NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
50 years
services to the nation

ANNUAL REPORT
2012-13

NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS

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Annual Report 2012 - 13

1 APRIL 2012 TO 31 MARCH 2013

National Council for Cement and Building Materials

(Under the Administrative Control of Ministry of Commerce & Industry, Govt of India)

34 Km Stone, Delhi-Mathura Road (NH-2), Ballabgarh-121 004, Haryana

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FOREWORD

Modernization and technology up-gradation is a continuous process for any growing industry. Adopting cost reduction, productivity enhancement and other measures, many plants in the industry have been able to achieve organic growth, which demands more and more technological support, trained manpower, etc. NCB has been providing this much needed technological support to cement and construction sectors.

Keeping in view the Thrust Areas of Research and Development identified in the country's 12th Five Year Plan and needs of the industry, NCB has taken up research projects in the areas of composite cements, fly-ash based geopolymeric cements, application of nano-technology, co-generation of power, concrete technology, pollution control, utilization of alternate fuels/wastes in cement manufacture etc. It is very satisfying to note that NCB has completed 342 Sponsored Projects during the year under report reaffirming the trust, users repose on NCB for providing cost effective and technically sound solutions for their operational problems, environmental and quality control issues.

NCB carried out several significant studies for cement industry covering optimization of raw mix design, wastes utilization, computer aided deposit evaluation and mine planning, process optimization etc. The industry continued to utilize services of the NABL accredited Test Houses at Ballabgarh and Hyderabad Units to maximum extent, as these are equipped with the best testing facilities and manned by highly experienced and dedicated personnel.

NCB carried out a large number of condition assessment studies on different RCC structures. Material evaluation and concrete mix design services were also provided for various power projects. Quality audit services were provided for a large number of construction projects covering roads, flyovers and buildings.

NCB International Seminar has emerged as singular biennial event which the cement and construction industries the world over look forward to for participation. The forthcoming 13th edition of this series is to be held from 19 to 22 November 2013. The response so far has been very encouraging in terms of registration, submission of papers, sponsorships and demand for exhibition stalls. I am sure, the industry will make use of this forum for exchange of latest information.

Another important service being provided by NCB is in the area of human resource development for Cement and construction industries. NCB continued updating knowledge and skills of industry personnel and

also providing trained manpower at entry level. It is hoped that with upgraded training facilities at its Ballabgarh and Hyderabad Units, NCB will offer more customized training courses.

Thus NCB made remarkable progress in the year 2012-13 in fulfillment of its objectives of rendering R&D and technological support to the Indian cement and construction industries. During my association with NCB in the recent past, I am convinced that the functioning of NCB is very industry friendly. I am confident, NCB with its strong organizational base and expertise would continue rendering better technological support for the sustained development of industries associated with it.

I compliment the NCB team under the able leadership of the Director General Shri Ashwani Pahuja for the achievements and progress made by NCB. I have to thank my colleagues on the Board of Governors and its committees for all the help and guidance provided by them in decision making on various issues from time to time. I am also grateful to the Department of Industrial Policy and Promotion, Government of India and Planning Commission for giving their fund support and direction at the corporate level.

M A M R Muthiah
Chairman

28 October 2013

INTRODUCTION

The report places on record the progress and achievements of NCB during the year in carrying out Research Projects - both Programmed and Sponsored and other industrial support services viz. testing, training and providing information to cement and construction industries. With customer centric approach and the updated infrastructure facilities, NCB completed 342 sponsored projects apart from pursuing 14 Programmed R&D Projects and providing industrial support services. The projects covered important areas like process optimization, energy conservation, environmental improvement, optimization of raw mix design, utilization of industrial wastes, diagnostic studies on distressed structures, quality audit, testing and calibration services, human resource development and information services.

NCB continued its efforts to enlarge the raw materials base for the industry. Studies were carried out for maximizing utilization of Effluent Solid Filtration (ESF) cake, a waste from soda ash manufacture. Another study revealed that LD slag could be gainfully utilized as performance improver in cement manufacture. The cement industry continued availing geological services like supervision of geological exploration, computer aided deposit evaluation and mine planning. Geological appraisal was made for two limestone deposits in Kenya. In the areas of Process optimization and Productivity, various studies were carried out including those to improve productivity of kiln through streamlining of process parameters and to improve the performance of a cement mill.

In the construction related activities, condition assessment studies were carried out on different RCC structures at several locations in India. Evaluation of materials and concrete mix design studies were carried out for various power projects in the country. NCB provided Third Party Inspection and Quality Assurance (TPIQA) services for a large number of major and minor construction projects.

Human resource development and quality management have been two important areas in which NCB has been providing services to the user industries. During the year, 78 training courses were organized for 1499 participants comprising of professionals from cement and construction industries and fresh graduates/post-graduates in science and engineering. Towards Quality Management, NCB assessed the quality assurance system of an integrated cement plant and clinker grinding unit. NCB has been accredited as Proficiency Testing (PT) service provider by NABL. A proficiency testing (PT) scheme on chemical analysis of OPC and two more PT schemes on mechanical parameters of OPC were completed in accordance with ISO 17043:2010. While various Certified Reference Materials (CRMs) were developed and supplied by NCB to a number of

organizations, NABL accredited calibration services were continued to be provided to cement plants, research institutes, testing laboratories and equipment manufacturers etc.

I attribute the achievements of the year to the dedicated and wholehearted support and cooperation of my colleagues and I look forward to their continued involvement and commitment. I am grateful to the Board of Governors and its Advisory Committees, Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India and Planning Commission for their valuable direction, guidance and encouragement.

Ashwani Pahuja
Director General

28 October 2013

NCB's Programmes and their Fulfilment

THE CORPORATE PROGRAMMES

NCB celebrated 50th year of its service to the Nation, with its pro-active R&D efforts and industrial support services to the cement, construction and other building materials industries. Innovative technological solutions and services were provided in the areas of optimal exploitation of limestone reserves including mine planning and computer aided deposit evaluation, utilization of industrial wastes, application of nanotechnology, process optimization and productivity, energy management, plant maintenance, total quality management, structural assessment and rehabilitation, concrete technology and quality assurance in construction.

Investigations were taken up for development of composite cements. Towards waste utilization in cement manufacture, studies were carried out on granulated LD Converter slag, marble dust/ slurry and Jarosite, a residual by-product from zinc industry. Basic research was continued on application of nano-technology and fly ash based geopolymeric cements. Geological services like topographical survey, mapping, supervision of exploration, computer aided deposit evaluation of limestone deposits were provided to the cement industry. Towards environmental management, services like monitoring of environmental parameters and life cycle assessment were provided to the industry. In the areas of Process Optimisation and Productivity, studies on improving the productivity of kiln and performance of cement mill were carried out. Heat balance studies were carried out and measures to reduce thermal energy consumption for two kilns were recommended. Techno-economic feasibility studies were carried out for a number of cement projects. NCB's services to the construction industry were reflected in studies on condition assessment of various concrete structures to determine the cause and extent of distress for repair and rehabilitation. Quality audit services were provided for various construction projects in the country. Evaluation of materials and concrete mix design studies were carried out for the construction industry.

Towards quality management, proficiency testing (PT) schemes were organized and certified reference materials, developed by NCB were provided to the industry. NCB continued providing training, testing, calibration and information services to the industry with its upgraded equipment facilities and NABL accredited laboratories.

101th Meeting of Board of Governors in Progress

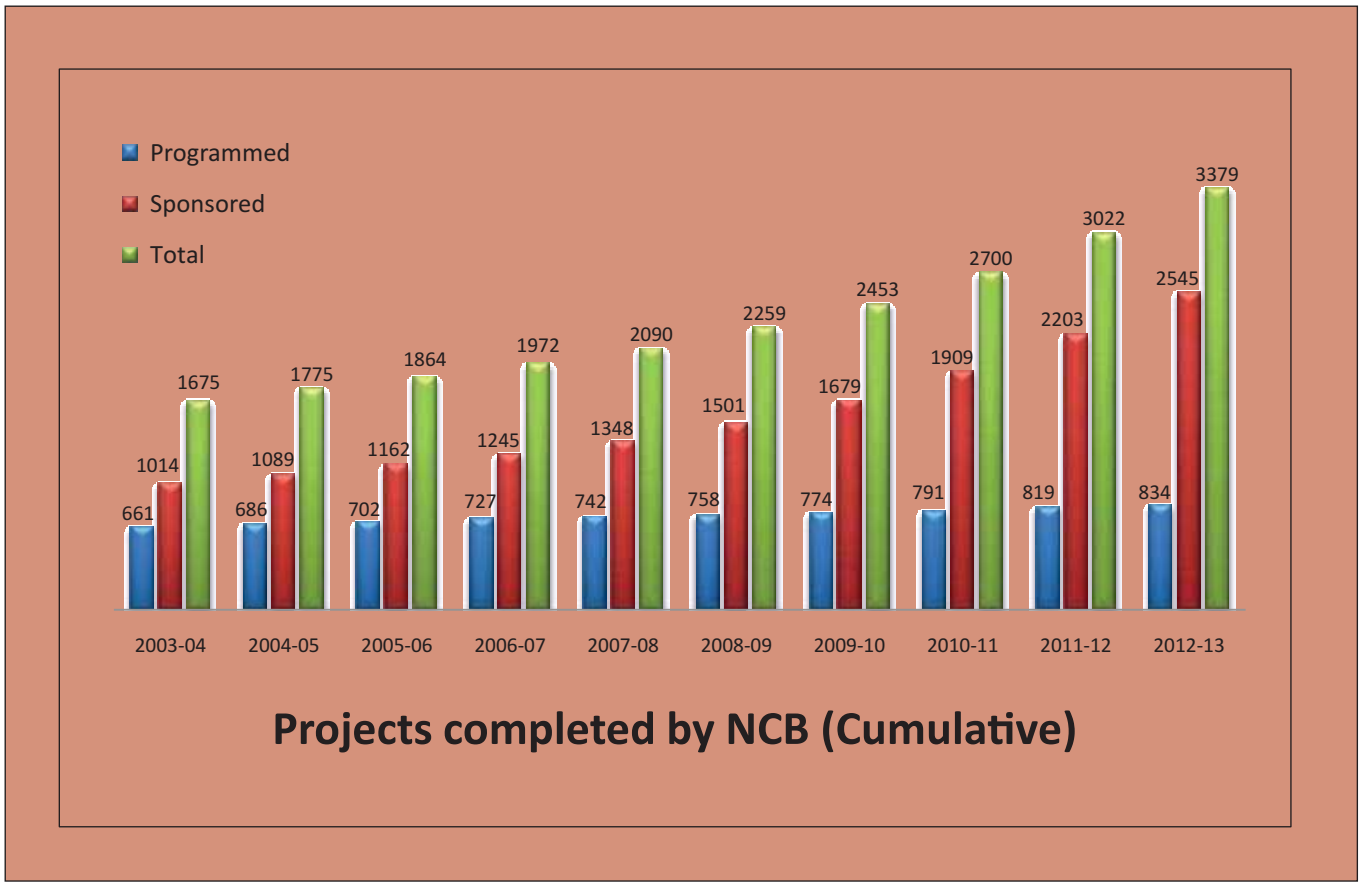
NCB's Current Rolling Plan of Missions is given in Appendix I. During the year under review specific projects with targets of time, cost and assured end-product were pursued under six Corporate Centres which are responsible for delivering the needed technological support services to the user industries. Close liaison was maintained as in the past with Cement Manufacturers' Association (CMA), Ministry of Environment and Forests (MoEF), Central Pollution Control Board (CPCB), Bureau of Indian Standards (BIS), Bureau of Energy Efficiency (BEE), Indian Bureau of Mines (IBM) and concerned departments of the state governments on aspects related to the development of cement and construction industries including availability of raw materials, quality assurance, modernization, energy management, environment, consumer protection, human resource development etc.

FRAMEWORK OF INSTITUTIONAL EFFORTS

The activities of the Council were carried out under the six Corporate Centres at NCB's Units, situated in Ahmedabad, Ballabgarh and Hyderabad. While the infrastructure is physically distributed over these Units, all the Units are involved in the execution of projects or services as necessary following the matrix approach.

During the year, 15 programmed and 342 sponsored projects were completed as listed in Appendices II and III respectively. The programmed projects, carried forward along with the new ones taken-up, comprised the R&D Programme for 2013-14, as given in Appendix IV.

The broad activities carried out by the six Corporate Centres during 2012-13 are highlighted in the following sections.



CENTRE FOR CEMENT RESEARCH AND INDEPENDENT TESTING - CRT

Centre for Cement Research and Independent Testing (CRT) carried out its activities through five programmes viz. Cements and Other Binders; Wastes Utilization; Refractories and Ceramics; Fundamental and Basic Research and Independent Testing. Twenty seven Sponsored Projects were completed and four Programmed Projects were pursued during the year.

Cements and Other Binders

Development of Composite Cements

Investigations were taken up for development of composite cements during the year. Composite cement blends using flyash and granulated blast furnace slag as the mineral additives will be evaluated for their physical properties *viz* fineness, setting time, compressive strength and soundness as per test procedures specified in relevant Indian Standards. The effect of micro silica and finely ground limestone, up to 5 percent by mass of cement, as mineral activator on the properties of these blends will also be investigated. Accordingly, samples of clinker, gypsum, fly ash, slag were collected from identified sources and characterized for their physical, chemical, thermal and mineralogical characteristics. Preparation of a number of cement blends utilizing OPC clinker (40-60%) with different dosages of fly ash and GGBFS (35-55%) in various combinations in line with EN-197 and their performance evaluation was in progress.

Limestone Consumption Factor (LCF) Studies

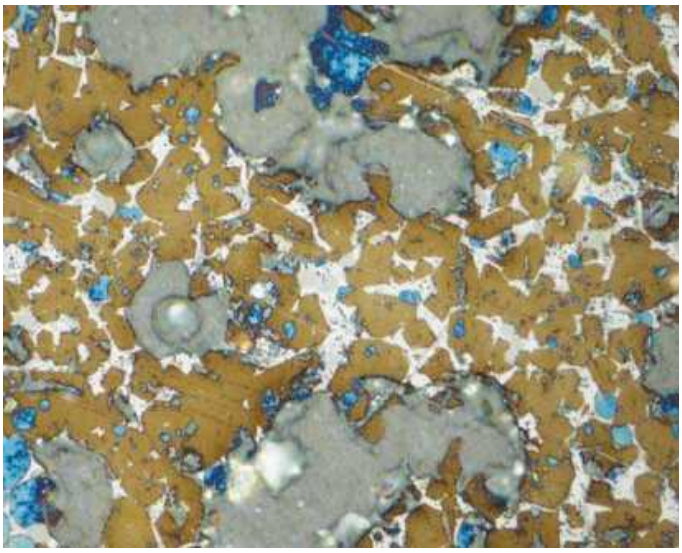
LCF studies are very important from the point of view of rationalization of limestone consumption in production of cement and internal material audit of the concerned cement plants. NCB has been carrying out Limestone Consumption Factor (LCF) study for cement plants from all over India and have so far, completed 152 studies. During the year, LCF studies were completed for 9 cement plants from Andhra Pradesh, Tamil Nadu, and Himachal Pradesh.

Optimization of Raw Mix Design

Studies on optimization of raw mix design were carried out for maximizing utilization of Effluent Solid Filtration (ESF) cake, a waste from soda ash manufacture, as raw mix component in the manufacture of OPC. The SO_3 and chloride contents of ESF cake were found to be 6.89% and 1.68%, respectively and were considered high. The high content of sulphate and chloride in the raw mix may put a limitation on the maximum proportion of ESF cake in the raw mix. The studies indicated that up to 14 percent ESF cake could be initially used in the raw mix.

Utilisation of Granulated LD Converter Slag

Investigations were carried out to study the utilization of granulated LD slag in the manufacture of cement and replacement of natural sand in cement mortars. The investigations revealed that LD slag could be gainfully utilized up to 5% as performance improver in cement manufacture. The results indicated that compressive strength at 28-days improved up to 3.5% as compared to that of control OPC without affecting the other parameters such as water requirement, setting time and soundness. Further, LD slag up to 40% by weight could be added during clinker grinding stage to manufacture cement blends. The compressive strength was found comparable to control OPC and PSC containing granulated BF slag. The investigations on use of LD slag as raw materials upto 4.25% by replacing iron bearing additives in the raw mix revealed that good quality clinker could be produced at 1400 °C.



Optical Micrograph of Clinker manufactured using LD slag as raw material

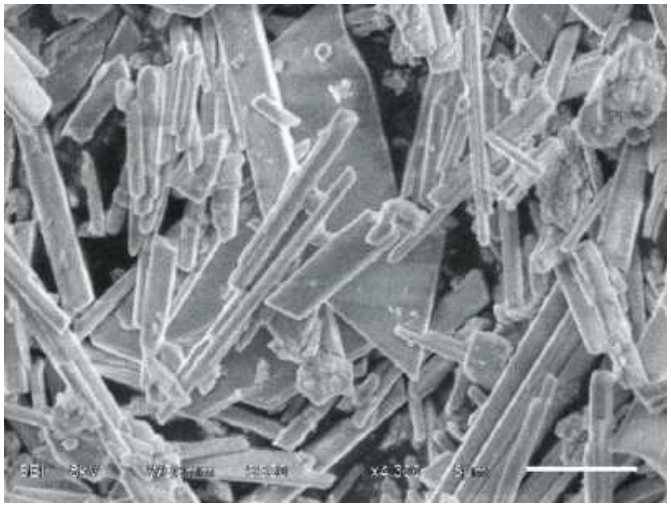
The investigations on use of LD slag as replacement of natural sand in cement mortar established that LD slag could be gainfully utilized up to 100 percent. The replacement of natural sand in cement mortar also showed improved performance characteristics.

Manufacture of Synthetic Gypsum from Marble Slurry for Subsequent use in Cement Production

The generation of waste marble slurry in India is in the range of 5 to 6 million tonnes per annum. The heaps of this waste material occupy large land areas and remain scattered all around at the marble processing unit, affecting the environment, eco-system and health of the people in the area. The chemical composition of marble slurry indicates predominance of calcium carbonate which is a suitable raw material for various industrial applications. One of its possible areas of utilization is its conversion into gypsum that can be used as set controller in cement industry. Marble slurry samples were collected from clusters at Kishangarh, Makrana, Rajsamand and Udaipur in Rajasthan and characterized for their physical and chemico-mineralogical properties.

Samples of synthetic gypsum with well grown crystalline phases were prepared in the laboratory by inducing chemical reaction using sulphuric acid and marble slurry. The amount of sulphuric acid to be consumed in its complete reaction with marble slurry was found to be dependent on the composition of the marble slurry especially on CaO and MgO content. The physical characteristics like specific gravity and whiteness index of the laboratory

SEM of Natural Mineral Gypsum Sample

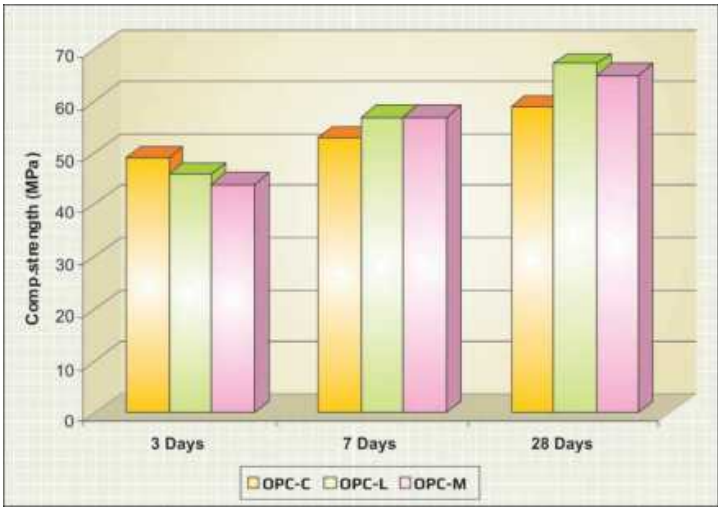


SEM of Laboratory prepared Gypsum Sample

prepared gypsum samples were found to be more or less comparable to mineral gypsum. The percentage purity of different synthetic gypsum samples prepared were 87.91, 89.55, 86.02 and 88.26%. The compatibility study on utilization of these synthetic gypsum samples as set retarder in manufacture of cement was in progress.

Utilization of Marble Waste in the Manufacture of Cement

Studies were continued on the suitability of marble dust/slurry for use in cement manufacture as raw mix, as performance improver in OPC and in making Portland Limestone Cement (PLC). Performance evaluation of Portland Limestone Cement (PLC) composites prepared by blending of 15-30% marble dust/limestone with OPC showed comparable strength development. Similarly, Ordinary Portland Cement samples containing 5% marble dust collected from different marble clusters of Rajasthan also showed performance comparable to OPC containing 5% limestone and conforming to IS requirement of $CaCO_3 \geq 75\%$ laid down for limestone to be used as performance improver in OPC.



