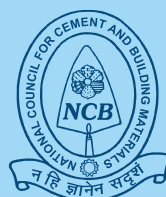


# Annual Report 2013-14



NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS

# BOARD OF GOVERNORS

## 2014

### Chairman

Shri O P Puranmalka

### Vice-Chairman

Dr S Chouksey

### Members

Shri R P Tak †

Shri Manoj Misra ††

Shri Mahendra Singhi

Shri Ajay Kapur

Shri Rahul Kumar

Shri T S Raghupathy

Shri K Padmakumar

Shri V S Narang

Shri S K Bahri

Shri Shailendra Singh

Shri T N Venkatesh@

Shri C Kamaraj, @@

Shri R L Tickoo\*

Shri Rakesh Sharma\*\*

Shri B Seenaiiah #

Shri Sushanta Kumar Basu ##

Shri Ashwani Pahuja



## COMMITTEES OF THE BOARD

### CORPORATE ADVISORY COMMITTEES

#### Research Advisory Committee

*Chairman* Shri V S Narang

#### Infrastructural Development Committee

*Chairman* Shri Mahendra Singhi

#### Administration and Finance Committee

*Chairman* Dr S Chouksey

### REGIONAL ADVISORY COMMITTEE

#### Advisory Committee for NCB-Hyderabad

*Chairman* Shri V S Narang

† Till 30 September 2014

†† Since 01 October 2014

@Till 11 September 2014

@@Since 12 September 2014

\* Till 03 February 2014

\*\*Since 04 February 2014

# Till 31 March 2014

## Since 01 April 2014

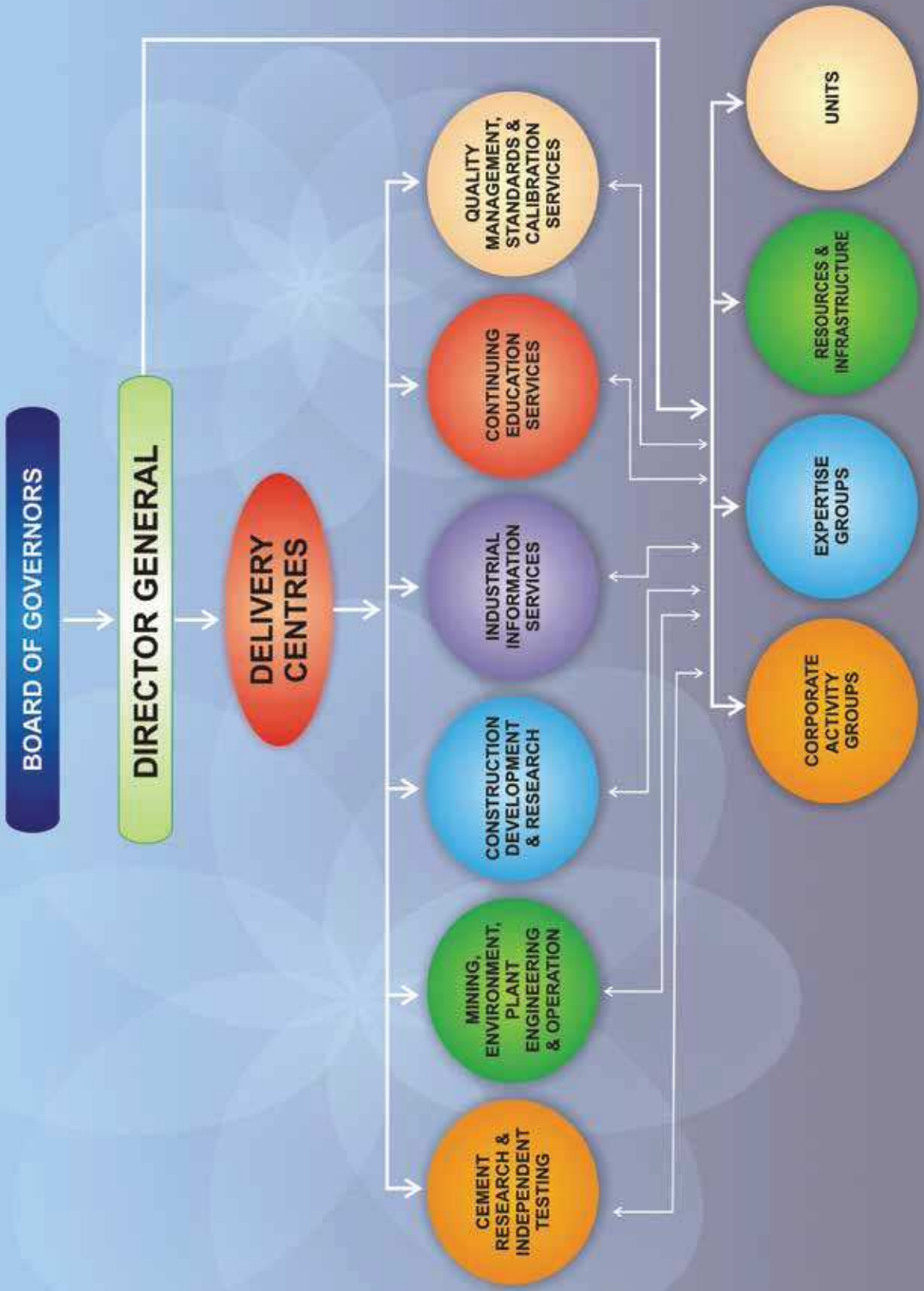
---

# Annual Report 2013 - 14

1 APRIL 2013 TO 31 MARCH 2014



**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



---

# Contents

	<b>Foreword</b>
	<b>Introduction</b>
<b>1</b>	<b>NCB's Programmes and their Fulfilment</b>
1	The Corporate Programmes
3	Framework of Institutional Efforts
<b>4</b>	<b>Centre for Cement Research &amp; Independent Testing - CRT</b>
4	Cements and Other Binders
6	Wastes Utilization
8	Refractories and Ceramics
8	Fundamental and Basic Research
10	Independent Testing
<b>11</b>	<b>Centre for Mining, Environment, Plant Engineering &amp; Operation - CME</b>
11	Geology, Mining and Raw Materials
12	Environmental Management
13	Process Optimization and Productivity
14	Energy Management
14	Plant Maintenance
14	Project Engineering and System Design
<b>16</b>	<b>Centre for Construction Development and Research - CDR</b>
16	Structural Optimization and Design
17	Structural Assessment and Rehabilitation
18	Concrete Technology
20	Construction Technology and Management
<b>21</b>	<b>Centre for Industrial Information Services - CIS</b>
21	Industrial Information and Data Bank
21	Integrated IT Solutions
22	Publications
23	Seminars and Conferences
24	Other Institutional Events
26	Participation in Seminars
28	Paper Presented in Seminars, Workshops etc
29	Papers Published
30	Important Visitors
31	International Linkages / Collaboration Programmes
<b>32</b>	<b>Centre for Continuing Education Services - CCE</b>
32	Long Term Courses
33	Short Term Refresher Courses

---

## Contents

34	Simulator Based Courses
34	Contact Training Programmes
34	Special Group Training Courses
35	Training/ Retraining of NCB Personnel
<b>36</b>	<b>Centre for Quality Management, Standards and Calibration Services - CQC</b>
36	Total Quality Management
37	Inter Laboratory Services
38	Standard Reference Materials
38	Calibration Services
<b>39</b>	<b>Patents</b>
<b>40</b>	<b>Organisational Forums</b>
40	Society
40	Board of Governors
40	Corporate Advisory Committees
44	Regional Advisory Committee
45	Executive Committee (EC)
45	Forum for Science and Technology (FST)
<b>46</b>	<b>Organisational Matters</b>
46	Staff Particulars
46	Staff Welfare
<b>47</b>	<b>Infrastructure</b>
47	NCB - Ahmedabad
47	NCB - Ballabgarh
48	NCB - Hyderabad
<b>49</b>	<b>Liaison and Co-ordination</b>
<b>Appendices</b>	
52	Appendix I - Rolling Plan of Missions within the Framework of Centres
57	Appendix II - Programmed Projects Completed during the Year 2013-14
58	Appendix III - Sponsored Projects Completed during the Year 2013-14
97	Appendix IV - Research and Development Programme 2014-15
99	Appendix V - NCB Patents in Force
<b>101</b>	<b>Finance and Accounts</b>
101	Finance
101	Accounts

---

## FOREWORD



My association with NCB runs over a number of years. I am happy to note that NCB's research programme remains aligned to national plans and R&D needs of cement and construction industries. Thus NCB is able to effectively address the issues faced by industry like expansion of raw material base, achieving energy efficiency, environmental audit, adaptation of technologies to reduce polluting emission in cement plants, quality management and human resource development.

In line with current industrial demands NCB has taken up projects in the areas of composite cements, fly ash based geopolymers cements, application of nano technology, co-generation of power, pollution control, utilization of alternate fuels/wastes in cement manufacture, concrete technology, bench marking of quality parameters etc. NCB completed 443 sponsored projects and 18 programmed projects during the year 2013-14 which reflects effective utilization of its resources. The industry continued utilizing the services of NABL accredited Test House at Ballabgarh and Hyderabad.

Some of the significant studies carried out by NCB relate to utilization of marble slurry, jarosite and aluminium wastes in cement manufacture and development of composite cements. Limestone consumption factor determination and raw mix design & optimization studies were also conducted for several plants.

NCB conducted studies on geological mapping and topographical survey for several limestone deposits in India and abroad using advanced computerized techniques. Productivity improvement of kiln, monitoring of environmental parameters, technical audits of process and quality aspects, baseline energy audit and projects engineering are other areas in which NCB's services were sought by various clients.

NCB carried out a large number of projects in the area of materials evaluation and concrete mix design, self compacting concrete mix design and petrographic studies for assessing alkali aggregate reactivity potential of aggregates. Quality audit services were provided for a large number of construction projects covering roads, flyovers and buildings.

NCB International Seminars provide a very effective forum for exchange of information and ideas and sharing innovations among the cement professionals. The 13<sup>th</sup> NCB International Seminar on Cement and Building Materials, organized in November 2013 was a grand success in achieving its objectives. The seminar and concurrent technical exhibition attracted participation from far and wide. National awards for energy efficiency, environment and quality excellence in cement industry

for the years 2011-12 and 2012-13 were given away in the concluding session of the seminar.

In the area of human resource development, NCB conducted 69 training programmes during the year benefiting 1104 participants. In the area of quality management NCB conducted 4 inter laboratory proficiency testing services and continued the supply of certified reference materials. NABL accredited Calibration services were also provided.

On the whole, NCB's performance during the year was commendable. The progress achieved by NCB as contained in this report reflects the determination of NCB's dedicated staff under the worthy leadership of the Director General, Ashwani Pahuja. The achievements and progress made by NCB are to a great extent due to the strong cooperation, encouragement and support from the government, industry and other organizations. I wish to express my sincere thanks to my colleagues on the Board of Governors and its committees for their valuable advice and guidance in decision making on various issues from time to time, and to the Department of Industrial Policy & Promotion, Govt. of India and Planning Commission for providing their support and direction.

**O P Puranmalka**  
**Chairman**

24 November 2014



---

## INTRODUCTION



While presenting the report for the year 2013-14, I feel satisfied and contented that we have been able to attract a larger number of clients looking for technological and industrial support services in various areas of our activities. With pro-active customer centric approach and the updated infrastructure facilities, we completed 443 sponsored projects apart from pursuing 18 programmed projects during the year. The projects covered all important research areas like raw mix design, utilization of industrial wastes, process optimization, energy conservation, environmental improvement, diagnostic studies on distressed structures, quality audit and human resource development.

NCB continued its efforts in the area of product diversification. Research on development of composite cements and flyash based geopolymeric cements is showing promising results. Raw mix designing and optimization services were provided to two cement plants while ten plants availed the services for establishing the limestone consumption factor. Investigations showed potential of Jarosite utilization in cement raw mix as well as a set controller, partly replacing gypsum. Aluminium waste was found suitable for use in refractory as well as in cement manufacture. Incorporation of nano-materials in cement for development of better binders is being investigated as a futuristic technology. Topographic survey and geological mapping studies were conducted for limestone deposits in India and also in Republic of Congo. A number of studies were taken up in the area of environmental management, process optimization and productivity enhancement. Baseline energy audit under PAT scheme of BEE were conducted for 14 cement sector designated consumers. Several studies in the area of plant maintenance, project engineering and system design were undertaken for various cement plants.

In the area of construction development and research, distress evaluation and condition assessment studies were conducted on a variety of structures covering heavy engineering structures like turbo-generator foundations, dam structures, bridges, cooling towers etc. A large number of projects were carried out in the areas of materials evaluation and concrete mix design and self compacting concrete mix design. High abrasive strength materials for spillway and glacis have been successfully developed for use in the down stream side of hydro electric projects. Petrographic studies for assessing alkali aggregate reactivity potential of aggregates were also conducted. Third party quality audit services were provided to a large number of construction projects covering roads, flyovers and buildings.

NCB International seminar has emerged as a singular biennial event which the cement and construction industry the world over look forward

to for exchange of information on latest technologies of their interest. The 13<sup>th</sup> NCB International Seminar on Cement and Building Materials drew overwhelming participation of about 900 delegates including 115 from overseas countries. About 120 technical papers were deliberated in 20 technical sessions. The concurrently organized Technical Exhibition, consisting of 122 stalls, gave an exposure to the latest developments in plant & machinery, related auxiliaries and services available to the cement industry and provided an opportunity for a very useful interaction among machinery manufacturers and users. A special publication titled "*Indian Cement and Construction Industry – Present Status and Future Outlook*" was also brought out jointly with CMA on this occasion.

On the human resource development activity, NCB conducted 69 training courses benefiting 1104 participants during the year. Additionally, ten contact training programmes were organized on request of industry with tailor made content. In the area of quality management, NCB completed a project on benchmarking of quality parameters in Indian cement industry. Inter-laboratory proficiency testing schemes on chemical and physical parameters of PPC and flyash were conducted as NABL accredited PT provider with participation of around 50 laboratories. NCB continued the supply of Certified Reference Materials to cement testing laboratories. Eight new CRM's were developed during the year for replenishing the stocks. NABL accredited calibration services for various equipment used in testing of cement were provided to users from industry, research institutes and equipment manufacturers.

I wish to thank my colleagues for their dedicated support and whole hearted cooperation 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.

24 November 2014

**Ashwani Pahuja**  
**Director General**

# NCB'S PROGRAMMES AND THEIR FULFILMENT

## The Corporate Programmes

*NCB is maintaining its leadership in the area of providing industrial support services to the cement, construction and other building materials industries through its proactive research programme and out reach to its stake holders. Innovative technological solutions and services were provided in the areas of optimal exploitation of limestone reserves including computer aided deposit evaluation and mine planning, optimization of raw mix design, utilization of industrial wastes, development of composite cements, application of nanotechnology, process optimization and improving productivity, energy studies, plant maintenance, total quality management, structural assessment and rehabilitation, concrete technology and quality assurance in construction.*

*Investigations continued on development of composite cements containing clinker, fly ash and granulated blast furnace slag. Studies were undertaken to optimize raw mix designs and establishing limestone consumption factor. On waste utilization aspect, scope of investigation expanded to cover various types of marble dust / slurry and multiple usage of jarosite, a waste from zinc industry. Studies indicated possibility of utilization of aluminum wastes in cement as well as refractory manufacture. Basic research on development of geopolymers cements and nanotechnology based binders continued. Geological services like topographical survey, mapping, supervision of exploration, computer aided deposit evaluation of limestone deposits were provided to cement industry in India and abroad. Technical (health) audit of limestone mines were also conducted. Towards environmental management, services like monitoring of environmental parameters in cement plants were provided. Studies have been undertaken to monitor and reduce dust emission in stone crushers also. In the areas of process optimization and productivity, studies were undertaken to improve the productivity of kilns through streamlining of process parameters. Heat and gas balance studies conducted on several plants indicated significant scope of reducing the heat consumption. Technical audit covering process and quality aspects of cement kiln was also conducted. Baseline energy audits under Perform Achieve and Trade (PAT) scheme of BEE were carried out in a number of cement sector designated consumers. Under plant maintenance programme, technical audits covering mechanical, electrical and instrumentation aspects were conducted in a number of cement plants. Study on technical appraisal and recommendation for setting up a cement plant in Congo was also under taken.*

*Studies continued on development of methods for service life design of concrete structural members. In an innovative study NCB recommended the use of specific monitoring / inspection equipment inside a hydro tunnel for long term condition monitoring. Services to construction*

*industry included studies on condition assessment of concrete structures to determine the cause and extent of distress for repair and rehabilitation. NCB continued to provide quality audit services for construction projects. Evaluation of materials and concrete mix design studies were also carried out for the construction industry. In the area of quality management, a project on bench marking of quality parameters in Indian cement industry was completed. NCB achieved NABL accreditation as proficiency testing service provider and continued to conduct PT programmes on different materials. Services like supply of reference materials, training, testing and calibration were continued. The 13<sup>th</sup> NCB International Seminar on Cement and Building Materials conducted during the year attracted much larger participation in terms of delegates, papers presented and exhibitors.*

*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.*



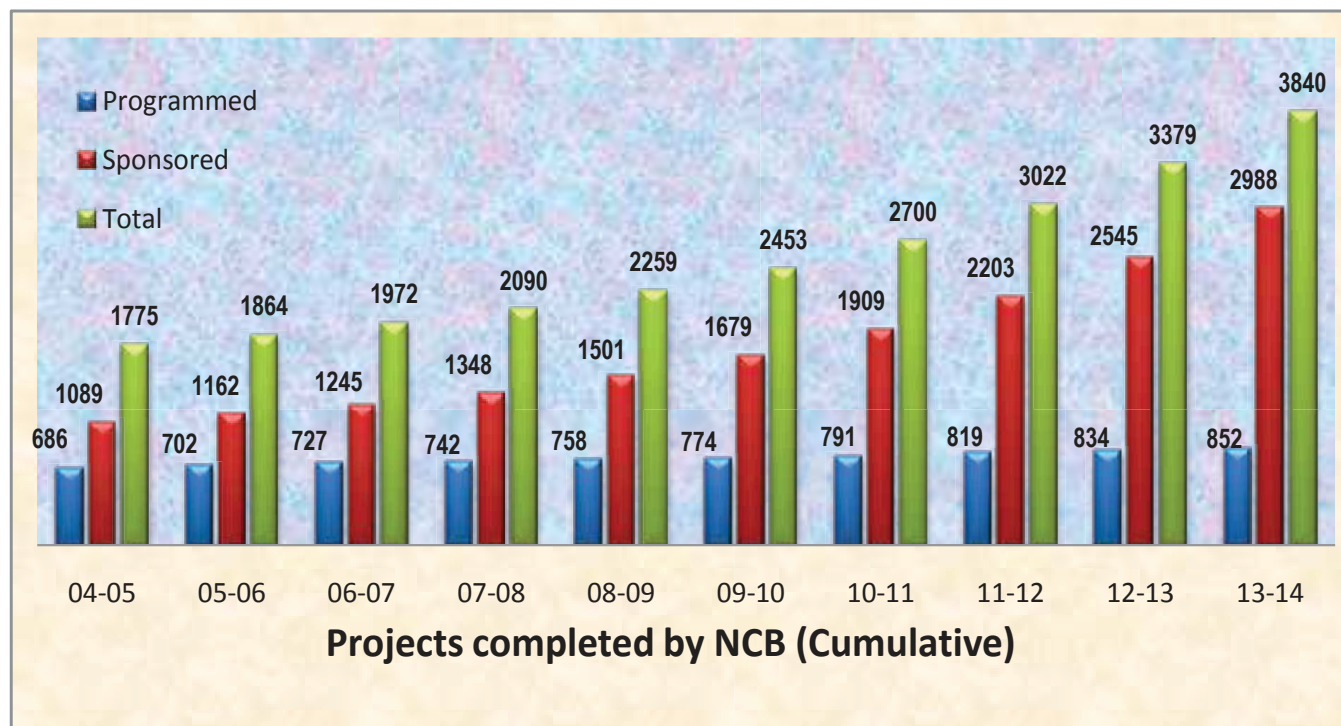
104<sup>th</sup> Board of Governors Meeting in progress at New Delhi

## 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, 18 programmed and 443 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 2014-15, as given in Appendix IV.*

*The broad activities carried out by the six Corporate Centres during 2013-14 are highlighted in the following sections.*





# CENTRE FOR CEMENT RESEARCH AND INDEPENDENT TESTING - CRT

*The Centre executes its activities through five programmes viz. Cements and Other Binders; Wastes Utilization; Refractories and Ceramics; Fundamental and Basic Research and Independent Testing. One Programmed Project & Thirty six Sponsored Projects were completed and four Programmed Projects were pursued during the year.*

## **Cements and Other Binders**

### **Development of Composite Cements**

A state of art report has been prepared covering developments on composite cements. Investigations have been taken up on composite cement blends prepared using industrial clinker, fly ash, ground granulated blast furnace slag (GGBFS) and gypsum samples obtained from two different sources. First set of cement blends containing OPC clinker (40-60 %) with different dosages of fly ash and GGBFS (35-55%) in various combinations have been prepared and are being evaluated for their physical properties such as fineness, setting time, compressive strength, soundness, sulphate expansion and heat of hydration as per test procedures specified in relevant Indian Standard.

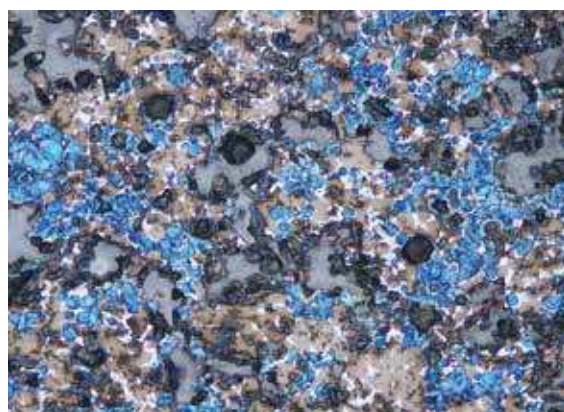
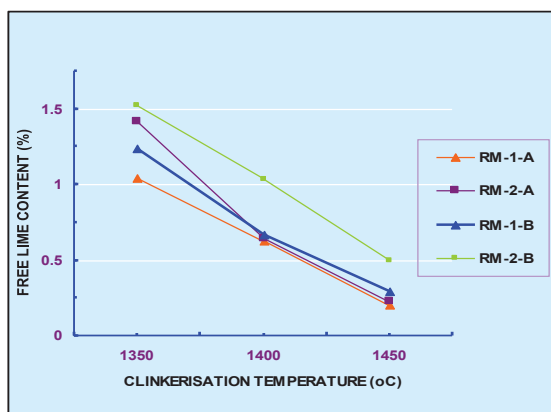
### **Establishing Limestone Consumption Factor (LCF)**

LCF studies are very important from the point of view of rationalization of limestone consumption in production of cement, estimating royalty payable to state for the limestone mined from their respective captive mines besides internal material audit of the concerned cement plants. NCB has been carrying out Limestone Consumption Factor (LCF) study for cement plants all over India and has established the same for 162 cement plants so far. During the year, LCF studies were completed for 10 cement plants from Andhra Pradesh, Gujarat, Madhya Pradesh and Rajasthan.

