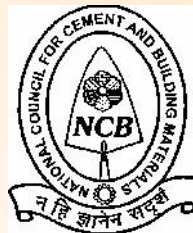


# TRAINING PROGRAMMES FOR OVERSEAS CEMENT PLANTS



Centre for Continuing Education Services

**NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS**

(UNDER ADMINISTRATIVE CONTROL OF MINISTRY OF COMMERCE & INDUSTRY, GOVT. OF INDIA)

ISO 9001: 2008 CERTIFIED

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## ORGANISATION PROFILE OF NCB

**National Council for Cement and Building Materials (NCB)** is an apex national body under the administrative control of the Ministry of Commerce and Industry, Government of India. NCB's activities have been devoted to Research, Technology Development, Absorption, Transfer, Continuing Education and Industrial Services for Cement, Concrete and Construction Industries. NCB has the relevant technical expertise and is competent to take up the above assignment.

NCB's services to the cement and construction industry are channelised through the following six Corporate Centres:

- Centre for Cement Research and Independent Testing (**CRT**)
- Centre for Mining, Environment, Plant Engineering & Operation (**CME**)
- Centre for Construction Development and Research (**CDR**)
- Centre for Industrial Information Services (**CIS**)
- Centre for Quality Management, Standards & Calibration Services (**CQC**)
- Centre for Continuing Education Services (**CCE**)

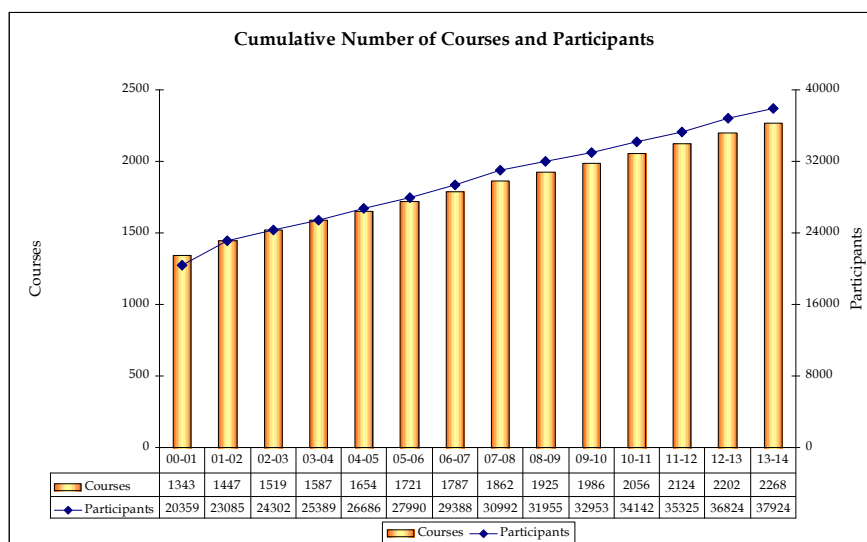
While the main laboratory is located at Ballabgarh near Delhi, the regional units/laboratories are located in Hyderabad (Andhra Pradesh) and Ahmedabad (Gujarat).

### **Centre for Continuing Education Services (CCE)**

The centre has been imparting the required skills for technical manpower for the cement and construction sectors since 1972. It organizes need based / industry oriented training programme for entry and post entry level. The training programmes are for cement industry, concrete and construction industry. The following types of the courses are organized:

- Long Term Courses
- Short Term Courses
- Contact Training Programmes
- Simulator Based Courses
- Special Group Training Programmes

CCE has already organized about 2,700 training courses and more than 38,000 professionals from cement and construction industry, State and Central Govt. Departments viz. Irrigation, Public Works and Public Health have availed the benefit of these courses. For overseas cement industry, training programmes are being conducted since 1985 and more than 500 professionals have taken advantage of these programmes particularly from Bangladesh, Bhutan, Colombia, Cuba, Dubai, Egypt, Indonesia, Iran, Iraq, Kenya, Kuwait, Libya, Malaysia, Nepal, Nigeria, Oman, Pakistan, Panama, Philippines, Saudi Arabia, Sudan, Sri Lanka, Turkey, Uganda, Yemen, etc.



As quality control and quality assurance is a critical component in construction projects, the World Bank has recommended NCB's training programmes for various State Govt. Departments as a part of their project approval.

### Facilities

The centre has good training facilities at NCB Ballabgarh/Hyderabad, which is equipped with comfortable lecture halls having modern Audio-Visual aids. NCB campus at Ballabgarh has lodging & boarding facilities. It has beautiful landscape surrounded with lawns and fountains. The hostel rooms are Air Conditioned with all modern facilities for senior executives / engineers.





