Date: 6th May, 2025

Introduction

As part of the academic enrichment and practical training initiative under the Internship and Training Club of the Department of Civil Engineering, an industrial visit was conducted to Khyber Cement Industries Pvt. Ltd., one of the leading cement manufacturers in the region. The aim of this visit was to provide students with real-world exposure to cement production technology, industrial automation, environmental sustainability practices, and modern quality assurance protocols.

Industrial site visits play a critical role in bridging the gap between theoretical classroom learning and field-based applications. This visit enabled students to witness the scale, precision, and complexity involved in the production of one of the most essential construction materials—cement.

Figure 1. *Group photo with Khyber Cement team.*

Objectives of the Visit

- To gain first hand exposure to the complete manufacturing process of Ordinary Portland Cement (OPC).
- To understand the function and layout of various industrial components such as crushers, kilns, mills, and silos.
- To explore the implementation of advanced automation systems and real-time process control.
- To observe modern quality control testing methods, including the use of X-Ray Diffraction (XRD).
- To appreciate the environmental safeguards adopted by the company, including dust suppression systems, emission control technologies, and green initiatives.
- To familiarize students with the professional work culture and safety norms within large-scale industrial operations.
- To learn about the company's CSR (Corporate Social Responsibility) engagements benefiting local communities.

Details of the Visit

The visit was carefully planned over two consecutive days to ensure effective management and active participation. Upon arrival, the students were courteously received by the HR department and technical team, who facilitated a formal orientation session. This session provided an overview of the company's history, production capacity, technological upgrades, and role in regional infrastructure development.

Figure 2. *Orientation session at Khyber Cement.*

After the orientation, the groups were taken on a guided tour through various sections of the plant:

1. Raw Material Handling and Crusher Unit

Students observed how raw materials such as limestone, gypsum, and additives are transported, crushed, and homogenized for further processing.

2. Preheater and Kiln Area

The heart of the manufacturing process was demonstrated, where crushed material is heated to over 1400°C in the rotary kiln to form clinker—a crucial intermediary in cement production.

3. Clinker Cooling and Grinding

The cooled clinker was seen being ground into fine cement powder using vertical roller mills and ball mills.

4. Packaging and Dispatch Unit

A highly automated packing section was demonstrated, where the final product is bagged and readied for transport with minimal manual handling.

5. Automation Control Room

A major highlight was the central control room, equipped with SCADA systems, automated instrumentation, and real-time process dashboards. Students were able to observe how parameters such as kiln temperature, pressure levels, feed rates, and emissions are continuously monitored and controlled with high precision, ensuring consistency, efficiency, and safety in operations.

6. Quality Control Laboratory

Students visited the in-house lab where multiple standard tests were demonstrated including:

- **Fineness Test**
- **Setting Time Test**
- **Compressive Strength Test**
- **XRD Analysis** for mineralogical content and chemical consistency

The extent and regularity of quality checks deeply impressed upon students the importance of strict control in civil engineering material specifications.

7. Environmental and CSR Initiatives

The visit also showcased Khyber Cement's commitment to environmental responsibility, which includes:

- Installation of German Bag Filter Technology and Electrostatic Precipitators (ESPs) to reduce particulate emissions by over 95%.

- Continuous air quality monitoring.
- Green belt development through plantation around the premises.
- CSR initiatives such as free computer education centers, skill development in tailoring for women, and local community welfare programs

Learning Outcomes

The students gained:

- A thorough understanding of cement manufacturing stages and the integrated flow of industrial processes.
- Insight into the role of automation and digital control in minimizing human error and enhancing productivity.
- Exposure to industrial safety standards and discipline.
- Awareness about how cement industries contribute to sustainable development and community upliftment.
- Confidence in relating core civil engineering knowledge (materials science, structural behaviour, sustainability) with practical realities.

Conclusion

This industrial visit to Khyber Cement Industries Pvt. Ltd. was an academically rich and professionally organized experience. The interaction with industry personnel, exposure to modern technologies, and structured plant tour contributed significantly to students' understanding of real-world engineering operations.

The visit successfully fulfilled its objectives by enriching the students' perspective on the complexities and responsibilities involved in industrial civil engineering practices. The generous hospitality, clear coordination, and willingness to educate by the staff of Khyber Cement are gratefully acknowledged.