### **Optimization Studies on Raw Mix Designing**

Studies were taken up on optimization of raw mix designs for making clinker for 53 grade OPC for two upcoming green field projects. Samples of raw materials provided were characterized and two sets of raw mixes were designed with two ROM limestone having different CaO content. In one set both the ROM limestones were used and in second set ROM limestone having high CaO content was used. Burnability studies were carried out and one raw mix for each set was optimized. The physical performance evaluation of OPC samples produced from the optimized raw mixes was found to meet all the requirements of 53 grade OPC as per Indian Standard Specifications IS: 12269-2013.

Similarly an optimization study of raw mix design was carried out for improving the quality of clinker of a major cement plant. Based on analysis of plant samples, raw mixes were prepared at two fineness levels and burnability carried out as shown below. The physical performance was evaluated for OPC samples produced from the bulk clinker. The microstructure of the same is also shown below. The properties of cement were found to meet all the requirements of 53 grade OPC as per Indian Standard Specifications IS: 12269-2013.

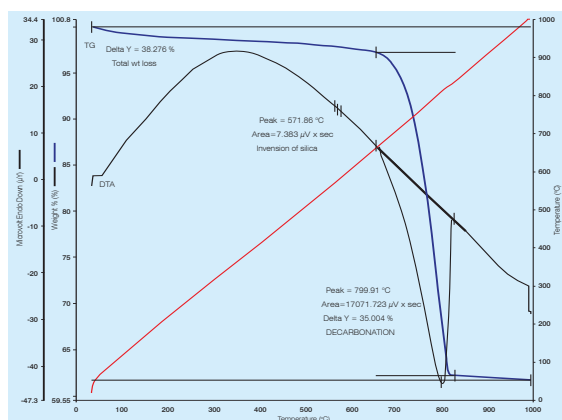


Burnability Studies Curves at Different Fineness Levels

Optical Micrograph of Clinker from optimized Raw Mix

## Characterization and Evaluation of Raw Materials, Fuel and Clinker from Cement Plant

A project involving complete physico-chemical, mineralogical and thermal characterization along with trace element analysis by inductively coupled plasma spectrophotometer (ICP) was carried out for different samples of limestone and additives from a major cement plant. All the samples of limestone were found to contain elements such as barium, chromium, manganese, nickel, copper and strontium. Similarly, all additive samples were found to contain barium, copper and strontium except in iron ore and iron sludge. Chromium and nickel was present in samples of aluminous clay and basalt. Studies were taken up on analyzing the effect of minor and trace elements in clinker formation. The thermal analysis of limestone and micro-structural feature of a basalt sample are shown below.



Thermographs of Limestone Samples



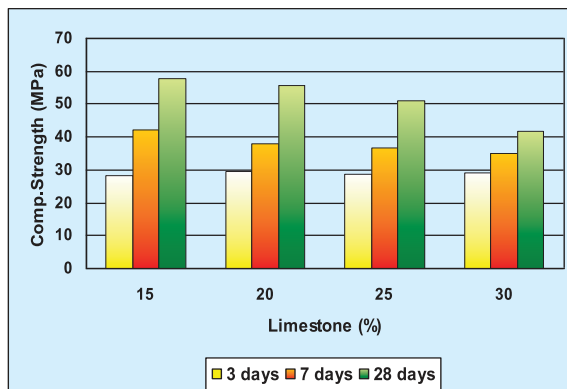
Optical Micrograph of Basalt Sample showing distribution of different mineral phases

## Wastes Utilization

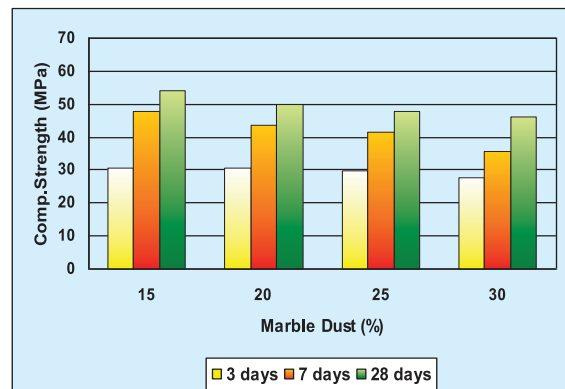
### Investigations on utilization of Marble Slurry/Dust as alternate to Limestone in Cement Manufacture

The amount of marble slurry generated as byproduct in the state of Rajasthan every year is in the range of 5 to 6 million tonnes. Chemical analysis of marble dust samples arranged from different marble clusters of Rajasthan showed wide variation in their oxide constituents such as CaO:30.17-44%, SiO<sub>2</sub>:5-16%, MgO:1-21% etc. The investigations on their use indicated that:

- Addition of 5% marble dust containing as low as 54% CaCO<sub>3</sub> as mineral additive in OPC showed physical performance comparable to OPC containing 5% limestone permitted to be used as performance improver by Bureau of Indian Standards.
- Portland Limestone Cement (PLC) samples prepared by blending of 15, 20, 25 and 30% marble dust with ordinary Portland cement showed marginally improved compressive strength development at early ages as compared to their counterparts' prepared using limestone as shown below.



PLC with limestone

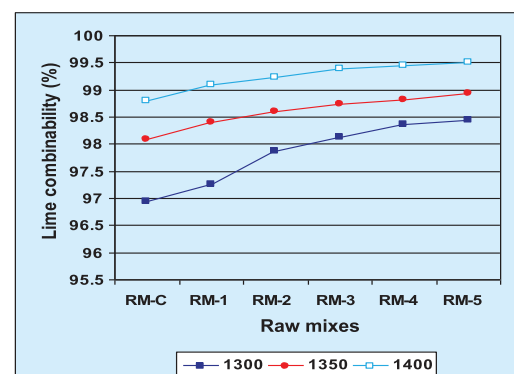


PLC with marble dust

Performance evaluation of PLC Samples prepared by blending with different doses of marble dust & limestone

### Mineralizing effect of Zinc Industry by-product 'Jarosite' in Cement Manufacture

In the study carried out, presence of mineral phases bearing Fe, S, Na, K and Zn in jarosite, showed its suitability for use as mineralizer in development of clinker mineral phases. Different cement raw mixes were designed incorporating various doses of jarosite maintaining clinker parameters comparable to OPC clinker. Burnability studies showed the mineralizing effect of jarosite in terms of rapid lime



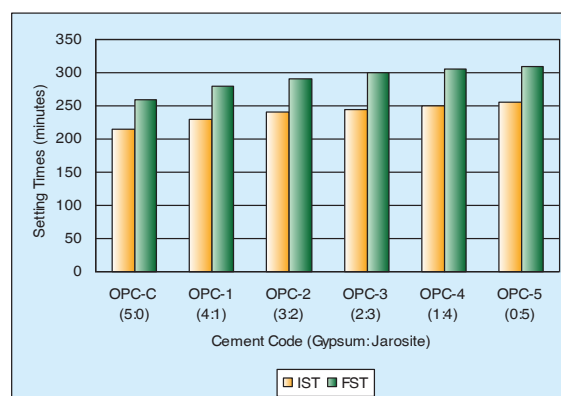
Lime combinability of cement raw mixes containing Different doses of Jarosite at 1300, 1350 and 1400 °C



assimilation as shown in figure and improved clinker mineral phase formation as compared to control mix prepared without using jarosite. The optimum clinkerization temperature could be reduced by  $\sim 50$  °C. The physical characteristics of cement sample prepared with 1.5 wt.% optimized dose of jarosite showed 18-25% increase in compressive strength development at early ages as compared to control cement.

### Investigations on the use of Jarosite as Set Controller in Cement

In cement manufacture, mineral gypsum is used in the range of 2.5-3.5% for regulating the setting of cement. This is achieved by changing the course of hydration of calcium aluminate phase through  $\text{SO}_3$  ions. In Jarosite, the predominance of sulphate bearing mineral phases such as natrojarosite, anhydrite and bassenite was considered as potential constituent for regulating cement setting and therefore, investigations were carried out by preparing different cement samples using plant clinker and 5% of jarosite and mixes of jarosite and mineral gypsum. In the mixes, the mineral gypsum was decreased from 4 to 1% by mass. The evaluation of above cement samples showed its suitability to regulate the setting of cement by partially/fully replacing conventional mineral gypsum as shown in the figure without adversely affecting the cement properties.



Setting behaviour of laboratory prepared OPC samples

### Characterization of Fly Ash samples form NTPC

Investigations were taken up on characterization of fly ash samples from NTPC Thermal Power plants located at Vindhyanager, Distt. Singrauli (Madhya Pradesh) and Ramagundam (Andhra Pradesh), for parameters mentioned in Indian Standard Specifications IS:3812 (Part-I)-2013. The test results indicated their conformance with respect to specified limits. The lime reactivity and pozzolana reactivity index values determined for most of the fly ash samples indicated their suitability for using in the manufacture of Portland Pozzolana Cement.

### Evaluation of Overburden from Limestone Mines as Coarse Aggregate

Investigations were carried out on evaluation of samples of overburden stone from the limestone mine of a cement plant for their utilization as aggregate in cement concrete. The studies indicated the suitability of overburden stone for production of coarse aggregates conforming to the requirements of IS:383-1970.

## Refractories and Ceramics

### **Investigations on Suitability of Aluminium Wastes for use in Refractories and Cement Manufacture**

Aluminium waste is generated in the course of making aluminium alloys by melting aluminium scrap in furnace. Studies were taken up on use of aluminium wastes in the manufacture of refractories and cement. Investigations showed that by the addition of definite proportions of aluminium wastes upto 10 percent by weight of waste could be used as refractory raw material replacing the alumina bearing grog fines to produce adequate quality refractory bricks as shown in figure. Similarly upto 0.7 percent of this material could be gainfully utilized as raw material as a replacement of alumina bearing additive in making cement.

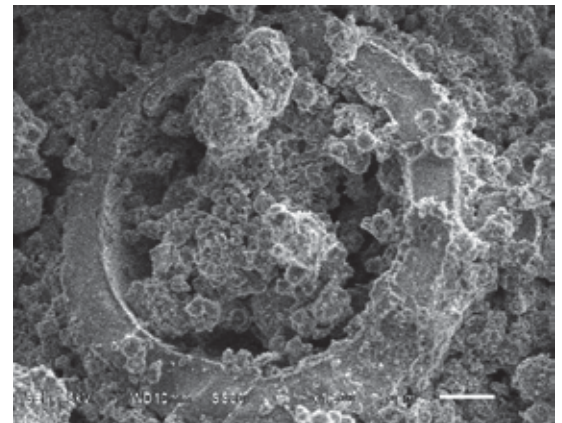
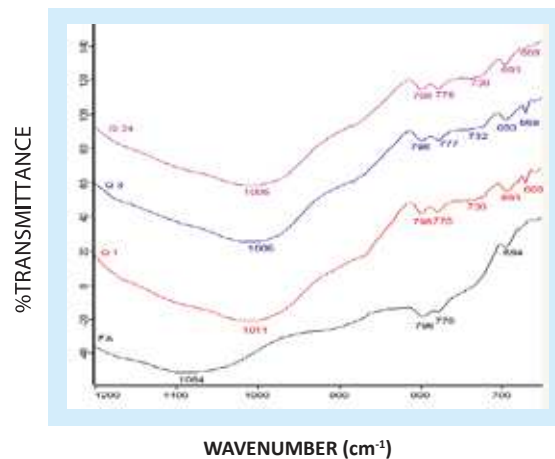


**Photograph showing the fired Refractory Bricks manufactured using Alumina Waste**

## Fundamental and Basic Research

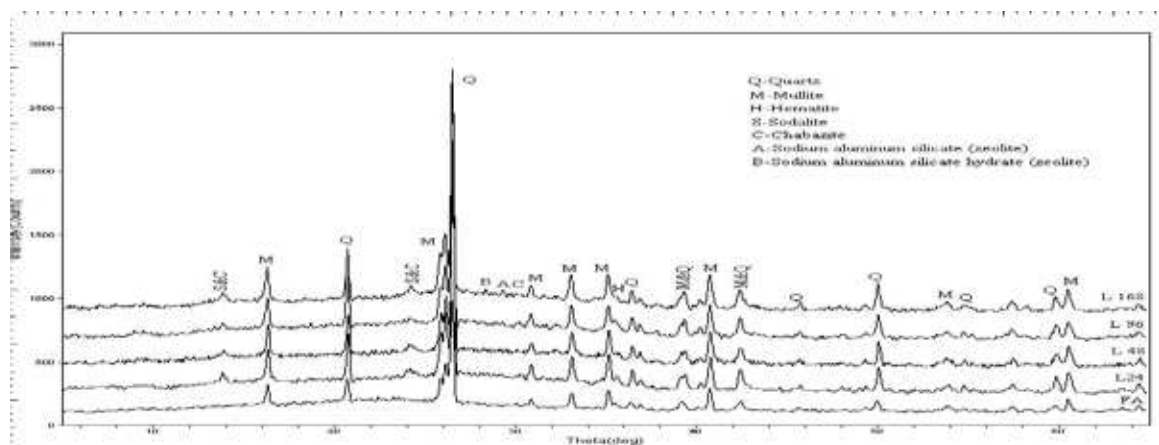
### **Investigations on Fly Ash based Geopolymeric Cements**

Investigations were taken up on formation of geopolymeric cements by alkali activation of low lime fly ash, initially cured at 60 °C and 90 °C for varying retention periods and afterwards under ambient temperature and at about 50 percent relative humidity (RH). Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction analysis (XRD) along with Scanning electron microscopy (SEM) confirmed the formation of geopolymers at both the temperatures. It was found that the initial rate of strength development was faster at 90 °C than at 60 °C. The product which gained more strength due to aggressive initial thermal curing showed retrogression in strength at later ages. SEM studies indicated the microstructural changes affecting strength development in the products. XRD studies of the products obtained after thermal curing showed transformation of some gel to crystalline zeolites in the samples. Specimens cured at 90 °C also showed some dimensional instability. However, drying shrinkage observed was under permissible limits in the products cured initially at 60 °C.



IR Spectra of fly ash and alkali treated fly ash cured at 90°C for 90 min (Q1), 180 min (Q3) and 24 hours (Q24).

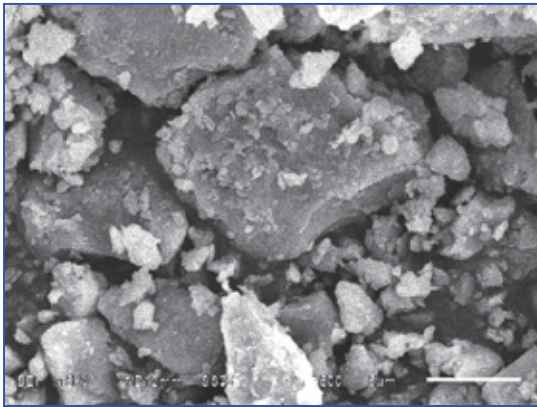
SEM image of alkali treated fly ash specimen cured at 90°C for 24 hours



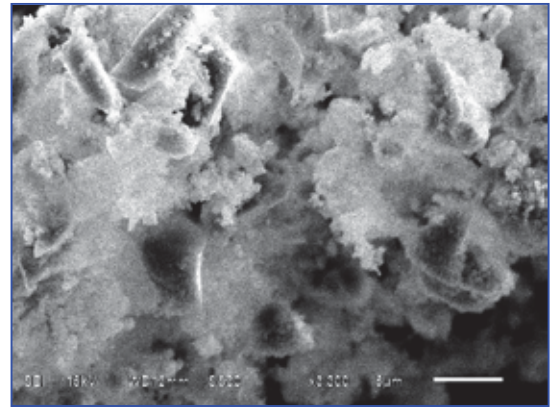
X-ray Diffractogram of fly ash (FA) and alkali treated fly ash thermally cured for different periods

## Development of Cements and Binders based on Nanotechnology

Investigations on nanoparticle blended cements and cement based nano-composites have been taken up. Blends of OPC were prepared with different nanoparticles in the size range of 15-50 nm, viz. nano silica, nano- $\text{Fe}_2\text{O}_3$  and nano- $\text{TiO}_2$  and investigations on hydration chemistry of the blends undertaken. The blends were prepared using 3-5% of nanoparticles replacing equal quantity of OPC. SEM, DTA, XRD & IR spectroscopy investigations of hydrated samples of OPC & OPC nano silica blends were carried out. Nanoparticles of silica were found to accelerate the cement hydration even at very early ages resulting in significantly shorter setting times. The scanning electron micrographs of OPC and 'OPC-5% nanosilica blend', after 70 minute hydration are shown herein. The micrographs show a more extensive formation of hydration products in case of 'OPC-nanosilica' blend. Nano particles of silica also exhibited pozzolanic reaction at very early ages of 1 day as indicated by DTA, FTIR, and XRD studies.



(A) OPC



(B) OPC-Nanosilica Blend

SEM of OPC and 'OPC-nanosilica blend' after 70 minute hydration

## 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.

The laboratories were established in 1977 on a Test House pattern and undertake testing jobs for cement, construction and allied industries. 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. Assignment were carried out for Bangladesh, Pakistan, Sri Lanka, Nepal, Bhutan, Dubai, UAE, and Tanzania during the year. The number of samples tested during the period is about 7775.

# CENTRE FOR MINING, ENVIRONMENT, PLANT ENGINEERING AND 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 19 sponsored projects during the year.*

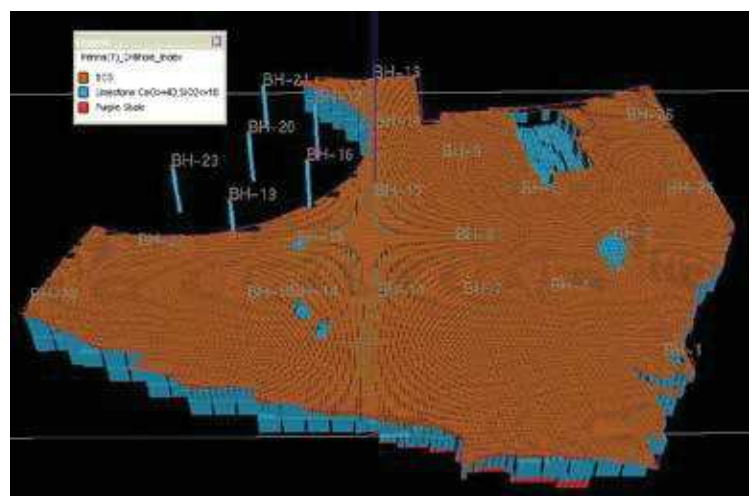
## Geology, Mining and Raw Materials

The total limestone reserves of all categories is estimated at 123829.53 million tonnes as on 31st March 2014 under the activity 'Updation of National Inventory of Cement Grade Limestone Deposits in India'. Interaction / consultation for limestone investigation / exploration data from various organizations of Central and State Governments and Indian cement industry has been carried out.

Survey, Geological Mapping and Supervision of Exploration, Computer Aided Deposit Evaluation of Limestone Deposit of M/s Penna Cement Industries Limited (PCIL) at Ogipur, Tandur Mandal, Ranga Reddy (Dist) Andhra Pradesh, limited to 2 sq. km area and drilling up to 2000 m to evaluate the limestone deposit qualitatively and quantitatively has been carried out for setting up a 1.00 MT cement plant.

Topographical Survey and Geological mapping have been carried out in the ML area. Subsequently the Geological Map has been prepared on 1:2000 scale at 1 m contour interval under the supervision of NCB. The detailed geological exploration through diamond core borehole drilling of 24 boreholes in grid pattern of 200m x 400m with total meterage of 728.86 m has been carried out in the Mining Lease area under the supervision of NCB experts. Meter wise core samples were analyzed.

The computer aided deposit evaluation of the deposit has been carried out through DATAMINE software. The 3-D solid ore body block model has been



**3-D Geological Model of Ogipur Limestone Deposit showing Black Cotton Soil, Limestone and Shale**

created for Soil, Limestone and Shale within ultimate pit limit. The wire frame solid body for limestone was filled with parent mining block cells of 50m x 50m x 8m. Grade has been estimated using Inverse Square Distance method. The grade and reserves are estimated for Limestone based on the range of CaO% parameter at 2% interval. The tonnage conversion factor for limestone of all categories has been taken as 2.5 for estimation of reserves and for soil it is taken as 14.

The total reserves of Limestone of Ogipur Limestone Deposit within the UPL (1.62 Sq. Km) is estimated at 80.24 million tonnes from 5 benches of 8m height each.

Technical (Health) Audit of Mining Aspects of M/s Ambuja Cement Ltd., Bhatapara. Site visit made and conducted technical (health) audit in the areas of drilling & blasting, loading, transportation to crusher plant, safety devices and methods adopted, haulage roads, maintenance works, illumination survey etc. Report submitted and discussed with the mine officials for implementation.

NCB geologist visited the limestone deposit area near Mafoubou village, approximately 20 km from Dolisie, Niari Department, Republic of Congo for geological investigation for the suitability of limestone qualitatively and quantitatively for setting up of a 600 TPD capacity cement plant near Dolisie. Limestone samples have been collected during the field traverse taken in 0.5 sq. km. area of the deposit and chemically analysed. It is observed that the preliminary investigation indicates that limestone is suitable for cement manufacture. Detailed exploration and deposit evaluation of the deposit is recommended.

Raw Material Prefeasibility report for setting up a 1000 tpd white cement plant in Nauradhar, Sirmaur, H.P. for M/s FCI Aravali Gypsum and Minerals India Ltd. (FAGMIL) has been carried out by site visit, collection of limestone samples, analysis and interpretation. Project report has been submitted.

