



NCB

ENDURING EXCELLENCE



NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
Under the administrative control of Ministry of Commerce & Industry, Govt. of India

ABOUT THE COUNCIL

National Council for Cement and Building Materials (NCB), set up in 1962, then known as Cement Research Institute of India, is the apex body in India under the administrative control of Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, government of India, devoted to research, technology development and transfer, education and industrial services for cement, building materials and construction industries. Its multi-disciplinary activities are performed in an integrated and coordinated manner through its units that are located at Ballabgarh (Near Delhi), Hyderabad, Ahmedabad and Bhubaneswar. The six corporate centres of the council guide the activities at different units. The Centre and their main areas of activity are:

CEMENT RESEARCH AND INDEPENDENT TESTING

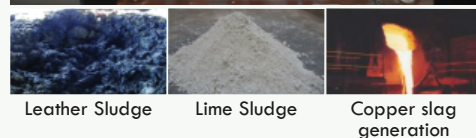
Achievements

- Submission of report comprising of comprehensive action plan and recommendations for implementing Circular Economy in Gypsum for NITI Aayog.
- Submitted report on technical evaluation of FGD gypsum produced in the country to BIS and standardization of FGD gypsum in cement manufacture achieved.
- Development of Low Carbon Cement like Portland composite cements based on fly ash and limestone and submission of its report to BIS for code formulation.
- Development of a new clinker system with low CO₂ emission having lower limestone content and energy consumption by utilizing the industrial waste.
- Developed a Technology to Produce Sodium Based Zeolite for Oxygen Concentrator by using Cement Raw Materials.
- Submitted a report to BIS on preparation of high magnesia clinker to utilize high MgO bearing low grade limestone for manufacture of blended cement resulting in preservation of natural resources and sustainable development.
- Laboratory assessment studies and providing necessary training and assisted the plant laboratories in getting the NABL accreditation carried out successfully for 6 cement plants of India and abroad.
- Secondary reference standards for XRF prepared and calibration of XRF being done for around 100 matrix of 20 cement plants of India.



WASTE UTILIZATION

- Techno-economic feasibility studies on utilization of industrial wastes such as coarse fly ash from thermal power plants, blast furnace slag and non-conventional slags (lead-zinc slag, copper slag, LD slag etc.) from metallurgical industries, lime sludges from chemical, paper, sugar, fertilizer, refinery, soda ash and carbide industries, red mud from aluminum industries, phospho-gypsum from fertilizer industry and agricultural wastes such as rice husk ash in manufacture of OPC, blended cements and other building materials.
- Typical studies on enhancing the level of fly ash content in the manufacture of PPC and in lime fly ash bricks/blocks
- Utilization of raw materials like dolomitic limestone, low grade limestone, shale, fly ash, bottom ash etc in making slag comparable to BF slag.
- Utilization of marble industry wastes in making artificial marble coatings, tiles, bricks and blocks etc.
- Development of gypsum board and tiles utilizing by-product gypsum
- Development of Synthetic Slag using low grade Lime Stone



FUNDAMENTAL AND BASIC RESEARCH

- Exploratory studies related to material science
- Application of nano technology for enhancing the cement and Concrete performance
- Development of novel cement systems and additives such as geopolymers, Portland limestone cement, High MgO clinker for blended cement, Belite-CSA clinker etc.
- Developed of Sodium Based Zeolite for Oxygen Concentrator by using Cement Raw Materials



Inauguration of zeolite prototype

CEMENTS AND OTHER BINDERS

- Establishing Limestone Consumption Factor (LCF)
- Characterization & Evaluation of raw materials & Fuels
- Optimization of raw mix design
- Utilization of marginal/low grade limestone in the manufacture of cement and building materials
- Development of newer cements, composite formulations, alternate binding materials



- Improving clinker/cement quality
- Investigations on lump formation in cement silos/bags and remedial measures
- Effect of minor constituents on clinker/cement quality
- Studies on use of mineralizers in clinkerization

Demonstration of optical microscopy for mineralogical analysis of clinker and raw materials