Comparative Compressive Strength Development of Cement Samples : OPC (OPC-C), Containing 5% Limestone (OPC-L) and Marble Dust (OPC-M) as performance improver

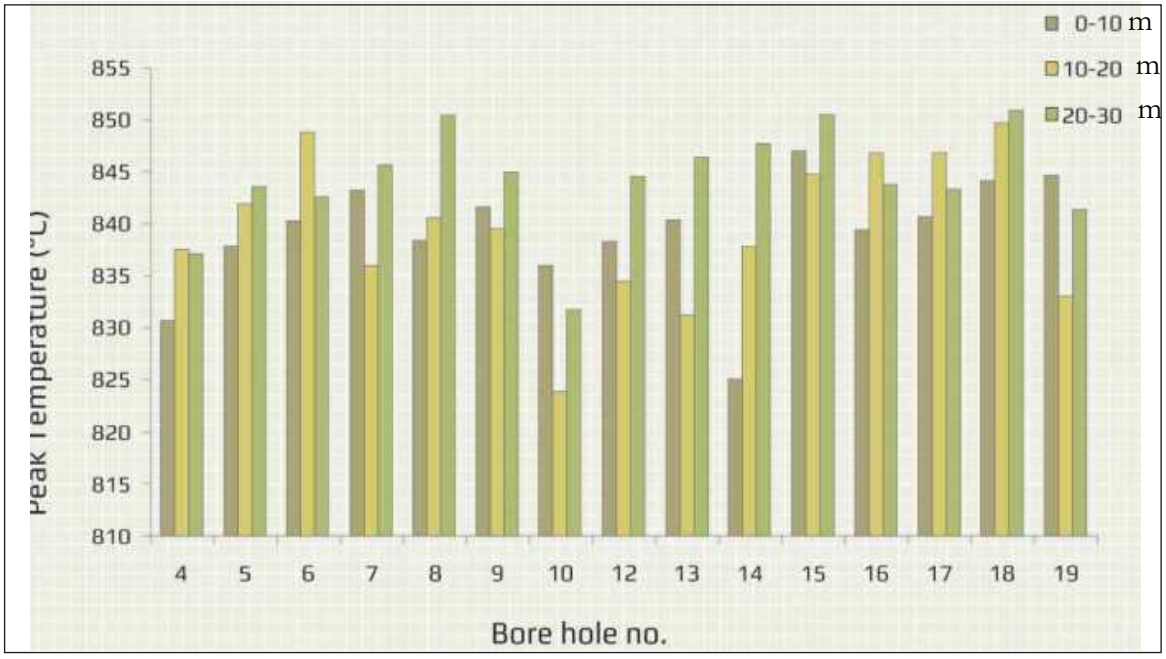
Utilization of Jarosite in Cement Manufacture

A study on Jarosite, a residual by-product generated from zinc industry during hydrometallurgical process containing predominantly Fe_2O_3, SO_3, alkalies with small amount of ZnO has been carried out. The constituent oxides present are known to contribute significantly in formation of clinker mineral phases and therefore, the Jarosite could be an effective mineralizer and activator in the manufacture of OPC clinker. The present study highlights the effect of addition of 0.5-2.0% of typical Jarosite in cement raw mixes prepared with different grade limestone samples along with other conventional raw materials. The clinker parameters such as LSF, SM and AM were maintained in the range of 0.92, 2.07-2.18 and 1.01-1.14 respectively. Burnability studies on raw mixes showed increase in the rate of lime assimilation and rapid formation of clinker mineral phases in presence of Jarosite. The mineral phase developments and micro-structures of laboratory clinkers fired at 1400±5°C were found to be adequate in presence of optimum dose of 1.5% Jarosite and were comparable to control clinker (without Jarosite addition) prepared at 1450±5°C.

The physical performance of Ordinary Portland Cement thus prepared from above mineralized clinker showed performance comparable to control cement. As the Jarosite contains heavy elements, a leaching study was carried out by immersing 28-days hardened neat cement cubes in 500 ml distilled water over a period of 24 months. The leachates such as barium, cadmium, cobalt, chromium, copper, manganese, zinc, lead and strontium were found to be in negligible amount.

Thermal Investigations of Limestone Mine Borehole Samples

Thermal investigations of limestone bore hole samples were carried out for an upcoming green field cement plant to foresee the extent of variation in the thermal behaviour of the limestone occurring in the mine. The investigations revealed that the quality of limestone present in the mine was varying in their thermal behavior. The difference in the energy requirement for de-carbonation indicated the role of minor minerals on the thermal behavior of limestone samples.



Plot of Peak Temperature of De-corbonation of Lime Stone samples

Fundamental and Basic Research

Investigations on Nanoparticle Blended Cements and Cement based Nano-composites

Nanoparticles can significantly improve the properties and performance of cements and concretes. Studies on the impact of blending small amounts (maximum 10 percent) of commercially available nanoparticles of SiO_2, Fe_2O_3, Al_2O_3, TiO_2 on properties and performance of cement and concrete were taken up. Hydration chemistry, nanostructure and mineralogy of hydration products in cements/ concretes incorporating nanoparticles will be investigated. Investigations on cement-polymer and cement-CNT nano-composites and their applications will also be carried out. Blends of OPC with nano silica, nano-iron oxide and nano TiO_2 were prepared and evaluated for physical properties. Hydration of OPC & OPC nano silica blends was investigated using FTIR, DTA, XRD and SEM techniques. Nanoparticles of silica were found to accelerate the cement hydration even at very early ages resulting in significantly shorter setting times.

Investigations on geopolymeric cements based on alkali activation of flyash were taken up. The microstructural and mineralogical studies were in progress.

Independent Testing

Independent Testing Laboratories of NCB undertake complete physical, chemical, mineralogical and micro structural analyses of various types of cement, clinker, pozzolana, aggregate, concrete, admixtures, water, refractory, bricks, limestone, coal, lignite, other raw materials, etc as per National and International standards.

X-ray Difractometer (XRD) for Mineralogical Analysis of clinker and raw materials of cement

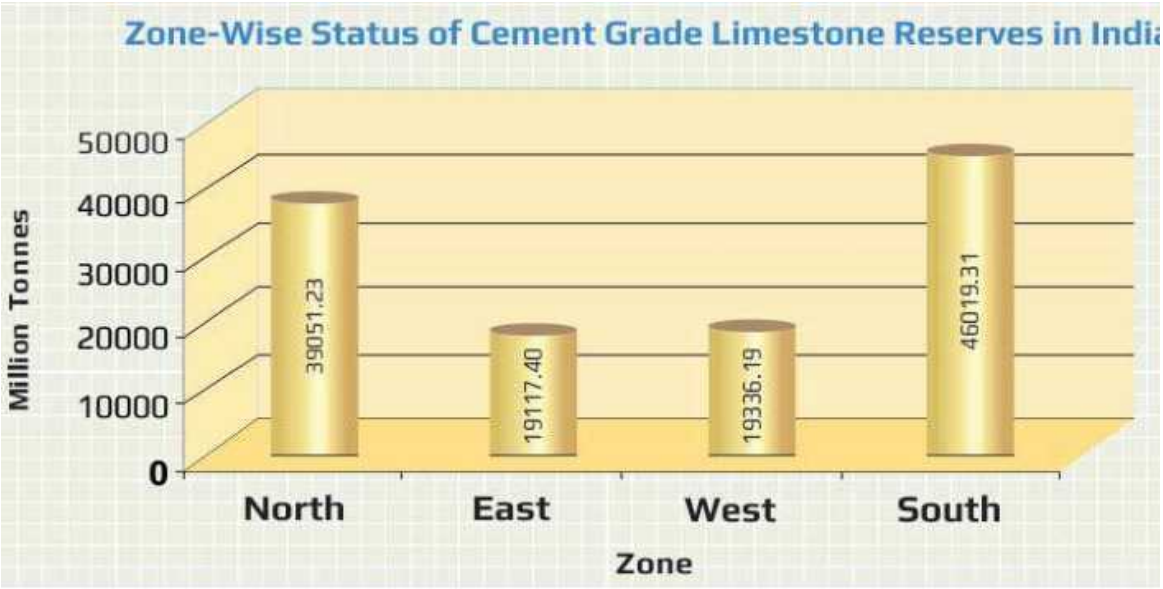
The laboratories were established in 1977 on a Test House pattern. NCB testing laboratories achieved a hallmark when NABL accredited them in the year 1997. The quality of testing services is maintained through NABL accreditation. The laboratories are equipped with state-of-the-art instruments to carry out the tests as per National and International standards. Assignments were carried out for Pakistan, Dubai, UAE, Nepal and Bhutan during the year. The number of samples tested during the year was about 7450.

CENTRE FOR MINING, ENVIRONMENT, PLANT ENGINEERING & OPERATION - CME

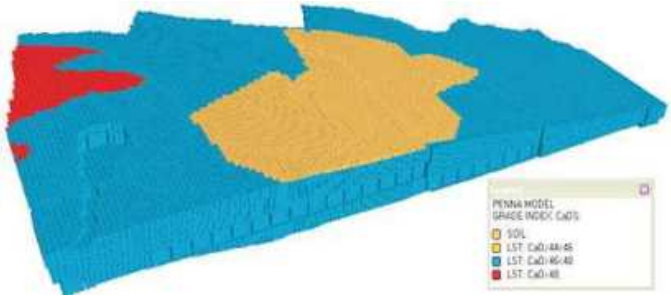
Centre for Mining, Environment, Plant Engineering and Operation carried out its activities through six Programmes viz Geology, Mining & Raw Materials; Environmental Management; Process Optimisation and Productivity; Energy Management; Plant Maintenance and Project Engineering & System Design and completed 20 sponsored projects during the year.

Geology, Mining and Raw Materials

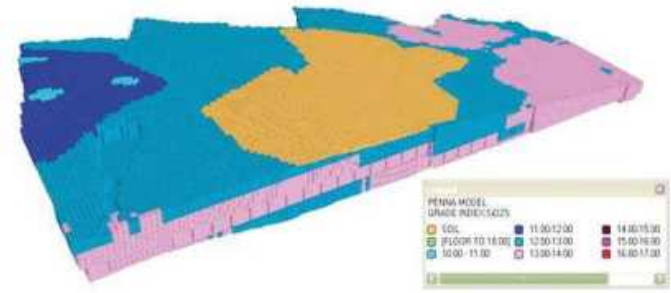
'*Updating of National Inventory of Cement Grade Limestone Deposits in India*' was continued through regular interaction/consultation for limestone investigation/exploration data from various organizations of Central and State Governments and Indian cement industry. The total cement grade limestone reserves is estimated at 123524.13 million tonnes as on 31 March 2013, out of which the proved, probable and possible categories are of 31441.22 million tonnes, 39026.84 million tonnes and 53056.06 million tonnes respectively. Various State Directorates of Geology and Mining have been approached for the additional reserves explored in their respective states. As per present scenario 93.78% of the total cement grade limestone reserves are found to occur in 10 states, rest 6.22% is distributed in other states and Union Territories. The zone-wise distribution of cement grade limestone in India is as given below:



Total Reserves 123524.13 Million Tonnes (March 2013)



Distribution of CaO - 3D Block Model of a Limestone Deposit



Distribution of SiO_2 - 3D Block Model of Limestone Deposit

Computer Aided Deposit Evaluation and Mine Planning of three limestone mines located in Nalgonda District of Andhra Pradesh were completed. Mine planning and production scheduling by blending to achieve the targeted ROM quality of limestone from the three limestone mines was carried out as per the mining restrictions in force.

Survey, geological mapping, supervision of exploration and computer aided deposit evaluation of a limestone deposit for 2 sq. km at Ogipur, Rangareddy district of Andhra Pradesh was in progress.

Survey, geological mapping, supervision of exploration and computer aided deposit evaluation of a limestone deposit of 1000 acres in Anantpur District of Andhra Pradesh was completed. 3D block model of limestone deposit showing distribution of CaO% and SiO_2% are shown in the *Figure*.

Preliminary Investigations for Beneficiation of Low/Marginal Grade Limestone on Laboratory Scale for a cement project in Chhattisgarh were completed.

Environmental Management

Study on Present Dust Emission Levels and Available Technologies for Reducing the Dust Emission at Stone Crushers has been taken up. Literature survey was carried out on pollution levels and dust control devices used at stone crushers. Data collection from stone crusher units in various states was in progress.

Life Cycle Assessment (LCA) Study for Construction Sector (Gate-to-grave) was completed. Final technical report comprising life cycle environmental impact assessment data of four commercial buildings, two Ready Mix Concrete (RMC) plants, concrete road and alternates for reduction of impact during various phases in the building life cycle was submitted to Ministry of Environment and Forests, Government of India.

Assessment of Air Pollution from Cement Plants using Petcoke as Fuel was completed after studying emissions of six major cement plants and two minor cement plants while using various percentages of petcoke along with different types of coals. Draft Report including data on emissions and laboratory analysis of samples collected from the selected plants was submitted to Central Pollution Control Board (CPCB).

Life Cycle Assessment (LCA) Study of Cement Plants based on Alternate Fuel was completed. Draft Report covering life cycle assessment analysis of five cement plants using various types of alternate fuels viz., Municipal solid waste, agro waste, benzo furan, tyre chips, plastic waste etc. was submitted to CPCB.

Environmental Monitoring at a White Cement plant

Life Cycle Assessment of Steel Re-Rolling Mill Sector was completed. The study covered the potential environmental benefits accrued from the implementation of Energy Efficient technologies at two Steel Re-Rolling Mill (SRRM) units. The study highlighted the environmental impact at baseline level vis-à-vis the post implementation level using LCA tool.

Monitoring of environmental parameters at two plants in Rajasthan was taken up. Various environmental parameters like Ambient Air Quality, Ground Water Quality in and around the plant, ambient noise level and noise level at plant machineries were monitored in the first phase.

Process Optimisation and Productivity

Studies on *Improving the Productivity of Kiln through Streamlining of Process Parameters* for a cement plant in Odisha were completed. It was carried out for a kiln with rated capacity of 3000 TPD clinker and producing around 2900 TPD clinker. The plant has been experiencing the problem of high free lime in clinker, coating formation in burning zone resulting in reduction of kiln output rate besides high pre-heater exit gas temperature and high heat consumption. The factors contributing to reduction of kiln output rate and high pre-heater exit gas temperature were identified and the following recommendations were provided to the plant to improve the productivity :

- The silo extraction mechanism changed from sequential to alternate segment besides reducing the extraction cycle time from 20 minutes to 5-7 minutes.
- The kiln burner should be operated with a flame momentum of 1500% m/s which will improve fuel combustion.
- Reduction in degree of calcination to 92-95% and calciner temperature to 880 °C.
- Modernization/ change of cooler was suggested to reduce heat loss from cooler from the existing level of 192 Kcal/ kg clinker to 120 Kcal/ kg clinker resulting in a saving of 72 Kcal/ kg clinker.

- Static grate cooling fans which are damper controlled with damper opening of 40% & 60% respectively should be operated at 100 % damper opening to increase air to the kiln system.

Studies on *Improving the Performance of a Cement Mill* for a cement plant in Gujarat were carried out. The Cement mill was running at 95 TPH as against the rated capacity of 105 TPH, and consuming specific power of around 40 kWh/t of cement. The factors contributing towards reduced cement mill output and high specific power consumption were identified and the following measures were recommended to improve performance of the cement mill :

- The worn out liners and different type of liners should be replaced with new step with wave to double wave liners.
- The outer ring slots of partition diaphragm should be periodically cleaned.
- Leakages have to be controlled to improve the ventilation in the mill.
- The clinker temperature has to be brought down below 120 °C
- The plant was recommended to go for regradation along with new grinding media pattern proposed by NCB.

A cement plant in Kerala installed a Reverse Air Bag House (RABH) to reduce the stack emission level and maintain a clean environment during the raw meal and clinker production processes. Since commissioning of the RABH, the plant faced various breakdowns in the en-masse conveyors below the RABH. NCB assessed the RABH system and recommended the following measures to improve the process :

- Misalignment of body/casing, shaft and chain of the en-masse conveyors to be rectified.
- To provide better structural integrity and life, internals of the en-masse conveyors should be replaced with an appropriate material.
- Damaged flights should be replaced with new ones.
- Adequate number of supports have to be provided for the ducting system.
- Misalignment in the duct across the emergency damper is to be rectified with proper supports.

Heat Balance study was carried out for two kilns in a plant in Tamil Nadu. Based on the heat balance of the kiln, the major factors contributing towards excess thermal energy consumption were identified to be :

- High cooler vent air temperature
- High clinker discharge temperature
- High false air entry into the KHD system across the kiln seal
- Low cooler recuperation efficiency

The following measures were recommended to reduce thermal energy consumption :

- Inspection of coolers for repair and maintenance of its internals.

- Optimization of coolers to achieve the heat recuperating efficiency of 65%.
- Proper sealing of the kiln inlet for reducing the false air entry.

Studies to improve the productivity of kiln through optimizing raw meal and streamlining of operating and process parameters in a plant in Andhra Pradesh were taken up. The study was taken up in two phases. Phase-I consisting of quality of limestone in different benches of the quarry, Pre-Blending and Homogenization & Raw meal fineness optimization study.

Recommendations/outcome of phase -I were as follows :

- Quality of lime stone from the quarry is appropriate.
- For effective blending silo filling should be maintained above 75%.
- While stacking, the material falling height should be reduced gradually. The gap between the telescopic chute and the stock pile should be low to reduce material segregation.
- The plant should develop a suitable calibration schedule and should strictly adhere to the same to improve reliability of results from their robotic quality control lab.
- The residue on 90 micron for raw meal should be 23-28 % for improving productivity of the kiln.

Energy Management

Baseline Energy Audit was carried out under Perform Achieve & Trade (PAT) Scheme of Bureau of Energy Efficiency (BEE) as per the Energy Conservation Act-2001. The baseline energy audit was carried out for 14 cement sector designated consumers.

Plant Maintenance

Studies on *Technical (Health) Audit covering Mechanical aspects* were carried out in a cement plant located in Andhra Pradesh. Various recommendations were given for improvement based on NCB's assessment made for various sections in Line-III such as capacity utilization, breakdown analysis of core equipment, review of condition monitoring practices adopted by the plant and its upgradation, ground work for development of maintenance strategy, etc.

View of deformed outlet air seals as observed during the technical (health) audit

Project Engineering and System Design

Studies were taken up to develop system design for storage, handling and firing of different types of alternate fuels/wastes in cement plants. Literature survey and categorization of waste and alternative fuels based on presence of toxic elements were in progress. Handling and storage of shredded tyres and ETP sludge was studied.

Techno-economic review was carried out for a cement project in Djibouti at the instance of the Ministry of External Affairs, Government of India. Government of India had extended a lien of credit for setting up a 600 tpd cement project in Djibouti. Government of Djibouti has requested for another LOC for completion of activities related to mining, electrical substation and switching over to coal as fuel from oil. NCB assessed the project progress on the site and identified the remaining work to make the plant operational. A report containing the observations, recommendations and future plan of action with financial implications was submitted to the Ministry of External Affairs.

CENTRE FOR CONSTRUCTION DEVELOPMENT AND RESEARCH - CDR

The activities under the centre were carried out through four programmes i.e. Structural Optimization and Design, Structural Assessment and Rehabilitation, Concrete Technology and Construction Technology and Management. The Centre completed 291 Sponsored Projects during the year.

Structural Optimization and Design

Studies to develop methods for service life design of concrete structures that not only lead to durable construction but also provide future planning based on residual life assessment of existing structures were taken up. The main objective of this study is to develop correlation on the basis of laboratory studies of chloride diffusion and accelerated carbonation with the actual chloride ingression and actual carbonation respectively under different environmental conditions. Various tests like Rapid Chloride Penetration Test (RCPT), compressive strength, air permeability, water permeability, electrical resistivity, accelerated carbonation test and chloride diffusion (unidirectional) test were in progress. A few field studies were also carried out on concrete structures located in different parts of the country.

Structural Assessment and Rehabilitation

Condition Assessment Studies were carried out on different RCC structures at several locations in India for NTPC, AAI, NHAI, NMDC, CPWD, PWD, JPVL, PCTL, APCL, TPDD & BHEL. Type of RCC structures covered includes TG deck slabs, residential/commercial/school buildings, cooling towers, chimneys, bridges, retaining walls etc. The investigations involved condition assessment of existing RCC structures using Non-Destructive Evaluation (NDE) techniques on different RCC members of the structures covering

Core extracted from terrace of a Residential Township showing carbonation depth

Half-cell potential test being done on a column

Scanning of reinforcement before extraction of core sample

Core extraction from a RCC Chimney

detailed visual inspection, Ultrasonic Pulse Velocity (UPV) testing as per IS: 13311(Part 1)-1992, concrete cover study, core extraction and testing as per IS: 456-2000 & IS: 516-1959, carbonation test, Half-Cell Potential test as per ASTM C876 and chemical analysis of concrete samples.

Concrete Technology

Material Evaluation and Concrete Mix Design

Over twenty five studies were carried out at NCB's State-of-the-art concrete laboratory in the areas of material evaluation and concrete mix design, for various power projects of NTPC, NHPC and other power companies situated in Bihar, UP, MP, Chhattisgarh, J&K and also in Myanmar. These studies covered complete assessment of concrete-making materials, optimization of basic concrete mix-design using PPC, various grades of OPC incorporating supplementary cementitious materials such as fly ash. Quality assessment of aggregate samples, covering mineralogy and Alkali-Aggregate-Reactivity as per relevant Indian and American standards, was carried out to identify the aggregates as innocuous or reactive for a large number of projects.

UPV testing being done on a TG Deck Slab for a Thermal Power Project

Roller compacted concrete as well as concrete mixes containing supplementary cementitious materials like flyash in various proportions were designed for various agencies including MCD, PWD, CPWD, DDA, DSIIDC, Delhi Jal Board etc. A total of 185 concrete

mixes were designed. Chemical admixtures were also tested as per IS: 9103-1999 for various companies. Controlled low strength material (CLSM) or flowable fill was designed for 28-days characteristic compressive strength of 75 psi. Rejected or coarser flyash was used as an aggregate filler. Amount of cement was kept very low. CLSM containing flyash benefits environment by making use of this industrial by product.