## Environmental Management

*'Study on dust emission levels and available technologies for reducing the dust emission at stone crushers'* was completed. Literature survey carried out on pollution level and dust control devices used at stone crushers. Data format designed and distributed to stone crusher units in various states. 12 Stone Crusher units in 4 different zones viz., Dindigul Dist. of Tamilnadu in South, Goa in West, Faridabad of Haryana in North and Pakur of Jharkhand in East were monitored for Ambient/Fugitive Dust.

*'Monitoring of Environmental Parameters at M/s JK White Cement Works and M/s JK Cement Works, Gotan, Rajasthan'* was completed after monitoring various environmental parameters like Ambient Air Quality, Ground Water Quality in and around the plant, ambient noise level and noise level at plant machineries, source emission during two phases viz., January & June 2013. Submitted the report for each phase of monitoring individually.

*'Generation of Background Environmental Data at M/s JK White Cement Works and M/s JK Cement Works, Gotan, Rajasthan'* has been taken up. Ambient Air Quality with in 10 km radius of the plant will be monitored during three different seasons.

*Monitoring of Environmental Parameters at M/s JK White Cement Works and M/s JK Cement Works, Gotan, Rajasthan* has been 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, source emission to be monitored during two phases viz., January & May 2014. First phase monitoring completed during January 2014 and submitted the report.



**Environmental Monitoring at M/s J K White Cement Works**

## Process Optimization and Productivity

*Improving the productivity of kiln through streamlining operating and process parameters:*

- Study was carried out in Andhra Pradesh and recommendations such as increasing silo filling, changing silo extraction pattern, flame adjustment etc were given. The implementation of NCB recommendation resulted in increased clinker production from 5000 tpd to 5500 tpd with simultaneous improvement in clinker quality.

*Heat & Gas Balance on Kiln:*

- Heat balance was carried out for one kiln in Gujarat, and two kilns in Andhra Pradesh. The specific heat consumption of Gujarat kiln was found to be 762.8 kcal/kg clinker while that for one kiln in Andhra Pradesh was 747.8 kcal/kg clinker and for the other kiln in Andhra Pradesh was 698.4 kcal/kg clinker. Potential savings of 32 kcal/kg clinker for plant in Gujarat, 37 kcal/kg clinker for 1st plant and 32.1 kcal/kg clinker for 2nd plant in Andhra Pradesh was indicated.

*Technical Audit:*

- Technical Audit covering Process & Quality Aspects of a cement kiln of 6000 tpd was carried out for improving the plant's energy performance besides making the plant  $\text{NO}_x$  compliant and reducing the clinker factor for cement.
- NCB suggestions for reducing  $\text{NO}_x$  were taking out the SLC string of pH and converting this into ILC besides use of low  $\text{NO}_x$  burner and calciner.
- NCB also suggested optimization of cement mill and separator for controlling the residue on 45  $\mu\text{m}$  so as to reduce the clinker factor besides reducing energy consumption.

## Energy Management

A project on 'Baseline Energy Audit under Perform Achieve & Trade (PAT) Scheme of BEE' was carried out for Bureau of Energy Efficiency (BEE), New Delhi, under the Energy Conservation Act-2001. The baseline energy audit was carried out for 14 cement sector designated consumers. A study on PAT advisory Services was carried out for M/s Malabar Cements Ltd.

## Plant Maintenance

Studies on Technical (Health) Audit covering Mechanical aspects, Electrical & Instrumentation aspects and Process & Quality aspects were taken up in a major cement plant of 3750 TPD located in Gujarat. Various recommendations were given for improvements based on NCB's assessment made from capacity utilization and breakdown analysis of various core equipment, condition monitoring practices adopted by the plant, study on operational health of various electrical systems to identify the causes of previous failures as well as technical audit of process and operating parameters to narrow down the ranges and optimize the performance of core equipment.



**View of Aggressive Scoring Developed on the down hill side of the Thrust Roller of Kiln - 1**

## Project Engineering and System Design

For the R&D project to develop system design for storage, handling and firing of different types of alternative fuels/wastes in cement plants, identification of best practices on waste alternative fuels is in progress. Studies on handling and storage of shredded tyres, ETP sludge organic waste and spent wash has been carried out and, handling, storage of waste oils and waste paints is in progress.

### *Work Study on Manpower*

M/s Malabar Cements Ltd. (MCL) sponsored a project on work study on manpower. NCB officials visited the plant site at Walayar to collect data on manpower and carry out discussions with the plant officials. A report was submitted to MCL which covered all the sections of the cement plant (administrative, technical and non-technical staff).



***Technical Health Audit of CCI mills at Delhi Grinding Unit which are for disposal***

M/s Malabar Cements Ltd. (MCL) sponsored a project to carry out Technical Health Audit of CCI mills at Delhi Grinding Unit marked for disposal. NCB officials visited the grinding unit at Okhla along with MCL officials to carry out the audit. A report was prepared and submitted to MCL containing the technical and financial evaluation of the ball mill (which was for disposal).

***Preparation of pre-feasibility report for setting up 0.6 mtpa Bulk Cement Terminal (BCT) at Cochin port***

M/s Malabar Cements Ltd. (MCL) sponsored a project to carry out a study for setting up 0.6 mtpa BCT at Cochin Port. NCB officials visited Cochin Port and later to the cement plant to collect relevant data and discussions with MCL as well as the Port Trust officials.

***Preparation of bench marking reports for cement projects (green & brown field) & cement grinding units of various capacities (with & without CPP)***

A benchmarking study was carried out for M/s IPICOL (Industrial Promotion and Investment Corporation of Odisha Limited), Odisha in which land, water, power and other infrastructure required for setting up cement plants and cement grinding units of various capacities was studied.

NCB team visited one cement plant and two cement grinding units in Odisha and one cement plant in Rajasthan along with IPICOL officials to carry out the study. It was concluded that the infrastructure required for setting up cement plants and cement grinding units varies on case to case basis depending on various factors and scenarios like terrain, availability of raw material, transportation and logistics etc.

***Preparation of pre-feasibility report for setting up a 1000 TPD white cement plant at Nauradhar, Sirmour (H.P.)***

M/s FAGMIL (Fci Aravalli Gypsum Mineral India Limited) sponsored a project on pre-feasibility report for setting up a 1000 TPD white cement plant at Nauradhar, Sirmour (H.P.). NCB officials visited the proposed plant site along with FAGMIL officials to collect relevant data and carry out discussions. Preliminary report suggests that the project is feasible. However, as a big stretch of flat land might not be available in hilly terrain, FAGMIL can opt for setting up various sections of cement plant at different levels.

***Technical Appraisal and recommendations for setting up of the proposed 600 tpd cement plant in the Republic of Congo***

The Embassy of Republic of Congo sponsored a project for Technical Appraisal and recommendations for setting up of the proposed 600 tpd cement plant in the Republic of Congo. NCB team visited the proposed site, Mafoubou (near Dolisie) for survey and data collections. After assessing the data provided by the Embassy of ROC and Ministry of External Affairs, it was concluded that the project is technically feasible and economically viable.



## 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 385 Sponsored Projects during the year.*

### Structural Optimization and Design

#### **Development of Methods for Service Life Design of Concrete Structures**

The aim of service life design is “to achieve an acceptable probability that the structure being designed will perform satisfactorily during its intended life”. The main objective of the study is to develop techniques/methods to determine/predict service life of concrete structures. The study include analyzing the deterioration mechanism of RCC structures such as Carbonation and Chloride induced corrosion for different environmental conditions and providing necessary remedial measures. While studying the effect of carbonation and chlorides, both OPC and PPC cement of different grades/types with different w/c ratios are being used. Correlation will be developed on the basis of laboratory studies of chloride diffusion and accelerated carbonation with the actual chloride ingress and actual carbonation respectively under different environmental conditions. Various tests like RCPT (Rapid Chloride Penetration Test), NT Build 492 (Chloride Migration Test), compressive strength, air permeability, water permeability and electrical resistivity have been conducted on concrete with different w/c ratios. Accelerated carbonation test and chloride diffusion (unidirectional) tests are in progress. Chloride diffusion coefficient for different w/c ratios have been worked out for PPC cement and results will be compared with the results of OPC and Slag cement. Correlation between chloride diffusion coefficient and results of other durability tests mentioned above are being analyzed. Few field studies were also carried out on the structures located in different parts of the country and more field studies are in progress. Based on field studies on carbonation carried out, correlation between carbonation rates and grade of concrete (made with OPC) has been worked out for hot and dry environment of northern part of our country ( except for hilly areas).

#### **Study on installation of suitable monitoring /inspection equipment inside lined water conducting system to monitor the performance of lining without dewatering**

Looking forward towards the need of instrumentation inside the hydro tunnel for the long term monitoring, NCB conducted a detailed study for SJVN Ltd and came out with

guidelines for instrumentation of tunnels for long term monitoring of concrete lining of hydro tunnels. These guidelines can act as a powerful tool for the structural assessment of hydro tunnel without dewatering if implemented judiciously. The guidelines prepared by NCB not only thrust upon the type of instruments that could be embedded inside the concrete lining but also throws light regarding installation and positioning of these instruments along with due importance given on the part of durability /longevity of these instruments covering latest technology on use of optical fibre also.

## **Structural Assessment and Rehabilitation**

Distress Evaluation & Condition Assessment studies on variety of structures covering heavy engineering structures such as Turbo Generator (TG) foundations, Dam Structure, Natural Draft Cooling Tower (NDCT), Bridges etc., as well as different residential & commercial buildings and RCC conduit/ pipeline projects have been successfully completed in different states in India.

The above assignments were taken up as sponsored R&D assignments. The departments included Gas Authority of India Ltd. (Agartala, Tripura), Indian Oil Corp. Ltd. (Rajkot, Gujarat), Central Public Works Deptt. (Delhi-NCR), Military Engg. Services (Pathankot, Punjab), MTNL (Delhi), Delhi Development Authority (Dwarka, Delhi), Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd. (Anpara, Uttar Pradesh), Damodar Valley Corp. (Kolkata, West Bengal), Bihar Rajya Pul Nirman Nigam Ltd. (Bihar), Satluj Jal Vidyut Nigam (Himachal Pradesh), Ratnagiri Gas Power Pvt. Ltd., Ratnagiri (Maharashtra) & Uttar Pradesh Jal Nigam, Muradnagar (Uttar Pradesh). Quality Assessment of hardened concrete in TG Deck slab has been completed for NTPC Limited, Kanti Bijli Utpadan Nigam Ltd. (Bihar) & Jaypee Power Ventures Ltd. (Eastern Uttar Pradesh).

In general the NCB's expertise on structural evaluation covering visual observation, Non Destructive Evaluation (NDE) techniques, Core testing & Chemical Analysis of Hardened concrete has been utilized. Recommendations on State-of-the-art repair materials & implementation techniques for repair & rehabilitation/restoration of distressed RCC



**Extraction of Concrete core Samples from Bridge Deck**



**Reinforcement location and cover thickness being assessed by Ferro Scanning Technique**



Carbonation depth being measured on extracted concrete core sample



Crack width being assessed on RCC Column of TG Foundation by using Crackoscope



UPV Testing being done on RCC Wall of Well at Sewage Treatment Plant

structures, including preparation of Specifications, Cost Estimates & Bill of Quantities were also covered.

Specific assignment which included assessment and rehabilitation works included (a) STE-21 building & 2 Nos RCC Bridges for MES Pathankot (Punjab) (b) RCC Columns of TG Deck Unit # 1 of Anpara Thermal Power Station, Anpara (Uttar Pradesh), (c) Cooling Tower at RGPPL, Ratnagiri (Maharashtra) & (d) 25.47 km long RCC conduit carrying 200 cusec of Ganga Water from Ghaziabad to Delhi for UP Jal Nigam (Uttar Pradesh).

In addition to the above, prestigious R&D project covering Performance study of Steel Fibre Reinforced Shotcrete (SFRS) lining in desilting chambers of *Nathpa Jhakri Hydro Power Station* (1500MW) for Sutlej Jal Vidyut Nigam (SJVN) was also completed.

## Concrete Technology

### **Materials Evaluation & Mix Design**

Testing & evaluation of materials like cement, water, fine aggregate, coarse aggregate, chemical and mineral admixtures and concrete mix designs for various grades were carried out for various structures of thermal power projects like TG Deck, Cooling Towers, Chimneys and other allied structures of NTPC. Testing and material evaluation study was also carried out for different Hydro projects like Kiru-Kwar HE project in J&K for NHPC and Lata Tapovan HE Project in Uttarakhand for NTPC in the year 2013-14. More than 260 concrete mix designs of various grades up to M80 were also carried out for various important structures of CPWD, PWD, DDA, Delhi Jal Board, DSIIDC and also for RMC suppliers in National Capital Region and more than 15 brands of chemical admixtures were tested as per codal provisions of IS: 9103-1999.

### **Petrographic Analysis and Alkali Aggregate Reaction (AAR) Study of Aggregates**

Petrographic analysis and alkali aggregate reaction study which includes both alkali silica reaction and alkali carbonate reaction were carried out on different fine and coarse

aggregates by conducting accelerated mortar bar testing as per ASTM C-1260 and long term testing like mortar bar testing as per IS: 2386 (Part-7) and concrete prism test as per ASTM C-1293 & 1105 for various hydro and thermal projects.

### Development of High Abrasive Strength Materials for Spillway & Glacis

R&D study for NHPC covering engineering properties of High Performance M80 Grade Steel Fibre Reinforced Concrete having unique abrasion & toughness to over come the heavy damage associated with the RCC structures on the downstream side of the Hydro Electric Projects in India has been carried out successfully. This included aggregate grading optimization, PCE grade super plasticizer testing, optimization of concrete mix of M80 grade using silica fumes, steel fibres and polypropylene fibres and testing for compressive strength, flexural strength, toughness, tensile strength and abrasion resistance to achieve most economical mix for potential use in hydraulic structures i.e spillways and glacis. In addition to this, microscopy & petrography analysis, X-ray diffraction studies & permeability testing were also carried out.

### Self Compacting Concrete

Several mix designs of self compacting concrete were carried out for PWD & DDA, with grades varying from M25 to M50 using flyash, silica fume etc.



Self Compacting Concrete



Creep Testing of High Strength Concrete

### Various mix designs carried out in year 2013-14:

Grade	M10&15	M20	M25	M30	M35	M40	M50	M60	M80
Nos.	8	10	132	22	33	18	15	3	6

### Testing of creep of concrete

Testing for creep strain of M70 and M100 grade concrete at 90 days and 180 days including supervision during casting of sample at site was carried out for a multistory residential tower at Mumbai.

## Construction Technology and Management



Inspection of Concreting of Pre-cast Spine Segment of Flyover Project at Viaspuri, Delhi

Third Party Inspection and Quality Assurance (TPIQA) was carried out for some of the bridges and road construction projects of Public Works Department, very large number of road, building and concrete drain projects of Municipal Corporation of Delhi (MCD) & Delhi urban shelter Improvement Board. TPIQA involved quality assurance & 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 as per IS, IRC, MORTH specification & Technical Specification of CPWD. Apart from checking the samples as per contractual obligation, performance testing of RCC structures using non-destructive testing in the field (i.e. Rebound Hammer Testing, UPV Testing & Core 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, spine & wing segment, ROB segmental construction deck slab, installation

of bearings, expansion joints in case of rigid and flexible pavements, retaining walls, diaphragm walls, RE walls, sump wells and school buildings.

NCB team also visited the manufacturing workshops to witness the testing of bearing, sheathing duct and expansion joints related to construction projects.



MCD Road Work at Okhla, Delhi

## 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. Besides other facilities the Centre consists of 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 46,398 documents. The library has a bibliographic database consisting of about 40,325 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
<ul style="list-style-type: none"> <li>Construction Industry Development Council (CIDC), New Delhi</li> <li>Indian Roads Congress (IRC), New Delhi</li> <li>Indian Mining &amp; Engineering JI, Bhubaneswar</li> <li>Materials Research Society of India, Bengaluru</li> </ul>	<ul style="list-style-type: none"> <li>The American Concrete Institute (ACI), USA</li> <li>The Concrete Society, UK</li> <li>Precast/ Prestressed Concrete Institute (PCI), USA</li> </ul>

### Integrated IT Solutions

NCB continued modernizing its IT infrastructure with MS windows 7 based PCs (4C/4T) and laptops. All new Windows deployments were done using Backup Exec based Windows Deployment Services. Adoption of Symantec Enterprise Protection Suite 4.0 implemented in Ballabgarh & Hyderabad Units is a huge success. PC machines and Data are intact.

Virtualisation has graduated to ESXi 5.1. Windows XP, Windows 7 and Linux Operating Systems are loaded. It is adopted in Specific laptops also for application development etc. extended with VMware Work Station 10.0 and Oracle Virtual Box. Symantec 4.0, LIBSYS version 4 Release 6.3, RAID backup and Windows Deployment Solution – all are in virtual mode now. This has resulted in minimum operation & maintenance and reduction in power consumption leading to less green house gas emissions.

Suitable software has been designed and used for the Registration of Delegates and for collecting the data of Technical Papers for inclusion in Proceedings booklet & for related processing. Seminar Proceedings, in the form of E-book/CD, an NCB in-house design was released in the Seminar Hall and distributed to the Delegates.

The 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 updates for CLAM.

The Websites, uploaded with various promotional information including 13<sup>th</sup> NCB Seminar. Now the website is bi-lingual. Following services were continued to be provided:

- 'RAID 5' and 'RAID 0' based storage and backup solution
- Intranet server solution
- Windows Deployment Services for maintenance & installation
- Indexing Services from Library, through Intranet site and www.ncbindia.com site.
- Uploading website with announcements on 13<sup>th</sup> NCB International Seminar, various Training Course announcements, recommendations of various workshops, employment opportunities, RTI related documents & RFD postings etc.

## Publications

Efforts to widely popularize and promote NCB activities, technologies and consultancy services amongst the cement, construction and related building materials industries continued. During the year a Proceedings, NCB-CMA Special Publication, Exhibitors' Directory and Programme Booklet were brought out for 13<sup>th</sup> NCB International Seminar. The other publications include: NCB Annual Report 2012-13 (English and Hindi), Seminar Bulletin 2 of 13<sup>th</sup> NCB International Seminar, NCB Training Programme 2014-15, one brochure on National Awards in Energy Efficiency, Environment Excellence and Quality Excellence in Indian Cement industry 2011–12 & 2012-13.



A few NCB Publications



## Seminars and Conferences

### 13<sup>TH</sup> NCB INTERNATIONAL SEMINAR ON CEMENT AND BUILDING MATERIALS



Dr E M Sudarsana Natchiappan is lighting lamp on the occasion of inauguration of 13<sup>th</sup> NCB International Seminar



Dr E M Sudarsana Natchiappan releasing the NCB-CMA Special Publication



Shri Talleen Kumar giving away the Award for Energy Efficiency at concluding session of the 13<sup>th</sup> NCB International Seminar



A Technical Session in progress

- The Seminar was held from 19 to 22 November 2013 in Manekshaw Centre, New Delhi. It drew participation of more than 900 delegates, including 115 from overseas countries, like Australia, Austria, Belgium, Bhutan, Canada, Denmark, Finland, France, Germany, Italy, Japan, Nepal, Norway, Singapore, Sultanate of Oman, Switzerland, Taiwan, The Netherlands, Turkey, United Arab Emirates, UK and USA. About 120 Technical Papers were deliberated in 21 Technical Sessions.
- The concurrent Technical Exhibition also received overwhelming response, with 122 stalls from 79 companies showcasing the latest advances in Technology, instrumentation & Control Systems, developments in machinery, related auxiliaries and services available to the cement industry and provided an opportunity for a very useful interaction among machinery suppliers and users.
- The Seminar as well as the Technical Exhibition were inaugurated by Dr E M Sudarsana Natchiappan, the Hon'ble Minister of State for Commerce & Industry, Govt of India. The keynote address was delivered by Shri Ashwani Pahuja DG-NCB. Dr Natchiappan also released the special publication, *Indian Cement and Construction Industry – Present Status and Future Outlook*, brought out jointly by National Council for Cement and Building Materials (NCB) and Cement Manufacturers' Association (CMA), on the occasion of the Seminar and the Exhibitors' Directory.
- The Seminar was sponsored by Cement Manufacturers' Association and UltraTech Cement Ltd (Patrons), Shree Cement Ltd (Platinum Sponsor), Ambuja Cements Ltd, Cement Manufacturing Co. Ltd, JK Lakshmi Cement Ltd, Reliance Cement Company Pvt. Ltd and World Business Council for Sustainable Development (Gold Sponsors), Industrial Filters & Fabrics Pvt Ltd, IKN Engineering India Pvt Ltd and Binani Cement Ltd (Silver Sponsors), Calderys India Refractories Ltd, Enexco Teknologies India Ltd, JK Cement Ltd, My Home Industries Ltd and Uttar Pradesh Jal Nigam (Bronze Sponsors),

Dalmia Cement (Bharat) Ltd and Saurashtra Cement Ltd & Gujarat Sidhee Cement Ltd (other Sponsors)

- Government Departments/Bodies namely Department of Industrial Policy & Promotion (DIPP) and Bureau of Indian Standards (BIS) supported the event.
- The deliberations were enriched by a special lecture, titled *Low Carbon Cement Based on Clinker, Calcined Clay and Limestone* by internationally renowned expert Prof. (Ms.) Karen Scrivener, Editor-in-chief, Cement and Concrete Research, highlighting the use of limestone in combination with calcined clay as blending components to produce cements having good performance as well as reduced carbon footprint.
- The Chief Guest of the Concluding Session, Shri Talleen Kumar, Joint Secretary, Department of Industrial Policy & Promotion (DIPP), Ministry of Commerce & Industry, Government of India gave away the National Awards for Energy Efficiency, Environmental Excellence and Quality Excellence in the Indian Cement Industry for the years 2011-12 and 2012-13 and also the Awards for twelve Best Technical Papers.

## 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 10 May 2013 at its Ballabgarh and Hyderabad Units. At Ballabgarh Unit, Dr S K Breja, General Manager NCB delivered a talk on *'TQM and its application in organization improvement & business excellence'* and at Hyderabad Unit, Shri B S S Rao, Senior General Manager, Insmart Systems Hyderabad delivered a talk on *'Reliable Analytical support to cement industry'*.