REFRACTORIES AND CERAMICS

❖ Diagnostic studies / investigations related to

- Premature refractory failures in cement rotary kilns
- Quality evaluation of fresh refractories lot at cement / refractory plant
- Loosening of brick rings in cement rotary kiln during operation
- Coating and build-up formation/ring formation
- Kiln shell corrosion

❖ Refractory management studies and optimization of refractory lining performance

❖ Development and technology transfer of refractory products

❖ High temperature investigations

- Devitrification studies of slag, aluminosilicates, etc.
- Refractory-raw mix interaction studies
- Technical suitability of industrial wastes in refractory and Ceramic industries
- Comprehensive thermal investigation of refractories using state-of-art equipments heating microscope, thermal analyzer, PCE, RUL, Spalling, PLC, etc.



Development of synthetic slag in laboratory

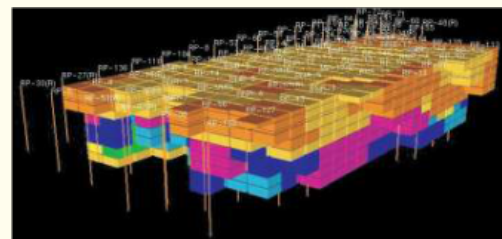
INDEPENDENT TESTING

- Complete physical, chemical, mineralogical, micro structural and high temperature analyses of various types of cement, clinker, pozzolana, aggregate, concrete, admixtures, water, refractories, bricks, limestone and other raw materials, coal, lignite, etc as per national and international standards in NABL Accredited and BIS Certified Laboratories.
- About 12000 samples are tested every year. The samples are mainly from BIS, Cement and Construction Industries and public sector organizations in India as well as from neighbouring countries.

CENTRE FOR MINING, ENVIRONMENT, PLANT ENGINEERING AND OPERATIONS

GEOLOGY, MINING AND RAW MATERIALS (GMR)

- Identification, technical appraisal & feasibility study of potential limestone deposit for new projects
- Planning, supervision and monitoring of exploration activities
- Computer aided deposit evaluation and mine planning, production scheduling and blending using advanced softwares like Datamine Studio, RM Scheduler and Multimine Scheduler
- Long term mine production sensitivity analysis based on grade constraints and production target using advanced softwares
- Technical audit of open cast limestone mines
- Lab scale beneficiation studies of low / marginal grade limestone



3D Block Model of Limestone Deposit

- *More Than 70 Projects on Supervision of Exploration & Computer Aided Deposit Evaluation and Mine Planning Completed in India and Abroad*

PROJECT ENGINEERING AND SYSTEM DESIGN (PSD)

- PMC Services
- Feasibility & Detailed Project Report
- Project Engineering & Implementation
- Plant Performance Assessment
- System Design Audits
- Plant modification and Upgradation



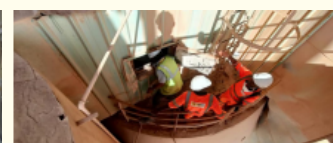
- *2 nos. Projects Completed as PMC*
- *100 + FEFRs, Detailed Project Reports completed successfully.*
- *State of the Art AutoCAD Lab, MS Project, Expertise of Simulation & Modelling etc.*

PROCESS OPTIMIZATION AND PRODUCTIVITY (PRP)

- Process Optimization studies for kiln-PH-calciner & cooler system
- Rational utilization of alternate fuels including hazardous wastes
- Improvement in fuel combustion efficiency
- Heat balance study on pyro processing and milling operations
- Diagnostic Studies: High PH exit gas temperature, kiln shell corrosion, unstable combustion / burning of fuel, coating formation / build-up in kiln system, lump formation in cement silos, buckling of chimney
- Determination of pre-blending and blending efficiency
- Capacity assessment of cement plant



Site inspection and Measurements during process optimization



Interacting session during audit

- Cement plant upgradation studies
- Technical feasibility study for alternate fuels
- Process optimization studies for Ball Mill, Roller Press and Vertical Roller Mill
- *150 Productivity Enhancement, Process Optimisation and Heat Balance Studies Completed*

ENERGY MANAGEMENT (EMG)

