

Industrial Visit Report

on

**Shri Chhatrapati Co-Operative Sugar
Factory Ltd, Bhavaninagar, Tal: Indapur,
Dist. Pune**

Date: 14th Oct 2025

TY B. Tech Electrical Student & Teacher with Shri Chhatrapati Co-Operative Sugar Factory
Ltd staff

Industrial Visit Report

Industry Visited: Shri Chhatrapati Co-Operative Sugar Factory Ltd, Bhavaninagar, Tal: Indapur, Dist. Pune

Date of Visit: 14th October 2025

Organized By: Department of Electrical Engineering, VPKBIET, Baramati

Location: Shri Chhatrapati Co-Operative Sugar Factory Ltd, Bhavaninagar

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

Number of Students Participated: 90

1. Introduction

As part of the curriculum for Switchgear and Protection (SGP) and Electrical Machine II (EM II) courses, an industrial visit was organized to Shri Chhatrapati Co-Operative Sugar Factory Ltd, Bhavaninagar, Tal: Indapur, Dist. Pune, on 14th October 2025. The objective of this visit was to bridge the gap between theoretical learning and practical industrial applications. The visit enabled students to gain insight into power generation through co-generation, the functioning of alternators and transformers, and various protection mechanisms employed in substations.

2. Objectives of the Visit

The primary objectives of the industrial visit were:

- To provide practical exposure to power generation, distribution, and protection systems used in sugar industries.
- To understand the operation of alternators, excitation systems, transformers, and switchgear equipment.
- To study the co-generation process and observe how electrical energy is produced and managed within an industrial setup.
- To reinforce theoretical knowledge through real-time exposure to industrial practices and safety measures.

3. Visit Overview

The visit began with an introductory session conducted by the plant engineers, who explained the overall process of sugar manufacturing and power co-generation. Students were then divided into small groups to visit different sections of the power plant, substation, and control room. The engineers explained the working of electrical machines, switchgear components, and protection schemes used for stable and reliable operation of the system.

4. Topics Covered

A. Switchgear and Protection (SGP)

1. Substation Overview:

The substation within the factory premises operates to distribute generated power efficiently. It includes power transformers, busbars, isolators, circuit breakers, and protective relays ensuring system reliability.

2. SF₆ Circuit Breaker:

- SF₆ (Sulphur Hexafluoride) gas is used for arc quenching due to its high dielectric strength.
- Advantages: Compact design, high interrupting capacity, and low maintenance.
- Application: Protection of high-voltage equipment from fault currents.

3. Distance Protection:

- A type of protection relay that detects faults based on impedance measurement between the relay location and the fault point.
- Widely used for transmission line protection to ensure selectivity and reliability.

4. Co-Generation:

- The sugar factory uses bagasse (a byproduct of sugarcane crushing) as a fuel in boilers to produce steam.
- Steam drives a turbine-coupled alternator to generate electrical energy.
- The generated power is used for internal plant operations, and surplus power is exported to the grid.
- This process demonstrates efficient utilization of resources and contributes to renewable energy generation.

B. Electrical Machine II (EM II)

1. Alternator:

- The alternator is coupled with a steam turbine and serves as the primary source of electrical energy in the co-generation unit.
- Students observed its constructional details, cooling arrangement, and terminal connections.
- Parameters such as voltage, frequency, and load control were discussed.

2. Excitation System:

- The excitation system provides the necessary DC supply to the alternator field winding.
- Various excitation methods such as static excitation and brushless excitation were discussed.
- Importance of voltage regulation and system stability was highlighted.

3. Transformer:

- Step-up transformers are used to increase generated voltage for transmission, while step-down transformers supply power to auxiliary units.
- Cooling methods (Oil Natural, Oil Forced) and protection systems (Buchholz relay, differential protection) were demonstrated.

5. Key Learnings from the Visit

- Practical understanding of co-generation power plants and their role in renewable energy.
- Exposure to substation layout, SF₆ circuit breakers, and distance protection relays.
- Hands-on knowledge of alternators, excitation systems, and power transformers.
- Real-time observation of switchgear operations and electrical safety measures.
- Enhanced comprehension of theoretical concepts through live demonstrations and technical interactions.

6. Conclusion

The industrial visit to Shri Chhatrapati Co-Operative Sugar Factory Ltd, Bhavaninagar provided students with valuable industrial exposure and practical understanding of power generation and protection systems. The experience strengthened their theoretical foundation in Switchgear and

Protection and Electrical Machine II by relating it to real-world applications. Such visits play a vital role in preparing students for professional challenges in the electrical engineering field.

7. Acknowledgment

We extend our heartfelt gratitude to the management and staff of Shri Chhatrapati Co-Operative Sugar Factory Ltd, Bhavaninagar, for their valuable time, guidance, and technical demonstrations during the visit. We also express our sincere thanks to the Hon. Management, Principal, Head of the Department (Electrical Engineering), and all faculty members for their continuous support and encouragement in organizing this successful industrial visit.

Some Glimpses:



Dongare sir is explaining TY Elect students about protection equipments used in substation



Alternator for Co-generation



Operation of Sugar Industry from Control Room



TY Elect group photo with Shri Chhatrapati Sahakari Sakhar Karkhana, Ltd., Bhavaninagar staff and Faculty members