Dr S K Breja delivering talk on the occasion of National Technology Day at NCB Ballabgarh Unit

**World Environment Day:** Special functions were organized on 5 June 2013 to celebrate World Environment Day at Ballabgarh and Hyderabad Units. The theme of the year was *"Think. Eat. Save"*.



Dr Manoranjan Hota, Director Ministry of Environment and Forest, New Delhi addressing on the occasion of World Environment Day (Left). The Chief Guest Planting the tree in the Ballabgarh Unit



Shri A Pahuja DG NCB addressing on the occasion of NCB Day 2013



NCB officials who completed 25 years of services with the Chief Guest Shri B Venkataraman, Secretary General, Quality Council of India (in centre).

At Ballabgarh unit, Dr Manoranjan Hota, Director Ministry of Environment & Forests, New Delhi was the Chief Guest and addressed the NCB officials on the occasion and at Hyderabad Unit, Shri Asghar Ali Khan, ESquare Design Studio delivered a special lecture on “*Rain Water Harvesting*”.

**NCB Day 2013:** NCB Day 2013 was celebrated on 24 December 2013. Shri Ashwani Pahuja, DG-NCB addressed the staff on the occasion. Shri B Venkataram, Secretary General, Quality Council of India (QCI) was the Chief Guest at the celebrations. 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 Suresh Kumar. The Best Supporting Staff Award was given to Shri V Ramaswamy in the Technical Stream.



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 2013 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 summarized the activities organized for promoting the use of Hindi in NCB during the year. Adhyaksha, Rajbhasha Karyanvayan Samiti, Dr Devender Yadav reviewed various programmes organized during the year and announced awards for the participants.

**Quami Ekta Week:** Quami Ekta Week was observed during 19-25 November 2013 and National Integration Pledge was administered to the staff as a part of it.



## Participation in Seminars

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

Participant(s)	Event
Sh Brijesh Singh Sh Arup Ghatak	Workshop on Code of Practice For Concrete Road Bridges IRC:112:2011, 2-4 May 2013, New Delhi, organized by Indian Concrete Institute
Sh M S Rao Smt K V Kalyani	Green Cementech- 2013, 17 May 2013, Hyderabad, organized by Confederation of Indian Industries.
Sh Navneet Jain Sh Puneet Kaura	Workshop on Quality Control of Concrete and Construction Materials Through Testing & Experimental Structure Dynamic, Health Monitoring & Non Destructive Evaluation Using Smart Materials, 14th June 2013, New Delhi, organized by Quazar Technologies Pvt. Ltd.
Sh V V Arora Sh Satish Sharma	National Roads & Highways Summit-Opportunities, Issues & Solutions, 28 June 2013, New Delhi, organized by PHD chamber of commerce and industry
Sh R K Goswami Sh K Suryanarayana Sh K S Durgaprasad Sh T Mohan Rao Sh T P Rao	PANalytical Seminar- General With Focus on Cement Segment, 8-9 August 2013, Hyderabad
Sh S K Breja	2 <sup>nd</sup> CII-NABL National Quality Conclave for Laboratories, 16-17 September 2013, Bengaluru.
Sh Yezaz Ahmed	12 <sup>th</sup> Energy Efficiency Summit , 19-21 August 2013, Hyderabad, organised by Confederation of Indian Industries
Sh Adarsh Kumar N S Sh Y N Daniel	Workshop on Structural Rehabilitation and Retrofitting using Construction Chemicals, 24-25 September 2013, IIT- Mumbai, Organized by Department of Civil Engineering, Indian Institute of Technology Bombay
Sh Brijesh Singh Sh Y N Daniel	Technical Lecture on Blast Resistant Design of Structures, 26 September 2013, IIT Delhi, organized by Dr Vasant Matsagar, Civil Engineering Department
Sh Arun Sidpara Sh Dipesh Tailor	Professional Development Course on Repair, Restoration and Renewal Engineering (3R) of Concrete Structures, 4-5 October 2013, Ahmedabad, Organised by Nirma University, Institute of Technology- Department of Civil Engineering

---

Sh M V Ramachandra Rao Sh K P K Reddy	Seminar for Senior Managers and Officials of Cement Science and Project from Developing Countries, 15-29 October 2013, Hefei. Anhui, P.R. China, organized by Anhui Institute of International Business
Sh Amit Prakash Sh Amit Sagar	Seminar on Geosynthetic Barriers, 23 October 2013, New Delhi, Organised by International Geosynthetics Society & Central Board of Irrigation & Power
Sh B S Rao Sh Arup Ghatak	Workshop on Experimental Structural Dynamics, Structural Health Monitoring and Non- Destructive Evaluation Using Smart Materials, 26 October 2013, New Delhi, organized by IVS Noble Solution
Sh Suresh Kumar Sh Manish Kumar	Symposium on Technology & Equipments for C& D Waste Recycling, 8-9 November 2013, New Delhi, Jointly organized by ICI & CPWD
Sh Brijesh Singh Sh Puneet Kaura Sh Jyothi Swaroop	Technical Lecture on 4000MW Mundra Ultra Mega Power Project-A Brief Overview, 26 December 2013, New Delhi, organized by Indian Association of Structural Engineers
Sh V V Arora Sh Suresh Kumar Sh Adarsh Kumar NS Sh Puneet Kaura	Fourth International <i>fib</i> - Congress 2014, 10 -14 February 2014, Mumbai.
Smt K V Kalyani	Climate Change Conference, 20-21 February 2014, Hyderabad, organised by Institute of Public Enterprise (IPE)
Smt K V Kalyani Sh K Suryanarayana Sh T P Rao Sh Yezaz Ahmed	Low Carbon Roadmap for Indian Cement Industry, 7 March 2014, Hyderabad, organised by Confederation of Indian Industries
Sh Suresh Kumar Sh Sunil Kumar Sh Rizwan Anwar	2 <sup>nd</sup> International Construction Chemical 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
Sh Nitin Chowdhary Sh Amit Prakash	Technical Lecture on Construction of Tunnel Under CC-23 Contract of Line-8 of Phase-III & Chawri Bazar Underground Station of MCIB Contract of Line-2 of Phase-I of Delhi MRTS Project by NATM, 27 March 2014, New Delhi, organized by Indian Association of Structural Engineers

---

## Paper Presented in Seminars, Workshops etc

The following papers were contributed/presented by NCB experts to / in different National and International Seminars, Workshops etc.:

### **2<sup>ND</sup> CII-NABL NATIONAL QUALITY CONCLAVE FOR LABORATORIES,** 16-17 September 2013, Bengaluru

1. *PT Scheme on Cement as per ISO/IEC 17043:2010* by S K Breja

### **13<sup>TH</sup> NCB INTERNATIONAL SEMINAR ON CEMENT AND BUILDING MATERIALS,** 19 – 22 November 2013, New Delhi

2. *Evaluation of Bench Height Selection for Limestone Resource Optimization – A Case Study* by N K Sharma, R Mazumder, D K Panda and A K Dubey
3. *Utilization of Aluminium Processing Waste as Raw Materials in the Manufacture of Cement* by M Pareek, Digvijay Singh, D Yadav, S K Chaturvedi and M M Ali
4. *Utilization of E-cat Generated at Panipat Refinery in Cement Manufacture - Lab Trial at UltraTech* by S K Chaturvedi, D Yadav, M M Ali, P Kasliwal, K M Prabhu, Brijesh Kumar, S Rajagopal and R K Malhotra
5. *Use of Granulated Steel Slag in Manufacture of Cement* by D Yadav, S Gupta and S K Chaturvedi, D Satish Kumar, R Sah, Ganapathi Prasad and S M R Prasad
6. *Studies on Cement Hydration in Presence of Nanosilica* by S Harsh, A K Arora, Varsha Thomas and M M Ali
7. *Proficiency Testing Services for Laboratories by an Accredited PT Provider* by S K Breja, V K Kandhari, S N Sahay, A Agnihotri, G C Mishra and A Pahuja
8. *Quality Trend in Indian Cements – A Decade Appraisal* by U S Sinha, K Bhatnagar, R Gupta and M M Ali
9. *Benchmarking of Quality Parameters in Cement Industry* by S K Breja, P Srikanth and A Agnihotri
10. *Development of Coal CRM through Interlaboratory Comparison Route* by S K Breja, V K Kandhari, A Agnihotri and G C Mishra
11. *Investigations on Use of Jarosite as Set Controller in Cement* by S K Agarwal, Puneet Sharma, Mithlesh Sharma, M M Ali, B K Singh and Vikas Sharma
12. *Activation of Indian Fly Ashes for Enhancing its Utilization in Cement Manufacture* by S K Chaturvedi, D Yadav, V P Chatterjee and A Pahuja
13. *Investigations on Curing Conditions and Properties of Geopolymeric Cements from Coarser Fly Ash* by M M Ali, R S Gupta, S Vanguri and A Pahuja
14. *Utilization of Marble Dust as Mineral Additive in Cement* by S K Agarwal, Asheesh Goyal, S C Sharma and M M Ali

15. *Diagnostic Studies for Cement Mill Optimization – A Case Study* by Naga Kumar, K P K Reddy, Rabindra Singh and A K Mishra
16. *Productivity Improvement and its Relevance in Indian Cement Industry- Case Studies* by Rabindra Singh, Ramachandra Rao, A K Mishra, S Kumar, Lokesh Bahety and N K M Sudhakar
17. *Granulated Steel Slag – An Alternative to River Sand* by A Sood, V P Chatterjee S K Chaturvedi, D Satish Kumar, R Sah, Ganapathi Prasad and S M R Prasad
18. *Study of Usage of Bottom Ash as part Replacement of Sand for making Concrete Blocks* by Satish Sharma, V V Arora and Adarsh Kumar N S
19. *Microstructural Development in Fire Damaged Concrete – A Case Study* by V P Chatterjee, S K Chaturvedi, S K Gupta, M Kumar and P S Sharma
20. *Use of Fly Ash in making Controlled Low Strength Material (CLSM) for Use as Self-Compacted Structure Backfill* by Suresh Kumar, Dinesh Kumar and Nancy Mittal
21. *Use of Portland Pozzolana Cement for RCC and Prestressed Concrete* by V V Arora, Brijesh Singh, Amit Prakash and Arup Ghatak
22. *Thermal Energy Audit - A Diagnostic Tool to Achieve PAT Targets in Indian Cement Industry* by O P Grover, Sd Rayees Ahmed, Prateek Sharma and Rabindra Singh
23. *Technical, Financial and Institutional Needs for Facilitating Cogeneration of Power through Waste Heat Recovery in Indian Cement Industry* by Ashutosh Saxena, K P K Reddy, Vinay Kant and Saurabh Bhatnagar
24. *GHG Reduction Potentials in the Indian Cement Industry – A Way Forward* by P Fonta, C Twigg, E Sar, A K Mishra, S K Chaturvedi, A Pahuja, N Trudeau, C Tam and P V Kiran Ananth
25. *Mercury Emission Scenario – World and Indian Cement Industry* by N K Tiwary, M Selvarajan, A Bohra, K R P Nath and A K Mishra
26. *Indian Cement Industry Strives towards Environmental Excellence* by J S Kamyotra, S S Bala, P K Gupta, Ankur Tiwari, K R P Nath, A Bohra, M Selvarajan, N K Tiwary, A Pahuja and A K Mishra

#### **FOURTH INTERNATIONAL fib-CONGRESS 2014, 10 -14 February 2014, Mumbai**

27. *Service Life Design – Field Studies and Laboratory Studies* by V V Arora and Satish Sharma

### **Papers Published**

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

1. Ashwani Pahuja and M M Ali: *NCB's Contribution to Technological Upgrading of the Cement and Construction Industries*. **Cement International**, Vol. 11, No.5, May 2013, pp 34-39
2. M M Ali, R S Gupta and Ashwani Pahuja : *Prospects of Geopolymeric Cements in Environmental Sustainability* **Cement Energy and Environment**, Vol. 12, No.2, April-June 2013, pp 9-10

3. S K Breja, V K Kandhari, A Agnihotri, G C Mishra and Ashwani Pahuja : *Managing the Expectations of Cement Users*. **World Cement**, Vol. 44, No. 10, Oct. 2013, pp 63-68
4. N K Tiwary, A K Mishra, M Selvarajan, Anand Bohra and K R P Nath : *Environmental Regulations in the Indian Cement Industry*. **World Cement**, Vol. 44, No. 10, Oct. 2013, pp 13-21
5. M M Ali, S K Agarwal, Ashwani Pahuja, B K Singh and Sunil Duggal : *Utilization of By-product Jarosite in the Manufacture of Ordinary Portland Cement*. **Advances in Cement Research**, Vol. 26, No.1,2014, pp.41-51 (<http://dx.doi.org/10.1680/adcr.12.00063>).
6. *Interview with Ashwani Pahuja, DG-NCB*. **Cement International**, Vol. 11, No.5, May 2013, pp 27-33

## Important Visitors

Sl. No.	Name of the Visitors	Organization
1	Dr Manoranjan Hota	Director Ministry of Environment & Forests, New Delhi
2	Mr Victor R Shevtsov	Assistant Director General, Cand Sc, Russia
3	Mr Alexander Bishnev	Project Director JSC "Rusatom Overseas", Russia
4	Mr B Venkataram	Secretary General, Quality Council of India
5	Mr B K Dash	Chief General Manager (Industrial Promotion and Investment Corporation of Odisha Limited)
6	Mr D K Senapati	Joint Manager (Industrial Promotion and Investment Corporation of Odisha Limited)
7	Mr Manoj Mishra	Director (HR) Cement Corporation of India Limited.



A delegation from Russia on a laboratory visit



## 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.

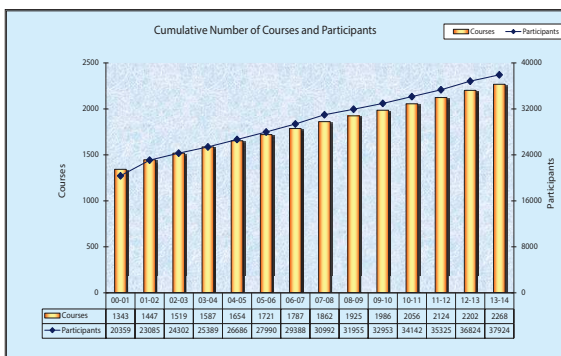
One NCB scientist, Shri V V Arora attended 20<sup>th</sup> plenary meeting of ISO/TC 71 Committee (Concrete, reinforced concrete and pre-stressed concrete) and its Sub-Committees as a member of the Indian delegation led by Bureau of Indian Standards (BIS) held during 28-31 January 2014 at Sydney, Australia.

## CENTRE FOR CONTINUING EDUCATION SERVICES - CCE

*Centre for Continuing Education Services (CCE), has been organizing variety of need-based, industry-oriented training programmes at entry and post-entry levels, for the participants from cement, concrete and construction industries since its inception in 1972. So far, 2,271 training programmes have been organized. A total number of 37,928 participants comprising of industry professionals and fresh graduates/post-graduates in science and different disciplines of engineering have been benefited. A number of Govt./Semi-govt./Private organizations both from India and abroad have availed the training services of NCB for their engineers and professionals.*

During the year under report, 69 training courses under the following categories were organized with a total of 1,104 participants benefited.

The highlights of the programmes conducted are as under :



Long Term Course	1
Short Term Refresher Courses	25
Simulator Based Courses	10
Contact Training Programmes	10
Special Group Training Programmes	23

### Long Term Course

In its efforts to develop technological talent for the cement industry, NCB has been regularly conducting Post-Graduate Diploma in Cement Technology since 1983. The course is duly approved by All India Council for Technical Education (AICTE), Ministry of Human Resource Development, Govt of India.

Thirteen self sponsored participants admitted for 2012-13 session comprising of three chemical engineers and ten post graduates in chemistry, have successfully completed the course in July 2013. As in the past., all these students were placed in the cement industry through campus interview. In the session 2013-14 eighteen students were admitted in the course.

## Short Term Refresher Courses

During the year, 25 Short Term Training Courses were organized wherein 581 professionals from cement and construction industries participated. In Cement Technology related area, special emphasis were given to topics such as Blending and Homogenisation in Cement Plants; Technical Skills for Cement Marketing; Calibration of Laboratory Equipment and Quality Assurance in Cement, Construction and Process Industries; Cement Quality Testing as per Indian Standards; Optimization of Raw Mix to Improve Clinker and Cement Quality; Advances in Refractory Management in Cement Industry; Quality Orientation for Marketing Executives in Cement Industry; Sampling and Testing of Cement as per BIS Standards; Instrumental Methods of Analysis and Quality Control; Environmental Management in Cement Industry; Advances in Pyroprocessing in Cement Industry; Advances in Raw Material Evaluation and Mining Techniques for Sustainable Development in Cement Industry; Modern Grinding Practices in Cement Industry.

In Concrete and Construction related areas, the training programmes on specific topics were organized such as Non-destructive Testing and Evaluation of Concrete Structures; Modern Construction Practices; Design, Construction and Quality Control Practices for Concrete Roads; Cracks and Leakages in Concrete Structures – Causes and Repair; Sampling, Testing and Evaluation of Concrete making Materials and Concrete; Concrete Mix Design and Acceptance Criteria of Concrete; Building Facility Management, Quality Control and Quality Assurance in Concrete Construction including Extreme Weather Concreting; Concrete Mix Design and Quality Control; Advances in Concrete Technology covering use of Admixtures, Self Compacting Concrete and High Performance Concrete; Use of Fly Ash and Blended Cements for Durable Concrete; Quality Assurance of Concrete Construction through ready mix concrete.



Shri A Pahuja DG-NCB with participants of a Special Group Training Programmes for Engineers of Republic of Afghanistan



Trainees are given demonstration at construction site



A NCB Engineer and Trainees in Interaction in NCB Laboratory

## Simulator Based Courses

With the aim of providing comprehensive training on various aspects of kiln and mill operation, ten training courses on Advanced Simulator trainer were organized at NCB's Ballabgarh and Hyderabad Units for 25 professionals from various cement industries of India and neighboring countries. The participants were trained on Operation, Control and Optimization of Modern Grinding System based on Roller Press, Vertical Roller Mills; Ball Mills; Operation, Control and Optimization of Modern Precalciner kilns.

## Contact Training Programmes

On the request of industry, ten 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:

- Application of Optical Microscopy for the Evaluation of Coarse Aggregates, Clinker and Minerals
- Physical Testing of Cement
- Chemical Testing of Cement for major oxides
- Estimation of Sulphide/Sulphur in Granulated Blast Furnace Slag and Portland Slag Cement
- EDTA Method of Analysis of Cement and Raw Materials

## Special Group Training Courses

Twenty three 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 Organisations**

- Delhi Metro Rail Corporation (DMRC Ltd) • National Building Construction Corporation (NBCC Ltd) • Rapid Metro Rail Corporation, Gurgaon • National Hydroelectric Power Corporation (NHPC Ltd) • Minor Irrigation, Deptt of Water Resources, PWD, Govt of Tamilnadu • AP Water Sector Improvement Project, AP • Punjab State Power Corpn Ltd (PSCL) • Associated Cement Cos Ltd, Mumbai
- Indian Air Force (IAF), New Delhi • Orient Cement Ltd, Hyderabad • Insmart Systems Ltd, Hyderabad.

### **b) Overseas Organisations**

- Ministry of Energy & Water, Govt of Afghanistan and Food & Agriculture Organisation of United Nations • Qassim Cement Company, Saudi Arabia



Participants in a Training Session

## Training / Retraining of NCB Personnel

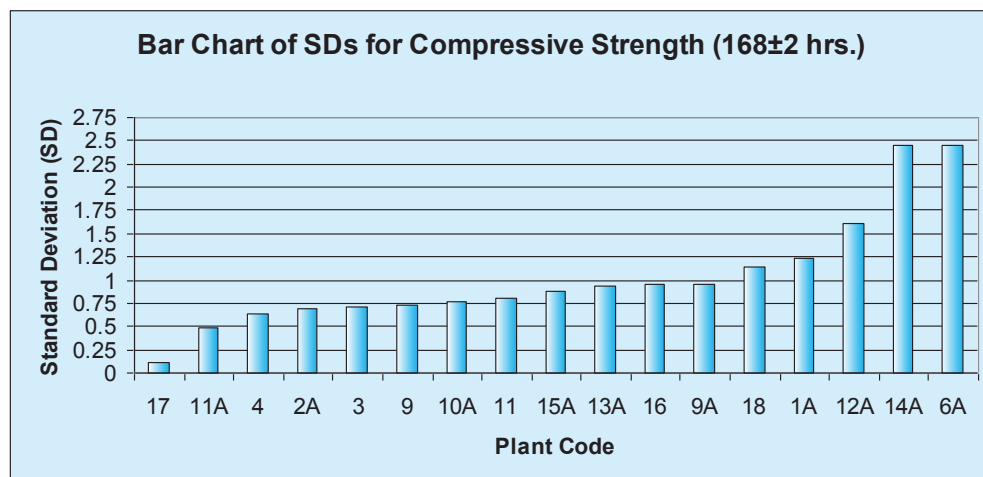
Sl. No.	Name of the Official	Title of course	Name and address of Training Organisation	Duration and Period
1 2 3 4 5 6 7 8 9 10 11 12 13	Sh Arun Sood Sh Mahesh Mishra Sh M Jamali Sh Ravendra Singh Sh Munish Kumar Sh Gaurav Bhatnagar Ms Kalpana Sharma Sh Ashish Goyal Sh S K Jain Sh P Srikanth Sh Bharat Ram Sh R P Vijayvergia Sh Rishi Raj	Calibration of Laboratory Equipment and Quality Assurance in Cement, Construction and Process Industries	Centre for Continuing Education Services NCB	2 days (10-11 July 2013)
14 15 16	Ms Komalpreet Kaur Sh Jagmohan Garg Sh Jyothi Swaroop	QC & QA in Concrete Construction	Centre for Continuing Education Services NCB	5 days (22-26 July 2013)
17	Sh Puneet Meena	Sampling, Testing and Evaluation of Concrete Making Materials and Concrete	Centre for Continuing Education Services NCB	4 days (30 July – 02 Aug 2013)
18 19	Sh Prateek Sharma Sh Vinay Kant	Energy Conservation & Management in Cement Industry	CII – Sohrabji Godrej Business Centre, Hyderabad	2 days (29-30 Aug 2013)
20 21	Sh Saurabh Garg Sh Shubam Jain	Quality Control & Quality Assurance in Concrete Construction	Centre for Continuing Education Services NCB	5 days (09-13 Sept 2013)
22 23 24	Sh B S Rao Sh D Pavan Kumar Sh Jagjit Sinh	Quality Control & Quality Assurance in Concrete Construction including Extreme Weather Concreting	Centre for Continuing Education Services NCB	5 days (21-25 Oct 2013)
25	Sh Rabindra Singh	Effective and Efficient Delegation of Energy Management with Focus on Building	Petroleum Conservation Research Association Tokyo, Japan	26 Nov – 05 Dec 2013
26 27	Dr S K Breja Sh P Srikanth	Laboratory Quality Management System and Internal Audit as per ISO/IEC 17025	Central Institute of Plastics Engineering & Technology (CIPTe), Gurgaon	4 days (29 Jan – 01 Feb 2014)

# 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; Inter laboratory Services; Standard 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. The activities of Inter laboratory Services were given a boost and four new proficiency testing (PT) schemes were completed in accordance with ISO17043:2010. Three sponsored projects in a variety of areas and one programmed project on benchmarking were completed during the year.*

## Total Quality Management

Under this programme, CQC completed project on benchmarking of quality parameters for OPC and PPC with the participation of 15 cement plants. Data were received from participants for chemical and mechanical parameters on monthly basis from where standard deviation (SD) and coefficient of variation (CV), were calculated. Trends of variation in quality control data of the plants were shown in the form of bar chart and feedback given to all plants on quarterly basis. At the end of the project, best performance benchmarks for the year 2013 were set. The chart shows comparative performance of plants for OPC in the month of December 2013.



