



Civil Engineering

Sloping, Benching, Embankments and Bundwalls

Course Introduction

This course provides comprehensive insights into the principles, techniques, and safety considerations associated with soil excavation, stabilization, and earthwork practices. Sloping, benching, embankments, and bundwalls are critical elements of construction projects that involve earthmoving and soil manipulation.

Participants will gain the knowledge and skills to evaluate soil types, select appropriate excavation and backfilling methods, implement protective systems, and ensure compliance with structural and environmental requirements. The course emphasizes practical applications and the latest standards for safe and efficient earthwork operations.

Target Audience

- civil engineers.
- Experienced Civil Engineers Seeking Professional Development
- Architects and Urban Planners
- Entrepreneurs in the Construction Industry
- Project Managers in the Construction Industry

Learning Objectives

- Identifying soil excavation/backfilling equipment in accordance with soil type and different excavation/backfilling purposes.
- Estimating soil excavation production rates.
- Learning how to select appropriate excavation protective systems.
- Matching fill and compaction requirements.
- Identifying compaction equipment/test in accordance with soil type and excavation/backfilling purposes.

- Identifying compaction degree required for structural /non-structural areas.
- Identifying Factors affecting compaction/compaction degree.
- Identifying appropriate protective systems (shoring of excavation sides),shoring/shielding techniques, sloping/benching, maximum allowable slopes.
- Identifying requirements of soil stabilization and different types of material applied to side slopes.
- Identifying soil improvement required in accordance with soil types and technique adopted.

Course Outline

• DAY 01

Fundamentals of Soil Excavation and Earthwork

Introduction to Soil Types and Properties:

- Soil classification systems
- Soil behavior under load and excavation

Excavation Equipment and Methods:

- Matching equipment to soil type and excavation purpose
- Estimating soil excavation production rates

Protective Systems for Excavation:

- Overview of shoring, shielding, sloping, and benching
- Introduction to maximum allowable slopes and safety regulations

Practical Session: Soil type evaluation and excavation planning

• Day 02

Compaction and Backfilling Techniques

Compaction Principles:

- Factors affecting compaction and compaction degree
- Structural vs. non-structural compaction requirements

Compaction Equipment and Testing:

- Selecting equipment based on soil type
- Common compaction tests (e.g., Proctor, CBR, field density tests)

Backfilling Methods:

- Matching fill materials to project requirements
- Layering and compaction techniques

Practical Session: Hands-on compaction and testing exercises

• Day 03

Sloping and Benching in Excavation

Principles of Sloping and Benching:

- Design and implementation of stable slopes and benches
- Slope stability analysis methods

Protective Systems for Slope Stability:

- Shoring and shielding techniques for excavation sides
- Introduction to soil stabilization methods for side slopes

Case Studies: Successful sloping and benching techniques in projects

Practical Session: Designing slopes and benches for specific soil types

• Day 04

Embankments and Bundwalls

- Design and Construction of Embankments:
- Embankment materials and stability considerations
- Factors affecting settlement and slope stability

Bundwalls Design and Applications:

- Role of bundwalls in flood control and containment
- Materials and construction methods for bundwalls

Soil Improvement and Stabilization:

- Techniques for soil stabilization (e.g., lime, cement, geosynthetics)
- Importance of drainage in embankments and bundwalls
- Practical Session: Embankment and bundwall design exercises

• Day 05

Safety, Sustainability, and Project Applications

Safety Standards in Earthwork Operations:

- Regulatory requirements and risk management
- Common hazards and safety measures

Environmental Considerations:

- Minimizing environmental impact during excavation and earthworks

- Erosion control and sediment management

Performance Monitoring and Maintenance:

- Long-term monitoring of embankments and slopes
- Rehabilitation techniques for failed slopes and embankments

Course Review and Final Case Study:

- Participants will develop a comprehensive plan for a real-world excavation, embankment, or bundwall project.

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 14, 2025	April 18, 2025	5 days	4950.00 \$	Spain - Madrid
Sept. 8, 2025	Sept. 12, 2025	5 days	4250.00 \$	UAE - Dubai
Dec. 15, 2025	Dec. 19, 2025	5 days	4250.00 \$	UAE - Dubai