- Energy audit studies in cement plants including captive power plants Energy management, monitoring and target setting
- Heat balance studies
- Gas balance studies
- Identification of potential for thermal and electrical energy savings and recommendations for remedial measures
- Techno Economic Feasibility studies for Waste Heat Recovery System (WHRS) in cement plants
- National Award for Energy Excellence for Indian cement industry
- NCB is Accredited with Bureau of Energy Efficiency (BEE)



Measurement of Process Parameters in Cement Plant

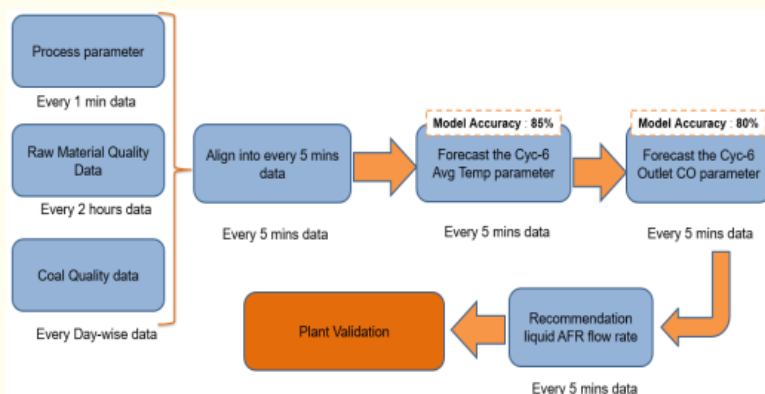


NCB National Awards Distributed at the NCB International Seminars

- *NCB is Accredited with Bureau of Energy Efficiency (BEE) as Energy Auditor 250 Energy Audit Studies Completed*

ADVANCED FUEL TECHNOLOGY (AFT)

- Technical feasibility studies for utilization of alternative fuels.
- Feasibility study for gasification of waste
- Optimization of AF utilization in cement plants and captive power plants using Artificial Intelligence
- Characterization of Alternative Fuels
- Impact assessment of waste utilization on Kiln Operation, Product Quality and Environment
- Fuel conservation studies/audits
- Audits of green fuels usage in cement sector
- Extended industry support through publications paper presentations, expert lectures, seminars, journal article submissions etc.



- *Specialized services focused on alternative and renewable fuel sources for the cement industry and power plants*
- *Ongoing project on enhancing TSP through liquid firing using AI models*

QUALITY ASSURANCE GROUP (QAG)

- Pre dispatch Inspections
- Independent Review and Quality Monitoring
- Periodical/ Regular visits in stages of project execution
- Review test reports of materials
- Quality of workmanship
- Prepare a comprehensive Quality Assurance Report



Yashobhoomi convention center, Dwarka, Delhi



Bharat Mandapam, ITPO, Delhi

- *NCB is Accredited with Bureau of Energy Efficiency (BEE) as Energy Auditor 250 Energy Audit Studies Completed*

ENVIRONMENT SUSTAINABILITY AND CLIMATE CHANGE (ESC)

- GHG Accounting and Verification
- Life Cycle Assessment (LCA) studies
- Environment Monitoring (Point Source & Ambient Air)
- Water Footprint Assessment
- Pollution Load Assessment
- Performance Evaluation of Air Pollution Control Equipment (APCE)
- Return Dust Assessment in Process Ducts
- Environment Audit
- Noise & Ground Vibration studies
- Salinity Intrusion Studies
- Impact Assessment Studie



Monitoring of PM & Gaseous Emissions at Kiln Stack

- *More than 100 Environment*
- *Studies completed on Performance Assessment of APCE, Pollution Load Assessment, LCA Studies, Salinity Intrusion Studies etc.*
- *Environment awareness in Indian Cement Industry – NCB has instituted National Awards for Environmental Excellence separately for integrated cement plants and grinding units, since 2000.*
- *NCB has given 38 nos National Award for Environment Excellence*