CQC assessed the quality assurance system of a clinkerization plant and a clinker grinding unit. This study dealt with the capability of the quality management and assurance system of the units and assessment of quality control in attaining the quality objectives. Further, the centre also assisted one cement plant in documentation and implementation of laboratory quality management system in line with ISO 17025:2005 in getting their quality control laboratory accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL).



NCB team at BJCL, Babupur unit, for assessment of quality assurance system

NCB successfully underwent surveillance audit of ISO 9001: 2008 Quality Management System, in January 2014, after recertification in February 2013. The continuation of ISO: 9001 Quality Management System Certification reflected NCB's commitment to ensuring excellence of processes and products and customer satisfaction.

## Inter Laboratory Services

Inter Laboratory Services (ILS) was awarded the NABL accreditation for conducting proficiency testing (PT) schemes on cement and fly ash. With this, NCB became the first accredited PT provider as per ISO 17043: 2010, in the country. After accreditation, ILS completed proficiency testing (PT) schemes on chemical analysis of PPC and fly ash with the participation of 49 and 27 laboratories, respectively, during the year. It also completed scheme on mechanical parameters of PPC and fly ash with the participation of 56 and 24 laboratories, respectively. These schemes were implemented in accordance with ISO 17043:2010.



DG-NCB along with NCB officials receiving the PT provider accreditation certificates from Secretary DST, Shri T Ramasamy

The participating laboratories were provided homogenized samples of PT item (cement/ fly ash) 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.

## Standard Reference Materials

SRM programme completed project on development of six nos. plant based clinker and PPC samples for calibration of XRF for a clinker grinding unit. The clinker and PPC samples were certified for LOI, SiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, CaO, MgO, SO<sub>3</sub>, Na<sub>2</sub>O, K<sub>2</sub>O & Cl. The certified results are used for plotting calibration curves for analysis.

Supply of developed Certified Reference Materials (CRMs) was continued and a total of 7631 vials of different CRMs and 1564 sets of standard lime were supplied to 484 customers from cement plants, testing laboratories and R&D institutions.

During the year 2013-14, following CRMs of fineness were developed for replenishing exhausted stock :

Sl. No.	Material/Parameter	CRM Code	Certified Value
1.	OPC (Blaine fineness)	1001A14	271 m <sup>2</sup> /kg
2.	OPC (Blaine fineness – higher)	1001C5	400 m <sup>2</sup> /kg
3.	PPC (Blaine fineness)	1002A8	343 m <sup>2</sup> /kg
4.	Fly ash (Blaine fineness)	1001FC4	485 m <sup>2</sup> /kg
5.	Cement (Residue on 45µm sieve)	1002G1	8.5%

Apart from the above, CRMs for chemical parameters (as per IS methods) like 1012L (OPC), 1016D (PPC) and 1007B (Gypsum) and hydrated lime for lime reactivity test of fly ash were also developed for stock replacement. These CRMs will meet the quality standardization and assurance needs of the cement and allied materials testing laboratories.

## Calibration Services

The calibration laboratories continued to implement Quality Management System as per ISO 17025:2005 requirements. The laboratories satisfactorily underwent surveillance audit by NABL. Over 1565 equipment/apparatus including proving rings, compression testing machines, vibrating machines, dial gauges, Blaine cell, pressure gauges, sieves and thermometers were checked, adjusted and calibrated as required by 667 clients. Satisfaction of customers from the calibration services showed significant improvement on timeliness, work quality and interaction dimensions.



---

## 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 2013 was held on 20 November, 2013 in New Delhi when it adopted the Annual Report, the audited accounts and balance sheet for the year 2012-2013.

### Board of Governors

The Composition of the Board for the year 2014 is given in the beginning 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 2014 is:

#### Chairman

Shri V S Narang  
Director (Technical)  
My Home Industries Ltd  
Hyderabad



*50<sup>th</sup> Annual General Meeting (AGM) in progress*

## Members

Dr Subrato Chowdhury  
Chief (Research and Development)  
UltraTech Cement Ltd.  
Mumbai

Shri S S Jain  
President  
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)

Sh M V Ramana Rao  
Jt. Executive President &  
Unit Head  
UltraTech Cement Ltd.  
Kotputli Cement Works  
Jaipur (Rajasthan)

The Chairman and Managing Director  
National Research Development Corpn  
New Delhi

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

Dr Achal Kumar Mittal  
Scientist 'F'  
Head, Structural Engg. Division  
Central Building Research Institute  
Roorkee (Uttarakhand)

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  
Udyog Bhavan  
New Delhi

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

Shri Satish Gurtoo  
Joint President  
Century Cement  
P.O. Baikunth  
Distt Raipur (Chhattisgarh)

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

The Chief Mineral Economist  
Indian Bureau of Mines  
Nagpur (Maharashtra)

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

The Director  
Structural Engineering Research  
Centre (SERC)  
Taramani P.O.  
Chennai



Shri Rakesh Bhargava  
Chief Climate and Sustainability Officer  
Shree Cement Ltd., Beawar  
Dist. Ajmer (Rajasthan)

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. V P (Prod.)  
Birla Corporation Ltd.  
Chittorgarh (Rajasthan)

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

The Member Secretary  
Central Pollution Control Board  
East Arjun Nagar  
Delhi

The Director  
Central Road Research Institute  
Delhi-Mathura Road  
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)

Prof B Bhattacharjee  
Deptt of Civil Engineering  
Indian Institute of Technology  
Delhi

Shri Jitander Kumar  
Plant Head  
Heidelberg Cement India Ltd  
P.O. Ammasandra,  
Tumkur (Karnataka)

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

Shri S K Saxena  
Vice President (Jhajjar Unit and QA)  
J K Lakshmi Cement Ltd.  
Jhajjar (Haryana)

Shri R K Khandekar  
Asstt. General Manager  
NTPC Ltd.  
NOIDA (UP)

Shri 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 2014 is:

### Chairman

Shri Mahendra Singhi -  
Group CEO  
Dalmia Cement (Bharat) Ltd  
New Delhi

### Members

Shri V S Bajaj  
Senior 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  
Udyog Bhawan  
New Delhi

Shri S K Chakraborty  
Scientist 'F'  
Dept of Scientific & Indl Research  
Ministry of Science & Technology  
New Delhi

Dr Rakesh Kumar  
Head of Deptt. (Rigid Pavements)  
Central Road Research Institute  
New Delhi

The Industrial Adviser  
Dept. of Indl. Policy & Promotion  
Ministry of Commerce and Industry  
Udyog Bhawan  
New Delhi

Dr Subrato Chowdhury  
Head R&D, Cement Division  
Ultra-Tech Cement Ltd  
Andheri (East), Mumbai

Shri Shashi Ranjan  
General Manager-PE-Civil  
NTPC Ltd  
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 2014 is :

### **Chairman**

Dr S Chouksey  
Wholetime Director  
JK Lakshmi Cement Ltd  
New Delhi

### **Members**

The Director (Cement)  
Department of Indl Policy & Promotion  
Ministry of Commerce & Industry  
Udyog Bhavan  
New Delhi

The Director  
Integrated Finance Wing  
Department of Indl Policy & Promotion  
Ministry of Commerce & Industry  
Udyog Bhavan  
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

Shri Ashwani Pahuja  
Director General, NCB

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

### **Member-Secretary**

Shri S K Chaturvedi  
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 2014 is:

### **Chairman**

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

### **Members**

Shri Animesh Banerjee  
President  
Vasavadatta Cement  
District Gulbarga,  
Karnataka

Shri N B Singh  
Senior Joint President (Technical)  
JayPee Balaji Cement  
District Krishna (AP)

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

Shri S S Sandhu  
Associate Vice President  
JSW Cement Ltd  
Secunderabad

Shri D Lakshmikantham  
Director  
Penna Cement Industries Ltd  
Hyderabad

Shri Sreekanth Reddy  
Executive Director  
Sagar VICAT Cement Ltd  
Banjara Hills  
Hyderabad

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

The Engineer-in-Chief  
(State Roads Division)  
Roads & Buildings Department  
Govt of Andhra Pradesh  
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  
Paryavaran Bhavan  
Hyderabad

The Regional Manager  
L&T Ltd, ECC Division  
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 323 sponsored projects.

## Forum for Science and Technology (FST)

During the period one meetings of FST was held. The meeting provided interactive discussions among the scientific staff of NCB. The meeting has served very well for keeping the scientists and engineers informed on the latest developments in the area.

Sl. No.	Date	Speaker (s) Topic
1.	19 July, 2013	'Quality Control in Manufacturing and Services' by Sh P Srikanth, Deputy Manager, NCB

## ORGANISATIONAL MATTERS

### Staff Particulars

NCB had strength of 201 Cadre officials comprising of engineers, scientists and technical and administrative support staff as on 31 March 2014 engaged in the activities of the organisation.

### Staff Welfare

NCB continued to look after the welfare of its staff through several activities. During 2013-14, 81 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 2013-14.

Activities of NCB Staff Club, working for fostering social and fraternal relations amongst the officials, included maintenance of library, indoor 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



## INFRASTRUCTURE

### NCB - Ahmedabad

The facilities at Ahmedabad Unit of NCB consist of Quality Assurance and Quality Control equipment mainly, 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 Ferroskan, 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:



Los Angeles Mill

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 Strength Testing Machine for concrete samples, Abrasion Testing Machine, Automatic Compression Testing Machines ( various capacities), Universal Testing Machines, 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<sub>2</sub> 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.

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



**Polarizing Microscope with  
Advanced Image Analyzing System**



**High Temperature Rapid Heating Furnace**



**Computerized Servo Controlled Multi Frame Compression  
Testing Machine**



**Heating Microscope**

Construction of a new laboratory block for test house and new hostel building with cafeteria for trainees is under progress.

During the year, important equipment facilities added were Servo Controlled Compression testing machine, Ultrasonic Pulse Velocity testing equipment and Flexural Testing Machine for RCC beam (as per ASTM C 1609) with displacement rate control upto 0.025mm/min.

## **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 advanced instruments laboratory of the Unit is equipped 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 for testing of cement and concrete making materials and conducting concrete mix proportioning.

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 simulator trainer covering different grinding and pyro-processing systems is available in the Unit for providing hands-on training to mill and kiln operators of cement plants. The Unit also has a Computational Fluid Dynamics (CFD) software package for modelling a variety of process equipment used for cement manufacture.

Construction of the training complex including training block, hostel and canteen to facilitate residential programmes has been completed during the year.

## 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, Laboratory Advisory Committee (LAC), Bureau of Indian Standards, New Delhi
- c) Member, Certification Advisory Committee, Bureau of Indian Standards, New Delhi
- d) Member, Standards Advisory Committee, Bureau of Indian Standards, New Delhi
- e) Member, Programme Advisory Committee (PAC) for Fly Ash, Department of Science & Technology, Government of India, New Delhi
- f) Member, Standing Committee for innovative Building Material and Technology, Building Materials and Technology Promotion Council (BMTPC), New Delhi
- g) Member, PAT Sectoral Expert Committee (Cement Sector), Bureau of Energy Efficiency (BEE), New Delhi
- h) Member, Research Council for CSIR-Central Road Research Institute, 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 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

**Shri Satish Sharma**

**Joint Director**

- 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

**Dr 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

**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

**Shri A Venkatasubramanian**

**General Manager**

- a) Advisor - Infrastructure and Capacity Building Committee, Monitoring Committee of RAC Projects of CPPRI, Saharanpur, U.P.



## 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 Precalculator 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
- 

## **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
- 

**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 2013-14

Sl. No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
1.	WAU-13	Investigations on utilization of marble dust /slurry waste as alternate to limestone in cement manufacture	April 2011	March 2014
2.	ENV-16	Study on present dust emission levels and available technologies for reducing the dust emission at stone crushers	April 2012	March 2014
3.	TQM-11	Benchmarking of quality parameters for Indian cement industry	April 2012	March 2014
4.	INT-02	Testing Services as per Standard Specifications and Established Procedures	April 2013	March 2014
5.	GMR-08	Updating of National Inventory of Cement Grade Limestone Deposits	April 2013	March 2014
6.	EMG-01	Study of Energy, Environment and Quality Performance Achievements and Creating Conditions for their Consistent Improvement	April 2013	March 2014
7.	INF-01	Collection, Storage, Retrieval and Dissemination of Bibliographical and Other Technical Information	April 2013	March 2014
8.	PBL-01	Dissemination of Research Results and Information on NCB	April 2013	March 2014
9.	SMC-01	Organisation of National and International Seminars/ Conferences	April 2013	March 2014
10.	HRD-01	Long Term Courses	April 2013	March 2014
11.	HRD-02	Updating Knowledge and Skills of NCB Officials	April 2013	March 2014
12.	CCE-02	Short Term Courses	April 2013	March 2014
13.	CCE-03	Contact Training Programmes for Industrial Personnel	April 2013	March 2014
14.	CCE-06	Special Programmes for Industry Personnel from India and Abroad	April 2013	March 2014
15.	SBC-01	Simulator Based Courses	April 2013	March 2014
16.	CLS-01	Calibration Services	April 2013	March 2014
17.	SRM-01	Development of Standard Reference Materials	April 2013	March 2014
18.	SRM-02	Supply of Standard Reference Materials	April 2013	March 2014

## Appendix - III

### Sponsored Projects Completed During the Year 2013-14

Sl. No	SP. No.	Projects Title	Sponsor
<b>CENTRE FOR CEMENT RESEARCH AND INDEPENDENT TESTING (CRT)</b>			
1.	2718	Development of technology papers for reduction of CO <sub>2</sub> in Indian cement industry	Confederation of Indian Industry (CII)
2.	2741	Bore hole limestone analysis	Vicat Sagar Cement Pvt. Ltd
3.	2870	Characterization and evaluation of raw materials for Cement Manufacture	Birla Cement, Chittorgarh
4.	3049	Performance evaluation of Blaine's apparatus and certification	Inditech Systems, Pune
5.	3092	Optimization of raw mix design for maximizing utilization of ESF cake as raw mix component in the manufacture of OPC	Tata Chemicals Ltd., Mithapur, Gujarat
6.	3096	Raw mix design for the manufacture of OPC	National Cement Co. Ltd., Kenya
7.	3175	Research study on manufacture of gypsum from marble slurry for subsequent use in cement production	Centre for Development of Stones (CDOS), Jaipur, Rajasthan
8.	3198	Cement quality monitoring services	Bheema Cements Limited, Hyderabad
9.	3218	Testing of Physical and Chemical Properties of Fly ash as per IS:3812(I)-2003	NTPC, Ramagundam
10.	3239	Characterization and evaluation of raw materials, fuel and clinker	UltraTech Cement, Jaffarabad
11.	3242	Cement Quality monitoring services	JSW Cement Ltd., Distt Kurnool, A.P.
12.	3257	Investigations on technical suitability of gypsum prepared with jarosite and marble slurry as set controller for cement manufacturing	Hindustan Zinc Limited, Udaipur
13.	3265	Establishing limestone consumption factor	Ultra Tech Cement, Jaffarabad
14.	3272	Establishing limestone consumption factor	Dalmia Cement (B) Ltd., Kadapa, A.P.
15.	3284	Study on the use of dolomite /marble as performance improver	UltraTech Cement, (Birla white), Jodhpur
16.	3288	Cement quality monitoring services	Penna Cement Ltd. A.P.
17.	3323	Raw mix design optimization based on burnability investigations for making clinker for 53 grade OPC	Mawmluh Cherra Cements Ltd., Meghalaya

Sl. No	SP. No.	Projects Title	Sponsor
18.	3333	Optical microscopy and wet sieve analysis of raw mixes and kiln feed	UltraTech Cement Ltd. (Unit. Birla White), Jodhpur
19.	3339	Evaluation of overburden stone for use in cement manufacture and as coarse aggregate in cement concrete	Grasim Industries (Unit: Kotputuli)
20.	3341	Establishing limestone consumption factor	Mangalam Cement, Kota
21.	3345	Investigations on utilization of aluminum waste in the manufacture of refractory and cement	Century Metals Recycling Pvt. Ltd. Palwal
22.	3354	Thermal investigations of coal and peat sample	FLS, Kelambakkam, TN
23.	3367	Burnability test for limestone for white cement production	SAWAClay and Minerals Pvt Ltd. Rajasthan
24.	3376	Study on burnability of raw mixes provided	J K Lakshmi Cement Ltd. Sirohi (Rajasthan)
25.	3392	Optimization of raw mix design for improving C <sub>3</sub> S content	Ambuja Cement , Darlaghat, H.P.
26.	3393	Limstone core drilling samples (100 No's) for chemical analysis	Hemadri Cements Ltd., Jaggayapet, A.P.
27.	3423	Investigations on utilization of barite sludge as mineralizer in the manufacture of OPC	Trimex Industries (P) Ltd., Chennai
28.	3430	Optimization of raw mix design for improved quality of clinker	Mangalam Cement Ltd., Kota
29.	3485	Testing of physical and chemical properties of fly ash as per IS:3812(1)-2003	NTPC, Vindhayanchal, M.P.
30.	3512	Establishing limestone consumption factor	KCP Ltd, A.P.
31.	3525	Raw mix design	Gujarat Siddhee Cement
32.	3588	Burnability study	Dalmia Cement
33.	3637	Establishing limestone consumption factor	ACC, Kymore, M.P.
34.	3638	Study for effect of SO <sub>3</sub> and IR on cement quality	UltraTech Cement, Birla White, Jodhpur
35.	3720	Characterization and evaluation of raw materials, fuels and clinker samples	Trinetra Cement Works, Mahi Cement, Banswara
36.	3721	Establishing limestone consumption factor	Penna Cement Industries Limited, Tandur

Sl. No	SP. No.	Projects Title	Sponsor
<b>CENTRE FOR MINING, ENVIRONMENT, PLANT ENGINEERING &amp; OPERATION (CME)</b>			
37.	2113	Survey, Geological Mapping and Supervision of Exploration, Computer-Aided Deposit Evaluation of Limestone Deposit at Ogipur, Tandur Mandal, Ranagreddy District, Andhra Pradesh	Penna Cement Industries Ltd.
38.	2663	Assessment of Air Pollution from Cement Plants using Petcoke as Fuel	Central Pollution Control Board, Delhi
39.	2664	Life Cycle Assessment (LCA) study of Cement Plants based on Alternate Fuel	Central Pollution Control Board, Delhi
40.	3168	Monitoring of environmental parameters	JK White Cement Works, Gotan, Rajasthan
41.	3169	Monitoring of environmental parameters	JK Cement Works, Gotan, Rajasthan
42.	3075	Improving the productivity of kiln through streamlining of operation and process parameters	Dalmia Cement Ltd, Kadapa, Andhra Pradesh
43.	3155	Heat & Gas Balance on Kiln	Bharathi Cement Corporation Private Ltd
44.	3264	Heat & Gas Balance on Kiln	Narmada Cements Ltd
45.	3522	Heat & Gas Balance on Kiln	Ultratech Cements Ltd
46.	3301	Technical Audit (Process & Quality Aspects)	Ambuja Cements Ltd, Rabriyawas
47.	2622	Conducting Baseline Energy Audit of the Designated Consumers under the Perform Achieve and Trade (PAT) Scheme	Energy Efficiency Services Limited (EESL)/Bureau of Energy Efficiency (BEE), New Delhi
48.	3479	PAT Advisory Services	Malabar Cements Ltd., Walayar, Kerala
49.	3033	Work study on manpower	Malabar Cements Ltd.
50.	3236	Technical Health Audit of CCI mills at Delhi Grinding Unit	Malabar Cements Ltd.
51.	3240	Preparation of pre-feasibility report for setting up 0.6 mtpa Bulk Cement Terminal at Cochin port	Malabar Cements Ltd.
52.	3248	Preparation of bench marking reports for cement projects (green & brown field) & cement grinding units of various capacities (with & without CPP)	IPICOL, Odisha
53.	3401	Assessment of Technology of Cement Plant and Cement Grinding Unit for M/s Jaypee Cement Clinkering Unit at Babupur (Satna), Madhya Pradesh and Grinding Unit at Bhilai, Chattisgarh	Jaypee Cement

Sl. No	SP. No.	Projects Title	Sponsor
54.	3564	Preparation of Pre-feasibility report for setting up a 1000 TPD white cement plant at Nauradhar, Sirmour (H.P.)	FCI Aravali Gypsum & Minerals India Ltd, Rajasthan
55.	3607	Technical Appraisal and recommendations for setting up of the proposed 600 tpd cement plant in the Republic of Congo	Embassy of Republic of Congo

