MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

Phone: +601116373203 | **Email:** info@mawaevents.net

BASIC CEMENT CHEMISTRY

"Understanding the Chemical Foundations of Cement for Improved Production Quality"

Schedule

Date	Venue	Fees (Face-to-Face)
02 – 06 Aug 2026	Manama, Bahrain	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

Cement chemistry is at the heart of the cement production process, influencing the strength, durability, and other critical properties of cement. This intensive 5-day course covers the fundamental chemical principles behind cement manufacturing. Participants will gain a deep understanding of the raw materials involved, the chemical reactions that occur during the production process, and how these reactions affect the final product.

By the end of this course, participants will be equipped with the knowledge to improve cement quality, troubleshoot production issues, and optimize the cement manufacturing process.

Objectives

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

- Understand the key chemical components of cement and their roles in cement properties.
- Analyze the chemical reactions that occur during cement production.
- Identify the impact of chemical composition on cement performance.
- Utilize cement chemistry principles to improve production quality and efficiency.
- Apply knowledge of cement chemistry to troubleshoot and resolve production issues.

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Why Attend

- Gain a deeper understanding of cement chemistry and its importance in the production process.
- Learn how to optimize chemical composition for improved cement quality.
- Understand the chemical reactions during cement production and their impact on performance.
- Enhance problem-solving skills for addressing production challenges.
- Network with industry experts and peers to share knowledge and best practices.

Target Audience

This program is designed for:

- Cement plant managers and engineers seeking to deepen their knowledge of cement chemistry.
- Materials scientists and professionals working in cement manufacturing.
- Production supervisors and quality control managers in cement plants.
- Engineers involved in cement process optimization and troubleshooting.
- Professionals interested in improving the quality and performance of cement products.

Individual Benefits

Key competencies that will be developed include:

- Expertise in the chemical composition of cement and its impact on quality.
- Skills in analyzing and controlling chemical reactions during cement production.
- Understanding of how cement chemistry influences strength, durability, and other key properties.
- Competency in troubleshooting and resolving chemical-related production issues.
- Knowledge of chemical optimization techniques to improve production efficiency.

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Enhanced ability to control cement chemistry for improved product quality.
- Better problem-solving skills related to chemical imbalances in production.
- Knowledge of advanced techniques for optimizing cement chemistry to reduce production costs.
- A stronger understanding of the chemical foundation that supports the cement production process.
- Practical strategies to troubleshoot and resolve chemical-related production issues efficiently.

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Lectures – In-depth sessions covering the chemistry of cement, its components, and production processes.
- Workshops – Hands-on activities focused on analyzing cement samples and understanding their chemical composition.
- Case Studies – Real-world examples of cement production issues related to chemical composition and solutions.
- Group Discussions – Collaborative discussions on challenges and solutions in cement chemistry.
- Site Visits – Practical insights through site visits to cement plants for a first-hand look at cement production and chemistry.

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Course Outline

Detailed 5-Day Course Outline

Training Hours: 7:30 AM – 3:30 PM **Daily Format**: 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Introduction to Cement Chemistry

- Module 1: Fundamentals of Cement Chemistry (07:30 – 09:30)
- Overview of cement and its chemical composition.
- Key chemical components: calcium oxide (CaO), silica (SiO_2), alumina (Al_2O_3), and iron oxide (Fe_2O_3).
- Understanding the phases of cement: clinker, gypsum, and additives.
- Module 2: Chemical Reactions in Cement Production (09:45 – 11:15)
- Chemical reactions involved in the production of cement.
- The formation of clinker and its impact on cement properties.
- Case study: Chemical reactions in a cement kiln.
- Module 3: The Role of Raw Materials in Cement Chemistry (01:00 – 03:30)
- The influence of raw materials on cement chemistry and product quality.
- Sourcing and preparing raw materials for optimal chemical composition.
- Workshop: Evaluating the chemical composition of raw materials.

Day 2: The Phases of Cement

- Module 1: Clinker Formation (07:30 – 09:30)
- The process of clinker formation in the kiln.
- The role of different minerals in clinker chemistry.
- Case study: The effect of clinker chemistry on cement quality.
- Module 2: The Impact of Gypsum on Cement Properties (09:45 – 11:15)
- The role of gypsum in regulating the setting time of cement.
- The effect of gypsum on cement hydration.
- Workshop: Analyzing the effect of gypsum on cement setting time.
- Module 3: Optimizing Cement Phases (01:00 – 03:30)
- Techniques to optimize the phases of cement for improved quality.
- The impact of phase balance on the performance of cement.
- Group discussion: Balancing clinker and gypsum for optimal cement quality.

Day 3: Cement Hydration and Setting

- Module 1: Hydration of Cement (07:30 – 09:30)
- The chemical process of cement hydration and its effect on cement properties.
- Factors affecting the rate of hydration.
- Case study: Accelerating or delaying hydration in cement.
- Module 2: Setting Time and Strength Development (09:45 – 11:15)
- The role of chemical reactions in cement setting and strength development.
- The effect of chemical composition on setting time and strength gain.
- Workshop: Testing the setting time and early strength development of cement.
- Module 3: Troubleshooting Cement Hydration Issues (01:00 – 03:30)
- Common problems related to cement hydration and how to address them.
- Methods for adjusting hydration reactions in cement production.
- Group activity: Identifying and resolving hydration-related production issues.

Day 4: Chemical Optimization in Cement Production

- Module 1: Controlling Chemical Composition (07:30 – 09:30)
- Techniques for controlling the chemical composition during cement production.
- The role of chemical additives and their impact on cement quality.
- Workshop: Adjusting chemical composition to optimize cement performance.
- Module 2: Minimizing Chemical Variations in Cement (09:45 – 11:15)
- Strategies for minimizing chemical variations in the final product.
- The role of quality control in maintaining consistent cement chemistry.
- Case study: Addressing chemical variations in a cement plant.
- Module 3: Sustainable Practices in Cement Chemistry (01:00 – 03:30)
- Using alternative raw materials to reduce environmental impact.
- Sustainable cement chemistry practices and technologies.
- Group discussion: Implementing sustainable practices in cement chemistry.

Day 5: Cement Chemistry Troubleshooting and Advanced Topics

- Module 1: Troubleshooting Cement Chemistry Issues (07:30 – 09:30)
- Identifying common cement chemistry issues and their root causes.
- Practical solutions for resolving chemistry-related production problems.
- Workshop: Troubleshooting cement chemistry issues in the production process.
- Module 2: Future Trends in Cement Chemistry (09:45 – 11:15)
- Emerging trends in cement chemistry and their impact on production.
- The future of sustainable and innovative cement chemistry.
- Group discussion: The next steps in cement chemistry advancements.
- Module 3: Implementing Cement Chemistry Solutions (01:00 – 03:30)
- Steps to implement cement chemistry solutions in your organization.
- Measuring the success of chemical optimization efforts.
- Final project: Developing an action plan for cement chemistry improvements.

Certification

Participants will receive a Certificate of Completion in Cement Chemistry, acknowledging their expertise in the chemical processes and principles that support cement production.

Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation’s unique goals.

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