Guideline for Rapid Method of Concrete Mix Design using PPC or Flyash with OPC

Studies to develop rapid method of concrete mix design using PPC are in progress. Studies on different brands of PPC using boiling water curing for different periods have been completed and results are encouraging. More studies at different temperatures and different durations are in progress to optimize and validate the proposed methods.

Roller Compacted Concrete for Dams

Concrete mix optimization study for a roller compacted concrete dam coming up in Arunachal Pradesh was carried out using high volume flyash concrete. The study included compatibility studies using different cements and flyashes, aggregate grading optimization, accelerated testing to design for one year compressive strength and testing for direct tensile strength etc to achieve most economical mix satisfying the compressive and tensile strength requirements. Vibration plus weight compaction was used to simulate roller compaction.

Use of Flyash, Bottom Ash and Recycled Aggregate in Concrete

A joint study with SINTEF, Norway was carried out involving investigations on the efficacy of lignosulfonate based advanced chemical admixtures and mineral admixtures in enhancing the utilization of wastes such as flyash, bottom ash and recycled concrete aggregate in cement mortar and concrete.

Evaluation of High Strength Concrete and Grout

High strength concrete of grade M100 was evaluated for properties of strength and creep

Segment Casting being Supervised at a Casting Yard

UPV test on a Pre-cast segment of a drain

strain at 90-days and 180-days. In another investigation, high strength flowable cement based grout was evaluated for various properties like shrinkage, flow and strength.

Construction Technology and Management

Compaction Test by Sand Replacement Method at a ROB in Delhi

Third Party Inspection and Quality Assurance (TPIQA) was carried out for some of the construction projects of Public Works Department and very large number of projects of Municipal Corporation of Delhi (MCD). TPIQA involved quality inspection services covering field and laboratory testing of concrete making materials, concrete mix checking, concrete testing and steel testing and ensuring compliance of specifications during construction of bridges/flyovers, concrete road and various building works. Apart from checking the samples as per contract specifications, performance testing of RCC structures using non-destructive testing was also carried out by NCB, which is a unique approach to third party inspection to ensure total quality approach. NCB provided TPIQA services for a large number of major and minor projects during the year, including pile/open foundation, piers, post tensioned box and I-girders, segmental construction deck slab, installation of bearings, expansion joints, rigid and flexible pavements, retaining walls, diaphragm walls, RE walls, sump wells and school buildings.

CENTRE FOR INDUSTRIAL INFORMATION SERVICES - CIS

The Centre pursued its activities through six programmes viz Industrial Information and Data Bank; Integrated IT Solutions; Publications; Seminars and Conferences; International and National Linkages; and Image Building. CIS collects and disseminates information to cement, building materials and construction industries. The Centre consists of besides other facilities, a modern library and a computer centre.

Industrial Information and Data Bank

NCB Library at Ballabgarh Unit serves as the national information centre for cement, building materials and construction industries. The holdings of the Library have grown to 46,346 documents. The library has a bibliographic database consisting of about 40,210 entries derived from the journals received. NCB scientists as well as cement plants and other user industries utilize it for interactive searches. A library automation system called '*Libsys*' has been installed. The system is user-friendly and compatible to network communication.

Memberships of Indian and Overseas professional institutions as listed below were serviced.

MEMBERSHIPS	
Indian	**Overseas**
• Construction Industry Development Council (CIDC), New Delhi	• The American Concrete Institute (ACI), USA
• Consultancy Development Centre (CDC), New Delhi	• American Society for Testing and Materials (ASTM), USA
• Indian Roads Congress (IRC), New Delhi	• The Concrete Society, UK
• Institute of Directors (IOD), New Delhi	• Precast/ Prestressed Concrete Institute (PCI), USA
• Winrock International India (WII/WISE), New Delhi	
• Indian Mining & Engineering Jl, Bhubaneswar	
• Materials Research Society of India, Bangalore	

Integrated IT Solutions

NCB continued modernizing its IT infrastructure as MS windows 7 based 35 PC 4C/4T machines were inducted. Antivirus and Network Threat Protection areas were strengthened with two different Enterprise Protection Suites. All new Windows deployments were done using Backup Exec based Windows Deployment Services.

LIBSYS has been revised to its latest version 4, Release 6.3 and the search services have been strengthened. Through WEBOPAC (WEB Online Public Access Catalogue) a library document can be searched from any computer in the LAN of NCB to the extent which copy of the document is available where or with whom.

CARIZEN – The Internet and Intranet server is upgraded and enhanced to minimize the time taken to upload and download mails; quicker internet connectivity for multiple users. Security is further strengthened with latest Antivirus, CLAM.

The Following services were continued to be provided:

a. 'RAID 5' and 'RAID 0' based storage and backup solution

b. Intranet server solution

c. Windows Deployment Services for maintenance & installation

d. Indexing Services from Library, through Intranet site and *www.ncbindia.com* site.

e. Uploading website with announcements on 13th NCB International Seminar, various Training Course announcements, recommendations of various workshops, employment opportunities, RTI related documents etc.

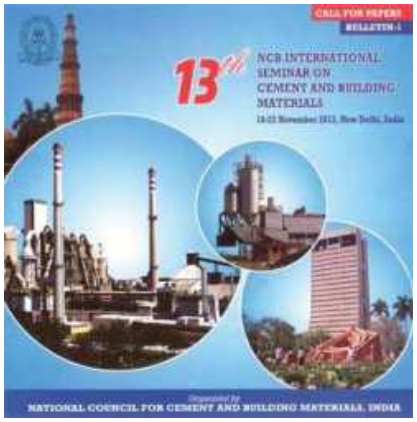
Publications

NCB Publications serve as a vehicle for dissemination of NCB's activities amongst the cement, construction and related building materials industries in terms of technologies developed, industrial support services provided, proceedings of seminars organized etc. *NCB Annual Report 2011-12* (English and Hindi versions), *50 Years of Service to the Nation* and *Life Cycle Assessment Studies of Construction Industry* were brought out during the year. Other promotional literature brought out included NCB Training Programme 2013-14, four brochures on - Centre for Continuing Education Services, Centre for Mining, Environment, Plant Engineering and Operation, Centre for Cement Research & Independent Testing and Benchmarking on Cement Quality Parameters and First Announcement (Bulletin1) of 13th NCB International Seminar on Cement and Building Materials.

A few NCB Publications

Seminars and Conferences

The 13th NCB International Seminar on Cement and Building Materials has been scheduled to be held from 19 to 22 November 2013 in New Delhi, in a new venue to meet the huge seminar participation and to cater to more number of exhibitors in the concurrently held Technical Exhibition. The Call for Papers (Bulletin-1) for the Seminar was circulated widely in India and abroad. Preliminary response for participation in the Seminar and Technical Exhibition has been very encouraging. An Organising Committee has been constituted and preparations for the Seminar are in full swing.



Other Institutional Events

Some important institutional events, as mentioned below, were organized during the period of the report :

National Technology Day :

NCB celebrated the 'National Technology Day' by organizing technology-related programmes on 11 May 2012 at its Ballabgarh and Hyderabad Units. At Ballabgarh Unit, Dr Shri Harsh, General Manager, NCB delivered a talk on '*Nano Technology and its myriad Applications* and at Hyderabad Unit, Dr N Narayana, General Manager, NCB delivered a talk on *Optical Microscopy - A Quality Control Tool for the Evaluation of Clinker, Limestone, Slag and Kilnfeed.*

Shri A Pahuja, Director General NCB addressing on the occasion of National Technology Day at Ballabgarh

Dr Bhure Lal, Chairman Environment Pollution (Prevention & Control) Authority Govt of India is addressing on the occassion of World Environment Day at NCB Ballabgarh

World Environment Day :

Special functions were organized on 5 June 2012 to celebrate World Environment Day at Ballabgarh and Hyderabad Units. The theme of the year was '*Green Economy - Does it include you*?'. At Ballabgarh unit, Dr Bhure Lal, Chairman - Environment Pollution (Prevention & Control), Authority, Government of India was the Chief Guest and addressed the NCB officials on the occasion.

NCB Day 2012 :

NCB Day 2012 was celebrated on 24 December 2012. Shri Ashwani Pahuja, DG-NCB addressed the staff on the occasion. Dr S Gangopadhyay, Director-Central Road Research Institute of India was the Chief Guest at the celebrations. Chief Guest released the Publication *NCB's 50 Years of service to the Nation*. The Chief Guest also gave away Awards to NCB officials who made outstanding contributions during the year in their respective fields of activities and presented mementoes to NCB officials, who had completed 25 years of service in NCB. Best Scientist Award was given to Shri Amit N Gandhi. The Best Supporting Staff Awards were given to Shri Firoz Ahmed and Shri M Balaraju in the Technical Stream and Shri Rajender Krishan in the Administrative Stream.

Chief Guest Dr S Gangopadhyay Director CRRI releasing a publication NCB's 50 Years of Service to the Nation on the occasion of NCB Day 2012. Shri G C Mishra, Joint Director NCB (right) and Shri A Pahuja, Director General NCB on his left

NCB Officials who completed 25 years of service with the Chief Guest Dr Gangopadhyay Director CRRI (in centre), Shri A Pahuja Director General, NCB is standing his left

Hindi Pakhwada celebrated at NCB Ballabgarh. Dr Devender Yadav Adhyaksha NCB Rajbhasha Karyanvayan Samiti is seen with Director General, NCB

Hindi Pakhwada :

Hindi Pakhwada was organized during 14-28 September 2012 in compliance with the Rajbhasha policy of Govt of India. Shri Ashwani Pahuja, Director General, speaking in the concluding function of the Pakhwada, urged the NCB officials to use Hindi in their day to day interaction. On this occasion, NCB staff members presented their views on the importance of Hindi language. Shri Vinod Kumar, Hindi Adhikari, NCB Rajbhasha Karyanvayan Samiti summarized the activities organized for promoting the use of Hindi in NCB during the year. *Adhyaksha, NCB Rajbhasha Karyanvayan Samiti*, Dr Devender Yadav reviewed various programmes conducted and announced awards for the participants.

Quami Ekta Week :

Quami Ekta Week was observed from 19-25 November, 2012 and National Integration Pledge was administered to the staff as a part of it. Besides, staff members expressed their views on the importance of the occasion.

Participation in Seminars

The following NCB officials participated in the Seminars, Workshops and Conferences shown against their names during the period under report:

Participants	Event
Sh S K Chaturvedi Sh R K Goswami Sh S K Breja Sh K Suryanarayana Sh T P Rao	National Conclave for Laboratories, 04-05 April 2012, New Delhi, organized by NABL
Sh Nitin Chowdhary Sh Amit Prakash	International Seminar on Green Technologies for Sustainable Concrete Construction,13-14 April 2012, New Delhi, organized by Indian Concrete Institute and Asian Concrete Federation

Participants	Event
Sh M S Rao Sh Yezaz Ahmed	8th Green Cementech - 2012, 24-25 May 2012, Hyderabad, organized by Confederation of Indian Industry (CII)
Sh V V Arora	FIB Symposium Stockholm 2012- Concrete Structures for Sustainable Community, 11-14 June 2012, organized by Royal Institute of Technology, Stockholm, Sweden
Sh Satish Sharma	International Congress on Durability of Concrete,18-21 June 2012,Norway, organized by SINTEF and NTNU, Norway
Sh M S Rao Smt K V Kalyani	Process Engineering Conference - 2012, 23 August 2012, Hyderabad, organized by HITEX
Sh Anand Bohra Sh K R P Nath	National Technical Seminar on Energy Efficient Technology Management (SRRM Sector), 20 September 2012, Gangtok, organized by UNDP/GEF Project (Steel)
Sh Brijesh Singh	21st International Forum for Material Testing (IFMT-2012), 15-18 October 2012, Ulm, Germany
Sh Ravi Gupta Sh Adarsh Kumar N S Sh Arup Ghatak	National Seminar & Exhibition on 'Non -Destructive Evaluation (NDE-2012)' 10-12 Dec. 2012, Sahibabad, organized by Indian Society for Non-Destructive Testing - Delhi Chapter
Sh Naga V Kumar Sh Prateek Sharma	National Workshop on Coal to Energy for Sustainable Development, 10-11 January 2013, New Delhi, organized by NTPC- NETRA & CSIR- CIMFR
Sh Puneet Kaura Sh Rohit Singh	CIDC International Conference & Exhibition "Implementation Challenges and Way Forward for Construction and Infrastructure Sector during the 12th Five Year Plan 2012-17, 30 January to 1st February 2013, New Delhi
Sh Nikhil Kaushik	ICI-CPWD Workshop on Construction & Demolition (C&D) Waste Recycling, 28th February - 01 March 2013, New Delhi, organized by Central Public Works Department and Indian Concrete Institute
Sh Adarsh Kumar N S Sh Ravi Gupta Sh Puneet Kaura	Seminar on New Chapter on Sustainability in the National Building Code of India 2005, 05 March 2013, New Delhi, organized by Bureau of Indian Standards, New Delhi & School of Planning and Architecture, New Delhi
Sh Suresh Kumar Sh Sunil Kumar Sh Rizwan Anwar	2nd International Construction Chemicals Conference, 8-9 March 2013, New Delhi, organized by Construction Chemicals Manufacturers Association
Sh Manish Kumar Mandre Sh P C Krishna	Technical Lecture on Concrete Protection & Durability Enhancement by Xypex Crystalline Technology, 15 March 2013, New Delhi, organized by Indian Concrete Institute and APAAR Infratech

Papers Published

The following papers were contributed by NCB scientists to outside technical journals :

1. M M Ali, S K Agarwal and A Pahuja : *Potentials of copper slag utilization in the manufacture of OPC*, **Advances in Cement Research**, No.4 (25). p 208-216, March 2013

2. M M Ali, R S Gupta and A Pahuja : *Geopolymeric Cements and their salient characteristics*, **Civil Engineering & Construction Review,** No.1 (26), 2013

3. S N M Khan, Y P Sethi, S N Pati, R Singh, A Saxena, K A Shah and A K Dubey : *Technical Audit of an Indian Cement Plant*, **Cement International,** No.3 (10), May/June 2012

4. S N M Khan, N K Sharma and A K Dubey : *Coordination of the Operation of four Quarries to Optimize Limestone blending*, **Cement International**, No.1 (11), 2013

Important Visitors

Sl No	Name of the Visitors	Organization
1	Dr Bhure Lal	Chairman, Environment Pollution (P & C) Authority, Govt. of India
2	Prof B Bhattacharjee	Professor, Department of Civil Engineering Indian Institute of Technology Delhi, India
3	Mr Mekonen Zergaw	Director for Privatization and Public Enterprises Mugher Cement Enterprise, Ethiopia
4	Mr Elias Kifle	Board Director, Mugher Cement Enterprise, Ethiopia
5	Mr Tebabal Wudneh	CEO Mugher Cement Enterprises Ethiopia
6	Mr Daniel Alemayehu	Operation Executive Officer Mugher Cement Enterprise, Ethiopia
7	Mrs Almaz Shite	Clinker Department Production Head, Mugher Cement Enterprise, Ethiopia
8	Mr Yohannes Yitbarek	Quality Department Head, Mugher Cement Enterprise, Ethiopia

International Linkages / Collaboration Programmes

NCB has been actively interacting and liaising with a number of international bodies and exchanging knowledge and experience particularly in the area of cement and building materials industries.

One NCB scientist, Shri V V Arora participated in the 19th Plenary Meeting of ISO/TC 71 Committee (Concrete, reinforced concrete and pre-stressed concrete) and its Sub-Committees held during 19-22 June 2012 at San Jose, Costa Rica as a member of the Indian delegation led by Bureau of Indian Standards (BIS).

NCB carried out studies on *Optimization of Raw Mix Design* for National Cement Company, Kenya for their proposed clinkerization plant in Nairobi. NCB's scientists S/Shri M S Rao and K Suryanaryana visited their limestone mines and collected samples of limestone and corrective materials available to them for the purpose.

CENTRE FOR CONTINUING EDUCATION SERVICES - CCE

Since its inception in 1972, CCE has been organizing variety of need-based, industry-oriented training programmes at entry and post-entry levels, for participants from cement, building materials and construction industries. So far, 2202 training programmes have been organized for a total of 36824 participants comprising of industry professionals and fresh graduates/post-graduates in science and different disciplines of engineering. These participants represent the Govt departments, public and private sector organizations from within the country and abroad.

During the year under report, 78 training courses under the following categories were organized and a total of 1499 participants benefited.

The highlights of the programmes conducted are as under :

Long Term Course	1
Short Term Refresher Courses	31
Simulator Based Courses	07
Contact Training Programmes	09
Special Group Training Programmes	27
Technology Awareness Programmes	03

Long Term Courses

In its efforts to develop technological talent for the cement industry, NCB has been regularly conducting Post-Graduate Diploma in Cement Technology Course since 1983.

The course is duly approved by All India Council for Technical Education (AICTE), Ministry of Human Resource Development, Government of India. Eighteen participants comprising of nine chemical engineers and nine post graduates in chemistry admitted for the Session 2011 - 2012 successfully completed the course in August 2012. As in the past, all the participants were placed in the cement industry through campus interview. Session 2012-2013 for which thirteen students were admitted was in progress.

Participants in a Training Session

Trainees is being given demonstration on a construction site

An Afganistan delegation in NCB laboratory at Ballabgarh

Short Term Refresher Courses

During the year, 31 Short Term Courses were organized wherein 682 professionals from cement and construction industries participated. In Cement Technology related area, special emphasis was given to aspects such as Co-processing of Alternate Fuels in Cement Industry; Advances in Pyroprocessing in Cement Industry; Modern Grinding Practices in Cement Industry; Utilization of Low and Marginal Grade Limestone by Optimum Raw Mix Design and Use of Minor Minerals; Testing Quality of Cement as per BIS Standards; Advances in Refractory Engineering and Practices; Energy Conservation and Energy Audit in Cement Plants; Sampling and Testing of Cement as per BIS Standards; Optimization of Raw Mix to Improve Clinker and Cement Quality; Advanced Mining Techniques and Practices in Cement Industry; Advances in Pyroprocessing in Cement Industry; Technical Skills for Cement Marketing.

In Concrete and Construction related areas, the training programmes on specific topics were organized such as Use of Fly ash and Blended Cements for Durable Concrete; Building Inspection and Maintenance Practices including Repairing; Concrete Mix Design and Acceptance Criteria of Concrete; Prevention and Repair of Cracks and Leakages in Concrete Structures including Water Proofing; Sampling, Testing and Evaluation of Concrete making Materials and Concrete; Construction Techniques including Segmental Construction; Non-destructive Testing and Evaluation of Concrete Structures; Quality Control and Quality Assurance in Concrete Construction including Extreme Weather Concreting; Corrosion in RCC Structures: Prevention and Repair; Advances in Concrete Technology including Self Compacting Concrete; High Performance concrete and its applications; Concrete Mix Proportioning including Self Compacting Concrete; Non-Destructive Testing and Evaluation of Concrete Structures; Design and Construction of Green Buildings; Corrosion in RCC Structure - Prevention, Repair and Rehabilitation; Design and Construction of High Rise Buildings including Form Work Practices.

Simulator Based Courses

With the aim of providing exhaustive training on various aspects of kiln and mill operation, seven training courses on Advanced Simulator trainer were organized at NCB's Ballabgarh and Hyderabad Units for 38 professionals from cement industry. The participants were trained on :

- Operation, Control and Optimization of Modern Grinding Systems based on Roller Press, Vertical Roller Mills and Ball Mills
- Operation, Control and Optimization of Modern Precalciner kilns

Contact Training Programmes

On the request of industry, nine tailor-made practice oriented contact training programmes for the professionals from cement and construction industries were organized to suit the specific requirement covering following areas:

- Chemical Analysis of Cement as per IS: 4032
- Mechanical Testing of Pozzolana Material
- Estimation of Alkalies and Chloride in Cement
- Determination of Potential Reactivity of Aggregates
- Application of Optical Microscopy
- Concrete Petrography (By Optical Microscopy)
- Physical Testing of Cement as per IS:4031
- Determination of Portland Cement Content in Hardened Portland Cement Concrete as per IS:1199.