CALIBRATION AND INTER LABORATORY SERVICES

- Calibration services as per ISO/IEC 17025:2017.
- Calibration of equipment and Instruments used in measurement of Temperature, Pressure, Dimensions, Revolution, Force, Mass, Volume and Relative Humidity (Rh).
- Inter Laboratory Comparison (ILC) and Proficiency testing (PT) services as per ISO 17043: 2023.
- Calibration of around 2000 equipment from various industries annually.
- 112 PT studies executed so far



Calibration of Sieve at Profile Projector

TOTAL QUALITY MANAGEMENT AND STANDARD REFERENCE MATERIALS

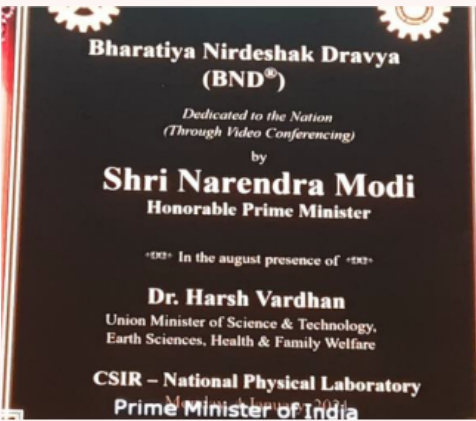
Programme under Total Quality Management (TQM)

- Consultancy for setting up Quality Control Laboratories in line with requirements of ISO/IEC 17025:2017.
- Benchmarking and Customer satisfaction measurement / enhancement studies.
- Assistance in ISO 9001:2015 Quality Management System Implementation to industries.
- National Quality Excellence award for Indian Cement Industry.

Programme under Standard Reference Materials (SRM's)

- NCB has developed RM /Certified Reference Materials (CRMs) in the areas of Cement, Building Materials and Solid Fuels (Coal and Pet Coke) which are accredited under ISO 17034:2016.
- NCB's CRM(s) have been quoted in IS 4031 (Part-2), IS 4031 (Part-15) and IS 1727.
- In addition, 21 Bhartiya Nirdeshak Dravyas (BNDs), the Indian Certified Reference Materials (CRMs) have been developed in collaboration with CSIR-National Physical Laboratory (NPL), NMI of India.
- 4000 CRM(s) supplied Annually to Indian and Overseas laboratories/Industries.

The details of RM/CRMs are mentioned below.

Field	Material		
Physical	OPC, PPC, PSC, Fly Ash, Composite Cement, WPC, Granulated Blast Furnace Slag, CCP, OPC residue on 45 μ m Sieve (Wet Sieving), OPC residue on 90 μ m Sieve (Dry Sieving), Fly ash for ROS 45 μ m (Wet Sieving)		
Chemical	OPC, PPC, PSC, Fly Ash, Composite Cement, Limestone, Raw Meal, Clinker, Granulated Blast Furnace Slag, Coal, Hydrated Lime Powder, Pet Coke, Red Ochre, Laterite, Silica Fume, Gypsum, WPC, Clay, Iron Ore, Bauxite		

BND's dedicated to Nation by Honorable Prime Minister of India

NCB developed BND with Certificate

CENTRE FOR CONSTRUCTION DEVELOPMENT AND RESEARCH

CONCRETE TECHNOLOGY AND STRUCTURAL OPTIMISATION DESIGN

- Evaluation of physical and chemical properties of concrete making materials i.e. cement, fly ash, silica fume, GGBS, water, fine and coarse aggregates and chemical admixtures
- Concrete mix design for special applications, design of self-compacting concrete, high strength concrete, pavement quality concrete, advanced concrete composites, geopolymer concrete, roller compacted concrete, pervious concrete, high volume fly ash concrete etc.
- Alkali Aggregate Reaction (AAR) studies on aggregates including petrography studies
- Evaluation of integral crystalline waterproofing compound
- Evaluation of new cementitious material and industrial bi-products for durable concrete structures
- Study on mechanical and time dependent properties of high and ultra-high performance concrete