#### CENTRE FOR CONSTRUCTION DEVELOPMENT AND RESEARCH (CDR)

56.	1679	Third Party Quality Assurance/Quality Audit for the Work of Reconstruction of Primary Health Centre M&CW, Centre and Construction of Poly Clinic at Mehrauli in South Zone	Executive Engineer (Pr) South, South Delhi Municipal Corporation, Sewa Nagar, New Delhi
57.	2003	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Block No.39, Shakti Nagar	Executive Engineer (Pr) CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
58.	2036	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at Khichripur Village in AC-38, Shahdara South Zone	Executive Engineer (Pr), Shahdara South, East Delhi Municipal Corporation, Krishna Nagar, Delhi
59.	2158	Third Party Quality Assurance/Quality Audit for I/U of Panchkuian Road from Baba Lal Dayal Chowk to Rani Jhansi Road towards Connaught Place S.H : Improvement of Footpath and Drainage System	Executive Engineer (Pr)-S.P Zone, North Delhi Municipal Corporation, Kashmere Gate, Delhi
60.	2193	Third Party Quality Assurance/Quality Audit for Construction of Road under Bridge on Existing Railway Line Level Crossing on Narela Lampur Road at Narela	Executive Engineer (Pr)-Narela, North Delhi Municipal Corporation, Narela, Delhi
61.	2210	Third Party Quality Assurance/Quality Audit for Construction of Drain near Chhachhi Building to near Chander Nagar Govt. School in Krishna Nagar	Executive Engineer (Pr) Shah South, East Delhi Municipal Corporation, Shahdara, New Delhi
62.	2336	Third Party Quality Assurance/Quality Audit for Construction of 17 ROBs/RUBs in Delhi S.H : Construction of RUB Adjacent to Roshnara Garden Near Under Bridge Shakti Nagar (on Delh-Ambala Line)	Executive Engineer (Pr) CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
63.	2381	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building of MC Pry School at AB Block, Shalimar Bagh	Executive Engineer (Pr) I-Rohini, North Delhi Municipal Corporation, Rohini, Delhi
64.	2382	Third Party Quality Assurance/Quality Audit for Construction of Zonal Office Building at Najafgarh Zone	Executive Engineer (Pr) NGZ, South Delhi Municipal Corporation Delhi, Kashmiri Gate, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
65.	2528	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building at MC Pry. School at Meet Nagar, Shahdara (North)	Executive Engineer (Pr) Shah (N)-I, East Delhi Municipal Corporation, Geeta Colony, Delhi
66.	2529	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building at MC Pry. School, Harizan Basti, E-Block, Gokalpur, Shahdara (North)	Executive Engineer (Pr) Shah (N)-I, East Delhi Municipal Corporation, Geeta Colony, Delhi
67.	2539	Third Party Quality Assurance/Quality Audit for Construction of Pucca School Building at M.C. Pry. School Building at Mansarover Garden in West Zone	Executive Engineer (Project-II) West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
68.	2587	Third Party Quality Assurance/Quality Audit for Construction of Maternity Home at B-Block Phase-II, Nangloi	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
69.	2610	Third Party Quality Assurance/Quality Audit for the Work of Construction of M C Pry. School Building at Shakarpur Village	Executive Engineer (Pr)-I, East Delhi Municipal Corporation, Krishna Nagar, Delhi
70.	2629	Third Party Quality Assurance/Quality Audit for the Work of W/I/S of Burari Road from Outer Road to Burari Chowk RHS Portion, Burari Chowk to Bandh and LHS Portion from Outer Ring Road to DJB Office	Executive Engineer (Project) CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
71.	2632	Third Party Quality Assurance/Quality Audit for the Work of Improvement of Roads of 60'ROW and above by Providing RMC Pavement in Najafgarh & Narela Zones	Executive Engineer (Pr.) CNG, South Delhi Municipal Corporation, Kashmere Gate, Delhi
72.	2703	Third party Quality Assurance/Quality Audit for the Work of Construction of Community Hall at Vishwas Nagar	Executive Engineer (Pro)-I Shahdara South Zone, East Delhi Municipal Corporation, Krishna Nagar, Delhi
73.	2709	Third party Quality Assurance/Quality Audit for the Work of Construction of M.C Pry School Building at Chhawla (B)	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
74.	2710	Third party Quality Assurance/Quality Audit for the Work of Providing RMC in Village Chhawla	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
75.	2720	Third party Quality Assurance/Quality Audit for the Work of Mini Stadium at Mukesh Nagar, Jwala Nagar by Providing B/W in Ward No.238	Executive Engineer (Proj.) Shah(SZ), East Delhi Municipal Corporation, Krishna Nagar, Delhi
76.	2722	Third party Quality Assurance/Quality Audit for the Work of Construction of M.C Pry School Building at Sector-7, Dwarka	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
77.	2723	Third party Quality Assurance/Quality Audit for the Work of Construction of M.C Pry School Building at Chuna Bhatti in West Zone	Executive Engineer (Project-II) WZ, South Delhi Municipal Corporation, Zakhira, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
78.	2740	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at BE-Block, Hari Nagar in West Zone	Executive Engineer (Project-II) West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
79.	2746	Third Party Quality Assurance/Quality Audit for Construction of Allopathic Dispensary at Issapur in NGZ	Executive Engineer (Proj)-NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
80.	2747	Third Party Quality Assurance/Quality Audit for Construction of Ayurvedic Panchkarma & Diabetic Centre at Village Begampur, Narela Zone	Executive Engineer (Project)-Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
81.	2753	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at Ranholla in West Zone	Executive Engineer (Project-II)-WZ, South Delhi Municipal Corporation, Zakhira, Delhi
82.	2758	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at C-Block, Jahangirpuri C-20/CLZ	Executive Engineer (Pr)-CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
83.	2761	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at A-Block, Jahangirpuri C-16/CLZ	Executive Engineer (Pr)-CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
84.	2763	Third Party Quality Assurance/Quality Audit for Construction of Polyclinic (Bigger Unit) Building at Burari	Executive Engineer (Pr)-CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
85.	2786	Third Party Quality Assurance/Quality Audit for Construction of M C Pry School Building at Tagore Garden Extension-I & II in West Zone	Executive Engineer (Project-II)-WZ, South Delhi Municipal Corporation, Zakhira, Delhi
86.	2813	Third Party Quality Assurance/Quality Audit for Construction of Pucca M C Pry School Building at HU Block Pitampura, North, Rohini Zone	Executive Engineer (Pr)-I/ Rohini, North Delhi Municipal Corporation, Rohini, Delhi
87.	2814	Third Party Quality Assurance/Quality Audit for Construction of M&CW Centre in Village Nilochi C-31/NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
88.	2819	Third Party Quality Assurance/Quality Audit for the Work of Construction of MC Pry School Building at Kishan Kunj, Laxmi Nagar Ward No.222, AC-58	Executive Engineer (Pr)-I Shah. South, East Delhi Municipal Corporation, Krishna Nagar, Delhi
89.	2820	Third Party Quality Assurance/Quality Audit for the Work of Widening of Patparganj Road from Ganesh Nagar Chowk to NH-24 in AC-58 Sah South S.H : Construction of Central Verge, construction of Footpath and Drain and Widening of Carriageway	Executive Engineer (M)-IV, East Delhi Municipal Corporation, Shahdara South Zone, Shakarpur, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
90.	2822	Third Party Quality Assurance/Quality Audit for the Work of Strengthening of Road in Dilshad Garden (Dharam Kanta GT Road Maleria Office) by Providing Dense Carpeting in Vivek Vihar S.H : Improvement & Development of Drain and Improvement of Side Berms by Providing Drain in Vivek Vihar	Executive Engineer (Pr)-I Shah. South, East Delhi Municipal Corporation, Krishna Nagar, Delhi
91.	2835	Third Party Quality Assurance/Quality Audit for Construction of Community Hall at E-Block, Sultanpuri, Ward No.39 in Rohini Zone	Executive Engineer (Project) Rohini-II, North Delhi Municipal Corporation, Rohini, Delhi
92.	2836	Third Party Quality Assurance/Quality Audit for Construction of MC Primary School Building at F-Block, Sultanpuri Ward No.C-40, Rohini Zone	Executive Engineer (Project) Rohini-II, North Delhi Municipal Corporation, Rohini, Delhi
93.	2859	Third Party Quality Assurance/Quality Audit for Construction of M. C. Pry. School Building at Bharthal (G) in Ward No. 141/NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
94.	2871	Third Party Quality Assurance/Quality Audit for Construction of M. C. Pry. School Building at Chhawla (G) in NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
95.	2873	Third Party Quality Assurance/Quality Audit for Construction of M. C. Pry. School Building at Kharkhari Jatmal in NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
96.	2878	Third Party Quality Assurance/Quality Audit for Construction of MC Pry School Building at Khera Dabar in NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
97.	2879	Third Party Quality Assurance/Quality Audit for Construction of Drain (Box Drain) in Village Chhawla from Phirni to Najafgarh Drain near Nirmal Dham, Ward No.133/NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
98.	2880	Third Party Quality Assurance/Quality Audit for Improvement of Phirni Road by RMC in Villages Samaspur, Bakkargarh, Kair, Malikpur & Khaira in Ward No.140/NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
99.	2881	Third Party Quality Assurance/Quality Audit for Improvement of Phirni Road by RMC in Villages Dhansa in NGZ Ward No.140	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
100.	2891	Third Party Quality Assurance/Quality Audit for Construction of Multipurpose Block at SDN Hospital Shahdara (North) Zone	Executive Engineer (Pr) Shah (N)-I, East Delhi Municipal Corporation, Geeta Colony, Delhi
101.	2893	Third Party Quality Assurance/Quality Audit for Construction of M.C. Pry School Building at C-Block Lajpat Nagar-II Ward No. 155/CZ	Executive Engineer (Project)-I CZ, South Delhi Municipal Corporation, Lajpat Nagar, New Delhi

Sl. No	SP. No.	Projects Title	Sponsor
102.	2895	Third Party Quality Assurance/Quality Audit for Construction of Unani Dispensary in C-Block , Lajpat Nagar-II in Ward No. 155/CZ	Executive Engineer (Project)-I CZ, South Delhi Municipal Corporation, Lajpat Nagar, New Delhi
103.	2900	Third Party Quality Assurance/Quality Audit for Providing RMC and Construction of Outfall Drain on various Roads in Mundka Village in C-30/NGZ	Executive Engineer (NGZ), South Delhi Municipal Corporation, Kashmiri Gate, Delhi
104.	2910	Third Party Quality Assurance/Quality Audit for Construction of MC Pry School Building at Sector-20, Rohini	Executive Engineer (Pr.) Rohini, North Delhi Municipal Corporation, Rohini, Delhi
105.	2911	Third Party Quality Assurance/Quality Audit for Construction of MC Pry School Building at X-II Block, Brahmpuri in Ward No.254 Shah (N) Zone	Executive Engineer (Project) Shah N-II, East Delhi Municipal Corporation, New Usmanpur, Delhi
106.	2927	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School at Sabhapur Gujran, Ward No.27, Shah (N) Zone.	Executive Engineer Project (Shah. N)-II, East Delhi Municipal Corporation, Usmanpur, Delhi
107.	2929	Third Party Quality Assurance/Quality Audit for work of Imp. Dev. of Brahmpuri Road drain Chuhan Banger Side (Gokalpur drain-Akhare wali gali) by pdg. B/W from in Chauhan Banger Shah.(North)	Executive Engineer Project (Shah. N)-II, East Delhi Municipal Corporation, Usmanpur, Delhi
108.	2934	Third Party Quality Assurance/Quality Audit for work of construction of school Building at M C Pry. school, Shakarpur No.1, AC-58, Shahdara South by providing 0 from in Shakarpur	Executive Engineer (Pr)-I Shahdara South Zone, East Delhi Municipal Corporation, Krishna Nagar, Delhi
109.	2936	Third Party Quality Assurance/Quality Audit for work of construction of Chest Clinic in relocation colony C-Block, Shahdara Daulatpur, Ward No. C-26	Executive Engineer(Project)-II/ Rohini Zone, North Delhi Municipal Corporation, Sector-17, Rohini, Delhi
110.	2938	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School, Guru Ram Dass Nagar, ward No.222, AC-58 Shahdara South	Executive Engineer (Pr)-I, Shahdara South Zone, East Delhi Municipal Corporation, Krishna Nagar Delhi
111.	2942	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School at Mukherjee Nagar (New) in C-11/CLZ	Executive Engineer (Project)-I/CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
112.	2945	Third Party Quality Assurance/Quality Audit for work of Construction of MC Pry School at Chander Vihar in Ward No. 218 Shahdara South Zone	Executive Engineer (Pr)-II(Sh.S), East Delhi Municipal Corporation, Asaf Ali Road, Delhi
113.	2946	Third Party Quality Assurance/Quality Audit for work of Construction of community hall at G block Shakurpur JJ Colony in Ward No. C-64 Rohini Zone	Executive Engineer (Project)-I/ Rohini Zone, North Delhi Municipal Corporation, Sector-17, Rohini, Delhi
114.	2947	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. school Jashola village in Ward No. 208, CNZ	Executive Engineer (Pr)-Central-II, South Delhi Municipal Corporation, Under Sewa Nagar, New Delhi

Sl. No	SP. No.	Projects Title	Sponsor
115.	2951	Third Party Quality Assurance/Quality Audit for work of Construction of Community Hall at P Block, Mangolpuri in Rohini Zone	Executive Engineer (Project)-II/ Rohini Zone, North Delhi Municipal Corporation, Sector-17, Rohini, Delhi
116.	2952	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School at Prem Nagar in Ward No.C-36, Rohini Zone	Executive Engineer (Project)-I/ Rohini Zone, North Delhi Municipal Corporation, Sector-17, Rohini, Delhi
117.	2953	Third Party Quality Assurance/Quality Audit for work of Construction of Community hall at Opposite Block – 24 & 25 Trilok puri	Executive Engineer DD-VII Delhi Urban Shelter Improvement Board, Kirloki, New Delhi
118.	2955	Third Party Quality Assurance/Quality Audit for work of Re-construction of Dhobi Ghat at Sunlight Colony Ward No. 156, Central Zone	Executive Engineer (Pr) Central-I, South Delhi Municipal Corporation, Lajpat Nagar, Delhi
119.	2962	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School Qutabgarh in C-28 Narela Zone	Executive Engineer(Project) Narela Zone, North Delhi Municipal Corporation, Narela Delhi
120.	2964	Third Party Quality Assurance/Quality Audit for work of Construction of Ayurvedic dispensary building at village Chhawla in NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
121.	2965	Third Party Quality Assurance/Quality Audit for work of Construction of Ayurvedic dispensary building at village Galipur in NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
122.	2967	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School building at M C Pry. School, Amar Colony in Ward No.160, Central Zone	Executive Engineer (Pr) Central-I, South Delhi Municipal Corporation, Lajpat Nagar, Delhi
123.	2969	Third Party Quality Assurance/Quality Audit for work of Construction of Sport Complex and senior citizen recreation center in village Pooth Khurd in Narela Zone	Executive Engineer(Project) Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
124.	2978	Third Party Quality Assurance/Quality Audit for work of Construction of Community hall near dispensary at HAF sector-17, Dwarka in C-136/NGZ	Executive Engineer (Project) NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
125.	2979	Third Party Quality Assurance/Quality Audit for work of Construction of New Chest Clinic SPM Marg (Pilli Kothi) in City Zone	Executive Engineer (Project) CZ, North Delhi Municipal Corporation, Asaf Ali Road, Delhi
126.	2984	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School Dariyapur (Boys) in C-28 in Narela Zone	Executive Engineer (Project) Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
127.	3002	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School EE-I block at Sant Ravidass Nagar (Jahangirpuri) in C-05/CLZ	Executive Engineer (Project) CLZ, North Delhi Municipal Corporation, Sindhora Kalan, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
128.	3010	Third Party Quality Assurance/Quality Audit for work of construction of community Hall at Pocket-1, Sec-17 Dwarka Ph-I in C-135/NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
129.	3011	Third Party Quality Assurance/Quality Audit for work of Construction of Community Hall at Manglapuri, Ward No. 130/NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
130.	3012	Third Party Quality Assurance/Quality Audit for work of Construction of Community Hall at HAF Pocket B Sec-22, Dwarka C-136/NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
131.	3015	Third Party Quality Assurance/Quality Audit for work of road restoration by providing RMC for the construction of Sewer Network for Trunk Main Sewer under Nilothi STP on Main Najafgarh Nangloi Road from Baprolla to Kammruddin Nagar in C-32/NGZ	Executive Engineer (M-II) NGZ, South Delhi Municipal Corporation, Zakhira Delhi
132.	3023	Third Party Quality Assurance/Quality Audit for work of construction of Community Hall at HAF Pocket-B, Sector-12, Dwarka in C-135/NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
133.	3024	Third Party Quality Assurance/Quality Audit for work of construction of Community Hall at HAF Pocket-3, Sector-23, Dwarka in NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
134.	3030	Testing and Evaluation of Power Grout	Marketing & Transit (India) Ltd, New Delhi
135.	3036	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School Building at M C Pry. School at Tilak Nagar No.2 with sports Complex West Zone	Executive Engineer (Project)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
136.	3037	Third Party Quality Assurance/Quality Audit for work of Trans Yamuna Area Development Board (TYADB) SH: Construction of Community hall at Block-A New Seema Puri	Executive Engineer (DD-VI) Delhi Urban Shelter Improvement Board, Kilokri, New Delhi
137.	3039	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building at M C Pry. School at Peeragarhi in West Zone	Executive Engineer (Project)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
138.	3040	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca school building at M C Pry. School at B-3, Raghubir Nagar in West Zone	Executive Engineer (Project)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
139.	3041	Third Party Quality Assurance/Quality Audit for work of construction of Boundary wall in M C Pry. School at Gopal Pur in C-11/CLZ	Executive Engineer (Project)-I, CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
140.	3044	Third Party Quality Assurance/Quality Audit for work of Construction of boundry wall, U. G. water tank, water harvesting, septic tank, pump room, generator room & development of ground at Zonal office building Nagafgarh Zone.	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
141.	3046	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building at M C Pry. School at Tilak Nagar No.4 in West Zone.	Executive Engineer (Project)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
142.	3054	Third Party Quality Assurance/Quality Audit for work of Improvement of SC/ST Basties in Mangolpuri SH: Construction of community Hall at Block-L Mangolpuri	Executive Engineer DD-II Delhi Urban Shelter Improvement Board, Raja Garden, New Delhi
143.	3056	Third Party Quality Assurance/Quality Audit for work of Improvement of SC/ST Basties in Mangolpuri SH: Construction of Community Hall at Block-R Mangolpuri	Executive Engineer DD-II Delhi Urban Shelter Improvement Board, Raja Garden, New Delhi
144.	3064	Third Party Quality Assurance/Quality Audit for work of construction of additional room at Jangpura Polyclinic in W. No. 156 Central Zone	Executive Engineer (Pr-I) Central Zone, South Delhi Municipal Corporation, Lajpat Nagar, Delhi
145.	3067	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School Building at M C Pry. School at 1212 Paschim Puri in West Zone	Executive Engineer (Pr)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
146.	3072	Third Party Quality Assurance/Quality Audit for work Construction of M C Pry. School, Bhorgarh in Narela Zone Including demolition of old Structure	Executive Engineer (Project), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
147.	3080	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School Building at M C Pry. School at Bhagirathi Vihar, Shahdara (North)	Executive Engineer (Project-II), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
148.	3087	Third Party Quality Assurance/Quality Audit for work of Re-construction of M C Pry. School at Sant Ravidas Nagar (Jahangirpuri)-I blocks in C-19/CLZ	Executive Engineer (Pr-I), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
149.	3088	Condition Assessment of RCC Members of Telephone Exchange Building at Kidwai Bhawan, Janpath, New Delhi	Executive Engineer (Civil), Mahanagar Telephone Nigam Ltd, Eastern Court, New Delhi
150.	3089	Structural Quality Assessment of Administrative Building and Control Building at Western Region Pipeline, Gauridad, Rajkot	Indian Oil Corporation Limited, Western Region Pipelines, Gauridad, Rajkot, Gujarat
151.	3090	Third Party Quality Assurance/Quality Audit for work of Re-construction of Community Hall in place of Physical centre at Punjabi Colony, Narela in Narela Zone	Executive Engineer (Project), Narela, North Delhi Municipal Corporation, Narela, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
152.	3094	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School, C Block Krishna Nagar by providing form in Krishna Nagar	Executive Engineer (Pr-I), Shah-South, East Delhi Municipal Corporation, Krishna Nagar, Delhi
153.	3099	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building at M C Pry. School at Vishal Enclave in West Zone	Executive Engineer (Project-II), Zakhira, South Delhi Municipal Corporation, Zakhira, Delhi
154.	3100	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building in M C Pry. School at Tilangpur Kotla in West Zone	Executive Engineer (Project-II), Zakhira, South Delhi Municipal Corporation, Zakhira, Delhi
155.	3101	Distress Evaluation & Damage Assessment of Hostel Building of Indian Institute of Public Administration at New Delhi	Indian Institute of Public Administration, Indraprastha Estate, New Delhi
156.	3103	Third Party Quality Assurance/Quality Audit for work of Improvement of drainage system from Balka Chowk Phirni Road to C-2, block near sump well up to Shamshan Ghat in Aya Nagar in ward no. 175 South Zone	Executive Engineer (Pr-II), South, South Delhi Municipal Corporation, Sewa Nagar, New Delhi
157.	3106	Testing of Cement, Coarse Aggregate, Fine Aggregate, Flyash, Murrum, Reinforcement and Concrete Cube for APMC Project at Rajkot, Gujarat	Kunal Structures (India) Pvt Ltd, Rajkot, Gujarat
158.	3107	Third Party Quality Assurance/Quality Audit for work of improvement of cremation ground at Nasirpur near DDA Office, Manglapuri, Ward No. 130, NGZ	Executive Engineer (Project)-NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
159.	3112	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building at M C Pry. School, Sec-3, Rohini in Rohini Zone	Executive Engineer (Project)-I, Rohini, North Delhi Municipal Corporation, Sector-17, Delhi
160.	3115	Third Party Quality Assurance/Quality Audit for work of construction of M C Pry. School Mubarakpur Dabas after dismantling the old dilapidate & dangerous school building Narela Zone	Executive Engineer (Project), Narela, North Delhi Municipal Corporation, Narela, Delhi
161.	3117	Third Party Quality Assurance/Quality Audit for work of Construction of M C Pry. School Indian Air Lines, Vasant Vihar in Ward No. 165/SZ	Executive Engineer (Pr.) South-I, South Delhi Municipal Corporation, Sewa Nagar, New Delhi
162.	3124	Consultancy Services for Structural Evaluation and Remedial Measures of RCC Slab, Beams etc of Peripheral S.W Drain in Sector-3 & 13A Dwarka	Executive Engineer, Delhi Development Authority, South Western Division No.7, Dwarka, New Delhi
163.	3125	Third Party Quality Assurance/Quality Audit for work of construction of School Building in M C Pry. School at Chanchal Park, Bakkarwala in West Zone.	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
164.	3126	Third Party Quality Assurance/Quality Audit for work of construction of community Hall, DTC Colony in Karol Bagh Zone	Executive Engineer (Project), KBZ, North Delhi Municipal Corporation , Old Rajinder Nagar, New Delhi
165.	3131	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School Building in M C Pry. School at Possangi Pur in West Zone	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
166.	3133	Third Party Quality Assurance/Quality Audit for work of construction of Culver/Small Bridge over Kachcha Drain at 8-Block, Geeta Colony near M&CW Centre in Ward Krishna Nagar in AC-60	Executive Engineer (M-I), Shah-S, East Delhi Municipal Corporation , Geeta Colony, Delhi
167.	3137	Third Party Quality Assurance/Quality Audit for work of Development of Unauthorized Colony at nine sites of Najafgarh Zone	Executive Engineer (M)-I, NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
168.	3144	Third Party Quality Assurance/Quality Audit for work of Improvemnet and Dev. of Kalyanvas Road from Chand Cinema to DJB office by pdg F/P from both sides in W.No. 219/AC-57 Shah-S Zone	Executive Engineer (M)-IV, Shah – South, East Delhi Municipal Corporation, Shakarpur, Delhi
169.	3145	Third Party Quality Assurance/Quality Audit for work of Improvement development of RUB Madhuban by pdg and fixing crash barriers, interlocking tiles on footpath and painting etc. in W.No.223/AC-58 Shah (S) Zone in Shakarpur	Executive Engineer (M)-IV, Shah – South, East Delhi Municipal Corporation, Shakarpur, Delhi
170.	3146	Third Party Quality Assurance/Quality Audit for work of construction of Electric Substation at SDN Hospital Shahdara (North) Zone	Executive Engineer (Project-I), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
171.	3148	Third Party Quality Assurance/Quality Audit for work of construction of pucca school building in M C Pry. School at Rajouri Garden (main) in West Zone	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
172.	3149	Third Party Quality Assurance/Quality Audit for work of construction of M C Pry. School, 9 blocks, Geeta Colony, Ward No. -229, AC-69 by pdg 0 in Krishna Nagar	Executive Engineer (Project), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
173.	3150	Third Party Quality Assurance/Quality Audit for work of construction of community hall at block-10, Geeta Colony in Krishna Nagar SH: C/o B/Wall and development of ground by providing B/W from in Krishna Nagar	Executive Engineer (Project), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
174.	3151	Third Party Quality Assurance/Quality Audit for work of construction of M C Pry. School at C-4-E, Janakpuri in West Zone	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
175.	3152	Third Party Quality Assurance/Quality Audit for work of construction of pucca school building in M C Pry. School at B-2, B, Janakpuri in West Zone	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
176.	3153	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School building in M C Pry. School at B-3-A, Janakpuri in WZ	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
177.	3156	Third Party Quality Assurance/Quality Audit for work of Construction of Pucca School Building in M C Pry. School at Lajwanti Garden in WZ	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
178.	3160	Third Party Quality Assurance/Quality Audit for work of improvement development of road from 8 block dispensary to bhudh bazaar road near gas godam colony by pdg RMC from in Krishna Nagar SH: Imp. Dev. Of road from H.No.A-5 in Krishna Nagar to H.NO. 718/11 in Jheel by RMC in Krishna Nagar	Executive Engineer (Project-I), Shah-S, East Delhi Municipal Corporation , Geeta Colony, Delhi
179.	3163	Third Party Quality Assurance/Quality Audit for work of construction of lawn Tennis Court and changing room for players in Kirti Nagar Sports complex in Karol Bagh Zone	Executive Engineer (Project), KBZ, North Delhi Municipal Corporation, Old Rajinder Nagar, New Delhi
180.	3165	Third Party Quality Assurance/Quality Audit for work of construction of additional stair case and additional toilet block at each level in M C Pry. School, Prem Nagar in ward no. C-94/KBZ	Executive Engineer (Project) M-II, KBZ, North Delhi Municipal Corporation, Old Rajinder Nagar, New Delhi
181.	3166	Ultrasonic Pulse Velocity (UPV) Testing of the Concrete of TG Deck of Unit-III & IV at Muzaffarpur Thermal Power Station	Kanti Bijlee Utpadan Nigam Ltd, Muzaffarpur Thermal Power Station, Distt. Muzaffarpur, Bihar
182.	3181	Third Party Quality Assurance/Quality Audit for work of reconstruction of M and CW Centre at D-Block Sant Ravidas Nagar (Jahangirpuri) in C-05/CLZ	Executive Engineer (Pr.) CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
183.	3182	Condition Assessment of Residential Tower Shipra and Kaveri of Income Tax Department at Vaishali, Ghaziabad	Executive Engineer, Noida Central Division, Central Public Works Department, Indra Prastha Bhawan, New Delhi
184.	3183	Third Party Quality Assurance/Quality Audit for work of construction of Pucca school building at M C Pry. School at A-4-C Janakpuri in West Zone (Part B demolishing of existing old structure)	Executive Engineer (Pr.)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
185.	3184	Third Party Quality Assurance/Quality Audit for work of construction at M C Pry. School Nanak Pura in Ward No. 168 South Zone	Executive Engineer (Pr.) South-I, South Delhi Municipal Corporation, Sewa Nagar, New Delhi