Special Group Training Programmes

Twentyseven courses on specific topics for groups of engineers/professionals were organized for the following organizations either at NCB's units or sponsors' sites:

a) Indian Organizations

• ACC Ltd • Kochi Metro Rail Ltd • Dalmia Cement (B) Ltd • Adhunik Cement • South Delhi Municipal Corporation • Confederation of Real Estate Developers' Association of India(CREDAI) • A P Housing Board • DMRC Ltd • NHPC Ltd • NBCC Ltd • Shriram Cement Works • Orient Cement • JK Lakshmi Ltd • Tata Chemicals Ltd

b) Overseas Organizations

- Food & Agriculture Organization of United Nations (UNFAO), Afghanistan
- Advanced Geotech & Testing Lab, Bhutan

Special Group Training Programme organised for a Cement Plant's personnel in progress

Technology Awareness Programmes

Three Technology Awareness Programmes were organized to suit the specific requirement covering following areas:

- New Generation of Concrete in Construction
- Use of Artificial Sand in Civil Construction
- Application of Fans in Cement Industry

Training / Retraining of NCB Personnel

Appreciating the imperative need for continuous upgradation of NCB's own talents, special thrust was given to deputing personnel for specialized development programmes in their respective areas. NCB officials, who benefited from such programmes/courses, during the year, are listed below :

Sl. No.	Name of the Official	Title of Course	Organiser	Period
1	Sh Pritam Singh Rawat Sh Aditya Mittal Sh Ashish Yadav Sh Ravi Gupta Ms Nancy Mittal Sh Himanshu Makkar Sh Rohit Singh Sh Varun Gupta Sh Navneet Jain Sh Puneet Kaura	QC & QA in Concrete Construction	NCB-Ballabhgarh	09-13 July 2012
2	Sh Y N Daniel Sh Rajendra R Payak Sh Arun Sidpara Sh Vikas Fatak Sh Dipesh Tailor	Testing & Evaluation of Concrete Making Materials	NCB-Ballabhgarh	06-09 Aug 2012
3	Sh Arvind T Chotialiya Ms Nikhat M Sheikh Sh Prareshbhai Hasmukhbhai Rathod	Construction Techniques including Segmental Construction	NCB-Ballabhgarh	18-20 Sept 2012
4	Sh Nikhil Kaushik Sh Puneet Kaura	Geophysical Investigations and Geotechnical Instrumentation for Hydropower Project	CSMRS, New Delhi	06-08 Nov 2012
5	Ms Shweta Jha Ms Rashmi Kaushik Sh Vijay Kumar	Sampling & Testing of Cement as per BIS Standards	NCB-Ballabhgarh	26-27 Nov 2012

CENTRE FOR QUALITY MANAGEMENT, STANDARDS AND CALIBRATION SERVICES - CQC

The activities of the Centre for Quality Management, Standards and Calibration Services were organised under four programmes : Total Quality Management; Interlaboratory Services; Certified Reference Materials; and Calibration Services. These activities address all aspects of quality management and provide the entire range of Standardization and calibration services to cement industry, R&D institutions, concrete and allied building materials laboratories in India and abroad. Three sponsored projects were completed by the centre during the year.

Total Quality Management

Under this programme, CQC assessed the quality assurance system of an integrated cement plant and a clinker grinding unit. This study dealt with capability of the quality management and assurance system of the units in attaining the quality objectives. Further, the centre also assisted one cement plant in documentation and implementation of quality management system in line with ISO 17025:2005 and NABL accreditation.

ISO : 9001 Quality Management System Certification

The continuation of ISO: 9001 Quality Management System Certification reflected NCB's commitment to ensuring excellence of processes and products and customer satisfaction. To ensure continued effectiveness of the quality management system, TQM organized a workshop on ISO 9001:2008 requirements for 38 NCB officials and a workshop on retraining of internal auditors for 22 NCB officials.

Inter-Laboratory Services

NCB implemented Quality Management System (QMS) in line with ISO 17043:2010 for accreditation as proficiency testing (PT) service provider and underwent final assessment by NABL assessment team. A proficiency testing (PT) scheme on chemical analysis of OPC with the participation of 41 laboratories and two PT schemes on mechanical parameters of OPC were completed. These schemes were implemented in accordance with ISO 17043:2010.

The participating laboratories were provided homogenized samples of cement for testing in their laboratories. The test data reported by the laboratories were statistically evaluated for central tendency (median), spread and Z-score. The robust average and standard uncertainty for each parameter were calculated after normalizing the data as per ISO 13528:2005. The standard uncertainty for one scheme on mechanical parameters is given in *Table 1*.

***Table 1*: Uncertainty Data for Mechanical Test Parameters**

Blaine Fineness (m^2/kg)	Normal Consistency (%)	Setting Time (mts)		Autoclave Expansion (%)	Compressive Strength (MPa)	
		Initial	Final		3 days (72±1h)	7 days (168±2h)
2.9607	0.1571	6.1033	7.6844	0.0082	0.6450	0.5874
3.0678	0.1433	8.0704	8.5459	0.0193	0.7476	0.6260

Comparison of performance of the PT participants has been made with previous scheme conducted as nodal agency of NABL. The data showed that the spread of data has increased in SiO_2, Al_2O_3 and MgO. Further, the data presented in *Table 2* showed that the number of outliers also increased in almost all the parameters in the present scheme. This situation might have arisen due to excellent growth witnessed in cement and construction sector and setting up of new cement plants and new laboratories. Chemical analysis requires expertise and chemists working in laboratories in this sector require continuous training and upgradation of analytical skills. Laboratories have to be modernized and equipped with necessary calibrated equipment. In this context, installation of quality system as per ISO 17025 (2005) and NABL accreditation can be of great help.

***Table 2*: Performance Comparison with Previous Scheme**

Parameter	N	Number of Labs with Questionable Performance (2<|Z|<3)		Number of Outlying Labs (|Z|≥ 3)	
		Between Lab	Within Lab	Between Lab	Within Lab
LOI	40 (34)	1 (1)	2 (1)	2 (1)	3 (2)
SiO_2	40 (34)	1 (2)	2 (1)	2 (Nil)	4 (4)
Fe_2O_3	39 (34)	2 (3)	2 (2)	7 (3)	6 (2)
Al_2O_3	40 (34)	2 (2)	3 (2)	Nil (1)	7 (3)
CaO	39 (34)	3 (3)	Nil (4)	4 (1)	5 (Nil)
MgO	39 (34)	Nil (2)	4 (1)	3 (1)	3 (2)
IR	40 (34)	2 (5)	3 (3)	1 (1)	6 (1)

Note: Figures in parentheses indicate data of previous scheme.

NABL assessment team interacting with NCB officials as a part of their assessment of NCB for accreditation as PT Provider

Having implemented the above PT schemes as per the new standard, NCB applied for accreditation as PT provider and successfully underwent final assessment by NABL assessment team. NCB has become the first accredited organization in the country for becoming PT provider for any sector. NCB's Interlaboratory Services organized a Work Shop on ISO 17043: 2010 covering essential requirements of the Standard, case studies and tasks for teams for NCB officials.

Certified Reference Materials

NCB developed clinker and PPC standards for calibration of X-ray Analyser for two cement plants. Plant specific materials are standardized to eliminate matrix variation. The plant was provided with certificate of analysis of each standard wherein average result and expanded uncertainty were mentioned for each parameter. The calibration curve plotted on the basis of intensity and average result would be helpful in on-line characterization of material. The range of expanded uncertainty for select parameters is given in *Table 3*.

Table 3 **: Expanded Uncertainty**

Identification	LOI (%)	SiO_2 (%)	Fe_2O_3 (%)	Al_2O_3 (%)	CaO (%)	MgO (%)
Plant 1	0.02-0.10	0.05-0.15	0.04-0.11	0.07-0.17	0.16-0.24	0.06-0.16
Plant 2	0.03-0.06	0.04-0.09	0.03-0.06	0.05-0.12	0.20-0.28	0.04-0.14

Supply of developed Certified Reference Materials (CRMs) was continued and a total of 6,264 vials of different CRMs and 1648 sets of standard lime were supplied to 424 users from cement plants, testing laboratories and R & D institutions.

Calibration Services

The Calibration laboratories continued to implement Quality Management System as per ISO 17025:2005 requirements. The laboratories satisfactorily underwent reaccreditation audit by NABL. Over 1204 equipment/apparatii including proving rings, compression testing machines, vibrating machines, dial gauges, Blaine's cell, pressure gauges, dead weight testers, sieves and thermometers were checked, adjusted or calibrated as required by 555 clients. Satisfaction of customers from the calibration services showed significant improvement on timeliness, work quality and interaction dimensions.

Thermometer Calibration Bath

PATENTS

NCB has been filing applications for patents on processes, products, systems, machinery, equipment and accessories developed by it from time to time. Details of NCB patents presently in force and the applications filed, which are in different stages of processing, are given in Appendix V.

ORGANISATIONAL FORUMS

Society

General Meeting

The Annual General Meeting of the Society for the year 2012 was held on 3 December 2012 in New Delhi when it adopted the Annual Report, the audited accounts and balance sheet for the year 2011-2012.

Board of Governors

The Composition of the Board for the year 2013 is given in the begining of the report.

Corporate Advisory Committees

Research Advisory Committee (RAC)

To advise on all aspects pertaining to Programmed R&D and industrial support services in NCB, with particular reference to technology forecasting, technology planning, programmes, strategies and methodologies and the overall project programme of NCB. The composition of the Committee for the year 2013 is:

Chairman

Shri M S Gilotra
Managing Director
Gujarat Sidhee Cement Ltd &
Saurashtra Cement Ltd
Mumbai

Shri M A M R Muthiah Chairman-NCB, addressing 48th Annual General Meeting (ADJ-AGM)

Members

Dr Subrato Chowdhury
Joint President
Head R&D, Cement Division
UltraTech Cement Ltd
Mumbai

Shri S S Jain
President (Work & Projects)
Mangalam Cement Ltd.
Morak , Dist. Kota (Rajasthan)

The Secretary
Bureau of Energy Efficiency
New Delhi

Advisor (I&VSE)
Planning Commission
New Delhi

The Director
National Physical Laboratory
New Delhi

The Director
Central Soil & Materials Research
Station (CSRMS)
New Delhi

Dr H S Saini
Director - TLOSL & STM
Geological Survey of India
Faridabad (Haryana)

Shri M V Ramana Rao
Jt. Executive President & Unit Head
UltraTech Cement Ltd
Kotputli Cement Works
Jaipur

The Chairman and Managing Director
National Research Development Corporation
New Delhi

Dr D Venkateswaran
Vice President (R&D)
The India Cements Ltd
Chennai

Dr B Kameshwara Rao
Chief Scientist & Advisor
Structural Engg Divn.
Central Building Research Institute
Roorkee

Dr M Salahuddin
Director - Clean Technology Division
Ministry of Environment & Forests
Government of India
New Delhi

The Industrial Advisor
Ministry of Commerce & Industry
Government of India
New Delhi

Shri Kamal Kumar
Chief General Manager
Holtec Consulting Pvt Ltd
Gurgaon (Haryana)

Shri Satish Gurtoo
Sr Vice President (Elect & Instrument)
Century Cement
P.O.Baikunth (Chattisgarh)

The Director
Central Pulp & Paper Research Institute
Saharanpur (UP)

The Chief Mineral Economist
Indian Bureau of Mines
Nagpur

Shri Jose Kurien
Chief Engineer
Delhi Tourism and Transportation Development
Corporation Ltd., New Delhi

The Director
Structural Engineering Research Centre (SERC)
Chennai

Shri S V P Gupta
President
Cement Manufacturing Company Ltd
Lumshong, Distt. Jaintia Hills, Meghalaya

The Deputy Director General
National Productivity Council
New Delhi

Dr S K Handoo
Advisor (Technical)
Cement Manufacturers' Association
Noida (UP)

Shri Sanjay Pant
Director (Civil Engg)
Bureau of Indian Standards
New Delhi

Shri A Jha
Sr Vice President (Prod.)
Birla Corporation Limited
Birla Cement Works & Chanderia Cement Works
Chanderia, Rajasthan

Shri C M Dordi
Corporate Head (PQM &CS)
Ambuja Cements Ltd
Mumbai

The Member Secretary
Central Pollution Control Board
Delhi

The Director
Central Road Research Institute
New Delhi

Shri Ashwani Gupta
Scientist 'G'
Department of Scientific and
Industrial Research (DSIR)
New Delhi

Shri S A Khadilkar
Director-Quality & Product Development
ACC Ltd
Thane (Maharashtra)

Dr B Bhattacharjee
Prof. of Civil Engineering
Indian Institute of Technology
Delhi

Shri Jitender Kumar
GM - Product Development
Heidelberg Cement India Ltd
Gurgaon

Dr S B Hegde
Vice President
Quality and Material Development
Reliance Cement Company Pvt. Ltd.
Navi Mumbai

Shri S K Saxena
Sr. GM (P&QC)
J K Lakshmi Cement Ltd
Jaykaypuram, Sirohi,
Rajasthan

Sh Ashwani Pahuja
Director General - NCB

Directors,
HOC's and Joint Directors of NCB

Member-Secretary

Dr S Harsh
Joint Director - NCB

Infrastructural Development Committee (IDC)

To advise the Board of Governors on various aspects of land, building services, equipment and facilities at the various NCB Units and to cause these infrastructural developments to be carried out at the various NCB Units and to assist in conducting the affairs of the units in such a manner as to fulfil the set objectives with the programmes, policies and guidelines laid down by the Board. The Composition of the Committee for the year 2013 is :

Chairman

Shri J C Toshniwal
Business Head (North)
Ambuja Cements Ltd
New Delhi

Members

Shri V S Bajaj
President (Corporate Affairs)
Jaiprakash Associates Ltd
(Cement Division)
Noida (UP)

Dr K C Narang
Advisor
Dalmia Cement (Bharat) Ltd
New Delhi

The Director (Cement)
Dept. of Indl. Policy & Promotion
Ministry of Commerce & Industry
Government of India
New Delhi

Shri K V S P Rao
Scientist 'G' (Advisor)
Department of Scientific & Industrial Research
New Delhi

Dr (Mrs) Renu Mathur
Head of Deptt. (Rigid Pavements)
Central Road Research Institute
New Delhi

The Industrial Adviser
Dept. of Indl. Policy & Promotion
Ministry of Commerce & Industry
Government of India, New Delhi

Dr Subrato Chowdhury
Head R&D, Cement Division
UltraTech Cement Ltd
Mumbai

Shri A Vijayaraman
Addl.General Manager- PE-Civil
NTPC Limited
Noida (UP)

Shri Ashwani Pahuja
Director General NCB

Directors, Joint Directors and Heads of concerned Service Groups in NCB

Member-Secretary

Shri A K Mishra
Jt.Director - NCB

Administration and Finance Committee (AFC)

To advise the Board of Governors on issues relating to financial planning, budgets, accounts, manpower growth plan and service matters including various rules of NCB. To take decisions on behalf of the Board of Governors on individual personnel cases and on issues of administrative nature as may be referred to it by the Board or by the Director General-NCB. All such decisions shall be reported to the Board at its immediate next meeting through the relevant status report. The Composition of the Committee for the year 2013 is :

Chairman

Shri S K Wali
Wholetime Director
J K Lakshmi Cement Ltd
New Delhi

Members

The Director (Cement)
Department of Indl Policy & Promotion
Ministry of Commerce & Industry
Government of India, New Delhi

The Director
Integrated Finance Wing
Department of Indl Policy & Promotion
Ministry of Commerce & Industry
Government of India, New Delhi

Shri R Muralidhar
Vice President
The India Cements Ltd
New Delhi

Shri K V Mohan
Dy Executive Director (A/Cs & Tax)
Dalmia Cement (Bharat) Ltd
New Delhi

Sh Ashwani Pahuja
Director General - NCB

Directors, Joint Directors and Heads of concerned Service Groups in NCB

Member-Secretary

Shri G C Mishra
Jt.Director - NCB

Regional Advisory Committee

Advisory Committee for NCB-Hyderabad (ACH)

To advise the Board of Governors and RAC, AFC and IDC on various aspects of development of NCB-Hyderabad and its activities, and in particular on matters concerning the development and utilization of infrastructural facilities of the Unit and the industrial services rendered by it, and to assist in conducting the affairs of the Unit in such a manner as to fulfill the set objectives within the programmes, policies and guidelines laid down by the Board. The Composition of the Committee for the year 2013 is:

Chairman

Shri V S Narang
Director - Technical
My Home Cements Ltd, Hyderabad

Members

Shri S V Tapadia
Senior Joint President
Vasavadatta Cement
Sedam, Karnataka

Shri N B Singh
Sr Joint President (Technical)
JayPee Balaji Cement
Budhwara, Jaggayyapet,
Andhra Pradesh

Shri S K Gupta
President & Unit Head
Rajashree Cements Ltd
Gulbarga, Karnataka

Shri S S Sandhu
Associate Vice President
JSW Cement Limited
Secunderabad

Shri D Lakshmikantham
Director
Penna Cement Industries Ltd
Hyderabad

Shri Sreekanth Reddy
Executive Director
Sagar VICAT Cement Ltd
Hyderabad

Shri S R B Ramesh Chandra
Managing Director
Bheema Cements Ltd
Hyderabad

The Engineer-in-Chief
(State Roads Division)
Roads & Building Department
Government of AP
Hyderabad

The Chief Engineer
Greater Hyderabad Municipal Corporation
Hyderabad

The Director
Department of Mines & Geology
Govt. of Andhra Pradesh
Hyderabad

The Head
Bureau of Indian Standards
Hyderabad

The Member Secretary
A P Pollution Control Board
Hyderabad

The Regional Manager
L&T Ltd, ECC Division
Madhapur
Hyderabad

Member- Secretary

Shri M S Rao
Jt.Director & Unit Head of NCB-Hyderabad

Executive Committee (EC)

With a view to achieve the objectives of collegiate management and to assist the Director General to deal with the various functions, the Executive Committee, comprising Heads of various Divisions of Activities with the Director General as its Chairman, held 9 meetings and deliberated upon important issues including approving proposals for 322 sponsored projects.

Forum for Science and Technology (FST)

During the period two meetings of FST were held. These meetings provided interactive discussions among the scientific staff of NCB. The meetings have served very well for keeping the scientists and engineers informed on the latest developments in the respective areas.

Sl. No.	Date	Speaker (s)	Topic
1.	27 April 2012	Shri A V Subramanian General Manager - NCB	Information Technology - Essentials for NCB
2.	9 May 2012	Shri A K Mishra Joint Director - NCB	Project Management and System Design in Cement Industry

ORGANISATIONAL MATTERS

Staff Particulars

NCB had strength of 199 Cadre officials comprising of engineers, scientists and technical and administrative support staff as on 31 March 2013 engaged in the activities of the organisation.

Staff Welfare

NCB continued to look after the welfare of its staff through several activities. During 2012-13, 68 NCB officials availed facility of staff quarters in the NCB Housing Colony. The Group Personal Accident Insurance Policy to cover risks arising out of accidents was continued for the year 2012-13.

NCB Staff Club, in its pursuit of fostering social and fraternal relations amongst the officials, organized excursions to Kedarnath (Uttarakhand), which received profound participation and appreciation. Activities of the Club included maintenance of library, in-door games and other cultural activities. The Club also involved the family members of staff, especially children, in celebration of Independence Day and Republic Day.

Shri A Pahuja DG-NCB addressing NCB Staff and their families on the occasion of Independence Day at Ballabgarh Unit

INFRASTRUCTURE

NCB - Ahmedabad

The Ahmedabad Unit of NCB consists of Quality Assurance and Quality Control equipment facilities, which include Universal Testing Machine for testing steel and concrete, an Automatic Compression Testing Machine for testing of cement and concrete in physical testing laboratory, Spectrophotometer and Flame Photometer in chemical testing laboratory for elemental analysis, Non Destructive Testing (NDT) equipment like Ferroscan, Rebound Hammer and Rapid Chloride Permeability Tester, Triaxial Testing Machine, CBR Testing Machine, Consolidation Testing Machine, Cone Penetrometer for soil testing.

NCB - Ballabgarh

The technical infrastructure at NCB's Ballabgarh Unit, developed in a planned manner and upgraded over the years, makes it one of the most modern R&D laboratories for cement and building materials. Major equipment facilities available here are: Scanning Electron Microscopy & Energy Dispersive Analysis of X-rays (SEM & EDX) Laboratory, Advanced X-ray Diffractometer, Multi-dispersive X-ray Fluorescence Spectrometer with large auto sample changer, Fused Bead Making Machine and sample preparation unit, Inductive Coupled Plasma Spectrometer for minor heavy elements, Fourier Transform Infrared Spectroscope, fully automatic CHNS Analyser, Computerized Bomb Calorimeter, Optical Microscope with image analysing system, Pyrometric Cone-Equivalent Furnace, equipment for non-destructive evaluation of concrete structures, Flexural and Transverse Testing Machine for concrete samples, Abrasion Testing Machine, Automatic Compression Testing Machine (100 KN), Permeability Tester, Heavy Test Floor for testing of large size structural elements and light weight concrete elements, Computerized Laser Beam Particle Size Analyser, Ultrasonic Pulse Velocity Apparatus, Concrete Pile Integrity Tester, Endoscopic Test Apparatus for Hardened Concrete, Bridge Testing Equipment, Impact Echo Test, and Underground Radar Equipment, Computer Aided Image Analyser System for satellite imageries, Global Positioning System, high temperature testing for clinkerisation and refractories, Differential Thermal Analyser, pollution monitoring equipment facility including High Volume Air Samplers, Respirable Dust Samplers, Multi-gas Analyser, Portable Flue Gas Analyser, Opacity Monitor, Noise Measurement System, CO_2 Gas Analyser, Ultrasonic Gas Leak Detector and Low Level BTX Hydrocarbon Analyser for ambient air, Hot Kiln Alignment System, etc. Simulator based training system for kiln and mill operation of cement plants with two PC-based trainer stations and five trainee stations each.

Raising Hearth Furnace for bulk firing

NCB has an Independent Test House equipped with an extensive range of sophisticated analytical instruments and a computer based Laboratory Information Management System (LIMS).

During the year, important equipment facilities added were Advanced Trinocular Polarizing

NEWLY ADDED FACILITIES AT NCB BALLABGARH UNIT

Microscope, Muffle Furnace and fully automatic microprocessor controlled Isoperibol Oxygen Bomb Calorimeter.

NCB - Hyderabad

The range of equipment facilities at NCB's Hyderabad Unit cover testing and evaluation facilities for cement, cement raw materials, coal, concrete making materials besides calibration facilities for related physical and mechanical testing equipment.