Accelerated Corrosion Test



Test setup for Stress-Strain study of concrete under Strain controlled mode

Some of the studies undertaken recently

1. Carbonation induced corrosion study for composite cement
2. Utilization of coarser fly ash (having fineness between 250 m²/kg to 320 m²/kg) in concrete as a cementitious material
3. Study on the use of Electric Arc Furnace (EAF) as a fine aggregate and coarse aggregate in concrete
4. Evaluation of processed LD Slag as per IS 383: 2016 and Study its suitability to be used as fine aggregate

5. *Studies on thermal properties of mass concrete*
6. *Study of carbonation and carbonation induced reinforcement corrosion in new cementitious system*
7. *Evaluation of activated GGBFS as an alternative to hydraulic binder*
8. *Study on the use of Ferrochrome Slag as a coarse aggregate in concrete*
9. *Study on flexural and shear behaviour of high strength concrete*
10. *Studies on mechanical and time dependent properties of Ultra-High Performance Concrete*
11. *Studies on mechanical and time dependent properties of Very High Strength Concrete (100 to 130 Mpa) and Ultra High Strength Concrete (130 to 180 Mpa)*
12. *Effect of Fire on the Residual Mechanical Properties of reinforcing bars and Structural Performance of Reinforced Concrete Beams in flexure & Shear*
13. *Mechanical and Durability Performance of CO₂ sequestered sintered ash lightweight aggregate in concrete*
14. *Utilization of CO₂ in Fresh Concrete and Study on Fresh and Hardened Properties of CO₂ Induced Concrete*



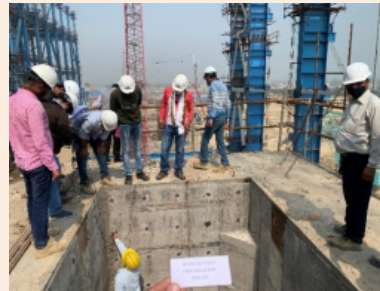
Experimental setup for evaluation of fracture parameters



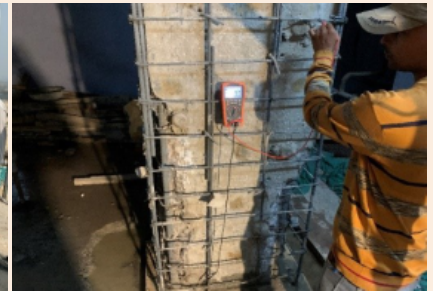
Creep Testing Arrangement for Ultra-High Performance Concrete

STRUCTURAL ASSESSMENT AND REHABILITATION & CONSTRUCTION MANAGEMENT

- In-situ quality assessment, durability investigation, residual life assessment and recommendation and supervision of repair, rehabilitation and retrofitting
- Application of Non-Destructive Testing for conformity of quality and condition assessment of concrete structures
- Preparation of repair estimates including cost estimates and detailed schedule of items for repair and rehabilitation works
- Consultancy services involving quality inspection and third party quality assurance of repair and rehabilitation works of concrete structures
- Assessment of load testing of RCC structures like bridges, underground RCC conduits, buildings, etc.
- Third party quality audit and quality assurance (TPQA) of new constructions
- Research & Development Projects on modern repair technologies



UPV Test on TG Deck Slab at a power plant project site in Uttar Pradesh



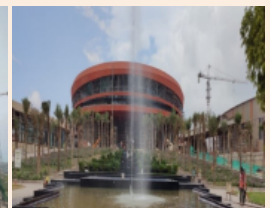
Continuity testing being done after installation of Zinc anodes at site of NHAI Residential Enclave at Dwarka, New Delhi

Some of the studies undertaken recently

- 1 *Distress Investigation & in-situ quality assurance of more than 40 structures per annum*
- 2 *Condition assessment of existing concrete structures including fire damaged concrete structures*
- 3 *Study on field and laboratory investigation of concrete dam under Dam Rehabilitation & Improvement Programme*
- 4 *Cathodic Protection to Enhance Service Life of New and Existing Concrete Structures*
- 5 *Performance Evaluation of Coatings under different types of environmental conditions*
- 6 *Third Party Quality Audit and Quality Assurance (TPQA) for more than 1000 construction projects including flyover, underpasses, buildings, roads etc*
- 7 *Development and evaluation of Reinforced Geopolymer Concrete for its mechanical and durability properties*



Quality Control and Quality Assurance of Bharat Mandapam, Delhi



Quality Control and Quality Assurance of Yashobhoomi, Delhi

MECHANICAL AND PHYSICAL PROPERTIES INVESTIGATION (MPI) LABORATORY

It is an NABL accredited testing laboratory in accordance with the ISO/IEC 17025:2017 procedures in the field of mechanical investigation of construction materials. The lab has wide range of specialized testing facilities for conducting R&D studies of hardened concrete for various mechanical, durability and time-dependent properties.

