

5-Day Cement Industry Training Course In

CEMENT PLANTS WEAR PARTS AND CORROSION MANAGEMENT

Abu Dhabi - UAE, 13 – 17 July 2026

COURSE LEVEL: INTERMEDIATE

COURSE OVERVIEW:

Wear parts and corrosion management in cement plants is the systematic technical approach to mitigating the degradation of machinery caused by abrasion, impact, and chemical attack. This course defines the mechanical and chemical mechanisms that lead to the failure of critical components, from the primary crusher to the final packing line. It establishes a comprehensive strategy for material selection and surface protection to extend the service life of plant assets.

The scope of this training involves the study of metallurgy and polymer science as applied to the harsh conditions of cement manufacturing. It covers the selection of high chromium alloys for grinding media, the application of ceramic linings in high velocity ducts, and the use of specialized coatings to prevent atmospheric and process corrosion. Furthermore, the course addresses the logistical and financial implications of "Total Cost of Ownership" when choosing between sacrificial and high durability wear parts.

Coverage includes detailed modules on hard-facing techniques, the impact of alternative fuels on acidic corrosion, and the maintenance of anti-corrosive systems in steel structures. Participants will explore the role of "Tribology" in reducing mechanical wear and the latest innovations in composite wear plates. Through the study of failure analysis and preventive maintenance, attendees will gain the expertise required to reduce unplanned downtime and optimize the maintenance budget of the facility.

COURSE OBJECTIVES:

After completion of this course, the participants will be able to:

- Identify the different types of wear: Abrasion, Impact, Erosion, and Corrosion.
- Select appropriate metallurgical alloys for crusher liners and hammers.
- Understand the chemical mechanism of corrosion in high temperature kiln zones.
- Implement hard-facing and thermal spray solutions for component life extension.
- Evaluate the performance of ceramic vs. metallic liners in ducting.
- Manage the corrosion of steel structures in aggressive industrial environments.
- Analyze the impact of chloride and sulfur cycles on equipment degradation.
- Perform a "Wear Audit" to predict the replacement cycle of critical parts.
- Understand the role of lubrication and coatings in friction and wear reduction.
- Specify anti-corrosive painting systems according to ISO 12944 standards.

- Conduct root cause failure analysis (RCFA) on prematurely worn components.
- Optimize the inventory of wear parts based on "Life-Cycle Cost" analysis.

TARGET AUDIENCE:

This course is intended for Maintenance Engineers, Mechanical Supervisors, Procurement Officers, and Reliability Engineers.

TRAINING COURSE METHODOLOGY:

A highly interactive combination of lectures, discussion sessions, and case studies will be employed to maximize the transfer of information, knowledge, and experience. The course will be intensive, practical, and highly interactive. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. The attendants will also be encouraged to raise more of their questions and to share in developing the right answers using their analysis and experience. There will also be some indoor experiential activities to enhance the learning experience. Course material will be provided in PowerPoint, with necessary animations, learning videos, and general discussions.

The course participants shall be evaluated before, during, and at the end of the course.

COURSE CERTIFICATE:

National Consultant Centre for Training LLC (NCC) will issue an Attendance Certificate to all participants completing a minimum of 80% of the total attendance time requirement.

COURSE OUTLINE / COURSE CONTENT:

MODULE 1: PRINCIPLES OF TRIBOLOGY AND WEAR

- Fundamentals of friction, lubrication, and wear mechanisms.
- Two-body vs. three-body abrasive wear in cement mills.
- Impact of particle hardness and shape on material loss.
- Understanding the "Mohs Scale" in relation to cement raw materials.
- Introduction to wear monitoring and measurement techniques.

MODULE 2: METALLURGY OF WEAR-RESISTANT MATERIALS

- Properties of High-Chromium White Cast Irons.
- Role of Manganese Steels in impact-heavy applications.
- Understanding heat treatment processes: Hardening and Tempering.
- Relationship between "Hardness" and "Toughness" in alloy selection.
- Testing protocols: Brinell, Rockwell, and Charpy V-Notch.

MODULE 3: WEAR MANAGEMENT IN CRUSHING AND RAW HANDLING

- Maintenance of jaw, gyratory, and impact crusher liners.
- Wear patterns in apron feeders and vibrating screens.
- Life extension of conveyor belts and transfer chutes.
- Implementing "Stone-on-Stone" (Dead boxes) to reduce liner wear.

- Managing the impact of high-silica raw materials on equipment life.

MODULE 4: GRINDING SYSTEM WEAR COMPONENTS

- Optimization of ball mill liners: Lifting vs. Classifying profiles.
- Selecting grinding media: Forged steel vs. High-chrome cast balls.
- Wear protection for Vertical Roller Mill (VRM) tires and tables.
- Maintenance of separator vanes and internal ducting.
- Impact of "Inter-grinding" on the wear rate of mill internals.

MODULE 5: HIGH TEMPERATURE CORROSION AND EROSION

- Mechanisms of "Sulfidation" and "Carburization" in the kiln system.
- Acid dew point corrosion in preheater towers and bag filters.
- Managing "Chlorine Attack" on steel shells and internal structures.
- Erosion of refractory and steel in high velocity gas streams.
- Protection of "Kiln Inlet" and "Outlet Seals" from chemical wear.

MODULE 6: HARD-FACING AND SURFACE ENGINEERING

- Principles of Welding Overlay (Hard-facing) for rollers and tables.
- Selecting the right welding consumables (Carbides vs. Borides).
- Introduction to Thermal Spraying and Laser Cladding.
- Repair vs. Replacement: Economic and technical decision making.
- Quality control of hard-faced surfaces: Dye penetrant and ultrasonic testing.

MODULE 7: CERAMIC AND COMPOSITE LININGS

- Application of Alumina and Silicon Carbide tiles in chutes and ducts.
- Use of "Rubber-Ceramic" composites for impact and noise reduction.
- Advantages of castable wear linings in complex geometries.
- Installation techniques: Adhesive bonding vs. Mechanical bolting.
- Performance monitoring of ceramic vs. metallic solutions.

MODULE 8: STRUCTURAL CORROSION MANAGEMENT

- Atmospheric corrosion of steel buildings and silos.
- Principles of Cathodic Protection in reinforced concrete.
- Selecting primer and top-coat systems for aggressive dust environments.
- Surface preparation standards: Sandblasting (Sa 2.5) vs. Power tooling.
- Managing the corrosion of "Underground Piping" and "Galvanized Steel."

MODULE 9: FAILURE ANALYSIS AND DIAGNOSTICS

- Techniques for "Post-Mortem" analysis of failed wear parts.
- Identifying "Fatigue Cracks" and "Brittle Fractures."
- Using "Wear Maps" to identify high-stress zones in the process.
- Monitoring wear through "Oil Analysis" and "Vibration Trends."
- Case studies on catastrophic component failures in cement plants.

MODULE 10: PROCUREMENT AND INVENTORY STRATEGY

- Developing "Technical Specifications" for wear part procurement.
- Evaluation of "Trial Parts" and supplier performance tracking.
- Managing the "Total Cost of Ownership" (TCO) model.
- Strategic inventory for "Critical Spare" wear components.
- Sustainability: Recycling and refurbishing of worn-out parts.