The Unit has an Advanced Instruments Laboratory with XRF Spectrometer, X-Ray Diffractometer, DTA-TG-DSC equipment, CHNS Elemental Analyser, Laser Beam (based) Particle Size Analyser and Optical Microscope with image analyser. The unit also has a concrete laboratory with a wide range of equipment facilities.

The Unit has modern instruments and equipment for in-plant studies including gas analysers, pyrometers and velocity/pressure measuring instruments for energy audit and process diagnostic studies. A modern PC based cement process simulator trainer covering different grinding and pyro-processing systems is available at the Unit for providing hands-on training to the cement plant engineers and operators in the efficient operation of modern cement plants. The Unit is also equipped with Computational Fluid Dynamics (CFD) software, which is a powerful technique for modelling a variety of process equipment used for cement manufacture. The Unit is also equipped with facilities for conducting environmental studies.

During the year, development of a training complex including a teaching block, hostel and canteen was in progress.

LIAISON AND CO-ORDINATION

NCB maintained liaison with a large number of overseas and Indian organisations, through membership or otherwise.

The Director General and other officials continued to serve on a number of committees constituted by the Government of India, the Bureau of Indian Standards and other organisations as follows :

Shri Ashwani Pahuja
Director General

a) Member, Bureau of Indian Standards, New Delhi

b) Member, Executive Committee (EC), Bureau of Indian Standards, New Delhi

c) Chairman, Standards Advisory Committee, Bureau of Indian Standards, New Delhi

d) Member, Laboratory Advisory Committee (LAC), Bureau of Indian Standards, New Delhi

e) Member, Certification Advisory Committee, Bureau of Indian Standards, New Delhi

f) Member, Panel for Building Materials (CED 46:P3), Bureau of Indian Standards, New Delhi

g) Member, Programme Advisory Committee (PAC) for Fly Ash, Department of Science & Technology, Government of India, New Delhi

h) Member, Standing Committee for innovative Building Material and Technology, Building Materials and Technology Promotion Council (BMTPC), New Delhi

i) Member, PAT Sectoral Expert Committee (Cement Sector), Bureau of Energy Efficiency (BEE), New Delhi

Dr M M Ali
Joint Director

a) Member, Building Lime Sectional Committee (CED 4), Bureau of Indian Standards, New Delhi

b) Member, Cement, Pozzolana and Cement Additives Sub Committee (CED: 2:1), Bureau of Indian Standards, New Delhi

c) Member, Special Group for Considering the Issue of Additional 43 &53 Grades of PSC and PPC (CED 2/SG), Bureau of Indian Standards, New Delhi

d) Member, Panel for work relating to ISO/TC71 and ISO/TC74 (CED 2/P1), Bureau of Indian Standards (CED 2/P1), New Delhi

e) Member, Panel under BIS Sectional Committee (CED 2) on use of slags other than granulated blast furnace slag in production of PSC, Bureau of Indian Standards, New Delhi

f) Member, Programme Advisory Committee of Fly ash Utilization (FAU), Department of Science and Technology, Government of India

Shri S N M Khan
Joint Director

a) Member, Coal Sub-Committee (PCD: 7.3), Bureau of Indian Standards, New Delhi

b) Member, Coal Beneficiation & Lignite Sub-Committee (PCD:7.6 & PCD 7.9), Bureau of Indian Standards, New Delhi

c) Member, Working Group on Technical Sector of Standard Promotion and Consumer Affairs Department (SP & CAD), Bureau of Indian Standards, New Delhi

d) Member, Bulk Handling Systems and Equipment Sectional Committee (MED 7), Bureau of Indian Standards, New Delhi

Shri V V Arora
Joint Director

a) Member, Civil Engineering Divisional Council (CEDC), Bureau of Indian Standards, New Delhi

b) Member, Cement and Concrete Sectional Committee (CED: 2), Bureau of Indian Standards, New Delhi

c) Member, Concrete Sub-Committee (CED: 2.2), Bureau of Indian Standards, New Delhi

d) Member, Panel for work relating to ISO/TC71 and ISO/TC74 (CED 2/P1), Bureau of Indian Standards, New Delhi

e) Member, Panel for Revision of Handbooks (CED 2/P2), Bureau of Indian Standards, New Delhi

f) Member, Panel for Revision of IS: 456 and IS: 1343 (CED 2:2/P5), Bureau of Indian Standards, New Delhi

g) Member, Panel for Revision of Indian Standards on Test Methods for Concrete (CED a.2:2/P7), Bureau of Indian Standards, New Delhi

h) Member, Panel for Revision of IS: 3370 (Part 1 &Part 2) (CED 2:2/P1), Bureau of Indian Standards, New Delhi

i) Member, Fibre Reinforced Cement Products Sub-Committee (CED 53:1), Bureau of Indian Standards, New Delhi

j) Member, Precast Concrete Products Sub-Committee (CED 53:3), Bureau of Indian Standards, New Delhi

k) Member, Structural Safety Sectional Committee (CED 37), Bureau of Indian Standards, New Delhi

l) Member, Earthquake Engineering Sectional Committee (CED 39), Bureau of Indian Standards, New Delhi

m) Member, National Building Code Sectional Committee (CED: 46), Bureau of Indian Standards, New Delhi

n) Member, Panel for Fire Protection (CED 46:P2), Bureau of Indian Standards, New Delhi

o) Member, Panel for Load, Forces and Effects (CED 46:P4), Bureau of Indian Standards, New Delhi

p) Member, Panel for Soil and Foundation/Panel for Plain Reinforced & Prestressed Concrete (CED 46:P5), Bureau of Indian Standards, New Delhi

q) Member, Panel for Masonary (CED 46:P7), Bureau of Indian Standards, New Delhi

r) Member, Panel for Plain Reinforced and Prestressed Concrete (CED 46:P8), Bureau of Indian Standards, New Delhi

s) Member, Panel for Prefabrication and Systems Building (CED 46:P10), Bureau of Indian Standards, New Delhi

t) Member, Housing Sectional Committee (CED: 51), Bureau of Indian Standards, New Delhi

u) Member, Cement Matrix Products Sectional Committee (CED: 53), Bureau of Indian Standards, New Delhi

v) Member, Concrete Reinforcement Sectional Committee (CED: 54), Bureau of Indian Standards, New Delhi

w) Member, Rigid Pavement Committee (H-5), Indian Roads Congress, New Delhi

Shri S K Chaturvedi
Joint Director

a) Member, Refractories Sectional Committee (MTD: 15), Bureau of Indian Standards, New Delhi

Dr V P Chatterjee
Joint Director

a) Member, Stones Sectional Committee (CED 6), Bureau of Indian Standards, New Delhi

Dr Shri Harsh
Joint Director

a) Member, Panel for Revision of Cement Standards (CED 2:1/P1), Bureau of Indian Standards, New Delhi

b) Member, Methods of Analysis Sub-Committee (PCD 7:4), Bureau of Indian Standards, New Delhi

Sh Y P Sethi
Joint Director

a) Member, Solid Mineral Fuels Sectional Committee (PCD 7), Bureau of Indian Standards, New Delhi

b) Member, Coke Sub-Committee (PCD 7:2), Bureau of Indian Standards, New Delhi

Shri S K Breja
General Manager

a) Member, Flooring, Wall Finishing and Roofing Sectional Committee (CED 5), Bureau of Indian Standards, New Delhi

b) Member, Sieves, Sieving and other Sizing Methods Sectional Committee (CED 55), Bureau of Indian Standards, New Delhi

Sh Satish Sharma
General Manager

a) Member, Panel for Revision of IS : 457 (CED 2:2/P6) Bureau of Indian Standards, New Delhi

b) Member, Construction Plant and Machinery Sectional Committee (MED: 18), Bureau of Indian Standards, New Delhi

c) Member, Concrete Pipes Sub-Committee (CED 53:2), Bureau of Indian Standards, New Delhi

d) Member, Panel for Administration, Development Control Rules and General Buildings (CED 46:P1), Bureau of Indian Standards, New Delhi

Shri N K Tiwari
General Manager

a) Member, Environment Protection and Waste Management Sectional Committee (CHD : 32) Bureau of Indian Standards, New Delhi

b) Member, Environment Management Sectional Committee (CHD: 34), Bureau of Indian Standards, New Delhi

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Appendix - I

Rolling Plan of Missions within the Framework of Centres

A. CENTRE – CEMENT RESEARCH AND INDEPENDENT TESTING (CRT)

Mission 1	:	Utilization of Marginal Grade Raw Materials in the Manufacture of Cement and Building Materials
Mission 2	:	Development of Newer Cements, Composites and Alternate Binding and Building Materials
Mission 3	:	Development of Newer Processes of Manufacturing Cement and other Binding and Buildings Materials
Mission 4	:	Raw Mix Design Optimization
Mission 5	:	Utilization of Industrial and other Wastes for Cement and Building Materials
Mission 6	:	Development of Newer Refractories
Mission 7	:	Improved Refractory Engineering Practices
Mission 8	:	Study of Fundamental Concepts in Material Science and Fundamental Studies Relating to Areas of Fuel Combustion, Pyro-processing, Size Reduction, etc
Mission 9	:	Independent Testing

B. CENTRE – MINING, ENVIRONMENT, PLANT ENGINEERING AND OPERATION(CME)

Mission 1	:	Compilation and Updating of National Inventory of Cement Grade Limestone Deposits
Mission 2	:	Identification, Exploration, Evaluation and Assessment of Limestone Deposits and other Cement Raw Materials
Mission 3	:	Upgradation and Quality Establishment of Limestone (at Quarries) and Mineral Conservation
Mission 4	:	Application of Remote Sensing Techniques
Mission 5	:	Advanced Survey Techniques including Geographical Information System (GIS) and Global Positioning System (GPS)
Mission 6	:	Application of Geophysical Techniques for Mineral Exploration, Ground Water Investigation, etc.

Mission 7	:	Mine Planning and Scheduling
Mission 8	:	Improved Machinery Application and Improved Technological Upgradation for Mining Practices
Mission 9	:	Sustainable Development through Environmental Improvement including Survey of Land and Water Resources.
Mission 10	:	Pollution Control Technologies for Particulate Gaseous Emissions and Liquid Effluents
Mission 11	:	Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for Industrial Projects and Mines
Mission 12	:	Environmental Management System (EMS) and ISO - 14001 Certification for Process Industries
Mission 13	:	Utilization of Hazardous Wastes as Supplementary Fuel
Mission 14	:	Monitoring of Environmental Parameters for Water, Ambient Air Quality, Noise and Vibration Studies
Mission 15	:	Rehabilitation and Reclamation of Mined out Areas
Mission 16	:	Improving Capacity Utilization and Increasing the Rate of Production in Kilns and Mills towards Improving Total Factor Productivity in Cement Industry through Process Optimization, Diagnostic Studies and Trouble Shooting and Improvement in Operation
Mission 17	:	Benchmarks, Best Practices, Operational Norms and Technical Audit including Plant Monitoring
Mission 18	:	Productivity Enhancement Programme (PEP)
Mission 19	:	Technological Upgradation
Mission 20	:	Improving Utilization of Coals
Mission 21	:	Utilization of Alternate Fuels such as Lignite, Natural Gas, Combustible Wastes etc.
Mission 22	:	Improvements in Fuel Combustion Efficiency
Mission 23	:	Optimization of Energy (Both Thermal and Electrical) Consumption
Mission 24	:	Energy Auditing, Management and Monitoring
Mission 25	:	Waste Heat Utilization including Cogeneration
Mission 26	:	Creating Awareness and Motivation for Energy Conservation
Mission 27	:	Total Productive Maintenance (TPM)
Mission 28	:	Preventive/Predictive Maintenance Programme, Condition Monitoring Techniques and Tribology including Computerised Maintenance
Mission 29	:	Inventory Control and Spare Parts Management
Mission 30	:	Risk Analysis and Improving Safety in Cement Plants
Mission 31	:	Turnkey Consultancy for Setting up Modern Medium and Large Cement Plants from Concept to Commissioning including Fund Sourcing

Mission 32 : Establishing Modern Energy Efficient CRI-MVSK and Rotary Kiln based Mini Cement Plants from Concept to Commissioning

Mission 33 : Improvements in System Design and Engineering of Plant and Machinery (including CRI-designed indigenous Precalcinator System, Burners for High Ash Coals, Refractory Lining System and Coal Quality Modulation System)

Mission 34 : Modernization and Technological Upgradation in Cement Plants

Mission 35 : Upgradation and Modification of VSK based Cement and Lime Plants

Mission 36 : Developing Systems Designs for Bulk Movement of Cement by Rail, Road and Waterways

Mission 37 : Marketing Strategies and Logistics

Mission 38 : Improvements in Packaging of Cement

C. CENTRE – CONSTRUCTION DEVELOPMENT AND RESEARCH (CDR)

Mission 1 : Analysis and Design of Structures for Safety and Economy and Development of Related Software Packages

Mission 2 : Rationalizing Designs of Structures and Foundations in Cement Plants and Other Constructions

Mission 3 : Performance Evaluation of Structures including Machine Foundations through Site Inspection and Testing

Mission 4 : Formulation and Evaluation of Protective System for Enhancing the Service Life of Concrete Structures

Mission 5 : Evaluation of Concrete Construction through Non-Destructive Investigations

Mission 6 : Improving Durability of Concrete Construction through Distress Investigations and Rehabilitation Procedures

Mission 7 : Improved Quality Control Procedures for Enhancing Durability

Mission 8 : Rational Utilization of Cement and other Ingredients in Concrete, including Admixtures

Mission 9 : Promotion of Ready Mix Concrete Technology in India

Mission 10 : Development of Concrete for Special and Newer usages such as Underwater Concreting, Special Concrete Exposed to Extreme Temperature etc.

Mission 11 : Development and Evaluation of Prefab Systems Appropriate for Housing Programmes

Mission 12 : Application of Alternative Building Materials and Development of Construction Techniques for Low Cost Housing

Mission 13 : Improvements in Construction Technology of Cement Concrete Pavements and Canal Linings

Mission 14 : Development of Precast Architectural Concrete Elements and Concrete Finishes

Mission 15 : Preventive Maintenance Programme for Enhancing Service Life of Buildings

Mission 16 : Extended Application of Concrete for Non-Structural Usage

Mission 17 : Improvement in Construction Management Techniques

D. CENTRE – INDUSTRIAL INFORMATION SERVICES (CIS)

Mission 1 : Collection, Documentation and Retrieval of Information for Development of Cement and Building Materials Industries

Mission 2 : Establishing National Data Bank for the Cement and Building Materials Industries

Mission 3 : Providing Library Services

Mission 4 : Establishing Display Centre and Sample Museum and Participation in Exhibition and Trade Fairs

Mission 5 : Publication of R & D Projects, Technology Digests, R & D Journals, Trend Reports, Promotional Literature etc.

Mission 6 : Organising Workshops and Seminars at National and International Levels on Topical Subjects in the Areas of Cement and Building Materials

Mission 7 : Promoting International Linkages for Development of Technologies in the Field of Cement and Building Materials

E. CENTRE – CONTINUING EDUCATION SERVICES (CCE)

Mission 1 : Improving the Talent of Personnel at Entry Level to Cement Industry

Mission 2 : Improving Technical and Managerial Skills/Knowledge of NCB Officials through In-house/External Programmes

Mission 3 : Manpower Planning and Human Resource Development Strategies for Cement and Building Material Industries

Mission 4 : Upgrading Technological Talent of Personnel in the Cement and Building Materials Industries

Mission 5 : Improving Operational Skills of Personnel in the Cement Industry through Simulator Based Courses

Mission 6 : Training of Personnel in Computer Programming, Application and Information Technology at Different Levels of Participation

Mission 7 : Training of Personnel in Software Development, System Analysis and Information Technology Applicable to Cement Manufacturing Process Industry, Structural Design and Investigations

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F. CENTRE – QUALITY MANAGEMENT, STANDARDS AND CALIBRATION SERVICES (CQC)

Mission 1 : Providing Traceable Calibration Services to the Industry for Ensuring Manufacture of Quality Product

Mission 2 : National and International Standardization

Mission 3 : Quality Management, Quality Assessment and Quality Improvement in Cement and Building Materials Industries

Mission 4 : Development of Improved Methodologies for Testing and Quality Control including Rapid Methods of Testing and Quality of Cement and Other Building Materials in the Field

Mission 5 : Inter-Laboratory Proficiency Testing

Mission 6 : Quality Related Services

Mission 7 : Development of New Standard Reference Materials

Mission 8 : Providing Standard Reference Materials (SRMs), Developed by NCB, to the Industry for Ensuring Accuracy of Testing for Quality Control

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These Programmes and Missions are proposed to be achieved through the pursuit of specific projects with specified targets of time, cost and assured end products

Appendix - II

Programmed Projects Completed During the Year 2012-13

Sl No.	Project No.	Project Title	Date of Commence-ment	Target Date of Completion
1	INT-02	Testing Services as per Standard Specifications and Established Procedures	April 2012	March 2013
2	GMR-08	Updating of National Inventory of Cement Grade Limestone Deposits	April 2012	March 2013
3	EMG-01	Study of Energy, Environment and Quality Performance Achievements and Creating Conditions for their Consistent Improvement	April 2012	March 2013
4	INF-01	Collection, Storage, Retrieval and Dissemination of Bibliographical and Other Technical Information	April 2012	March 2013
5	PBL-01	Dissemination of Research Results and Information on NCB	April 2012	March 2013
6	SMC-01	Organisation of National and International Seminars/Conferences	April 2012	March 2013
7	HRD-01	Long Term Courses	April 2012	March 2013
8	HRD-02	Updating Knowledge and Skills of NCB Officials	April 2012	March 2013
9	CCE-02	Short Term Courses	April 2012	March 2013
10	CCE-03	Contact Training Programmes for Industrial Personnel	April 2012	March 2013
11	CCE-06	Special Programmes for Industry Personnel from India and Abroad Including UNIDO Sponsored Programmes	April 2012	March 2013
12	SBC-01	Simulator Based Courses	April 2012	March 2013
13	CLS-01	Calibration Services	April 2012	March 2013
14	SRM-01	Development of Standard Reference Materials	April 2012	March 2013
15	SRM-02	Supply of Standard Reference Materials	April 2012	March 2013

Appendix - III

Sponsored Projects Completed During the Year 2012-13

Sl No.	SP No.	Title	Sponsor
CENTRE FOR CEMENT RESEARCH AND INDEPENDENT TESTING (CRT)			
1.	2175	Environmental friendly strategies for waste management in India utilizing cement and concrete production technology, WP-2 : Mineral wastes integrated in cement and concrete	SINTEF Building and infrastructure, Norway
2.	2741	Bore Hole Limestone Analysis	Vicat Sagar Cement Pvt., Ltd.
3.	2777	Utilization of Granulated LD Converter Slag in the manufacture of Cement and as Replacement of Natural Sand in Cement Mortars	Jindal Steel Works, Bellary, Karnatka
4.	2816	Technical suitability of mines rejects for use as construction sand	JK Lakshmi Cement Ltd., Sirohi, Rajasthan
5.	2959	Establishing limestone consumption factor	Jaypee Himachal Cement, Baga, HP
6.	2810	Establishing limestone consumption factor	Rain Cement Ltd., Unit-I, Ramapuram, AP
7.	2804	Optimisation of Raw Mix design for the manufacture of Sulphate Resisting Portland Cement as per IS:12330-1988	Manglam Cement, Kota
8.	2830	Establishing limestone consumption factor	Rain Cement Ltd., Unit-II, Ramapuram AP
9.	2667	Establishing limestone consumption factor	Anjani Portland Cement Ltd.,
10.	2958	Establishing limestone consumption factor	The KCP Ltd., Dist. Guntur, AP
11.	2790	Investigation on strength development pattern in cement	Shree Cement, Beawar, Rajasthan
12.	3063	Impact of mineralogical characteristics on granulometery of clinker	JK Lakshmi Cement Ltd., Sirohi, Rajasthan
13.	2711	Performance evaluation of cement grinding aid formulations at laboratory scale	Dow Chemicals International Private Ltd., Pune

Sl No.	SP No.	Title	Sponsor
14.	2875	Testing and Evaluation of clinker, gypsum and cement	Reliance Cement Company Ltd., Navi Mumbai
15.	2882	Chemical analysis of clinker, gypsum, fly ash and PPC (prepared by grinding in a laboratory ball mill) samples	Reliance Cement Company Ltd., Navi Mumbai
16.	3074	Thermal Investigations of Limestone Mine borehole samples	JK Lakshmi Cement Ltd., Sirohi, Rajasthan
17.	3093	Establishing limestone consumption factor	Jaypee Balaji Cement, Jaggayyapet, Mandal, AP
18.	3069	Establishing limestone consumption factor	JSW Cement Ltd., Kurnool, AP
19.	2977	Study on technical suitability of Jarosite in the manufacture of Cement	Binani Zinc Ltd., Ernakulam, Kerla
20.	3032	Establishing limestone consumption factor	Bhavya Cement Ltd., AP
21.	2906	Establishing limestone consumption factor	Ariyalur Cement Works, Ariyalur, T. N.
22.	3052	Optimization of Raw mix design & Burnability using High Grade Limestone for manufacture of OPC	Manikgarh Cement, Chandrapur, Maharashtra
23.	3045	Increasing the fly ash content in PPC from 31 to 35 %	Vasavdatta Cement, Distt. Gulbarga, Karnatka
24.	3049	Performance Evaluation of Semi-automatic Blaine's Apparatus	Inditech Systems, Pune
25.	3092	Optimisation of raw mix design for maximizing utilization of ESF cake as Raw Mix component in manufacture of OPC	Tata Chemicals Ltd., Mithapur
26.	3096	Optimisation of raw mix design	National Cement Company, Kenya
27.	3238	Characterisation and Evaluation of Limestone Samples	JK Udaipur Udyog Ltd., Udaipur