State of the art facilities

- Chloride Ion Penetrability Testing Equipment
- Corrosion Rate Analyzer
- Strain Controlled Compression Testing Machine-3000kN along with Flexural Testing Machine-300kN.
- Determination of Toughness and Energy Absorption of Steel Fibre Reinforced Concrete and Shotcrete Panels.
- Determination of Modulus of elasticity and Poisson ratio of Concrete
- Mercury Intrusion Porosimetry Equipment
- BET Apparatus for Surface Area Determination
- Tri-axial Shear Strength of Concrete-500kN
- Temperature studies in concrete through thermocouples and Resistance Temperature Device and their recording in Data Loggers having multiple channels.
- Water Permeability Testing Equipment



Hardened Concrete Sample - Accelerated Carbonation



Mercury Intrusion Porosity equipment for checking porosity of concrete

- Study on Carbonation induced concrete by keeping concrete samples in carbonation chambers.
- Study on Long term sustained loading on concrete samples in Creep testing machine
- Study on corrosion studies using Electrochemical Impedance spectroscopy (EIS) equipment
- Particle Size Analyzer to study Particle size distribution of various building materials such as Cementitious materials, repair materials such as latex, coatings etc.

Apart from the testing of construction materials, laboratory has also provide demonstration and training to various groups from esteemed organization such as Public Works department (PWD), TamilNadu, Department of Irrigation, NHPC, DMRC, NTPC etc., and recognized cement industry and also to many recognized academic institutions under various training programs.

CENTRE FOR INDUSTRIAL INFORMATION SERVICES

- Library with 47074 documents.
- Database of over 44750 biblio-graphic records for quick interactive searches.
- Regular and ad-hoc publications.
- National and international seminars /conferences /exhibitions / linkages.
- Organization of webinars, workshops and technical talks in hybrid mode.
- Digitization, office automation, web & mobile app enabled services.
- Modern IT infrastructure and cyber hygiene ecosystem.
- *17 international events already organized.*



CENTRE FOR CONTINUING EDUCATION SERVICES

- One Year PG Diploma course in Cement Technology (AICTE approved)
- Four/Eight Weeks training course in Cement Manufacturing Technology
- Short Term Refresher Courses for cement, concrete and construction technology
- Special Group Training Programmes
- Industry Specific training programmes for newly recruited professionals
- Simulator based courses for cement plant operations
- Contact training programmes – testing procedures, demonstration on NCB lab equipment facilities
- Workers Development programmes
- Pedagogy covers lectures, group discussions, case studies, field visit, audio-visual presentations, educational films, experience sharing, lab demonstration, hands on training and technical site visit

(upon special requirements)

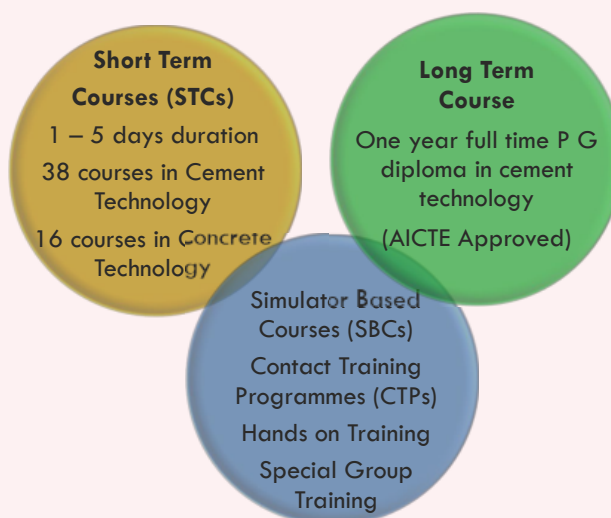
- Facilities include:
- Special Class rooms with state of the art training aids
- Well furnished, air-conditioned accommodations with mess facility

So far NCB has conducted more than 2800 training programmes and around 48000 participants have utilized our services. The participants have benefited on improving their skills and benefitted their organization in terms of cost reduction, carbon foot print and global economic improvement etc.

