



Earth Retaining Structures Course: Deep Excavation Support and Slope Stabilisation



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Introduction:

Earth retaining structures, deep excavation support and slope stabilisation are the subject of this 5-day course for geotechnical, civil, structural and shoring engineering staff, ending with an Excavation Support and Slope Stabilisation Plan for a case basement. Projects lose time when earth pressure is underestimated, anchors go untested, groundwater lifts an excavation base or a cut slope is opened without drainage or monitoring. Nominees already design, build or review walls and excavations, and teaching is by case study on wall sections, anchor tests and monitoring data. CoreConcept Training Center delivers this earth retaining structures course.

Course Objectives:

- Select a retaining system among gravity, cantilever, reinforced fill, sheet pile, bored pile, diaphragm and soil nailed walls for a given ground model, retained height and site constraint
- Calculate active, passive and at-rest earth pressure with surcharge and groundwater loads acting on a retaining wall
- Verify sliding, overturning, bearing pressure and global stability of gravity, cantilever and reinforced fill walls using Eurocode 7 design approaches
- Specify embedded walls, ground anchors, struts and soil nails for basement excavation, including installation sequence and anchor and nail testing
- Choose soil and rock slope stabilisation measures and set instrumentation layouts with alert and alarm trigger levels for excavations and slopes
- Produce an Excavation Support and Slope Stabilisation Plan for a case basement and cut slope

Target Audience:

- Geotechnical design staff responsible for earth pressure, wall stability and slope calculations
 - Structural design staff responsible for wall stems, capping beams, walers and strut connections
 - Contractor engineering staff responsible for shoring installation, excavation staging and anchor stressing
 - Consultant and owner engineering staff responsible for reviewing retaining wall and excavation support submittals
 - Infrastructure engineering staff responsible for road, rail and utility cut slopes and embankment walls
 - Site engineering staff responsible for reading monitoring data and acting on trigger level breaches
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Course Outline:

Day 1: Retaining Structure Families and Lateral Earth Pressure

- Gravity, Cantilever and Embedded Wall Families Compared by Function
- Rankine and Coulomb Active and Passive Earth Pressure
- At-Rest Pressure, Surcharge and Compaction-Induced Lateral Loads
- Groundwater, Water Uplift and Hydrostatic Pressure on Walls
- Failure Case Review of Collapsed Walls and Excavations

Day 2: Eurocode 7 Design Checks for Gravity, Cantilever and Reinforced Fill Walls

- Eurocode 7 Limit States and Partial Factor Design Approaches
- Sliding, Overturning and Bearing Pressure Checks for Cantilever Walls
- Global Stability Check Using Limit Equilibrium Slip Surfaces
- EN 14475 Reinforced Fill Walls with Geogrid and Strip Layers
- MSE Wall Internal Stability, Pullout and Facing Connection Checks

Day 3: Embedded Walls, Anchors, Struts and Soil Nails for Basements

- Steel Sheet Pile Wall Embedment Depth and Section Selection
- Contiguous, Secant Pile and Diaphragm Wall Construction Sequences
- EN 1537 Ground Anchor Bond Length, Lock-Off and Acceptance Tests
- Strut, Waler and Raking Shore Load Distribution in Basements
- EN 14490 Soil Nail Layout, Shotcrete Facing and Proof Tests

Day 4: Slope Stabilisation, Excavation Base Stability and Monitoring

- Soil Slope Regrading, Counterfort Drains and Vegetation Bioengineering
- Rock Slope Bolting, Rockfall Netting and Catch Fence Selection
- Basal Heave, Hydraulic Uplift and Piping Checks at Excavation Base
- Inclinator, Strut Load Cell and Piezometer Monitoring Layouts
- Alert and Alarm Trigger Levels with Contingency Response Actions

Day 5: Case Study Practice and the Excavation Support and Slope Stabilisation Plan

- Case Basement and Cut Slope Brief with Ground Model Review
 - Case Retaining System Option Selection Using Wall Family Matrix
 - Case Anchor and Strut Layout with Staged Excavation Checks
 - Case Monitoring Schedule with Trigger Levels and Responsibilities
 - Excavation Support and Slope Stabilisation Plan Completion and Panel Review
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Skills You Will Gain:

- Retaining System Selection
- Lateral Earth Pressure Analysis
- Wall Stability Verification
- Reinforced Fill Wall Design
- Ground Anchor Testing
- Soil Nail Wall Specification
- Rock Slope Remediation
- Excavation Monitoring Interpretation

Why Attend This Course:

- Deliver an Excavation Support and Slope Stabilisation Plan for a case basement and cut slope to the project design lead and the construction manager
- Decide which wall family, anchor or strut arrangement and slope measure suits the ground, retained height and neighbouring structures
- Avoid wall rotation, base heave, anchor failure and slope slips that halt excavation and damage adjacent property
- Share earth pressure spreadsheets, anchor test records and trigger level schedules with design and site colleagues

Conclusion:

Back at work, the participant gives the project design lead and the construction manager an Excavation Support and Slope Stabilisation Plan that records the selected wall system, earth pressure and stability checks, anchor, strut and nail arrangements, slope measures and the monitoring schedule with trigger levels. Designers use it to fix wall depths and support levels before drawings are issued, and site teams use it to stage excavation and respond to readings. After the first excavation stage, the unit should compare measured wall movement and anchor loads with predictions and revise trigger levels where needed.

Frequently Asked Questions FAQ:

What should participants know before an earth retaining structures and deep excavation support course?

Participants should already design, build or review retaining walls, basements or cut slopes and be able to read soil parameters, wall sections and construction drawings. Familiarity with basic soil mechanics and spreadsheet calculation helps, because earth pressure and stability checks are built during the case work.

How does an earth retaining structures and slope stabilisation course differ from a ground investigation or pile foundation course?

It concentrates on holding back soil and rock: earth pressure, wall stability, embedded walls, anchors, soil nails, slope measures and excavation monitoring. Ground investigation courses stop at soil data, and pile foundation courses address vertical capacity, settlement and pile load testing.

When is a soil nailed wall preferred over an anchored embedded wall for deep excavation support?

Soil nailing suits dense or stiff soils above the water table where the excavation can stand briefly in short lifts. Anchored sheet pile, secant or diaphragm walls are preferred in loose soils, high groundwater or where movement next to sensitive buildings must stay small.

What do participants take back from the earth retaining structures and deep excavation support course?

Participants take back an Excavation Support and Slope Stabilisation Plan for a case basement and cut slope, with a wall selection matrix, earth pressure and stability checks, anchor and nail test criteria and a monitoring schedule with alert and alarm trigger levels.