CENTRE FOR MINING, ENVIRONMENT, PLANT ENGINEERING & OPERATION (CME)

28.	1757	Survey, Geological Mapping and Supervision of Exploration, Computer-Aided Deposit Evaluation of Limestone Deposit for 1000 acres at Gudipadu, Anantpur Dist., Andhra Pradesh	Penna Cement Industries Ltd. Andhra Pradesh
29.	2059	Computer Aided Deposit Evaluation and mine planing of three limestone mines at Nalgonda district, Andhra Pradesh	My Home Industries Ltd. Andhra Pradesh
30.	2631	Geological appraisal for two limestone deposits in Kenya.	East African Portland Cement Co. Ltd, Kenya

Sl No.	SP No.	Title	Sponsor
31.	3102	Preliminary investigations for beneficiation of low/ marginal grade limestone on laboratory scale	Reliance Cement Company Pvt. Ltd.
32.	2032	Life Cycle Assessment (LCA) study for construction sector (Gate-to-grave)	Ministry of Environment and Forests, GOI, New Delhi
33.	2907	Life Cycle Assessment of Steel Re-Rolling Mill (SRRM) sector	Steel Authority of India Limited (SAIL), Delhi
34.	2869	Improving the productivity of kiln through streamlining of process parameters.	OCL India Ltd., Rajgangpur, Odisha
35.	3068	Technical Audit of RABH System	Malabar Cement Ltd, Walayar, Kerala
36.	3121	Study to improve performance of cement mill-1	Gujarat SidheeCement Ltd at Sidheegram, Gujarat
37.	3211	Assessment of technology for a cement plant	My Home Industries (MHIL), Andhra Pradesh
38.	3212	Heat & Gas Balance on Kiln	Dalmia Cement (B) Ltd, Dalmiapuram. TN
39.	2622	Conducting Baseline Energy Audit of the Designated Consumers under the Perform Achieve and Trade (PAT) Scheme	Energy Efficiency Services Limited /Bureau of Energy Efficiency (BEE), New Delhi
40.	2330	Revision of TEFR for setting up a 3.0 mtpa cement plant along with 3*16.5 MW CPP	Murli Industries Ltd
41.	2569	TEFR for setting up a 3 mtpa cement plant at Gulbarga, Karnataka	Heidelberg Cement Ltd.
42.	2718	Development of Technical papers for CO_2 reduction in Indian Cement Industry	Confederation of Indian Industry, New Delhi
43.	2857	TEFR for setting up 1 mtpa cement plant at Rajban, HP	Cement Corporation of India Ltd.
44.	2856	TEFR for setting up 1 mtpa cement plant at Bokajan, Assam	Cement Corporation of India Ltd.
45.	2858	TEFR for setting up 2 mtpa cement plant at Tandur, AP	Cement Corporation of India Ltd.
46.	3097	Revised TEFR for up-gradation of Unit-I capacity at Morak, Rajasthan	Mangalam Cement Ltd.
47.	3294	Techno-economic review for a cement plant in Djibouti	DPA, Ministry of External Affairs, Govt of India

Sl No.	SP No.	Title	Sponsor
CENTRE FOR CONSTRUCTION DEVELOPMENT AND RESEARCH (CDR)			
48.	1669	Third Party Quality Assurance/Quality Audit for Drain, Widening of Road to Manglapuri and W/I/S of Road from Pankha Road to MCD School, Indra Park	Executive Engineer VI, Municipal Corporation of Delhi
49.	1753	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Madanpur Khader	Executive Engineer (Pr.) Central-II, Municipal Corporation of Delhi
50.	1926	Third Party Quality Assurance/Quality Audit for Construction of School at Mandi Village, South Zone	Executive Engineer (Pr.) South, Municipal Corporation of Delhi
51.	2018	Third Party Quality Assurance/Quality Audit for Construction of School Building at Railway Colony, Tuglakabad	Executive Engineer (Pr) C-H, Municipal Corporation of Delhi
52.	2020	Third Party Quality Assurance/Quality Audit for Construction of School Building at Sriniwaspuri (Boys)	Executive Engineer (Pr.) Central-II, Municipal Corporation of Delhi
53.	2029	Third Party Quality Assurance/Quality Audit for Construction of 15 Class Rooms at Harkesh Nagar School	Executive Engineer (Pr) Central-II, Municipal Corporation of Delhi
54.	2041	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building for Prithvi Park School	Executive Engineer (Project-II), WZ, Municipal Corporation of Delhi
55.	2055	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building at Sabhapur School	Executive Engineer Project (Shah-N)-II, Municipal Corporation of Delhi
56.	2088	Third Party Quality Assurance/Quality Audit for Construction of School Building at F-2 Sangam Vihar, Delhi	Executive Engineer (Pr) Central-II, Municipal Corporation of Delhi
57.	2089	Third Party Quality Assurance/Quality Audit for Construction of School Buildings at Tajpur; Zakir Nagar (Girls) and Tehkhand (Girls)	Executive Engineer (Pr) Central-II, Municipal Corporation of Delhi
58.	2104	Third Party Quality Assurance/Quality Audit for the Work of I/S of Internal Roads in Subhash Nagar	Executive Engineer (M) WZ, Municipal Corporation of Delhi
59.	2144	Third Party Quality Assurance/Quality Audit for the Work of Addition/Alteration in Gymnasium for Community Hall at C-2 Pkt, Keshav Puram, Rohini	Executive Engineer (Pr) I Rohini, Municipal Corporation of Delhi
60.	2147	Third Party Quality Assurance/Quality Audit for Covering of LSR Nallah from Kalka Devi Marg to Feroz Gandhi Marg	Executive Engineer (Pr)-I, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
61.	2149	Third Party Quality Assurance/Quality Audit for Construction of Drain and Road on the Phirni Road from Oberoi Farm to DC Office (SW) in Village Kapashera	Executive Engineer Pr. (NGZ), Municipal Corporation of Delhi
62.	2155	Detailed Third Party inspection/quality assurance for Construction of Railway Underpass (RUB) at Shalimar Bagh, Delhi	Public Works Department, Govt. of Delhi
63.	2188	Third Party Quality Assurance/Quality Audit for Construction of Sump Well	Executive Engineer (Pr)-CZ, Municipal Corporation of Delhi
64.	2215	Third Party Quality Assurance/Quality Audit for Improvement of Road from Block-13 to Block-18 Trilokpuri	Executive Engineer (Pr) Shah South, Municipal Corporation of Delhi
65.	2266	Third Party Quality Assurance/Quality Audit for Improvement and Upgradation of Surrounding area of Hotels and Guest Houses near New Delhi Railway Station	Executive Engineer-Project SP, Municipal Corporation of Delhi
66.	2274	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at JJ Nangloi Camp No.2 D-Block	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
67.	2280	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Wazirpur Village Rohini Zone	Executive Engineer (Pr) I Rohini, Municipal Corporation of Delhi
68.	2284	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Block-12 Geeta Colony	Executive Engineer (Pr) Shah South, Municipal Corporation of Delhi
69.	2297	Third Party Quality Assurance/Quality Audit for Improvement of Internal Storm Water Drainage System at DDA MIG Flats, East of Loni Road	Executive Engineer (Pr) Shah (N)-I, Municipal Corporation of Delhi
70.	2302	Third Party Quality Assurance/Quality Audit for Construction of M&CW Centre in Village Nizampur	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
71.	2310	Third Party Quality Assurance/Quality Audit for Construction of Additional Community Hall/Library at New Seelampur CPA (J-Block)	Executive Engineer (Project) (Shah-N)-II, Municipal Corporation of Delhi
72.	2311	Third Party Quality Assurance/Quality Audit for Construction of Additional Community Hall at Ghonda Chowk	Executive Engineer (Project) (Shah-N)-II, Municipal Corporation of Delhi
73.	2339	Third Party Quality Assurance/Quality Audit for Upgradation of Road, Footpath, Electrification, Central Verge, Rotaries etc for CWG-2010	Executive Engineer (Pr.)/KBZ, Municipal Corporation of Delhi
74.	2343	Third Party Quality Assurance/Quality Audit for Construction of School Building at JJ Shadipur	Executive Engineer (Pr.)/KBZ, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
75.	2344	Third Party Quality Assurance/Quality Audit for Construction of School Building at Baljeet Nagar	Executive Engineer (Pr.)/KBZ, Municipal Corporation of Delhi
76.	2346	Third Party Quality Assurance/Quality Audit for Remodelling of Drain at Moti Nagar	Executive Engineer (Project-II) WZ, Municipal Corporation of Delhi
77.	2355	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Mandawli	Executive Engineer (Pr) Shahdara South, Municipal Corporation of Delhi
78.	2363	Third Party Quality Assurance/Quality Audit for Construction of Duct, Drainage, and Providing RMC on Carriageway of Main Bazar from New Delhi Railway Station to R K Mission Ashram	Executive Engineer (Pr) SP Zone, Municipal Corporation of Delhi
79.	2364	Third Party Quality Assurance/Quality Audit for Construction of Central Verge, Duct, Footpath and Berms on DB Gupta Road from Faiz Road to P S Paharganj	Executive Engineer (Pr) SP Zone, Municipal Corporation of Delhi
80.	2387	Third Party Quality Assurance/Quality Audit for Construction of School Building at Lalita Park	Executive Engineer (Pr) Shah (South), Municipal Corporation of Delhi
81.	2389	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at M-Block, Shakurpur, Rohini	Executive Engineer (Pr) I-Rohini, Municipal Corporation of Delhi
82.	2395	Third Party Quality Assurance/Quality Audit for Improvement of Drainage System of Devli Village from C-22 Raju Park to Devli Village	Executive Engineer (Pr) South-I, Municipal Corporation of Delhi
83.	2396	Third Party Quality Assurance/Quality Audit for Improvement of Footpath, Drainage System and Providing Duct of Utility Services at Ajmal Khan Road from DB Gupta Road to Pusa Road	Executive Engineer (Pr) KBZ, Municipal Corporation of Delhi
84.	2399	Third Party Quality Assurance/Quality Audit for Construction of School Building at Tulsi Nagar in Karol Bagh	Executive Engineer (Pr) KBZ, Municipal Corporation of Delhi
85.	2403	Third Party Quality Assurance/Quality Audit for Providing RMC on Nangloi Railway Station Road	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
86.	2404	Third Party Quality Assurance/Quality Audit for Construction of School Building at New Krishna Park	Executive Engineer (Project-II) WZ, Municipal Corporation of Delhi
87.	2409	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Khureji	Executive Engineer (Pr) Shah (South), Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
88.	2423	Third Party Quality Assurance/Quality Audit for the work of Construction of School at Block-7 Trilokpuri	Executive Engineer (Pr.) Sh.(S), Municipal Corporation of Delhi
89.	2454	Third Party Quality Assurance/Quality Audit for Remodeling and Covering of Subhash Nagar Drain	Executive Engineer (Pr) II-West Zone, Municipal Corporation of Delhi
90.	2456	Third Party Quality Assurance/Quality Audit for Construction of School Building at Vivek Vihar Ph-II	Executive Engineer, Project (Shah-S), Municipal Corporation of Delhi
91.	2458	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain from existing Outfall to Village Galibpur	Executive Engineer (Pr) NGZ, Municipal Corporation of Delhi
92.	2460	Third Party Quality Assurance/Quality Audit for Construction of School Building at Tilak Nagar	Executive Engineer (Pr) II-West Zone, Municipal Corporation of Delhi
93.	2462	Third Party Quality Assurance/Quality Audit for Construction of School Building at GG-III, Vikas Puri	Executive Engineer (Pr) II-West Zone, Municipal Corporation of Delhi
94.	2469	Third Party Quality Assurance/Quality Audit for the Construction of 17 ROB's/RUB's in Delhi Near Badli	Executive Engineer (Pr) CLZ, Municipal Corporation of Delhi
95.	2478	Assessment of RCC Foundation of 200 MW Turbo-Generator Foundation Unit No.5 at NTPC-Singrauli	NTPC Limited, Singrauli Super Thermal Power Station, Sonebhadra, U.P.
96.	2479	Third Party Quality Assurance/Quality Audit for Construction of Additional 3 Storey Community Hall Building Adjoining Existing Community Hall at Sunlight Colony part-II, Central Zone	Executive Engineer (Pr.), Central Zone, Municipal Corporation of Delhi
97.	2499	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain and Sumpwell in Village Malikpur	Executive Engineer (Project) NGZ Municipal Corporation of Delhi
98.	2504	Third Party Quality Assurance/Quality Audit for Construction of Community Centre at Chirag Delhi	Executive Engineer (Project-) South-I, Municipal Corporation of Delhi
99.	2506	Third Party Quality Assurance/Quality Audit for Construction of School Building at Fatehpur Beri (Girls)	Executive Engineer (Project) South-II, Municipal Corporation of Delhi
100.	2515	Third Party Quality Assurance/Quality Audit for Construction of School Building at Chattarpur Mandir	Executive Engineer (Pr.) South-II, Municipal Corporation of Delhi
101.	2520	Third Party Quality Assurance/Quality Audit for Re-construction of Drain from M.C. Primary School Tihar Village in Najafgarh Road	Executive Engineer (M)-I/WZ, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
102.	2526	Third Party Quality Assurance/Quality Audit for Ready Mix Concrete Work	Executive Engineer (M)-I Central Zone, Municipal Corporation Delhi
103.	2530	Third Party Quality Assurance/Quality Audit for Construction of School at Beharipur, Shahadara (North) Zone	Executive Engineer Project (Shah-N) II, Municipal Corporation of Delhi
104.	2542	Third Party Quality Assurance/Quality Audit for Construction of Maternity and Child Welfare Home at Village Tughlakabad in Central Zone	Executive Engineer (Project-I) Central Zone, Municipal Corporation of Delhi
105.	2544	Study on Structural Stability of RCC Framed Structures of Primary Crushing Plant Building at BIOM Complex Bacheli, Chattisgarh and Recommendations for Remedial Measures.	NMDC Limited, Hyderabad
106.	2554	Third Party Quality Assurance/Quality Audit for Construction of Barat Ghar/Community Hall at DDA Flat Kalkaji Extn.	Executive Engineer (Pr) Central-II, Municipal Corporation of Delhi
107.	2555	Third Party Quality Assurance/Quality Audit for Construction of RUB on Level crossing near Badli at the back of Sanjay Gandhi Transport Nagar	Executive Engineer (Pr) CLZ, Municipal Corporation of Delhi
108.	2576	Third Party Quality Assurance/Quality Audit for Construction of School Building, Boundary Wall, MS Grill and Ramp at Sector-4, R K Puram	Executive Engineer (Pr) South-I, Municipal Corporation of Delhi
109.	2592	Third Party Quality Assurance/Quality Audit for Construction of School at Dayalpur on Karwal Nagar Road	Executive Engineer (Shah-N)-II, Municipal Corporation of Delhi
110.	2594	Third Party Quality Assurance/Quality Audit for Construction of School at Mundka	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
111.	2605	Third Party Quality Assurance/Quality Audit for Strengthening of Boundary Wall along Block-A at Usmanpur Staff Quarters	Executive Engineer (Shah-N)-II, Municipal Corporation of Delhi
112.	2607	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain along Narela-Alipur Road	Executive Engineer Project Narela, Municipal Corporation of Delhi
113.	2609	Third Party Quality Assurance/Quality Audit for Construction of School Building at Ganesh Nagar-II	Executive Engineer (Shah-S) Project-I, Municipal Corporation of Delhi
114.	2618	Third Party Quality Assurance/Quality Audit for Providing RMC & Construction of Outfall Drain on Phirni Road of Tikri Village	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
115.	2619	Third Party Quality Assurance/Quality Audit for Construction of School Building at Bhola Nath Nagar-II	Executive Engineer (Shah-S) Project-I, Municipal Corporation of Delhi
116.	2633	Third Party Quality Assurance/Quality Audit for Construction of Nursing College at SDN Hospital	Executive Engineer (Project) Shah (N)-I, Municipal Corporation of Delhi
117.	2635	Third Party Quality Assurance/Quality Audit for I/S of Road from Mathura Road (near Humayun Tomb) to Nizamuddin Railway Station	Executive Engineer (Pr) CZ, Municipal Corporation of Delhi
118.	2638	Third Party Quality Assurance/Quality Audit for Construction of Road (Ramesh Park Community Hall - Police Station Shakarpur)	Executive Engineer (Pr)-I, Shahdara South, Municipal Corporation of Delhi
119.	2645	Third Party Quality Assurance/Quality Audit for the Work of Construction of School Building at Tihar No.1	Executive Engineer (Project-II)-WZ, Municipal Corporation of Delhi
120.	2648	Third Party Quality Assurance/Quality Audit for Restoration of entire Road of Village Prahladpur Banger	Executive Engineer (Prj)-1/ Rohini, Municipal Corporation of Delhi
121.	2652	Third Party Quality Assurance/Quality Audit for Remodelling of Drain at Brahmpuri	Executive Engineer-Proj (Shah-N-II), Municipal Corporation of Delhi
122.	2657	Third Party Quality Assurance/Quality Audit for Construction of School Building at Kapashera (B)	Executive Engineer (Pr.) CNG, Municipal Corporation of Delhi
123.	2665	Third Party Quality Assurance/Quality Audit for Construction of Health and Malaria (Auto) Workshop at Gandhi Vihar, Jhasola Dheepur	Executive Engineer (Proj)-CLZ, Municipal Corporation of Delhi
124.	2677	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at L Block JJ Colony, Wazirpur	Executive Engineer (Proj)-I/ Rohini, Municipal Corporation of Delhi
125.	2678	Third Party Quality Assurance/Quality Audit for Construction of School Building at C-1 Block, Ashok Vihar	Executive Engineer (Proj)-I/ Rohini, Municipal Corporation of Delhi
126.	2680	Third Party Quality Assurance/Quality Audit for Construction of School Building at Kazirpur	Executive Engineer (Pr.) CNG, Municipal Corporation of Delhi
127.	2681	Third Party Quality Assurance/Quality Audit for Remodeling of drainage system at main Maujpur Road, Shahdara North Zone.	Executive Engineer Project (Shah-N)-II, Municipal Corporation of Delhi
128.	2684	Third Party Quality Assurance/Quality Audit for Construction of New Building of Narayan Dutt Ayurvedic Dispensary near Sheila Cinema, Arya Nagar	Executive Engineer (Pr.) SPZ Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
129.	2694	Third Party Quality Assurance/Quality Audit for Improvement and Construction of Roads by Providing RMC and Drain in Harijan Basti, Palam Village	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
130.	2698	Third Party Quality Assurance/Quality Audit for Construction of School Building at Ghasipura	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
131.	2701	Third party Quality Assurance/Quality Audit for Construction of School Building at Punjab Khore, Narela	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi
132.	2702	Third party Quality Assurance/Quality Audit for Construction of New Building in M C Primary School Co.-Ed at Pooth Khurd, Narela	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi
133.	2706	Third party Quality Assurance/Quality Audit for Construction of Drain and Footpath at Mukherjee Nagar	Executive Engineer (Pr)-CLZ, Municipal Corporation of Delhi
134.	2707	Third party Quality Assurance/Quality Audit for Construction of Drain from Hanuman Setu to Pumping Station in C-77/CLZ	Executive Engineer (M-II)-CLZ, Municipal Corporation of Delhi
135.	2708	Third party Quality Assurance/Quality Audit for Construction of School Building at Jaffarpur Kalan(G)	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
136.	2713	Third party Quality Assurance/Quality Audit for Construction of Cremation Ground at Jawala Nagar, Shahdara	Executive Engineer (Pr)-1, Municipal Corporation of Delhi, Shahdara South Zone
137.	2715	Third party Quality Assurance/Quality Audit for Construction of School Building at Salahpur Majra, Narela	Executive Engineer (Project), Narela Zone, Municipal Corporation of Delhi
138.	2721	Third party Quality Assurance/Quality Audit for Construction of School Building at Palam (New), NGZ	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
139.	2724	Third party Quality Assurance/Quality Audit for Construction of School Building at Jat Khore, Narela	Executive Engineer (Project) Narela, Municipal Corporation of Delhi
140.	2726	Third party Quality Assurance/Quality Audit for Construction of School Building at Site-IV, Vikas Puri	Executive Engineer (Project-II) WZ, Municipal Corporation of Delhi
141.	2730	Third Party Quality Assurance/Quality Audit for Construction of School Building at Ashok Vihar, Phase-I, Rohini	Executive Engineer (Proj)-1/ Rohini, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
142.	2731	Third Party Quality Assurance/Quality Audit for Construction of School Building at A-1, Partap Kunj, Rohini	Executive Engineer (Proj)-1/ Rohini, Municipal Corporation of Delhi
143.	2733	Third Party Quality Assurance/Quality Audit for Construction of Allopathic Dispensary in Village Daulatpur	Executive Engineer (Proj)-NGZ, Municipal Corporation of Delhi
144.	2734	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at Parmanand Colony	Executive Engineer (Pr) CLZ, Municipal Corporation of Delhi
145.	2737	Testing & Evaluation of Aggregates for Alkali Aggregate Reactivity for RHO Hydroelectric Project, Tawang, Arunachal Pradesh	SEW Infrastructure Ltd, Begampet, Hyderabad
146.	2739	Third Party Quality Assurance/Quality Audit for Construction of RCC Drain in Jahangirpuri	Executive Engineer (Pr.) CLZ, Municipal Corporation of Delhi
147.	2744	Third Party Quality Assurance/Quality Audit for Traffic Management Plan on Roads Leading to and Around New Delhi Railway Station	Executive Engineer (Pr)-CZ, Municipal corporation of Delhi
148.	2745	Third Party Quality Assurance/Quality Audit for Construction of School Building at JJ Nangloi-I	Executive Engineer (Proj)-NGZ, Municipal Corporation of Delhi
149.	2752	Third Party Quality Assurance/Quality Audit for Construction of School Building at Hari Nagar	Executive Engineer (Project-II)-WZ, Municipal Corporation of Delhi
150.	2754	Third Party Quality Assurance/Quality Audit for Construction of School Building at Jwalapuri in West Zone	Executive Engineer (Project-II)-WZ, Municipal Corporation of Delhi
151.	2755	Testing & Evaluation of Coarse Aggregate and Fine Aggregate Samples for Tamanthi Project	NHPC Limited, Faridabad
152.	2756	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Gandhi Vihar	Executive Engineer (Pr)-CLZ, Municipal Corporation of Delhi
153.	2764	Third Party Quality Assurance/Quality Audit for Construction of School Building at Jahangirpuri	Executive Engineer (Pr)-CLZ, Municipal Corporation of Delhi
154.	2766	Third Party Quality Assurance/Quality Audit for Construction of School Building at Harewali in Narela Zone	Executive Engineer (Pr)-Narela Zone, Municipal Corporation of Delhi
155.	2768	Testing & Evaluation of Coarse Aggregate Samples for Tamanthi Project	NHPC Limited, Faridabad
156.	2771	Third Party Quality Assurance/Quality Audit for Construction of School Building at Nangal Thakran in Narela	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
157.	2772	Third Party Quality Assurance/Quality Audit for Improvement of Road & Drain on the Phirni Road of Village Mahipalpur	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
158.	2775	Third Party Quality Assurance/Quality Audit for Construction of Dispensary at Village Bijwasan, NGZ	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
159.	2780	Third Party Quality Assurance/Quality Audit for Construction of ROB on Desh Bandhu Gupta Road across Qutab Road	Executive Engineer (Project) SPZ, Municipal Corporation of Delhi
160.	2782	Third Party Quality Assurance/Quality Audit for Construction of Model Ghat at Lodhi Road, New Delhi	Executive Engineer (Pro)-I Shah South, Municipal Corporation of Delhi
161.	2783	Third Party Quality Assurance/Quality Audit for Construction of School Building at Bamnoli Village	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
162.	2784	Third Party Quality Assurance/Quality Audit for Construction of School Building at Samalkha (G) in NGZ	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
163.	2785	Testing & Evaluation of Materials and Concrete Mix Design for Lift Pump House Package Stage-II at NTPC-Farakka	NTPC Limited, Farakka Super Thermal Power Station, Murshidabad, West Bengal
164.	2787	Third Party Quality Assurance/Quality Audit for Construction of School Building at Shah Pur Garhi, Narela Zone	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi
165.	2789	Third Party Quality Assurance/Quality Audit for Construction of Drain from Pradhan Chowk to Kailashpuri Chowk	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
166.	2793	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Block No.3, Khichripur	Executive Engineer (M)-IV, Municipal Corporation of Delhi
167.	2794	Third Party Quality Assurance/Quality Audit for Remodeling and Covering of Drain on Pandit Marg and Mandawali Main Road	Executive Engineer (M)-IV, Municipal Corporation of Delhi
168.	2795	Third Party Quality Assurance/Quality Audit for Construction of School Building at Sector 7-B, Rohini	Executive Engineer (Prj)-I/ Rohini, Municipal Corporation Delhi
169.	2796	Third Party Quality Assurance/Quality Audit for Improvement & Development of Drain in Welcome Seelampur Phase-III Shahdara (North)	Executive Engineer (Pr.) Shah (N)-I, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
170.	2797	Third Party Quality Assurance/Quality Audit for Improvement of Internal Lanes in D-Block, Ashok Vihar	Executive Engineer (Prj)-I/ Rohini, Municipal Corporation Delhi
171.	2798	Third Party Quality Assurance/Quality Audit for Improvement of Road by Providing and Laying RMC in Wazirpur Industrial Area	Executive Engineer (Prj)-I/ Rohini, Municipal Corporation Delhi
172.	2799	Third Party Quality Assurance/Quality Audit for Improvement of Internal Lane Road in A & B Block, Shalimar Bagh	Executive Engineer (Prj)-I/ Rohini, Municipal Corporation Delhi
173.	2807	Testing & Evaluation of Materials and Concrete Mix Design for Construction of Coal Handling, Lime Handling and Gypsum Handling Plant & Ash Handling Plant Package at NTPC-Bongaigaon	NTPC Limited, Bongaigaon Thermal Power Project, Kokrajhar, Assam
174.	2809	Third Party Quality Inspection for Repair of Cooling Tower-I at NTPC-Korba	NTPC Limited, Korba Super Thermal Power Project, Chattisgarh
175.	2812	Third Party Quality Assurance/Quality Audit for Construction of Polyclinic by Providing RCC Item from Kanjhawla	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi
176.	2815	Third Party Quality Assurance/Quality Audit for Construction of School Building at Mohammad Pur Majri	Executive Engineer (Project) Narela Zone, Municipal Corporation of Delhi
177.	2817	Evaluation of Materials including Potential Alkali-Aggregate Reactivity and Concrete Mix Design for Ash Circulation System at NTPC-Bongaigaon	NTPC Limited , Bongaigaon Thermal Power Project, Kokrajhar, Assam
178.	2821	Third Party Quality Assurance/Quality Audit for R/R Cut Made by DJB for Laying of Sewer Line in Village Mundka	Executive Engineer M-NGZ-II, Municipal Corporation of Delhi
179.	2823	Third Party Quality Assurance/Quality Audit for Construction of Drain from Ramdev Chowk to Irrigation Drain on Kanya Gurukul Road	Executive Engineer (Project), Narela Zone, Municipal Corporation of Delhi
180.	2824	Third Party Quality Assurance/Quality Audit for Construction of School Building at Rangpuri Pahar	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
181.	2826	Third Party Quality Assurance/Quality Audit for Construction of M C Primary School Building at Raj Nagar Extension	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
182.	2828	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain from Bijwasan Phirni to Pipe Culvert Flood Drain on Bijwasan Najafgarh Road	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
183.	2829	Condition Assessment Study of Buildings and Structure at NTPC-Badarpur	NTPC Limited (Badarpur Thermal Power Station), Delhi
184.	2832	Third Party Quality Assurance/Quality Audit for Construction of School Building at Najafgarh	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
185.	2833	Damage/Distress Assessment of Concrete Slab (using appropriate NDT and Chemical Analysis) of a Factory Building at Bahadurgarh and Recommendations/ Remedial Measures	ACC Limited, Noida
186.	2834	Third Party Quality Assurance/Quality Audit for Construction of School Building at Mundka (Boys)	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
187.	2837	Third Party Quality Assurance/Quality Audit for Construction of School Building at Tikri Kalan (G)	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
188.	2839	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain from Main Bahadurgarh Road to Transformer in Lokesh Park Extension	Executive Engineer (M)-I/ NGZ, Municipal Corporation of Delhi
189.	2840	Third Party Quality Assurance/Quality Audit for Providing and Laying of CC Pavement from Shiv Mandir to DDA Community Centre	Executive Engineer (M)-IV/ NGZ, Municipal Corporation of Delhi
190.	2841	Third Party Quality Assurance/Quality Audit for Improvement and Strengthening of Road and Drainage System of DMS Road from Patel Road to Dalao	Executive Engineer (Pr.)/KBZ, Municipal Corporation of Delhi
191.	2843	Evaluation of Materials and Concrete Mix Design for Civil and Architectural Work of Main Power Block and Chimney at Lalitpur Super Thermal Project, Lalitpur	Simplex Infrastructure Limited, C/o Lalitpur Power Generation Company Ltd, Lalitpur, U.P.
192.	2845	Third Party Quality Assurance/Quality Audit for Construction of School Building at F-Block and G-Block Jahangirpuri	Executive Engineer (Pr)-I/CLZ, Municipal Corporation of Delhi
193.	2848	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Vijay Nagar	Executive Engineer (Project)-I (CLZ), Municipal Corporation of Delhi
194.	2850	Third Party Quality Assurance/Quality Audit for Construction of School Building at Mundka (Old)	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
195.	2852	Third Party Quality Assurance/Quality Audit for Construction of School Building at Rani Khera (B)	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi

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196.	2853	Third Party Quality Assurance/Quality Audit for Construction of Under Ground Reservoir at Squatters Resettlement at Holambi Kalan, Phase-II, Delhi	Executive Engineer (C.D-II), Delhi Urban Shelter Improvement Board, Inderlok, Delhi
197.	2855	Third Party Quality Assurance/Quality Audit for Strengthening of Roads in Narela Zone	Executive Engineer (Project)-Narela, Municipal Corporation of Delhi
198.	2861	Third Party Quality Assurance/Quality Audit for Construction of Boundary Wall, Gate and Guard Room of Balak Ram Hospital	Executive Engineer (Pr)-I/CLZ, Municipal Corporation of Delhi
199.	2862	Third Party Quality Assurance/Quality Audit for Restoration of Cut made by IGL for Laying Gas Pipe Line under Dig and Deposit Policy	Executive Engineer (M-II)-KBZ, Municipal Corporation of Delhi
200.	2864	Third Party Quality Assurance/Quality Audit for S.W. Drain in Sanjay Gandhi Transport Nagar Phase-II.	Executive Engineer (M)-I Civil Line Zone, Municipal Corporation of Delhi
201.	2865	Third Party Quality Assurance/Quality Audit for Construction of All Back Lane by Providing Brick Flooring and Drain in New Roshanpura Extension	Executive Engineer (M)-I/ NGZ, Municipal Corporation of Delhi
202.	2866	Third Party Quality Assurance/Quality Audit for Improvement of Road Surface by RMC from Nagarvan Gate to Transformer in Sagarpur, NGZ	Executive Engineer (Project) Najafgarh, Municipal Corporation of Delhi
203.	2867	Third Party Quality Assurance/Quality Audit for Construction of road in Ajay Park in Najafgarh	Executive Engineer (M)-I/ NGZ, Municipal Corporation of Delhi
204.	2868	Third Party Quality Assurance/Quality Audit for Improvement of Roads by Providing RMC in C-137 NGZ	Executive Engineer (M)-I/ NGZ, Municipal Corporation of Delhi
205.	2872	Third Party Quality Assurance/Quality Audit for Construction of Drain, Sumpwell & Pump Room in Nanakheri	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
206.	2874	Third Party Quality Assurance/Quality Audit for Construction of School Building at Vasundhara Enclave	Executive Engineer (Project)-II-Shahdara South, Municipal Corporation of Delhi
207.	2883	Third Party Quality Assurance/Quality Audit for Construction of SW Drain and Providing RMC from Dabri Palam Road to Nasirpur Road in Mahavir Enclave	Executive Engineer (NGZ), Municipal Corporation of Delhi
208.	2885	Third Party Quality Assurance/Quality Audit for Improvement of Outfall Drain and Providing RMC from in West Sagarpur	Executive Engineer (NGZ), Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
209.	2886	Third Party Quality Assurance/Quality Audit for Construction of Drain from Indra Park School to Palam Drain	Executive Engineer (NGZ), Municipal Corporation of Delhi
210.	2888	Third Party Quality Assurance/Quality Audit for Improvement of Drainage System in Aya Nagar at Band Road	Executive Engineer (Pr) South-II, Municipal Corporation of Delhi
211.	2890	Third Party Quality Assurance/Quality Audit for Construction of Drain from Pump House Old GT Road to New GT road in Shahdara South	Executive Engineer (Pr)-I Shah South, Municipal Corporation of Delhi
212.	2897	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain from M.C. School New Roshanpura to Pandit Lal Main Chowk	Executive Engineer (NGZ), Municipal Corporation of Delhi
213.	2901	Third Party Quality Assurance/Quality Audit for Providing RMC and Construction of Drains in C-32/NGZ	Executive Engineer (NGZ), Municipal Corporation of Delhi
214.	2902	Third Party Quality Assurance/Quality Audit for Providing RMC and Construction of Outfall Drain on Phirni Road of Neelwal Village in C-30/NGZ	Executive Engineer (NGZ), Municipal Corporation of Delhi
215.	2903	Third Party Quality Assurance/Quality Audit for Providing RMC & Construction of Outfall Drain from Rohtak Road to Gaurav Communication on Phirni Road of Tikri Kalan Village	Executive Engineer (NGZ), Municipal Corporation of Delhi
216.	2904	Third Party Quality Assurance/Quality Audit for Providing RMC and Construction of Outfall Drain on Phirni Road of Nilothi Village in C-32/NGZ	Executive Engineer (NGZ), Municipal Corporation of Delhi
217.	2905	Third Party Quality Assurance/Quality Audit for Construction of Outfall Drain and Providing RMC in C-30/NGZ	Executive Engineer (NGZ), Municipal Corporation of Delhi
218.	2913	Evaluation of Aggregate for Petrography and Alkali Aggregate Reactivity Test for Mangdechhu Hydroelectric Project, Bhutan	Mangdechhu Hydroelectric Project Authority, Trongsa, Bhutan
219.	2916	Third Party Quality Assurance/Quality Audit for Construction of box type drain from Dwarka more Metro Station to DTC bus stand (Pillar no. 798) on Najafgarh Road in NGZ	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
220.	2917	Third Party Quality Assurance/Quality Audit for I/D of lanes (10 feet) by Providing RMC in Palam Extension	Executive Engineer (M)-IV / NGZ, Dwarka, Delhi
221.	2918	Third Party Quality Assurance/Quality Audit for Providing and laying RMC on Dada Dev Road and connecting lanes in Palam village	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi

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222.	2920	Third Party Quality Assurance/Quality Audit for Construction of box type drain from Najafgarh Road to Matiyala Community Centre	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
223.	2924	Third Party Quality Assurance/Quality Audit for Improvement of lane by providing RMC in Najafgarh	Executive Engineer (M-I) Municipal Corporation of Delhi
224.	2928	Third Party Quality Assurance/Quality Audit for C/o RCC drain from Y-shape Chowk to Road No.66	Executive Engineer Project (Shahdara N)-II, Municipal Corporation of Delhi
225.	2931	Testing and Evaluation of Materials and Concrete Mix Design for Draft Cooling Tower Package at KBUNL-Muzaffarpur Thermal Power Project	Kanti Bijlee Utpadan Nigam Ltd, Muzaffarpur, Bihar
226.	2932	Evaluation of Materials for 2X750 MW CCPP at Bawana, Delhi	Bharat Heavy Electricals Ltd, Bawana, Sector-5, Delhi
227.	2933	Testing and Evaluation of Materials and Concrete Mix Design for Strengthening of MGR Road at Rihand Super Thermal Power Project	NTPC Limited, Rihand Super Thermal Power Project, Rihand Nagar, Sonebhadra
228.	2935	Third Party Quality Assurance/Quality Audit for Providing RMC on damaged road in C-31/NGZ	Executive Engineer(Project) NGZ, Municipal Corporation of Delhi
229.	2937	Third Party Quality Assurance/Quality Audit for construction of community Hall at F Block, Sultanpuri	Executive Engineer(Project)-II/ Rohini Zone, Municipal Corporation of Delhi
230.	2939	Third Party Quality Assurance/Quality Audit for Construction of Ayurvedic Dispensary at Biharipur	Executive Engineer (Pr.) Central-I, Municipal Corporation of Delhi
231.	2940	Third Party Quality Assurance/Quality Audit for Construction of school at East Vinod Nagar	Executive Engineer(Pr)-II(Sh.S), Municipal Corporation of Delhi
232.	2943	Third Party Quality Assurance/Quality Audit for Construction of Pucca school building at Ashok Vihar	Executive Engineer (Project)-I/ Rohini Zone, Municipal Corporation of Delhi
233.	2948	Third Party Quality Assurance/Quality Audit for work of Remodeling and covering of drain in Bihari Colony	Executive Engineer (Pr)-I, Shahdara South Zone, Municipal Corporation of Delhi
234.	2949	Third Party Quality Assurance/Quality Audit for Construction of Class rooms in M C Primary School block 32 Trilokpuri	Executive Engineer(Pr)-II(Sh.S), Municipal Corporation of Delhi
235.	2950	Third Party Quality Assurance/Quality Audit for Construction of School Building at Kadam Sharif	Executive Engineer (Project), S. P. Zone, Municipal Corporation of Delhi

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236.	2957	Evaluation of Materials for 2X750 MW CCPP at Bawana, Delhi	Bharat Heavy Electrical Limited, Bawana, Delhi
237.	2960	Third Party Quality Assurance/Quality Audit for Construction of drain on main Rawta Road in Vill. Ujwa	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
238.	2961	Third Party Quality Assurance/Quality Audit for Construction of 10 Nos. Class rooms, 1 Hall, & 2 Toilet blocks in M C Primary School Bajitpur Thakran	Executive Engineer(Project) Narela Zone, Municipal Corporation of Delhi
239.	2963	Third Party Quality Assurance/Quality Audit for Construction of drain in village Jaffarpur	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
240.	2968	Third Party Quality Assurance/Quality Audit for I/D of side berm and Remodeling of Covering of drain in Janakpuri North.	Executive Engineer (Project-II), West Zone, Municipal Corporation of Delhi
241.	2970	Third Party Quality Assurance/Quality Audit for Construction of Pucca School at Guru Nanak Pura Fateh Nagar	Executive Engineer (Project-II), West Zone, Municipal Corporation of Delhi
242.	2971	Evaluation of Materials & Concrete Mix design of M35 Grade for R&M for Cooling Tower (Unit 6&7) at Barauni Thermal Power Station	Bharat Heavy Electrical Ltd. Projects Division, Barauni TPS, Begusarai, Bihar
243.	2973	Third Party Quality Assurance/Quality Audit for Improvement of internal lane in Shalimar Bagh	Executive Engineer(Project)-I/ Rohini Zone, Municipal Corporation of Delhi
244.	2974	Third Party Quality Assurance/Quality Audit for I/S of road by providing RMC and drainage in Pitampura (N)	Executive Engineer(Project)-I/ Rohini Zone, Municipal Corporation of Delhi
245.	2975	Condition Assessment of RCC Members of Kendriya Vidyalaya Building at INA Colony, New Delhi	Central Public Works Department, D-Division, New Delhi
246.	2976	Third Party Quality Assurance/Quality Audit for Construction of Kirari road from Rohtak road to railway crossing	Executive Engineer M-II/NGZ, Municipal Corporation of Delhi
247.	2981	Third Party Quality Assurance/Quality Audit for Improvement of cremation ground of village Sarangpur and road by providing RMC in Matiala	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
248.	2982	Third Party Quality Assurance/Quality Audit for restoration of D-Block sewer in Ashok Nagar by Providing RMC	Executive Engineer (M-III) Shah- N, Municipal Corporation of Delhi
249.	2983	Third Party Quality Assurance/Quality Audit for Improvement of road by providing RMC and drain in Roshan Garden	Executive Engineer (M-I)/ NGZ, Municipal Corporation of Delhi

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250.	2985	Third Party Quality Assurance/Quality Audit for Providing RMC in different lanes in Sadh Nagar	Executive Engineer (Project) NGZ, Municipal Corporation of Delhi
251.	2986	Third Party Quality Assurance/Quality Audit for Restoration of Cut by providing RMC in Village Mundka	Executive Engineer M-II/NGZ, Municipal Corporation of Delhi
252.	2987	Third Party Quality Assurance/Quality Audit for Road restoration for cut made for laying of natural gas pipeline in Vikaspuri	Executive Engineer (M-III)/ West Zone, Municipal Corporation of Delhi
253.	2989	Third Party Quality Assurance/Quality Audit for work of Remodeling and covering of drain in Jahangirpuri	Executive Engineer (Project-II), West Zone, Municipal Corporation of Delhi
254.	2990	Third Party Quality Assurance/Quality Audit for Restoration of road cut in Bapraula village	Executive Engineer (M-IV)/ West Zone, Municipal Corporation of Delhi
255.	2991	Third Party Quality Assurance/Quality Audit for Construction of Drainage System in Aruna Nagar	Executive Engineer (Project)-I/ CLZ, Municipal Corporation of Delhi
256.	2993	Third Party Quality Assurance/Quality Audit for I/D of road and drainage system in Dilshad Garden	Executive Engineer (Pr) Shadara South Zone, Municipal Corporation of Delhi
257.	2994	Testing and Evaluation of Materials for the Preliminary Feasibility Studies of Kuri-Gongri HE Project, Bhutan	NHPC Limited, Kuri-Gongri HE Project, Bhutan
258.	2998	Third Party Quality Assurance/Quality Audit for Construction of Cunit of Nallah No.2 in RK Puram	Executive Engineer (M-South)-I, Municipal Corporation of Delhi
259.	3001	Third Party Quality Assurance/Quality Audit for Construction of drain and CC pavement in Khhada Basti Raja Vihar	Executive Engineer (M-IV)- Rohini Zone, Municipal Corporation of Delhi
260.	3004	Third Party Quality Assurance/Quality Audit for Restoration of road cut in Rohini	Executive Engineer (M-IV)- Rohini Zone, Municipal Corporation of Delhi
261.	3005	Third Party Quality Assurance/Quality Audit for Restoration of road cut in Rohini North	Executive Engineer (M-IV)- Rohini Zone, Municipal Corporation of Delhi
262.	3006	Third Party Quality Assurance/Quality Audit for Construction of School building, in Narela Zone	Executive Engineer (Project) Narela, Municipal Corporation of Delhi
263.	3007	Third Party Quality Assurance/Quality Audit for Improvement of 30 feet wide approach road to old Rangpuri road	Executive Engineer (Project)- NGZ, Municipal Corporation of Delhi