## Library

NCB has a vast knowledge resource in its well-equipped library holding all the necessary books, periodicals and journals on all aspects of cement manufacture, building materials and concrete technology. The integrated bibliographic database consisting of more than 30,000 records for interactive searches is being constantly updated and used by NCB scientists as well as cement plants and other organizations.



## Training Methodology & Environment

The lectures are delivered by expert faculty using either Multimedia presentation/ OHP. Lectures are followed by group discussion / demonstration / laboratory practical



sessions. Two way interaction between the participant and the faculty is encouraged. Each programme also includes technical/site visit and yoga classes.



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## ADDRESSES OF NCB UNITS

### **BALLABGARH**

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34 Km Stone, Delhi-Mathura Road (NH-2)  
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**Website : [www.ncbindia.com](http://www.ncbindia.com)**

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# Modern Grinding and Pyroprocessing Technologies for Cement Manufacture

## ***Intended For***

Process / maintenance / electrical engineers and managers

## ***Objective***

The course aims to impart knowledge of the design features, selection and operation of modern grinding and pyroprocessing technologies for cement manufacture, developmental trends and retrofitting / upgradation possibilities for achieving enhanced production in cement manufacture.

## ***Course Contents***

- Modern grinding mills for raw material, solid fuel and cement grinding and their salient features
- Developments in classifier technology
- Vertical roller mills and roller presses as pre-grinders
- Evaluation of performance and optimization of ball mills, roller presses and vertical roller mills
- Grinding systems for production of blended cements
- Developmental trends in pre-heaters, pre-calciners, kilns, burners and grate coolers
- Optimisation of kiln operation
- Developments in refractories and refractory management
- Modernisation and retrofitting possibilities
- Energy conservation

## ***Duration***

2 Weeks



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# Methods of Sampling, Testing and Quality Control of Cement

## Intended for

Chemists, CCR operators, Quality Control managers and personnel engaged in quality & process control of cement plants

## Objective

The course aims at imparting knowledge on Bureau of Indian Standards Procedures on Sampling and Testing of Cement.

## Course Contents

- Types of Indian cement and BIS requirements
- Sampling of cement
- Physical tests of cement and evaluation of result
- Chemical analysis of cement
- Estimation of minor constituents in cement
- Application of XRD and XRF in analysis of cement
- Applications of optical microscopy in cement industry
- Principles & applications of Colorimetry & Flame photometry
- Instrumental techniques for evaluation of fuels – Bomb calorimetry & CHNS Analyser
- Interpretation of the data obtained from the above instruments in context of raw material, pyroprocessing, kiln history, quality control and process optimization instruments
- Thermal analysis

## Duration

2 Weeks





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## Raw Mix Design, Burnability and Cement Quality

### Intended For

Raw material technologists, production engineers/managers, process engineers/managers, quality control personnel, kiln operators.

### Objective

The course aims to impart knowledge of raw materials used in cement manufacture, raw mix design and proportioning, burnability of raw mix and the influence of raw mix characteristics on the formation and properties of clinker and cement quality.

### Course Contents

- Chemistry of clinker burning
- Raw materials used in cement manufacture, their characteristics and quality requirements
- Raw mix design, concept of moduli values, potential phase composition and impact on clinker quality
- Raw mix burnability and influencing parameters
- The effect of raw mix and burning process on cement quality
- Improvement of burnability through use of mineralisers, techno-economic assessment
- Impact of raw mix on coating and build ups and refractory performance.
- Assessment of raw materials, raw mix and clinker quality using DTA/TGA, optical microscopy and X – ray diffraction techniques.
- Raw meal quality control based on modern techniques like X-ray fluorescence spectrometer, bulk material analysers etc.
- Case studies.

### Duration

2 Weeks



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## Process Diagnostic Studies and Productivity Enhancement

### Intended For

Process/production managers/engineers, maintenance managers/engineers and supervisors.

### Objective

The course aims at equipping the participants with knowledge in the ways of enhancing the productivity through process diagnostic studies, process optimization and trouble shooting in grinding mills, pyroprocessing systems etc.

### Course Contents

- Optimisation of process parameters of ball mills
- Diagnostic studies on the operational problems in vertical roller mills/roller presses and trouble shooting
- Evaluation of performance of separators in grinding circuits
- Optimisation of kiln performance through improvement in raw mix design
- Quality variations of raw mix and homogenization as a tool to improve the productivity
- Fuel characteristics and combustion behaviour inside rotary kiln
- Optimisation of process parameters of kiln systems
- Problems encountered in clinker coolers and their redressal
- Process diagnostics for identifying the causes and remedies of undesirable coating and build-up formation, kiln shell corrosion etc
- Premature failure of refractories - causes and remedies
- Case studies and group discussions on plant specific problems

### Duration

2 Weeks



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# Energy Conservation and Energy Audit in Cement Plants

## Intended for

Process / production managers / engineers, maintenance managers / engineers and supervisors

## Objective

The programme aims at imparting in-depth knowledge on Energy Management and Energy Audit in various operations in cement manufacture and scope of energy conservation, including the latest technological developments.

