



# **Geosynthetics Engineering Course: Geotextiles, Geogrids and Geomembranes for Roads and Containment**



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### **Introduction:**

Geosynthetics engineering covering geotextiles, geogrids and geomembranes for roads and containment is a 5-day course for geotechnical, highway, environmental and contractor engineering staff, ending with a Geosynthetics Specification and Installation CQA Plan for a case organisation. Haul roads rut over soft subgrade, drains clog and lined ponds leak when products are chosen by catalogue habit, specified without test properties or installed without seam and leak checks. Nominees already design, specify or supervise earthworks, pavements or lined facilities, and teaching is by case study on product data sheets, test reports and installation records. CoreConcept Training Center delivers this geosynthetics engineering course.

### **Course Objectives:**

- Match geotextile, geogrid, geonet, geomembrane and GCL products to separation, filtration, drainage, reinforcement and barrier functions on a project
- Interpret index and performance test results, including wide-width tensile, opening size, permittivity and interface shear, and apply durability reduction factors
- Design geogrid base reinforcement, geotextile separation and filter layers and geocomposite drains for roads, working platforms and drainage works
- Select geomembrane, GCL and protection layers for pond, reservoir and landfill liner systems
- Supervise seaming, destructive and non-destructive seam testing and electrical leak location, and resolve wrinkle, anchorage and uplift problems
- Produce a Geosynthetics Specification and Installation CQA Plan for a case organisation

### **Target Audience:**

- Geotechnical design staff responsible for selecting and specifying geosynthetic products
  - Highway and pavement engineering staff responsible for subgrade stabilisation and base layers over weak ground
  - Environmental engineering staff responsible for pond, reservoir and waste containment liner systems
  - Contractor engineering staff responsible for geosynthetic installation, seaming and method statements
  - Quality and CQA staff responsible for conformance testing, seam records and leak location surveys
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## **Course Outline:**

### **Day 1: Geosynthetic Families, Functions and Polymer Properties**

- Geotextile, Geogrid, Geonet, Geomembrane and GCL Product Families
- Separation, Filtration, Drainage, Reinforcement and Barrier Function Matching
- Polypropylene, Polyester and HDPE Polymer Behaviour in Soil
- Woven Versus Nonwoven Geotextile Manufacture and Property Differences
- Function Matrix Linking Site Problems to Geosynthetic Solutions

### **Day 2: Testing Standards, Specifications and Long-Term Durability**

- ISO 10319 Wide-Width Tensile Testing and Strain Response
- Apparent Opening Size and Permittivity Index Tests for Geotextiles
- Interface Shear Testing Between Geomembranes, GCLs and Soils
- Creep, Installation Damage and Durability Reduction Factor Derivation
- EN 13249 and EN 13361 Application Standard Property Tables

### **Day 3: Road, Drainage and Reinforced Fill Design Applications**

- Geogrid Base Reinforcement for Unpaved Haul Roads and Platforms
- Geotextile Separation Layers Over Soft Subgrade Under Granular Fill
- Geotextile Filter Retention, Permeability and Clogging Criteria Checks
- Geocomposite Drain Flow Capacity Under Load and Gradient
- Geogrid Product Selection for Reinforced Steep Slopes and Walls

### **Day 4: Geomembrane Liners, GCLs and Installation Problem Cases**

- HDPE, LLDPE and PVC Geomembrane Selection for Ponds and Reservoirs
- Composite Liner Layering With GCL and Protection Geotextile
- Fusion and Extrusion Welding With Destructive and Non-Destructive Seam Tests
- Electrical Leak Location Surveys on Exposed and Covered Liners
- Wrinkles, Slope Anchor Trenches and Wind Uplift Failure Cases

### **Day 5: Case Study Practice and the Geosynthetics Specification and CQA Plan**

- Case Organisation Site Brief and Geosynthetic Function Allocation
  - Case Road and Drainage Geosynthetic Property Specification Table
  - Case Containment Pond Liner System and Seam Testing Schedule
  - Case Material Conformance Sampling and Roll Inspection Records
  - Geosynthetics Specification and Installation CQA Plan Completion
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## Skills You Will Gain:

- Geosynthetic Function Selection
- Index Test Interpretation
- Reduction Factor Application
- Filter Compatibility Design
- Base Reinforcement Design
- Liner System Layering
- Seam Quality Verification
- Leak Location Survey Planning

## Why Attend This Course:

- Deliver a Geosynthetics Specification and Installation CQA Plan for a case organisation to the project design lead and the quality manager
- Decide which geosynthetic product and property values suit each road, drainage and containment element before procurement starts
- Avoid rutted haul roads, clogged drains and leaking liners that trigger rework, environmental exposure and contract claims
- Share function matrices, property specification tables and seam testing checklists with design and site colleagues

## Conclusion:

Back at work, the participant gives the project design lead, the procurement team and the quality manager a Geosynthetics Specification and Installation CQA Plan that records each element's function, required property values, conformance sampling, seam and leak testing and acceptance criteria. Procurement uses it to compare supplier submittals on equal terms, and site teams use it to accept or reject installed layers. After the first lined area or reinforced section is completed, the unit should review test failures, repair counts and supplier deviations and tighten the specification where needed.

## Frequently Asked Questions FAQ:

### What should participants know before a geosynthetics engineering course?

Participants should already design, specify or supervise earthworks, pavements, drains or lined facilities and read soil data, drawings and product data sheets. Basic soil mechanics and spreadsheet skills help, because filter checks, reduction factors and seam test schedules are built on case data.

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## **How does a geosynthetics engineering course differ from a ground improvement or retaining wall course?**

It concentrates on manufactured polymer products: their functions, test properties, design checks and installation quality. Ground improvement courses change the soil itself by densifying, draining or mixing it, and retaining wall courses address earth pressure, wall stability, anchors and nails.

## **Why do geomembrane seams need both destructive and non-destructive testing in geosynthetics engineering?**

Non-destructive air pressure and vacuum box checks cover the full seam length, while destructive peel and shear samples prove weld strength at set intervals. Together with an electrical leak location survey they show whether a liner will hold liquid.

## **What do participants take back from the geosynthetics engineering course?**

Participants take back a Geosynthetics Specification and Installation CQA Plan for a case organisation, with a function allocation, property specification tables, liner layering, a seam testing schedule and conformance sampling records they can adapt to their own projects.

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