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264.	3008	Third Party Quality Assurance/Quality Audit for Construction of connecting road to Nilothi village	Executive Engineer (M-II) NGZ, Municipal Corporation of Delhi
265.	3013	Third Party Quality Assurance/Quality Audit for Construction of box type drain in Dwarka	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
266.	3014	Third Party Quality Assurance/Quality Audit for Construction of box type drain in Ambrahi Dwarka	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
267.	3017	Third Party Quality Assurance/Quality Audit for Improvement of drain and providing RMC in W.No.131/NGZ	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
268.	3018	Third Party Quality Assurance/Quality Audit for Improvement of drain in village Deenpur	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
269.	3019	Third Party Quality Assurance/Quality Audit for Improvement of drain by construction of box type drain in Matiala	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
270.	3020	Third Party Quality Assurance/Quality Audit for Improvement of drain in Durga Vihar	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
271.	3021	Third Party Quality Assurance/Quality Audit for Improvement of drain in village Deenpur	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
272.	3027	Third Party Quality Assurance/Quality Audit for Improvement of road by providing RMC and drain in Dharampura	Executive Engineer (M-I-NGZ, Municipal Corporation of Delhi
273.	3028	Third Party Quality Assurance/Quality Audit for providing RMC in different lanes in Sadh Nagar	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi
274.	3029	Condition Monitoring Study by Quality Investigation of Identified RCC Members of Existing Building at Nangloi, Delhi	Airports Authority of India, Rangpuri Project, New Delhi
275.	3031	Testing and Evaluation of Materials and Concrete Mix Design for Ash Handling System at Nabinagar Thermal Power Project	Bharatiya Rail Bijlee Company Ltd, Nabinagar Thermal Power Project, Aurangabad, Bihar
276.	3035	Third Party Quality Assurance/Quality Audit for Improvement of drain and providing RMC in West Sagarpur	Executive Engineer (Project)-NGZ, Municipal Corporation of Delhi

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277.	3038	Quality & Strength assessment of I girders in four laning on Dholpur Marena section of NH-3 on North South Corridor in Rajasthan/Madhya Pradesh	National Highways Authority of India, Project Implementation Unit 13, Gwalior, M.P.
278.	3043	Third Party Quality Assurance/Quality Audit for Construction of drain in Deepak Vihar	Executive Engineer (M-I) NGZ, Municipal Corporation of Delhi
279.	3047	Testing and Evaluation of Materials and Concrete Mix Design for Main Plant and Offsite Civil Works Package at Meja Urja Thermal Power Project	Meja Urja Nigam Limited, Allahabad
280.	3048	Evaluation of materials and concrete mix design for Construction of non-residential Building Package -I	NTPC Limited, Mouda Thermal Power Station, Nagpur
281.	3055	Third Party Quality Assurance/Quality Audit for Imprpvement of drainage system and side berms at Mandi road	Executive Engineer (Pr)-South-II, Municipal Corporation of Delhi
282.	3057	Third Party Quality Assurance/Quality Audit for Construction of class rooms and a lav block raising of boundry wall in M C Primary School at Tiggipur	Executive Engineer (Project), Narela Zone, Municipal Corporation of Delhi
283.	3059	Third Party Quality Assurance/Quality Audit for Construction of drain carrying storm water of Sunder Nagar Colony	Executive Engineer (Project), CZ, Municipal Corporation of Delhi
284.	3062	Ultrasonic Pulse Velocity Test of Concrete in TG Deck Slab of Unit # 1 at Nigrie STPP and Bara STPP	Jaiprakash Power Ventures Ltd, Noida, U.P.
285.	3065	Third Party Quality Assurance/Quality Audit for Construction of drainage system in Vishnu Garden	Executive Engineer (M-WZ)-II, Municipal Corporation of Delhi
286.	3066	Third Party Quality Assurance/Quality Audit for Remodeling and Covering of drainage system in Vishnu Garden (Main Khyalla road)	Executive Engineer (M-WZ)-II, Municipal Corporation of Delhi
287.	3070	Evaluation of Materials for Pre Treatment Plant Package for HUBNL-Muzaffarpur Thermal Power Project (2×195 MW)	Kanti Bijlee Utpadan Nigam Limited, Mujaffarpur, Bihar
288.	3076	Petrographic & Accelerated Mortar Bar Test of Coarse & Fine Aggregate Samples	Tato Hydro Power (P) Ltd, Noida
289.	3079	Third Party Quality Assurance/Quality Audit for Improvement of drain by constructing box type drain on Bindapur Matiala road, Matiala	Executive Engineer (Project), NGZ, Municipal Corporation of Delhi
290.	3081	Third Party Quality Assurance/Quality Audit for Improvement/Strengthening of main Jagarabad Road	Executive Engineer (Project-II), Shah-N, Municipal Corporation of Delhi
291.	3082	Third Party Quality Assurance/Quality Audit for Construction of Recreation Centre/Old Age Home at Ghanta Ghar	Executive Engineer (Pr-I), CLZ, Municipal Corporation of Delhi

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292.	3084	Assessment of cause of peeling off plaster/ masonry in building of Oriental Staff Training College, Faridabad & Suggestions for remedial measures.	Oriental Staff Training College, Faridabad
293.	3085	Concrete Mix Design for Civil Works at Gogri, Singrauli	Gannon Dunkerley & Co Ltd, New Delhi
294.	3086	Third Party Quality Assurance/Quality Audit for Re-construction of School at F-block Jahangirpuri and construction of School at G-block Jahangirpuri	Executive Engineer (Pr-I), CLZ, Municipal Corporation of Delhi
295.	3091	Third Party Quality Assurance/Quality Audit for Re-construction of School Narela Mandi.	Executive Engineer (Project), Narela, Municipal Corporation of Delhi
296.	3095	Third Party Quality Assurance/Quality Audit for Improvement of cremation ground of Surehra Village of Najafgarh	Executive Engineer (Project), NGZ, Municipal Corporation of Delhi
297.	3104	Third Party Quality Assurance/Quality Audit for Remodeling and covering of drain on Sadhbhavna Road	Executive Engineer (M-IV), Shah South, Municipal Corporation of Delhi
298.	3105	Condition Assessment Study of Different RCC Structures at TATA Power Delhi Distribution Ltd, Rithla, New Delhi	TATA Power Delhi Distribution Ltd, Rithla, New Delhi
299.	3108	Third Party Quality Assurance/Quality Audit for Improvement of drain in Village Deenpur	Executive Engineer (Project), NGZ, Municipal Corporation of Delhi
300.	3110	Testing and Evaluation of materials of Kiru HE Project	NHPC Ltd. (K K HE Project), Dulhasti Power Station (J&K)
301.	3113	Structural Quality Assessment of RCC Members of Grade-III and Grade-IV Staff Quarters of Meghalaya House, New Delhi and Recommendations for Repair and Strengthening	Joint Resident Commissioner, Govt. of Meghalaya, New Delhi
302.	3114	Third Party Quality Assurance/Quality Audit for I/D of drainage system and remodeling of drain in Mandawali	Executive Engineer (M)-IV, Shah - South, Municipal Corporation of Delhi
303.	3116	Third Party Quality Assurance/Quality Audit for Improvement of lane by raising of road and drain in Baba Enclave	Executive Engineer (M)-I, NGZ, Municipal Corporation of Delhi
304.	3118	Third Party Quality Assurance/Quality Audit for Construction of 2 classrooms, 1 store and boundary wall in M C Primary School Bhalaswa village	Executive Engineer (Project-II), CLZ, Municipal Corporation Delhi
305.	3119	Evaluation of materials for Switchyard Package for Muzaffarpur Thermal Power Project (2x195MW)	Kanti Bijlee Utpadan Nigam Ltd., Distt. Muzaffarpur

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306.	3120	Extraction and testing of Concrete Cores upto 75 mm Diameter to Ascertain the Equivalent Cube Compressive Strength of Concrete RCC wall of CW pump house at MBPIL project	PMG-Lanco Intratech Ltd. MBPIL Project, Jaitari, Distt. Anuppur- Madhya Pradesh
307.	3127	Third Party Quality Assurance/Quality Audit for Restoration of Pits and I/D of drain in Hari Nagar	Executive Engineer M/West-I, Municipal Corporation of Delhi
308.	3128	Third Party Quality Assurance/Quality Audit for restoration of open cut and improvement to footpath in Hari Nagar	Executive Engineer M/West-I, Municipal Corporation of Delhi
309.	3129	Third Party Quality Assurance/Quality Audit for restoration of cut in Shiv Nagar in Janak Puri West	Executive Engineer M/West-III, Municipal Corporation of Delhi
310.	3138	Condition Assessment Study of Distressed Flats of Type B & C Quarters at NTPC-Korba Township and Suggestions for Remedial Measures for Repair	NTPC Limited, Korba Super Thermal Power Station, Korba, Chhattisgarh
311.	3139	Third Party Quality Assurance/Quality Audit for Improvement of Raising Road and Drain in Roshan Vihar Ph-II, Najafgarh	Executive Engineer (M)-I, NGZ, Municipal Corporation of Delhi
312.	3140	Third Party Quality Assurance/Quality Audit for restoration of cut in Mansarover Garden	Executive Engineer (M)-I, KBZ, Municipal Corporation of Delhi
313.	3142	Third Party Quality Assurance/Quality Audit for Construction of drain from in New Gopal Nagar Extn in C-139, NGZ	Executive Engineer (M)-I, NGZ, Municipal Corporation of Delhi
314.	3154	Ultrasonic Pulse Velocity (UPV) Testing of Pedestals of Coal Mills 2A and 2B at IGSTPP at Jhajjar	Aravali Power Company Ltd., Indira Gandhi Super Thermal Power Plant, Jhajjar, Haryana
315.	3159	Third Party Quality Assurance/Quality Audit for Improvement of Road and Construction of Drain at Najafgarh Zone	Executive Engineer (M)-I, NGZ, Municipal Corporation of Delhi
316.	3161	Quality Assessment of hardened concrete of RCC Chimney (275 mt height) around 38m + 0.5m height at Anpara-D Site Distt. Sonebhadra in U.P.	Lanco Infratech Ltd., EPC Division, Gurgaon
317.	3162	Third Party Quality Assurance/Quality Audit for Restoration of cut West Patel Nagar	Executive Engineer (Project) M-II, KBZ, Municipal Corporation of Delhi
318.	3167	Condition Assessment of Machine Foundations of Fan No.13 & 5 of Cooling Tower Module # 2 at Dadri Gas Power Station, Vidyut Nagar, Dadri	NTPC Limited, National Capital Power Station, Vidyut Nagar, Dadri
319.	3170	Third Party Quality Assurance/Quality Audit for Remodeling of Kasturba Nagar Drain(Ph-II) in AC-59 Shahdara South	Executive Engineer (Project), Shah-S, Municipal Corporation of Delhi

Sl No.	SP No.	Title	Sponsor
320.	3171	Third Party Quality Assurance/Quality Audit for improvement of lane by raising of road and drain in Nathu Ram Park in C-138 NGZ and Roshanpura Extn. G-block in C-137 NGZ	Executive Engineer (M)-I, NGZ, Municipal Corporation of Delhi
321.	3178	Third party audit and quality assurance for construction of district training centre at PHQ Jamnagar	Gujrat State Police Housing Corporation Ltd., Gandhi Nagar
322.	3186	Third Party Quality Assurance/Quality Audit for improvement of internal lanes by P/L RMC and drainage system in C-Block, Ashok Vihar in C-68 Rohini Zone	Executive Engineer (Pr.) CLZ, Municipal Corporation of Delhi
323.	3189	Strength and Durability Study on Concrete using Different Cement Samples	Penden Cement Authority Ltd, Gomtu, Bhutan
324.	3190	Ultrasonic Pulse Velocity Test of Concrete in TG Deck Slab of Unit # 2 at Nigrie Thermal Power Plant	Jaiprakash Power Ventures Limited, Noida
325.	3191	Third Party Quality Assurance/Quality Audit for Providing RMC for construction of Road and drains	Executive Engineer (M-I) NGZ, Municipal Corporation of Delhi
326.	3200	Evaluation of Coarse Aggregates for NMDC Steel Plant, Nagarnar BF Project, Jagadalpur, Chattisgarh	Tata Projects Limited, Nagarnar BF Project, Jagdalpur, Bastan, Chattisgarh
327.	3204	Third Party Quality Assurance/Quality Audit for Construction of drain and improvement of side berms.	Executive Engineer (Project)-I Rohini, Municipal Corporation of Delhi
328.	3210	Ultrasonic Pulse Velocity Test of Concrete in TG Deck Slab of Unit # 2 to Ascertain Homogeneity and Integrity of Concrete at Bara Thermal Power Plant	Jaiprakash Power Ventures Limited, Noida
329.	3213	Determination of Compressive Strength of Precast Concrete (PC) Block of NDCT of RTPP at DVC, Raghunathpur Project, Purulia	Paharpur Cooling Towers Limited, Kolkata
330.	3214	Non-Destructive Testing of Natural Draft Cooling Tower (NDCT # 1) from 28 to 32 Lifts of RTPP at DVC, Raghunathpur Project, Purulia	Paharpur Cooling Towers Limited, Kolkata
331.	3226	Third Party Quality Assurance/Quality Audit for I/D of drainage system at Ramesh Nagar and Manasarover Garden	Executive Engineer (Pr.) M-I, Municipal Corporation of Delhi
332.	3229	Third Party Quality Assurance/Quality Audit I/D of lane by providing RCC box drain from 36A to 112A (LHS&RHS) in Kamla Nagar in C-69 CLZ	Executive Engineer (M-III) CLZ, Municipal Corporation of Delhi
333.	3230	Evaluation of Materials and Concrete Mix Design for Cooling Towers of Meja Urja Thermal Power Project	Meja Urja Nigam (P) Limited, Allahabad

Sl No.	SP No.	Title	Sponsor
334.	3232	Comparative Quality Assessment Study of Hardened Concrete of RCC Retaining Wall and Combined Footings FCG-18 and FCG-19 using NDT of 2nd Office Building of NHAI, Dwarka, Delhi	Unity Infratech Limited, Mumbai
335.	3241	Quality Assessment Study of Hardened Concrete of RCC Chimney Shell around 37 ± 1m Height at Anpara-D Site, Distt. Sonebhadra, U.P. using Non-Destructive Evaluation	Lanco Infratech Limited, Gurgaon
336.	3268	Third Party Quality Assurance/Quality Audit for construction of Pucca School Building at M C Pry. School C-1, Ashok Vihar Phase-I, Rohini Zone SH: Development of site by pdg storm water drains, water supply distribution line, main gate etc.	Executive Engineer (Pr-I), CLZ, Municipal Corporation of Delhi
337.	3271	Testing and Evaluation of Aggregates for NTPC Hydro Ltd, Lata Tapovan HE Project, Uttrakhand	NTPC Hydro Limited, Lata Tapovan Hydroelectric Project, Joshimath, Chamoli, Uttrakhand

CENTRE FOR QUALITY MANAGEMENT, STANDARDS & CALIBRATION SERVICES (CQC)

338.	2647	Assistance in NABL Accreditation of Quality Control Laboratories	JK Cement Works, Rajasthan
339.	2914	Development of Clinker and PPC Standards	UltraTech Cement Ltd., Punjab
340.	2925	Development of Clinker and PPC Standards	UltraTech Cement Ltd., Haryana
341.	3223	Assessment of Quality Assurance System of Cement Plant, Mellacheruvu (AP)	My Home Industries Ltd., Andhra Pradesh
342.	3224	Assessment of Quality Assurance System of Grinding Unit, Viskahapatnam (AP)	My Home Industries Ltd., Andhra Pradesh

Appendix - IV

Research and Development Programme 2013-14

Sl No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
		I PLAN FUNDED PROJECTS		
1	CCE-09	Modernization and Upgradation of Training Facilities for Cement, Concrete and Construction Industries at NCB Units	April 2012	March 2017
2	ITS-04	Information Technology for Improving Communication	April 2012	March 2017
3	CQC-03	Modernization and Upgradation of Laboratories and Infrastructural Facilities at NCB Units	April 2012	March 2017
4	EMG-03	Studies on Evaluation of Technologies for Co-generation of Power Utilizing Waste Heat in Cement Manufacture	April 2012	March 2015
5	FBR-12	Investigations on Fly ash Based Geopolymeric Cements	April 2012	March 2017
6	FBR-13	Investigations on Nanoparticle blended Cements and Cement Based Nano-Composites	April 2012	March 2017
7	COB-04	Development of Composite Cements Based on OPC	April 2012	March 2017
8	SOD-07	Development of Methods for Service Life Design for Concrete Structures	April 2012	March 2017
9	SOD-08	Development of Design Parameters for High Strength Concrete	April 2012	March 2015
		II CESS FUNDED PROJECTS		
10	WAU-13	Investigations on Utilization of Marble Dust/Slurry Waste as Alternate to Limestone in Cement Manufacture	April 2011	March 2014

Sl No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
11	ENV-16	Study on present Dust Emission Levels and Available Technologies for Reducing the Dust Emission at Stone Crushers	April 2012	March 2014
12	PSD-01	Development of System Design for Storage, Handling and Firing of Different Types of Alternate Fuels/Wastes in Cement Plants	April 2012	March 2015
13	CON-10	Development of Accelerated Mix Design Method for Concrete Using PPC or Flyash with OPC	April 2012	March 2014
14	TQM-11	Benchmarking of Quality Parameters for Indian Cement Industry	April 2012	March 2014
		III OTHER PROJECTS		
15	INT-02	Testing Services as per Standard Specifications and Established Procedures	April 2013	March 2014
16	GMR-08	Updating of National Inventory Cement Grade Limestone Deposits	April 2013	March 2014
17	EMG-01	Study of Energy, Environment and Quality Performance Achievements and Creating Conditions for their Consistent Improvement	April 2013	March 2014
18	INF-01	Collection, Storage, Retrieval and Dissemination of Bibliographical and Other Technical Information	April 2013	March 2014
19	PBL-01	Dissemination of Research Results and Information on NCB	April 2013	March 2014
20	SMC-01	Organisation of National and International Seminars/Conferences	April 2013	March 2014
21	HRD-01	Long Term Courses	April 2013	March 2014
22	HRD-02	Updating Knowledge and Skills of NCB Officials	April 2013	March 2014

Sl No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
23	CCE-02	Short Term Courses	April 2013	March 2014
24	CCE-03	Contact Training Programmes for Industrial Personnel	April 2013	March 2014
25	CCE-06	Special Programmes for Industry Personnel from India and Abroad Including UNIDO Sponsored Programmes	April 2013	March 2014
26	SBC-01	Simulator Based Courses	April 2013	March 2014
27	CLS-01	Calibration Services	April 2013	March 2014
28	SRM-01	Development of Standard Reference Materials	April 2013	March 2014
29	SRM-02	Supply of Standard Reference Materials	April 2013	March 2014

Appendix - V

NCB Patents in force as on 31 March 2013

Sl No	Patent No	Title	Name of Inventors
1	251637	A decorative Plaster coating	Shri S Raina Dr K Mohan Dr K M Sharma Dr M M Ali Shri S K Agarwal Shri S K Chaturvedi

PATENTS FILED :

Sl No	Title	Name of Inventors
1	A Ceramic body mix utilizing spent catalyst waste and a process for preparing the same	Shri S Raina Dr K Mohan Dr K M Sharma Dr M M Ali Shri S K Chaturvedi Dr D Yadav Shri S K Agarwal
2	Decorative tiles utilizing marble dust and a process for preparation thereof	Shri S Raina Dr K Mohan Dr K M Sharma Dr M M Ali Shri S K Chaturvedi Shri S K Agarwal
3	Cement and fly ash based aesthetic building bricks and tiles utilizing marble dust and a process for preparation thereof	Shri S Raina Dr K Mohan Dr K M Sharma Dr M M Ali Shri S K Chaturvedi Shri S K Agarwal
4	A Process for utilization of red mud in cement manufacture	Dr K Mohan Dr K M Sharma Shri P S Sharma Dr D Yadav Dr J M Sharma

Sl No	Title	Name of Inventors
5	A sintered aggregate and a process for manufacture thereof	Shri M Vasudeva Dr M M Ali Shri S K Chaturvedi Shri P S Sharma Dr D Yadav
6	A process for the preparation of synthetic slag from low grade limestone and dolomite	Shri A Pahuja Dr M M Ali Shri P S Sharma Shri S K Chaturvedi Shri S K Agarwal Dr V P Chatterjee Dr D Yadav Shri T Tshering Shri U Kaflay

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NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS
34 Km Stone, Delhi-Mathura Road (NH-2), Ballabgarh-121 004, Haryana, INDIA