- Committed to enhance specific knowledge and skills of engineers, managers, supervisors and workers by providing training.
- Trainings include long term, short term, simulator based, contact training, hand on training and special group training programs.

Concrete Technology Training

- Corrosion resistance
- Durability and service life
- Fresh and hardened concrete properties
- High strength and high performance concrete.
- Mineral and chemical admixtures
- Mix proportions, acceptance criteria
- Non destructive testing
- Pre cast technology
- QA and QC
- Ready mix concrete technology
- Repair and rehabilitation



Cement Technology Training

- Alternate fuels and raw material
- Calibration of laboratory equipment.
- Carbon capture
- Cement marketing
- Certified reference materials
- Circular economy
- Energy audits
- Pyro process, grinding systems QMS, WHRS, XRD, XRF
- Quality and productivity
- Renewable energy
- Safety measures
- Testing of cements
- Waste management



ABOUT THE COUNCIL

The six corporate Centres of the Council guide the activities at the different units. The Centres and their main areas of activity are:

Centre for Cement Research and Independent Testing (CRT) - Cement and Other Binders, Waste Utilization, Refractory and Ceramics, Fundamental & Basic Research and Raw & Alternative Materials.

Centre for Mining, Environment, Plant Engineering and Operations (CME) - Geology, Mining and Raw Materials, Environmental Sustainability & Climate Change, Process Optimization & Productivity, Energy Management, Project Engineering & System design, Advanced Fuel Technology and Quality Assurance (Electrical & Mechanical).

Centre for Construction Development and Research (CDR) - Structural Optimisation & Design, Structural Assessment & Rehabilitation, Concrete Technology, Construction Technology and Management.

Centre for Industrial Information Services (CIS) - Industrial Information and Data Bank, Integrated IT Solution, Publication, Seminars & Conferences, International & National Linkages, Image Building.

Centre for Continuing Education Services (CCE) - Long Term & Short Term Courses, Special Group Training Programmes, Simulator Based Courses, Distance Learning Correspondence Courses, Workers' Development Programmes.

Centre for Quality Management, Standards & Calibration Services (CQC) - Total Quality Management, Calibration Services, Standard Reference Materials, Inter laboratory Services.

FOR FURTHER DETAILS, PLEASE CONTACT

DIRECTOR GENERAL

NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS

34Km Stone, Delhi-Mathura Road (NH-2), Ballabgarh-121004, Haryana, INDIA

Phone: +91-129-2666600

Email: nccbm@ncbindia.com, Website: www.ncbindia.com

NCB-HYDERABAD

NCB Bhawan, Old
Bombay Road,
(Gachibowli-Mehdipatnam Road)
Hyderabad-500 104,
Telangana, INDIA
Phone: +91-40-23180400 / 417
E-mail: uicncbh@ncbindia.com,
uicncbh@gmail.com

NCB-AHMEDABAD

Smeet Bungalows, B/h Planet House-2
(PH-2), Opp. Shukan Shubh-Labh Apt.,
off. Judges Bungalows Road,
Bodakdev, Ahmedabad-380 054,
Gujarat, INDIA.
Phone: +91-79-26855840
E-mail: uicncba@ncbindia.com,
brncb@rediffmail.com

NCB-BHUBANESWAR

Plot No. 145, Zone-B,
Shed No.4, IDCO Central Store,
Mancheswar Industrial Estate,
Bhubaneswar-751 010
Odisha, INDIA.
Phone: +91-674-2915172
E-mail: uicncbbh@ncbindia.com,
ncbodisha@gmail.com