## Course Contents

- Role and principles of energy audit
- Influence of raw material and fuel characteristics on energy consumption
- Energy conservation in grinding operations
- Energy conservation in pyroprocessing operations
- Energy conservation in fans
- Improving energy efficiency in electrical systems
- Optimizing the operation of water pumps for energy efficiency
- Energy saving opportunities in compressors
- Energy management in air conditioning systems

## Duration

2 Weeks



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## Refractory Engineering and Management Practices in Cement Industry

### Intended for

Process / production managers / engineers, maintenance managers / engineers and supervisors

### Objective

The course aims at highlighting the importance of refractory management in cement industry for improving the life and performance of refractories in cement rotary kiln systems to ensure increased productivity and reduced kiln downtime and disseminate the experience / information for use at large.

### Course Contents

- Elements of refractory management in cement plants
- Types of refractories and their selection criteria
- Quality control and inspection
- Advances in refractory products for cement rotary kiln system
- Refractory engineering and lining schemes for modern high capacity kilns
- Refractory installation techniques and commissioning of lining
- Kiln mechanics, operational parameters and their effect on the performance of refractory bricks/castables
- Diagnosis of refractory related failure including shell corrosion, build ups, ring formation etc. and remedial measures
- Lab. demonstrations

Duration

2 Weeks



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# Environment Management and in Cement Industry

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## Intended for

Chemists, CCR operators, Quality Control managers and personnel engaged in environment management, quality & process control of cement plants

## Objective

The course aims at imparting knowledge on environment management aspects of cement plants and allied industries.

## Course Contents

- Environment management system
- Environmental impact assessment and environmental management plan
- Operation and maintenance of mechanical dust collectors, fabric filters, electrostatic precipitators (ESPs)
- Advances in types of filters and their specific applications
- Advances in ESPs and gas conditioning towers
- Monitoring of environmental parameters
- Life cycle assessment (LCA)
- Demonstration of monitoring equipment at environmental field equipment laboratory
- O-processing of waste in cement industry
- Water and waste water analysis
- Noise and ground vibration

## Duration

1 Week (5 Days)



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## **Instrumental Methods of Analysis & Quality Control in Cement Industry**

### **Intended For**

Chemists, CCR operators, Quality Control managers and personnel engaged in quality & process control of cement plants.

### **Objective**

The course aims at imparting knowledge of principles, application and operation of modern analytical and quality control instruments in cement industry.

### **Course Contents**

- Principle and application of XRD, XRF, optical microscopy, calorimetry, flame photometry, Colorimetry
- Interpretation of the data obtained from the above instruments in the context of raw material characteristics, clinker and cement quality, pyroprocessing, kiln history, quality control and process optimisation
- Standard reference materials
- Methods of sampling
- Online quality control systems and laboratory automation
- Statistical quality control
- Quality management system

### **Duration**

2 Weeks





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## **Advanced Maintenance Techniques and Management System for cement Industry**

### **Intended For**

Maintenance engineers of cement industry.

### **Objective**

The course is aimed to impart knowledge of maintenance practices for different equipment in order to reduce downtime of operation in cement industry.

### **Course Contents**

- Maintenance procedures for crusher and different grinding mills
- Maintenance procedures for kiln drive and supports
- Alignment and mechanical stability of kiln
- Maintenance procedures for grate coolers
- Types of gears, gear failure and its analysis, maintenance and alignment
- Maintenance of feeders & conveyors
- Maintenance of compressors, fans & blowers
- Maintenance of dust control equipments
- Maintenance of electrical motors
- Lubrication and tribology
- Preventive maintenance schedules for different equipment in cement plants
- Predictive maintenance and condition monitoring techniques
- Modern maintenance management systems including TPM

### **Duration**

2 Weeks



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# Certificate Course in Cement Manufacturing Technology

## Intended For

Chemists, CCR operators and Process, Chemical & Mechanical engineers

## Objective

The course provides a perspective of the complete spectrum of cement manufacturing technology including 2 weeks practical training on Process Simulator.

