Advanced Concrete Materials and Performance Training Course

25 – 29 October 2027
Addis Ababa

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Training Center

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Ref: 487_223705 **Date:** 25 – 29 October 2027 **Location:** Addis Ababa **Fees:** 6000 Euro

Overview

Advanced Concrete Materials and Performance Training Course is a one-week course for concrete technologists, materials engineers, quality teams, laboratory functions, and construction engineers who leave with a Concrete Performance Optimization File. Participants connect binder systems, supplementary cementitious materials, admixture compatibility, rheology, mixture optimization, durability mechanisms, and test interpretation. The course turns variable material behavior into evidence-based production and quality decisions. Agile Leaders Training Center presents advanced concrete materials through performance-focused controls.

Who Should Attend

- Concrete-technology functions responsible for mixture development and performance adjustment
- Materials-engineering functions responsible for binder, aggregate, and admixture selection
- Laboratory functions responsible for sampling, testing, interpretation, and reporting
- Quality functions responsible for production controls and nonconformance diagnosis
- Construction-engineering functions responsible for placing behavior and field performance

The course assumes participants can interpret basic concrete mixture data and test reports, and it leaves out structural member design, repair-code compliance, and introductory laboratory procedures.

Departments and Industries

The course supports departments and industries that specify, produce, test, place, or evaluate concrete materials.

- Ready-mixed concrete and precast production organizations
- Construction, infrastructure, and transport project teams
- Materials laboratories and technical consultancies
- Cement, admixture, and supplementary material suppliers
- Industrial, energy, and asset-owner quality departments

Learning Objectives

By the end of this course, participants will be able to:

- Analyze binder, aggregate, water, and admixture interactions
- Build mixture adjustments around fresh and hardened performance criteria
- Evaluate rheology, workability retention, setting, and segregation evidence
- Diagnose permeability, cracking, chemical exposure, and reinforcement-corrosion risks
- Compare high-performance and self-consolidating mixture strategies
- Create a concrete performance optimization file from test evidence

Course Agenda

Day 1: Cementitious Systems and Materials

- Binder Composition and Hydration Response Map
- Supplementary Cementitious Material Selection Matrix
- Aggregate Grading, Shape, and Packing Review
- Water Quality and Water-to-Binder Control Sheet
- Material Variability and Compatibility Risk Register

Day 2: Admixtures and Fresh Behavior

- Chemical Admixture Function and Dosage Matrix
- Admixture-Binder Compatibility Trial Method
- Concrete Rheology and Flow Behavior Profile
- Workability Retention and Setting Diagnostic Chart
- Bleeding, Segregation, and Pumpability Troubleshooting Log

Day 3: Mixture Optimization

- Performance-Based Mixture Requirement Sheet
- Volume Balance and Aggregate Packing Method
- Trial Batch Adjustment Decision Tree
- High-Performance Concrete Mixture Strategy
- Self-Consolidating Concrete Stability Check

Day 4: Durability and Test Evidence

- Transport, Permeability, and Sorptivity Interpretation Grid
- Chloride Exposure and Reinforcement-Corrosion Risk Map
- Sulfate, Chemical Attack, and Aggregate Reaction Diagnostic
- Shrinkage, Thermal Behavior, and Cracking Cause Matrix
- Fresh and Hardened Concrete Test Correlation Record

Day 5: Concrete Performance Practice

- Suggested Exercise: Diagnose a Material Compatibility Problem
- Suggested Exercise: Adjust a Trial Batch from Fresh Tests
- Suggested Exercise: Select a Durability Control Strategy
- Suggested Exercise: Reconcile Laboratory and Field Results
- Capstone Exercise: Concrete Performance Optimization File

Practical Exercises

The course uses suggested activities to convert material observations and test results into controlled mixture decisions.

- Suggested activity: compare binder, supplementary material, aggregate, and admixture data for compatibility and variability risks.
- Suggested activity: adjust water, paste volume, grading, and admixture dosage from trial-batch behavior without losing defined performance criteria.
- Suggested activity: diagnose durability exposure and cracking mechanisms from test evidence and production records.
- Suggested activity: assemble material selections, trial results, adjustments, risks, and acceptance decisions into an optimization file.

FAQs

What does advanced concrete materials and performance training address?

Advanced concrete materials and performance training addresses constituent interactions, fresh behavior, mixture optimization, durability mechanisms, specialized concretes, test interpretation, and performance-based quality decisions.

Who suits advanced concrete materials training, and what does it assume?

Concrete technologists, materials engineers, laboratory teams, quality functions, and construction engineers suit the training. It assumes the ability to interpret basic mixture data and concrete test reports.

How does advanced concrete materials training differ from structural concrete design?

Advanced concrete materials training concentrates on mixture constituents, production behavior, durability, testing, and troubleshooting. Structural concrete design concentrates on member actions, capacity, reinforcement, and detailing.

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How are concrete admixture compatibility problems diagnosed?

Concrete admixture compatibility problems are diagnosed by controlling materials and conditions, comparing dosage and sequence trials, observing flow retention and setting behavior, and linking results to production records.

Why combine fresh and hardened concrete test evidence?

Combining fresh and hardened concrete test evidence connects workability, air, density, temperature, setting, strength, permeability, and cracking observations, helping teams distinguish material, production, sampling, and curing causes.

Conclusion

Participants take back a Concrete Performance Optimization File linking material data, trial batches, fresh behavior, durability risks, test interpretation, and corrective decisions. It changes isolated results into a traceable materials-control process. The file gives laboratory, production, quality, and construction functions a shared basis for adjusting mixtures and documenting performance choices.