and its components. This hands-on experience was essential for reinforcing theoretical concepts covered in the classroom.

The Bhatghar Hydro Electric Power Station is one of the significant hydroelectric projects in Maharashtra. It utilizes the gravitational force of flowing or falling water to generate electricity. With a capacity of 16 MW, the station plays a vital role in providing electricity to nearby regions.

2. Objectives of the Visit:

The primary objectives of the visit were:

- To understand the working principles of a hydroelectric power plant
- To observe the major electrical components of hydroelectric power plant
- To learn about the maintenance procedures for key components of the plant
- To observe and discuss the testing methods used for performance assessment
- To explore troubleshooting strategies used to solve operational issues

3. Key Components Discussed:

During the visit, students were introduced to the major components of the hydroelectric power plant, and their roles in power generation were explained in detail. The critical components discussed were:

a) **Dam and Reservoir:**

The water stored in the reservoir is the primary energy source for power generation. The students were shown how the dam helps control the water flow, which in turn regulates the generation process.

b) **Penstock:**

This large conduit transports water from the reservoir to the turbines. The importance of inspecting and maintaining the penstock for any leaks or damage was emphasized, as even minor issues could affect the efficiency of power generation.

c) **Turbines:**

The heart of the hydroelectric power station, turbines convert the kinetic energy of falling water into mechanical energy. The maintenance team explained the types of

turbines (Francis, Pelton, and Kaplan) and provided insights into the specific turbine used at Bhatghar.

d) **Generators:**

The mechanical energy from the turbine is converted into electrical energy by the generator. The working principles of synchronous generators were explained, along with the importance of regular testing and lubrication of moving parts to avoid mechanical failures.

e) **Control Room:**

The students had a guided tour of the control room, where the plant's operational parameters (water flow, turbine speed, voltage, etc.) are monitored and controlled. The technicians discussed the various safety protocols and remote monitoring systems in place.

4. Maintenance Practices Observed:

Maintenance is a crucial aspect of ensuring continuous and efficient operation at the hydroelectric power plant. The plant engineers provided a detailed explanation of their preventive and corrective maintenance strategies, which include:

- **Scheduled Maintenance:**
Regular inspection of turbines, generators, and other mechanical components ensures they operate efficiently. Students learned about the periodic checks performed on bearings, oil levels, and seals to prevent wear and tear.
- **Testing of Components:**
Various testing methods were shown, including vibration analysis and thermography, to detect early signs of mechanical failure in rotating components. Generator insulation testing and electrical tests (such as resistance and impedance tests) were also demonstrated to the students.
- **Troubleshooting Common Issues:**
The team highlighted common operational issues such as cavitation in turbines, overheating in generators, and control system failures. Practical examples of troubleshooting these issues were shared with students, showcasing the importance of quick diagnostic skills.

5. Learning Outcomes:

The industrial visit was a highly enriching experience for the students. Key outcomes from the visit included:

- **Understanding Plant Operations:**
The students gained a clear understanding of how the hydroelectric power plant functions, from water flow regulation to energy conversion and electricity transmission.
- **Enhanced Knowledge of Maintenance Practices:**
Observing real-world maintenance and testing techniques gave students practical insights into keeping plant components in optimal working condition. The importance of preventive maintenance and its role in reducing downtime was particularly emphasized.
- **Troubleshooting Skills:**
Through the examples provided by the plant engineers, students learned about

common challenges faced by hydroelectric plants and the methods used to quickly resolve operational issues.

- **Teamwork and Communication:**

Students had the opportunity to interact with engineers and technicians, which helped them appreciate the importance of teamwork and effective communication in large-scale engineering operations.

6. Conclusion:

The industrial visit to Bhatghar Hydro Electric Power Station was an invaluable experience for the students of the EIDCBM, EM II course. It provided them with a real-world understanding of how hydroelectric power plants operate, the intricacies of maintaining critical components, and the practical challenges faced in the day-to-day operations of such facilities.

This visit not only enhanced the technical knowledge of the students but also inspired them to explore careers in renewable energy, plant maintenance, and power systems. The hands-on learning experience will undoubtedly complement their academic learning and help them in their future professional endeavors.

Some Glimpses:



Felicitation of Bhatghar Hydro Electric Power Station staff