## Course Contents

- **Cement:** Classification and types, properties; Overview of various cement manufacturing processes
- **Raw Materials:** Cement raw materials and their quality requirements; Technological assessment and their effect on various unit operations
- **Raw mix design and burnability:** Significance of various modulii values; Burnability of raw mix; Factors affecting burnability
- Raw mix design for 2, 3 & 4 component systems
- **Use of low grade materials and industrial wastes:**
- Preblending and homogenization techniques
- **Size reduction:** Various crushing and grinding systems, their operation and maintenance.
- Optimisation of grinding mills
- **Fuels and firing systems:** Fuels used in cement manufacture and their characteristics, fuel combustion process, burners and firing systems
- **Burning Process:** Chemistry of clinker burning; different types of Preheaters and Precalcinators; Rotary kiln and its auxiliaries; Grate Coolers and developmental trends; Operation and Maintenance of Kilns; Problems in kiln operation and remedial measures; Refractories and recent developments
- **Instrumentation and process control:** Use of various instruments for process monitoring and their maintenance; modern computerised process control systems
- Pollution control and environmental improvement measures in cement plants; Environmental management systems (ISO 14000)
- Materials handling systems, feeders and fans
- Energy conservation and management
- Modern plant maintenance methods, and condition monitoring techniques,
- Instrumental methods of analysis, Quality Control and Quality Management System (ISO-9000)
- Simulator training on operation, control and optimization of modern grinding and pyroprocessing systems

## Duration

5 weeks



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# **SIMULATOR BASED COURSE ON Operation, Control and Optimization of Modern Grinding and Pyroprocessing Systems**

## ***Intended For***

Control Room Operators, supervisory and managerial level personnel of modern cement plants

## ***Objective***

The course aims at imparting an understanding of the behavior of precalciner kiln and modern grinding systems and ways to stabilize kiln and mill operation and achieve optimal performance.

## ***Course Contents***

Training on the versatile and modern PC based Simulator covering different grinding and pyroprocessing systems as under :

- Vertical Roller Mills for raw material and coal grinding.
- Separate Line Calciner (SLC) / In Line Calciner (ILC) Kiln with modern grate cooler
- Roller press - ball mill systems as well as vertical roller mills for cement grinding.

The training covers the following aspects:

- Operational aspects of kiln and mill systems including operational disturbances and stabilization and optimization
- Start-up and shut-down procedures of kiln and mill systems including light-up and heating –up of kiln
- Compound operation of kiln along with mills
- Start-stop of drives, PID loops and computerized process monitoring, controlling and reporting systems.
- Kiln and mill control systems
- Each trainee operating either one section of a plant or the entire plant independently
- Trainees working in a group to operate a 'Common Cement Plant'

## ***Duration***

2 Weeks



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In addition to the above, customized training programmes on various aspects of cement chemistry & its manufacturing technology, concrete, construction and related areas and contact programmes to suit specific requirements can be worked out on specific request and can be organized at both the units of National Council For Cement and Building Materials or at Sponsor's site for a group of participants on mutually convenient dates.



## GENERAL INFORMATION

### 1.0 Course Fee

Duration	Course Fee Per Participant (US\$) ** (Non-residential)
2 Weeks (ten working days)	2,000
5 Weeks (25 working days)	5,000

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- Applicable for 10 minimum numbers of participants in any selected programme. The training programme can be organized on mutually convenient dates.
- In case, number of participants is less than 10, the course fee for the selected training programme will be worked out on case to case basis and intimated on request.
- The organization can also consider availing the benefit of our scheduled training programmes as per calendar posted on our website [ncbindia.com](http://ncbindia.com)

### 2.0 Venue

The venues of the training programmes are Ballabgarh (near Delhi) or Hyderabad (Andhra Pradesh) units of National council for cement and Building Materials (NCB)

### 3.0 Lodging/Boarding Etc.

Basic hotel facility is available inside the campus of both the units of NCB. Residential charges inclusive of breakfast, dinner, tea with snacks for training course are as below:

Duration of course	Residential Charges (US\$)
For short-term courses of duration two weeks	US \$ 50 per day on single occupancy basis Us \$ 35 per day on twin sharing basis
For long-term courses of duration 5 Weeks or more	US \$ 875 per month on twin sharing basis

1. Transport on the day of arrival from airport to Ballabgarh or Hyderabad unit of NCB and back on the day of departure can be arranged on specific request on payment basis.
2. Services such as telephone, fax, laundry, extra eatables/drinks, etc., will have to be borne by the participants themselves and payment will be made directly to the canteen/hotel since these facilities are not covered in the course fee.

### 4.0 Medical Facility

Medical consultancy by NCB doctor is free of charge within NCB Premises, on the days of his visit and can be availed in case of need. Any expense towards consultancy/treatment at Doctor's Clinic/Hospital will however be borne by the participants themselves.



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## Address for communications for further information/ clarification

Centre for Continuing Education  
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