Sl. No	SP. No.	Projects Title	Sponsor
186.	3185	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School Building at M C Pry. School at J J Hasthaal No.2 in West Zone	Executive Engineer (Pr.)-II, West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
187.	3187	Creep Testing of Concrete at NCB-Ballabgarh for Lafarge Aggregate & Concrete Pvt Ltd	Zonal Quality Manager North, Lafarge Aggregate & Concrete Pvt Ltd, Gurgaon
188.	3188	Third Party Quality Assurance/Quality Audit for work of improvement/Strength of Mori Gate Bus Terminal towards Kashmere Gate Metro Station X-ing in C-78/CLZ	Executive Engineer (Pr.) CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
189.	3192	Third Party Quality Assurance/Quality Audit for work of construction of community hall near Sidh Apartment by providing from balance work in I.P. Extn	Executive Engineer (Project), Shah-South, East Delhi Municipal Corporation, Krishna Nagar, Delhi
190.	3193	Third Party Quality Assurance/Quality Audit for work of remodeling and covering of Nallah by providing RCC item from Ward No. 198 EE(M)-III/Central Zone in Pul Peahldpur	Executive Engineer (M)- III/ Central Zone, South Delhi Municipal Corporation, Jal Vihar, Delhi
191.	3196	Third Party Quality Assurance/Quality Audit for work of construction in M C Pry. School at Burari (Girls) in C-7/CLZ	Executive Engineer (Pr.) CLZ, North Delhi Municipal Corporation of Delhi, Shakti Nagar, Delhi
192.	3197	Third Party Quality Assurance/Quality Audit for work of improvement of internal lanes by P/L RMC and drainage system in A and B Block, Ashok Vihar, Phase-I in C-68 Rohini Zone	Executive Engineer (Pr.) CLZ, North Delhi Municipal Corporation of Delhi, Shakti Nagar, Delhi
193.	3199	Evaluation of Concreting Materials and concrete mix proportions for SG Area and Offsite Civil works package for NTPC Kudgi Super Thermal Power Project, Bijapur (NCB - Hyderabad)	NTPC Limited Kudgi Super Thermal Project, Bijapur, Karnataka
194.	3201	Third Party Quality Assurance/Quality Audit for work of Remodeling of drain no.14 SH: connection of storm water discharge of NDMC drain no 12 to MCD Drain No. 14 at the intersection of Purana Quila Road and Mathura Road through trenchless technology	Executive Engineer (Pr.)-III Central Zone, South Delhi Municipal Corporation, Asaf Ali Road, New Delhi
195.	3202	Third Party Quality Assurance/Quality Audit for work of construction of Pucca School building in M C Pry. School at M-Block Raghubir Nagar in WZ	Executive Engineer (Project-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi
196.	3203	Third Party Quality Assurance/Quality Audit for work of construction of Gym and labour welfare centre at old Chandrawal, Majnu Ka Tilla in C-78/CLZ	Executive Engineer (Project) CLZ, North Delhi Municipal Corporation of Delhi, Shakti Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
197.	3205	Evaluation of concreting materials and concrete mix proportions for TG area and civil work package for NTPC-Kudgi Super Thermal Power Project, Bijapur, Karnataka	NTPC Limited Kudgi Super Thermal Power Project, Bijapur, Karnataka
198.	3206	Evaluation of Concreting materials & concrete mix proportions for work of main plant, CW, offsite civil works and chimney & chimney elevator package for NTPC - Solapur Super Thermal Power Project, South Solapur M/s IVRCL Ltd.	NTPC Ltd, Solapur Super Thermal Power Project, Solapur, Maharashtra
199.	3216	Third Party Quality Assurance/Quality Audit for work of improvement of surrounding area of Hotels and Guest Houses in Darya Ganj behind Jama Masjid and near old Delhi Railway Station, Church Mission Road CZ SH: Streetscaping of road from Netaji Subhash Marg to Netaji Subhash Marg Behind Jama Masjid in City Zone	Executive Engineer (Pr) City Zone, North Delhi Municipal Corporation, Asaf Ali Road, Delhi
200.	3221	Third Party Quality Assurance/Quality Audit for work of construction of M&CW centre at Vill. Tikri in C-30 in Narela	Executive Engineer (Project), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
201.	3222	Third Party Quality Assurance/Quality Audit for work of construction of M&CW centre at Ghevra in C-30 in Narela	Executive Engineer (Project), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
202.	3225	Third Party Quality Assurance/Quality Audit for work of construction in M. C. Pry. School Bhalaswa Diary in CLZ	Executive Engineer (Project-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
203.	3227	Third Party Quality Assurance/Quality Audit for work of construction of pedestrian bridge on Barapulla Nallah between Graveyard at Lodhi Road and Nizamuddin Basti/ in Ward No. 154 Central Zone	Executive Engineer (M-I) Central Zone, South Delhi Municipal Corporation, Defence Colony, New Delhi
204.	3228	Third Party Quality Assurance/Quality Audit for work of construction of Community Hall at G-block at Jahangirpuri behind Dhobi Ghat in C-16/CLZ	Executive Engineer (Project-I), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
205.	3233	Third Party Quality Assurance/Quality Audit for work of providing RMC from Drawka tent house to flood drain on Old Matiala Road in Ward No. 148/NGZ (Madhu Vihar)	Executive Engineer (Pr.-I), NGZ, South Delhi Municipal Corporation, Kashmeri Gate, Delhi
206.	3235	Third Party Quality Assurance/Quality Audit for work of Remodeling of existing deteriorated brick Nallah by RCC box Nalla Starting from Pkt-E Mayur Vihar Ph-II through Sanjay Lake to Kalyanvas in AC-57 Shahdara South Zone	Executive Engineer (Project), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
207.	3237	Third Party Quality Assurance/Quality Audit for work of construction of Community Hall SH: Construction of Dispensary/CFC at Pro. No. 10058/XII, Nawab Ganj Gali Zamir Wali	Delhi Urban Shelter Improvement Board, Government of NCT of Delhi, DD-IV, Maharana Pratap Bagh, New Delhi
208.	3243	Evaluation of Concrete Material and concrete mix proportions for Civil Works of Construction of Permanent Campus for Indian Institute of Technology (IIT), Hyderabad	Indian Institute of Technology, Hyderabad
209.	3244	Third Party Quality Assurance/Quality Audit for work of Lowering of G.T/ road near Tripolia Gate in front of R.P. Bagh in C-70/CLZ	Executive Engineer (Project-I), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
210.	3247	Third Party Quality Assurance/Quality Audit for the work of Development of Unauthorized Colony by providing & laying RMC and Construction of drain at three sites of Najafgarh Zone	Executive Engineer (M-II), NGZ, South Delhi Municipal Corporation, Zakhira Flyover, Delhi
211.	3249	Third Party Quality Assurance/Quality Audit for work of construction of community room at J-block, Seemapuri	Executive Engineer, DD-VI Delhi Urban Shelter Improvement Board, Community Hall, Kilokri, Delhi
212.	3251	Third Party Quality Assurance/Quality Audit for work of improvement development of drain and construction of footpath from connecting road from PWD Road No. 64 to along Dilshad Colony from G-191 to F-198 in Ward No. 240 Shahdara North Zone	Executive Engineer (Project-I), Shah -N, East Delhi Municipal Corporation, Geeta Colony, Delhi
213.	3253	Third Party Quality Assurance/Quality Audit for work of Improvement strengthening of 1st Pusta Road, Usmanpur in AC-65 Shah North Zone	Executive Engineer (Project-II) , Shah -N, East Delhi Municipal Corporation, New Usmanpur, Delhi
214.	3255	Third Party Quality Assurance/Quality Audit for work of remodeling of drain at Shani Bazar Road in Sunder Nagari AC-63 Shahdara North Zone	Executive Engineer (Pr-I) ,Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
215.	3258	Third Party Quality Assurance/Quality Audit for work of construction of M C Pry. School Deendarpur after demolishing of existing old structure in C-134/NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Kashmeri Gate, Delhi
216.	3259	Third Party Quality Assurance/Quality Audit for work of construction in M C Pry. School Tajpur Goyla C-134/NGZ	Executive Engineer(Pr.) NGZ, South Delhi Municipal Corporation, Kashmeri Gate, Delhi
217.	3261	Third Party Quality Assurance/Quality Audit for work of improvement/strengthening of 13.5 mtr and 18 mtr ROW road sector-15, Rohini. SH: C/o drain and improvement of side berms of 13.5 mtr ROW road	Executive Engineer (Project)-I, Rohini, North Delhi Municipal Corporation, Rohini, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
218.	3263	Third Party Quality Assurance/Quality Audit for work of Construction of Road, Lane and Drain at seven Site of Rohini Zone	Executive Engineer (M)-I, Rohini Zone, North Delhi Municipal Corporation., Near Keshavpuram, New Delhi
219.	3266	Third Party Quality Assurance/Quality Audit for work of construction of RCC drain and footpath along dividing road of Jahangirpuri Colony and Mahindra Park from Shah Alam Bandh road in main road of Jahangirpuri Colony in CLZ	Executive Engineer (Pr-I), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
220.	3267	Third Party Quality Assurance/Quality Audit for work of improvement of internal lanes by pdg RMC and drainage system in CC-block Shalimar Bagh C-55, Rohini Zone	Executive Engineer (Project)-I, Rohini, North Delhi Municipal Corporation, Sector-17, Delhi
221.	3269	Third Party Quality Assurance/Quality Audit for work of construction in M C Pry. School at Jahangirpuri E - Block in CLZ SH: C/o boundary wall, development of ground and other miscellaneous works	Executive Engineer (Pr-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
222.	3273	Third Party Quality Assurance/Quality Audit for work of construction of Community Hall at 12 block Geeta Colony SH: pdg marble wash on outer surface, sanitary fitting and kotala stone in staircase etc in Geeta Colony	Executive Engineer (Pr-), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
223.	3275	Third Party Quality Assurance/Quality Audit for work of improvement Development of Shanti Marg from Narwana Road to main road Mandawali by pdg RMC from in Ward No. 217/AC-57 Shah-S Zone in Vinod Nagar	Executive Engineer (M)-IV, Shah-S East Delhi Municipal Corporation, Shakarpur, Delhi
224.	3277	Third Party Quality Assurance/Quality Audit for work of construction of Shed in front of casualty block additional accommodation of manifold rooms and providing miscellaneous additional works in 120 bedded ward in SDN hospital Shahdara South Zone	Executive Engineer (Project-I), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
225.	3278	Evaluation of Materials and Concrete Mix Design for Construction of Main Plant for 1x500 MW Vindhyachal Super Thermal Power Project, Stage-V, Vindhya Nagar, Singrauli (awarded M/s L&T Ltd)	NTPC Limited, Vindhyachal Super Thermal Power Project, PO Vindhya Nagar, Distt Singrauli, MP
226.	3279	Third Party Quality Assurance/Quality Audit for work of construction of M C Pry. School building at Shastri Nagar in Ward No 230 Shahdara South Zone	Executive Engineer (Pr-), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
227.	3280	Third Party Quality Assurance/Quality Audit for work of remodeling of Kasturba Nagar drain Ph-III from Gali No. 10, Vishwas Nagar, Ward No. 226 AC-59	Executive Engineer (Pr-), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
228.	3281	Testing and Evaluation of Materials for Kiru-Kwar HE Project, Dulhasti Power Station, J&K	NHPC Limited, Kiru-Kwar HE Project, Dulhasti Power Station, Kistwar (J&K)
229.	3283	Third Party Quality Assurance/Quality Audit for work of (i) construction of recreation centre in Paschim Vihar in C-41 WZ now Rohini Zone and in Nagin Lake apartment in Peeragarhi in C-42 WZ now Rohini Zone	Executive Engineer (M-I), Rohini Zone, North Delhi Municipal Corporation, Near Keshavpuram, Delhi
230.	3285	Third Party Quality Assurance/Quality Audit for work of improvement of drain from WZ 1192 to Hanuman Mandir and Mohan Nagar Ward No. 129, NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Kashmeri Gate, Delhi
231.	3286	Testing and Evaluation of Materials for Mono Hanol Hydro Project (63 MW) in Uttrakhand	Krishna Knitwear Technology Ltd, Dehradun, Uttrakhand
232.	3289	Third Party Quality Assurance/Quality Audit for work of construction of sump wall by providing RCC item from Bindapur const of out fall of waste water disposal of Bindapur Pkt-IV colony by pdg drain in Ward No. C-128/WZ	Executive Engineer (M-WZ)-II, South Delhi Municipal Corporation, Udyog Nagar, Peeragarhi, New Delhi
233.	3290	Third Party Quality Assurance/Quality Audit for Construction of M.C. Pry. School at Palla in Narela Zone	Executive Engineer (Project) Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
234.	3291	Third Party Quality Assurance/Quality Audit for Work of Restoration of pits made by IGL for laying Natural Gas pipeline Madhuban Colony Nirman Vihar, Preet Vihar, A,B,C,D,E,F & G Block Hargovind Enclave and Dayanand Vihar by pdg. 0 in C-228 Shahadara South Zone	Executive Engineer (M-II) SH. South Zone, East Delhi Municipal Corporation, Geeta Colony, Delhi
235.	3292	Third Party Quality Assurance/Quality Audit for Work of Restoration of Road cut made by NDPL for laying of U/G Cable Karur Vysya Bank to DDA Park Falling in C-98/KBZ and DDA Park to Rama Road falling in C-97/KBZ pdg. RMC in C-98/CBZ in Mansarovar Garden	Executive Engineer (M-I), KBZ, North Delhi Municipal Corporation, Old Rajinder Nagar, New Delhi
236.	3295	Concrete Mix Design using Flyash for M35 Grade of Concrete and Concrete Mix Design for Control Low Strength Material (CLSM) for NTPC-Sipat	NTPC Limited, Sipat Super Thermal Power Project Sipat, Chattisgarh
237.	3297	Third Party Quality Assurance/Quality Audit for Construction of M.C. Pry. School Building at Hiranki in Narela Zone	Executive Engineer (Project) Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
238.	3298	Third Party Quality Assurance/Quality for Audit Work of Development of Unauthorized Colony by Pdg. Laying RMC and Construction of Drain at six sites of Ward No. C-130 Najafgarh Zone	Executive Engineer (Pr.) M-II, NGZ, South Delhi Municipal Corporation, Zakhira Flyover, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
239.	3302	Third Party Quality Assurance/Quality Audit for work of Improvement of Road by Pdg. RMC from Goela Road to Kakrola Road in C-134/NGZ	Executive Engineer (Pr.) NGZ, South Delhi Municipal Corporation, Old Hindu College, Nigam Bhawan, New Delhi
240.	3304	Third Party Quality Assurance/Quality Audit for Work of Improvement of Main Internal Roads and Phirni Road by Pdg. RMC in Village Goela in C-134/NGZ	Executive Engineer (Pr.) NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
241.	3306	Third Party Quality Assurance/Quality Audit for work of Improvement Development Main Road Lalita Park by Pdg. RMC and Interlocking Paver in AC58 Ward No. 221 in Kishan Kunj, Shahdara South Zone	Executive Engineer (M)-IV, East Delhi Municipal Corporation, Shakkarpur Delhi
242.	3307	Evaluation and Testing of concrete core (1 set of three numbers concrete cores of 50 mm dia) from each of the slope and one from the bottom of canal work	Sardar Sarovar Narmada Nigam Ltd Radhanpur, Gujrat
243.	3308	Third Party Quality Assurance/Quality Audit for Work of improvement Development of cremation ground at Karkardooma near Karkari more Ward No. 228 in AC-59 Shahdara South by pdg.0 in Preet Vihar	Executive Engineer Project, Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
244.	3309	Third Party Quality Assurance/Quality Audit for Work of construction of road by pdg pavement quality concrete (PQC) in Bharthal Village in C-41, NGZ	Executive Engineer M-I, NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
245.	3311	Evaluation of Materials and Concrete Mix Design for Re-routing of Under-Ground Piping System with above Ground Piping System in Main Plant Area of NTPC-NCPP	NTPC Limited, National Capital Power Project, Gautam Buddha Nagar, U.P.
246.	3312	Evaluation of Materials and Concrete Mix Design for the Work of Coal Handling Plant at MUNPL	Meja Urja Nigam (P) Limited, (Joint Venture of NTPC Ltd & UPRVUN Ltd), Allahabad, U.P.
247.	3314	Third Party Quality Assurance/Quality Audit for Work of Development of ground boundary wall and harvesting in M.C. Pry. School, Baljeet Nagar C-93/KBZ	Executive Engineer (Pr) KBZ North Delhi Municipal Corporation, Old Rajender Nagar, New Delhi
248.	3315	Third Party Quality Assurance/Quality Audit for Work of Construction of Nursing College in SDN Hospital Shahdara (North) Zone SH: Imp./Dev. of ground in Nursing College in SDN Hospital Shahdara (North)	Executive Engineer (Pr) –I Shah(N), East Delhi Municipal Corporation, Geeta Colony, Delhi
249.	3317	Third Party Quality Assurance/Quality Audit for Work of Construction of road by providing (PQC) from Roshnara road to road towards Hindurao Hospital & adjoining roads of A Block in Malkaganj in C-9/CLZ	Executive Engineer (Pr) –II CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
250.	3318	Ultrasonic Pulse Velocity Test of Concrete in TG Deck Slab of Unit #3 (3x660 MW) to Ascertain Homogeneity and Integrity of Concrete at Prayagraj Super Thermal Power Project, Bara, Allahabad	Jaiprakash Power Ventures Limited, Noida
251.	3319	Third Party Quality Assurance/Quality Audit for work of Improvement of ground and P/F concertina coil on boundary wall and Construction of stage at M C Pry. School (Girls) Siraspur in C-18/CLZ	Executive Engineer (Pr) –II CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
252.	3321	Third Party Quality Assurance/Quality Audit for work of Improvement Development of Gali No. 1 by pdg RMC and construction of drain in friends Colony in AC-62	Executive Engineer (Project), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
253.	3322	Third Party Quality Assurance/Quality Audit for Work of Construction in M C Pry. School, Garhi Randhala after Dismantling Old Existing Class Rooms in Narela Zone	Executive Engineer (Project), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
254.	3324	Third Party Quality Assurance/Quality Audit for work of R/R Charges for laying of natural Gas Pipe Line under Deposit and Dig Policy in West Patel Nagar ward no. C-94/KBZ SH: Restoration and improvement of the cut in different blocks by laying RMC in West Patel Nagar in C-94/KBZ	Executive Engineer (M-II), KBZ, North Delhi Municipal Corporation, Old Rajinder Nagar, Delhi
255.	3326	Third Party Quality Assurance/Quality Audit for work of Providing laying and jointing peripheral water mains of dia 1500mm to 150mm Remaining from Bawana UGR by DJB in ward C-2 NZ SH: Restoration of road from Bawala UGR to Narela Lampur road, Ghoga approach road and Ghonda road by pdg. CC and brick pavement	Executive Engineer (M-I), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
256.	3327	Third Party Quality Assurance/Quality Audit for Work of Construction in M C Pry. School, Pooth Khurd (Old) in Narela Zone	Executive Engineer (Project), Narela Zone, North Delhi Municipal Corporation, Narela, Delhi
257.	3330	Third Party Quality Assurance/Quality Audit for Work of Improvement of Lane and Drain From Palam Vihar Road to Railway Line and EP No. X-48 to X-13 and Link Road in Bijwasan Village in C-141, NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Delhi Gate, Delhi
258.	3335	Third Party Quality Assurance/Quality Audit for Work of Improvement of Development by Road and drainage system at three sites in Bihari Colony in Ward No. 237, AC62	Executive Engineer (Project), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
259.	3337	Condition Assessment Study using Non-Destructive Testing of (a) Old Damaged and Undamaged RCC Columns of Air Force Station Building (b) RCC Bridge (2 Nos) at Air Force Station, Pathankot	Garrison Engineer (AF) Zone, C/o 39 Wing, Air Force, Pathankot
260.	3338	Third Party Quality Assurance/Quality Audit for Work of Construction of approach road from NH-24 to weight bridge by RMC at Gazipur SLF in Shah.S Zone	Executive Engineer (M-IV), Shah-S, East Delhi Municipal Corporation, Shakarpur, Delhi
261.	3340	Third Party Quality Assurance/Quality Audit for Work of Development of Approved Colony Shalimar Bagh in Rohini Zone. SH: Dev. of road by providing RMC and drainage in BC in Shalimar Bagh (North) in C-55	Executive Engineer (M-I), Rohini Zone, North Delhi Municipal Corporation, Keshav Puram, Delhi
262.	3342	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony Sr. 398/1639 in C-139/NGZ SH: Construction of Road by PdG. M/P and O/S/D from Main Nangloi Road to Dinesh House in Jai Vihar, Phase-II, B-Block on Nangloi Road in C-139 NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Delhi Gate, Delhi
263.	3343	Third Party Quality Assurance/Quality Audit for Work of Improvement of Link Road by RMC from App. Road of Jafferpur Village, Jafferpur to Khaira Village, Malikpur to Jhuljhuli, Rawta Road to Shyam Baba Mandir in NGZ	Executive Engineer (Pr), NGZ, South Delhi Municipal Corporation, Kashmiri Gate, Delhi
264.	3344	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at Sr. No. 398/1639 in C-139/NGZ SH: Construction of Road by PdG. M/P and O/S/D from Gali No. 1 to Gali No. 12 in all lanes in Jai Vihar, B- Block Phase-II, Nangloi Road in C-139 NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Delhi Gate, Delhi
265.	3347	Third Party Quality Assurance/Quality Audit for work of Construction of Boundary Wall (Remaining) and room for Mali	Executive Engineer (Pr-I), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
266.	3348	Third Party Quality Assurance/Quality Audit for work of Reconstruction of M C Pry. School at Raj Park at Sultanpuri Ward No. 40 in Rohini Zone	Executive Engineer (Project-II), Rohini Zone, North Delhi Municipal Corporation, Rohini, New Delhi
267.	3350	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Chilla Road by pdg. Drain from Dhalao to Ghazipur Road Through Radio Research Centre in Ward No. 212 in New Ashok Nagar in AC-55	Executive Engineer (Pr-II), Shah-S Zone, East Delhi Municipal Corporation, Lalita Park, New Delhi



