Earth Retaining Structures Training Course

Professional Development Training Course Outline

Category	Construction Institute	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Earth Retaining Structures Training Course is designed to develop advanced expertise in the design, analysis, construction, and management of modern retaining systems used in geotechnical and civil engineering projects. With growing demand for sustainable infrastructure, resilient urban development, climate-adaptive engineering, and smart construction technologies, professionals must understand innovative solutions such as reinforced earth walls, mechanically stabilized earth (MSE) structures, gravity retaining walls, cantilever walls, anchored systems, sheet piles, diaphragm walls, and soil nailing techniques. This course integrates geotechnical engineering principles, advanced soil mechanics, numerical modeling, risk assessment, and construction best practices to enhance participants' ability to deliver safe, economical, and durable retaining structure solutions.

The program combines theoretical concepts, practical applications, industry standards, digital engineering tools, and real-world case studies to provide a complete understanding of earth retaining systems throughout their lifecycle. Participants will explore foundation stability, lateral earth pressure analysis, drainage design, seismic considerations, environmental sustainability, failure prevention, and quality control methods. Through expert-led sessions and applied learning, this training enables engineers, designers, contractors, and project managers to implement innovative geotechnical solutions, optimize structural performance, and improve infrastructure resilience in complex construction environments.

Programme Curriculum

Earth Retaining Structures Training Course

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Course Duration

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Course Objectives

By the end of the Earth Retaining Structures Training Course, participants will be able to:

1. Understand advanced principles of geotechnical engineering and earth retaining system design.
2. Apply modern soil mechanics and lateral earth pressure theories for retaining structure analysis.
3. Design safe and economical gravity, cantilever, anchored, and reinforced retaining walls.
4. Evaluate ground conditions, soil parameters, and site investigation data for engineering decisions.
5. Use advanced approaches for stability analysis and structural optimization.
6. Develop effective drainage and groundwater management strategies for retaining structures.
7. Apply sustainable construction practices and green infrastructure concepts.
8. Analyze retaining wall failures using forensic geotechnical engineering techniques.
9. Incorporate seismic resilience and climate adaptation strategies into designs.
10. Understand the application of digital engineering, BIM, and geotechnical software tools.
11. Improve project outcomes through risk management and construction quality control.
12. Evaluate innovative solutions including MSE walls, soil reinforcement, and hybrid retaining systems.
13. Enhance decision-making using smart construction technologies and industry best practices.

Target Audience

1. Civil Engineers and Structural Engineers
2. Geotechnical Engineers and Consultants
3. Construction Project Managers
4. Infrastructure Development Professionals
5. Highway, Railway, and Transportation Engineers
6. Contractors and Site Engineers
7. Urban Development and Environmental Engineers
8. Engineering Students and Technical Researchers

Course Modules

Module 1: Fundamentals of Earth Retaining Structures

- Introduction to **modern retaining structure systems and applications**

- Classification of retaining walls and selection criteria
- Principles of **soil-structure interaction and geotechnical behavior**
- Overview of construction materials and engineering standards
- **Case Study:** Analysis of retaining wall selection for a highway expansion project

Module 2: Soil Mechanics and Earth Pressure Analysis

- Understanding active, passive, and at-rest earth pressure concepts
- Soil properties affecting retaining structure performance
- Application of **Rankine and Coulomb earth pressure theories**
- Groundwater effects and pore pressure evaluation
- **Case Study:** Earth pressure assessment for an urban basement retaining system

Module 3: Design of Conventional Retaining Walls

- Design principles of gravity and cantilever retaining walls
- Reinforced concrete retaining wall optimization
- Stability checks: sliding, overturning, and bearing capacity
- Structural detailing and reinforcement requirements
- **Case Study:** Design evaluation of a commercial development retaining wall

Module 4: Advanced Retaining Systems and Ground Improvement

- Design concepts of **Mechanically Stabilized Earth (MSE) walls**
- Soil nailing and anchored retaining systems
- Sheet piles and diaphragm wall applications
- Ground improvement technologies for difficult soils
- **Case Study:** MSE wall implementation in a major transportation corridor

Module 5: Numerical Modeling and Digital Engineering

- Introduction to **BIM-enabled geotechnical workflows**
- Finite element analysis concepts for retaining structures
- Use of digital tools for stability prediction
- Data-driven design optimization techniques
- **Case Study:** Numerical simulation of deep excavation support systems

Module 6: Construction Methods and Quality Control

- Construction sequence planning for retaining structures
- Excavation safety and temporary support systems
- Material testing and field quality assurance
- Monitoring techniques and performance evaluation
- **Case Study:** Construction monitoring of an anchored retaining wall project

Module 7: Risk Management, Failures, and Sustainability

- Common causes of retaining structure failures
- Failure investigation and rehabilitation methods
- Climate resilience and extreme weather considerations
- Sustainable materials and low-carbon construction practices
- **Case Study:** Investigation of retaining wall failure after heavy rainfall events

Module 8: Future Trends and Smart Retaining Technologies

- Emerging innovations in geotechnical engineering
- Smart sensors and real-time structural monitoring
- Artificial intelligence applications in infrastructure design
- Sustainable and adaptive retaining solutions
- **Case Study:** Smart monitoring system for a large-scale retaining structure

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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