Industrial Visit Report

Electrical Substation at Nira Bhima Sahakari Sakhar Karkhana, Shahaji Nagar

Institute Name: S.B Patil College Of Engineering [Polytechnic]
Department: Diploma in Electrical Engineering
Date of Visit: 10th September 2025
Location: NiraBhima Sahakari Sakhar Karkhana, Indapur Report
Prepared by: Batch 25-26

Introduction

Industrial visits play an essential role in bridging classroom theory with practical industrial applications. This visit to the electrical substation at Nira Bhima Sahakari Sakhar Karkhana Ltd., located at Shahaji Nagar near Bavada, Maharashtra, provided students with firsthand experience in electrical power distribution and management within a major agro-based industrial facility.

The substation is a critical infrastructure element responsible for stepping down high transmission voltages to distribution levels suitable for plant operations and local supply. It integrates advanced equipment such as power transformers, circuit breakers, busbars, CT/PT (current and potential transformers), and sophisticated control and protection systems, ensuring reliable and safe power supply to the karkhana.

By observing the substation components and understanding their roles from power reception to distribution, students gained valuable knowledge about real-world electrical network operations, fault protection mechanisms, and automation. The exposure highlighted the substation's function as the nerve center in the karkhana's power setup, supporting sustainable and uninterrupted industrial processes.


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Company Overview

Nira Bhima Sahakari Sakhar Karkhana Ltd., located in Shahaji Nagar, Indapur Taluka, Pune district, Maharashtra, is a cooperative sugar factory that integrates state-of-the-art electrical power systems with its sugar manufacturing processes. The factory operates an electrical substation critical to its power management and distribution infrastructure.

The substation serves as a pivotal node for receiving high-voltage power from the regional grid and stepping it down through transformer units to suitable voltage levels, enabling safe and reliable distribution within the plant. It features modern switchgear, circuit breakers, current and voltage transformers, and protection relays to safeguard equipment and ensure operational continuity.

Nira Bhima's electrical substation is built to meet industrial standards with advanced control and monitoring systems, including programmable logic controllers (PLCs) and digital relays, enabling quick fault identification and power restoration. The substation also connects with the state transmission network through 132kV and 220kV lines, ensuring stable power flow and catering to peak demand efficiently.

Visit Details

Date: 10th September 2025
Participants: Diploma Electrical Engineering Students
Focus Areas: Electrical Substation equipment and operational systems
Guidance: Factory Technical Staff

Electrical Substation Components Observed

Power Transformers: Step down high voltage to distribution levels within the plant. Typically rated between 10 to 20 MVA, oil-insulated for cooling and protection.

Circuit Breakers: Vacuum and SF medium voltage breakers for interrupting fault currents safely, protecting the substation and plant equipment.

Busbars: Copper or aluminum conductors connecting various substation components with a double busbar setup for operational flexibility.

Current and Voltage Transformers (CT/PT): For accurate metering, protection, and relay operation.

Switchgear and Isolators: Provide sectional isolation and house protective equipment to ensure safe maintenance and operations.

Lightning Arrestors: Protect equipment from voltage surges and lightning strikes.

Earthing System: Comprehensive grounding grid for safety and fault current dissipation.

Protection and Control Panels: PLCs and digital relays coordinate substation automation, fault detection, and control operations.

Auxiliary Systems: Backup batteries, control power transformers, and cooling arrangements for continuous reliable service.


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Technical Specifications Summary

Component	Specification Example
Power Transformers	10-20 MVA rating, oil-immersed
Circuit Breakers	Vacuum and SF6 gas types, medium voltage
Busbars	Copper/aluminum double bus arrangement
CT/PT	Accurate metering and protection
Switchgear & Isolators	Essential for safety and maintenance
Įightning Arrestors	Surge protection devices
Earthing System	Grounding grid for personnel and equipment safety
Protection Panels	PĮC and digital relay controlled
Auxiliary Systems	Batteries, cooling, backup systems

Jearning Outcomes and Conclusion

The visit to the electrical substation at Nira Bhima Sahakari Sakhar Karkhana deepened students' practical understanding of how substations operate as critical nodes for electrical power transformation, distribution, and protection within an industrial setting. The exposure to various equipment such as transformers, circuit breakers, protection relays, and automation systems enhanced their comprehension of real-world power system operations and reliability.

Students also appreciated the role of substations in integrating power generation with distribution networks and ensuring safety through control and protection schemes. Overall, the visit provided valuable insights into industrial power management practices and expanded their technical knowledge, preparing them for professional roles in electrical engineering and power systems.

Acknowledgments

I would like to express my sincere gratitude to the management and technical staff of Nira Bhima Sahakari Sakhar Karkhana for extending their warm welcome and providing valuable insights during our industrial visit. Their detailed explanations and willingness to share knowledge significantly enhanced our understanding of the steam power plant and electrical systems.

Special thanks to the faculty and administration of our educational institute for organizing this visit, thereby offering us an excellent opportunity to connect classroom learning with real-world industrial practices. Their continuous encouragement and support were pivotal in the successful completion of this visit.

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