Sl. No	SP. No.	Projects Title	Sponsor
268.	3351	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S. No. 23 Regn. No. 432 of 733 in Shyam Vihar in C-134 SH: Construction of Road and Drain from Jyoti Steel Goyla Road to PP-177, PP-176 to 25 feet wide road and B-20 to PP-184, PP-182 to PP-08 in Shyam Vihar in C-134/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Sector-12, Dwarka, Delhi
269.	3352	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S. No. 23 Regn. No. 432 of 733 in Shyam Vihar in C-134 SH: Construction of Road and Drain from R.S. Associates to DEL Public School to PP No. 839 to 817 and its perpendicular lanes upto high tension road and Misri Devi School to PP NO. 863 and its perpendicular lanes in Shyam Vihar in C-134/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Sector-12, Dwarka, Delhi
270.	3353	Evaluation of Materials and Concrete Mix Design for the Work of Coal Handling System Package at KBUNL, Muzaffarpur TPP, Bihar	Kanti Bijlee Utpadan Ltd, Muzaffarpur Thermal Power Project, Muzaffarpur, Bihar
271.	3355	Quality Assessment/Quality Audit of Hardened Concrete of RCC Natural Draft Cooling Tower (NDCT) # 1st to 27th Lifts at Damodar Valley Project at Raghunathpur, West Bengal using Non-Destructive Testing Technique	Damodar Valley Corporation, Kolkata
272.	3357	Evaluation of Materials and Concrete Mix Design for Civil Works of 400/132 KV Sub-Station Stage-II at NTPC-Mouda	NTPC Limited, Mouda Super Thermal Power Project, Mouda, Nagpur
273.	3358	Evaluation of Materials and Concrete Mix Design for the Work of DM Plant and Chemical Treatment Plant Package at Muzaffarpur TPP (2x660 MW)	Meja Urja Nigam Pvt Ltd, Muzaffarpur Thermal Power Project, Muzaffarpur, Bihar
274.	3360	Third Party Quality Assurance/Quality Audit for Work of Construction of Pucca School Building at M C Prys. School in Sector-9 Rohini in Rohini Zone	Executive Engineer (Project-I), Rohini, North Delhi Municipal Corporation, Rohini, Delhi
275.	3361	Third Party Quality Assurance/Quality Audit for Work of Construction of Outfall Nallah from Telecom to Aaditya Communication on Approach Road from JJ Colony Sec-15 to Dwarka in C-135/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Sector-12, Dwarka, Delhi
276.	3364	Third Party Quality Assurance/Quality Audit for work of Improvement Development of lane by pdg RMC and drainage system in C-3 block Ashok Vihar Ph-II in Ward No. 66 Sawan Park	Executive Engineer (M-IV), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
277.	3368	Third Party Quality Assurance/Quality Audit for Work of Improvement Development main Market Road Shakapur from New Patparganj Road to Vikas Marg by pdg RMC in AC-58 Shah (S) Zone	Executive Engineer (M-IV), CLZ, East Delhi Municipal Corporation, Shakarpur, Delhi
278.	3370	Third Party Quality Assurance/Quality Audit for Work of Improvement of Link road by RMC from Dhansa Village to Sarangpur, Surehra to Ghumanhera Road and Ujwa to Dariyapur in NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Kashmeri Gate, Delhi
279.	3374	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony in Shyam Vihar in C-134/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, Delhi
280.	3379	Evaluation of Materials and Concrete Mix Design for the Work of Ganga Water Supply Project, Barauni TPS, Barauni	McNally Bharat Engineering Co Ltd, Barauni Thermal Power Station, Barauni, Begusarai, Bihar
281.	3382	Evaluation of Materials and Concrete Mix Design for the Work of Barrage & Desilting Chamber at NTPC-TVHPP	NTPC Limited, Tapovan Vishnugad HE Power Project, Chamoli, Uttranchal
282.	3383	Evaluation of Materials and Concrete Mix Design for the Work of Ash Handling System Package for Muzaffarpur TPP (2x195 MW)	Kanti Bijlee Utpadan Limited, Muzaffarpur Thermal Power Plant, Muzaffarpur, Bihar
283.	3385	Evaluation of concrete materials and concrete mix proportions for civil works of Integrated Township for NTPC -Solapur	NTPC Ltd, Solapur Super Thermal Power Project, Solapur, Maharashtra
284.	3386	Evaluation of Concreting materials and concrete mix proportions for civil works switchyard package of NTPC Solapur	NTPC Ltd, Solapur Super Thermal Power Project, Solapur, Maharashtra
285.	3390	Evaluation of Materials and Concrete Mix Design for the Work of Main Plant & Off-Site Civil Works Package for NTPC-Lara STPP Stage-I (2x800 MW)	NTPC Limited, Lara Super Thermal Power Project, Raigarh, Chattisgarh
286.	3394	Quality Assessment / Audit of RCC Columns of TG Deck Unit # 1 of URVUNL-Anpara TPS, Anpara	U P Rajya Vidyut Utpadan Nigam Ltd, Anpara Thermal Power Station, Anpara, Sonbhadra, U.P.
287.	3395	Condition Assessment of RCC Members of Primary School Building of Kendriya Vidyalaya at INA Colony, New Delhi	Public Works Department D-Division, Kidwai Nagar (West), New Delhi
288.	3396	Third Party Quality Assurance/Quality Audit for Work of Construction of Box Type Drain from Choudhary Sweet to Metro Pillar No. 861 in Village Kakrola in C-135/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
289.	3397	Third Party Quality Assurance/Quality Audit for Work of Construction of Box Type Drain (Both side from Dilbagh Singh House to House Tax Office on Delhi NGZ Road in C-135/NGZ)	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, Delhi
290.	3398	Third Party Quality Assurance/Quality Audit for Work of Construction of Box Type Drain from toilet Block (Near Old Palam Road Chowk) to Metro Pillar No.860 in Kakrola Village Road in C-135/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, Delhi
291.	3400	Third Party Quality Assurance/Quality Audit for Work of Improvement Construction of New Chest Clinic on SPM Marg (Pilli Kothi) in City Zone	Executive Engineer (Project), CZ, North Delhi Municipal Corporation, Asaf Ali Road, Delhi
292.	3402	Third Party Quality Assurance/Quality Audit for Work of Construction of three class rooms in M C Pry. School at Sector-15F, Rohini in Rohini Zone	Executive Engineer (Pr.I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
293.	3403	Third Party Quality Assurance/Quality Audit for Work of Raising of side walls of Gokalpur drain by pdg RCC from Brahampuri Culvert to M C Pry. School T-Block, Gautampuri (RD 790 to 1120 mtr) and X-Block Brahampuri Culvert to Wazirabad Road (RD 1560 to 5500 mtr) Ward No. 251, AC-65 & Ward No. 253, and 254 AC-66 Shah-North	Executive Engineer (Pr-II), South-N, East Delhi Municipal Corporation, New Usmanpur, Delhi
294.	3405	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of back lane by pdg. RMC from in Raja Garden SH:- Imp. / Dev. of lane and drain at two sites in Raja Garden	Executive Engineer (M-I), West, South Delhi Municipal Corporation, Rajouri Garden, New Delhi
295.	3406	Evaluation of Concreting Materials and Concrete mix proportions for civil works for Construction of 10MW Solar Power Project at NTPC Ramagundam	NTPC Ltd, Ramagundam Super Thermal Power Station, Karimnagar, AP
296.	3407	Third Party Quality Assurance/Quality Audit for Work of Improvement and Strengthening of Internal Roads in Seelampur Ward No. 250, AC-65 Shahdara (North)	Executive Engineer (Pr-II), South-N, East Delhi Municipal Corporation, New Usmanpur, Delhi
297.	3408	Third Party Quality Assurance/Quality Audit for Work of Improvement and strengthening og 13.5m ROW roads in sector 16 Rohini SH: Improvement of drain	Executive Engineer (Pr-II), South-N, East Delhi Municipal Corporation, New Usmanpur, Delhi
298.	3412	Third Party Quality Assurance/Quality Audit for Work of Improvement of internal lanes by P/L RMC and drainage system in pkt B-5, C-I, E-I and Pkt E-2 sector-11 Rohini in Ward No. 21 Rohini Zone SH C/o RMC pavement and drain	Executive Engineer (Pr-II), South-N, East Delhi Municipal Corporation, New Usmanpur, Delhi
299.	3416	Third Party Quality Assurance/Quality Audit for Work of Re-construction of community hall at A-Block Chowkhandi, WZ	Executive Engineer (Pr-II), West Zone, South Delhi Municipal Corporation, Zakhira, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
300.	3418	Third Party Quality Assurance/Quality Audit for Work of Construction of Senior Citizen Centre at the land of abandoned disused Toilet Block near C-239 Welcome in Ward No. 259	Executive Engineer (Pr-I), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
301.	3419	Third Party Quality Assurance/Quality Audit for Work of Construction of PUHC Clinic at Shahbad Dairy in Ward No.26 in Rohini Zone	Executive Engineer (Pr.II), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
302.	3420	Quality Assessment of Concrete in TG Deck Slab using Ultrasonic Pulse Velocity (UPV) Testing Techniques as per IS:13311 (Part-1)-1992 to Ascertain Homogeneity and Integrity of Concrete at BTPS – 'A' 1 x 500 MW, Bokaro	Prasad & Company (Project Works) Limited, Bokaro A – Thermal Power Station, Bokaro Steel City, Jharkhand
303.	3421	Evaluation of Materials and Concrete Mix Design for Comprehensive Development of Outer Ring Road between Mukarba Chowk to Wazirabad Chowk	Continental Engineering Corporation, Gurgaon, Haryana
304.	3422	Evaluation of Materials and Concrete Mix Design for Comprehensive Development of Outer Ring Road between Mukarba Chowk to Wazirabad Chowk	Continental Engineering Corporation, Gurgaon, Haryana
305.	3424	Evaluation of Concreting Materials and Concrete Mix Proportions for Civil Works Construction of CDFD Campus, Hyderabad	RTES Ltd, Secunderabad
306.	3425	Third Party Quality Assurance/Quality Audit for Work of Construction in M. C. Pry. School at Nehru Vihar (Girls) in C-11/CLZ	Executive Engineer (Pr-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
307.	3429	Creep Testing of M70 Grade Concrete	Simplex Infrastructures Limited, Mumbai
308.	3433	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at five sites by Construction of Road by pdg. RMC at S.NO. 159/1639 in C-139, Najafgarh Zone	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
309.	3436	Third Party Quality Assurance/Quality Audit for Work of Improvement and Construction of box type drain from M C Pry. School Deenpur to Masjid in Village Deenpur in C-134/NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
310.	3437	Third Party Quality Assurance/Quality Audit for Work of Improvement and Construction of box type drain main Najafgarh Bijwasan Road to Gali No. 8, Dutta Ram Park in Village Deenpur in C-134/NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
311.	3439	Third Party Quality Assurance/Quality Audit for Work of P/L of RMC and drain from Jai Narayan House to Khati Wali Gali and Jogender House to Khati Wali Gali in Kapashera Village in C-143/NGZ	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
312.	3440	Testing and Evaluation of Admixture and Cement Samples for Civil including H.M. Works EPC Package for Lata Tapovan H.E. Project (3x57 MW)	NTPC Hydro Limited, Lata Tapovan H.E. Project, Chamoli, Uttrakhand
313.	3441	Third Party Quality Assurance/Quality Audit for Work of P/L of RMC and drain from M C Pry. School to Old Gurgaon Road and Internal Road in Samalkha Village in C-143/NGZ	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
314.	3442	Third Party Quality Assurance/Quality Audit for Work of Imp/Dev of Super Bazar Market in B Block, A Block near Mahila Park Vivek Vihar and B block, between B and W Pocket Dilshad Garden Ward No. 239 AC-62	Executive Engineer (Pr-I), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
315.	3443	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.NO. 159/1639 by C/o road by pdg. RMC and O/S/D at five sites in C-139, Najafgarh Zone	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
316.	3446	Third Party Quality Assurance/Quality Audit for Work of Construction of road by providing ready Mix Concrete and Drains on main road and adjoining lanes in Jharoda Dairy in C-8.CLZ	Executive Engineer (Pr-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
317.	3448	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.No.812/1639 by Imp. of Road by RMC and drain at three sites in C-137, Najafgarh Zone	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
318.	3449	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.No.1081/1639 in C-139, NGZ SH: Construction of drain from Main Sunder Nagar to Main Jharoda Road on Surakhpur road in Sunder Nagar in Gopal Nagar in C-139, NGZ	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
319.	3450	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at Gopal Nagar Extn on Dhansa Road in C-139, NGZ.	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
320.	3451	Third Party Quality Assurance/Quality Audit for Work of Improvement of drainage and providing RMC at two sites in C-131 Najafgarh Zone	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
321.	3452	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at Sl No. 534/1639 in C-137 NGZ SH: Improvement and Construction of road by pdg. B/P and O/S/D in back lanes at two sites of Naveen Palace Jharoda Road in C-139, NGZ	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
322.	3453	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at Sl No. 1219/1639 by Imp. of Road by RMC and drain at two sites in C-137 Najafgarh Zone	Executive Engineer(M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
323.	3454	Third Party Quality Assurance/Quality Audit for Work of Improvement of road by providing RMC at two sites in Manglapuri, Najafgarh Zone	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
324.	3455	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.No.1134/1639 in C-139, NGZ SH: Rising of road by pdg. RMC and O/S/D from Dhansa Road to H.NO.139, Mata Kasturi Devi School to Jeevan Master House in Main Gopal Nagar in C-139, NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
325.	3456	Third Party Quality Assurance/Quality Audit for Work of Improvement of drain and road surface by providing RMC at four sites in Ward No.129 Najafgarh Zone	Executive Engineer (Pr), NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
326.	3457	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.No.849/1639 by Improvement of Road by RMC at three sites in C-139, Najafgarh Zone	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
327.	3458	Third Party Quality Assurance/Quality Audit for Work of Improvement of road surface by providing RMC from A-9 to B-11, B-1 to B-38 and B-38 to D-242 in Manglapuri Ward No. 130, NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Old Hindu College, Delhi
328.	3459	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony at S.No.387/1639 in C-137, NGZ SH: Imp. of Road by RMC from Jai Properties to Old Kakrola Road in Chander Mohalla Dharampura Extn. In C-137, NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
329.	3460	Third Party Quality Assurance/Quality Audit for Work of (i) Development of Unauthorized Colony at Indra Park in C-138, NGZ SH: Construction of road by pdg. RMC and drain in Indra Park in C-138, NGZ (ii) Development of U/A colony at Indra Park in C-138, NGZ SH: Construction of road by pdg. RMC in Roshan Garden in C-138, NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
330.	3462	Third Party Quality Assurance/Quality Audit for Work of Development of Unauthorized Colony in C-138, NGZ (i) SH: Construction of road by pdg. B/P and O/S/D Gopal Nagar Extn. in C-139, NGZ (ii) SH: Construction of drain in Jal Vihar in C-139, NGZ	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
331.	3464	Quality Assessment Study of Segmental Concrete Construction of Bridge using Non-Destructive Testing Technique at Saharsa, Bihar	Bihar Rajya Pul Nirman Nigam Ltd, Patna, Bihar
332.	3469	Third Party Quality Assurance/Quality Audit for Work of Improvement and Development of chest hospital in Patparganj by providing sanitary installation, water supply, flooring, roofing etc. and improvement and development of open ground and providing storm water drain in SPM chest Hospital Patparganj in ward No. 220/AC-57 Shah.(S)	Executive Engineer (M-IV), Shah-S, East Delhi Municipal Corporation, Shakarpur, Delhi
333.	3470	Third Party Quality Assurance/Quality Audit for Work of Remodeling of S.W. Drainage System in G-Block Ashok Vihar in C-67/CLZ	Executive Engineer (Pr-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
334.	3471	Third Party Quality Assurance/Quality Audit for Work of Improvement and Strengthening of 13.5 m & 9 m ROW roads of Sector-17, Rohini SH: Improvement of Drain and Side Berms	Executive Engineer (Pr-I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
335.	3475	Third Party Quality Assurance/Quality Audit for Work of Improvement and strengthening of 13.5 m and 9m ROW Road of Sector-6, Rohini SH: Improvement of Drain and Side Berms	Executive Engineer (Pr-I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
336.	3478	Third Party Quality Assurance/Quality Audit for Work of Construction of Nursing College in SDN Hospital Shahdara (North) Zone SH: Providing Additional Civil Works in newly constructed Nursing College in SDN Hospital Shahdara (North)	Executive Engineer (Project-I), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi
337.	3480	Third Party Quality Assurance/Quality Audit for Work of Remodeling of Nalla at X-Block Brahmpuri by pdg. RCC item in Brahmpuri in Ward No. 254	Executive Engineer M-Shah (N-II), East Delhi Municipal Corporation, Yamuna Vihar, Delhi
338.	3482	Third Party Quality Assurance/Quality Audit for Work of Construction of Ornamental Gate, Walkway and Improvement of B/Wall in (Green Belt) welcome double storey No. 236 Shahdara North	Executive Engineer (Pr-I), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
339.	3483	Third Party Quality Assurance/Quality Audit for Work of Improvement development of side berm by providing RMC from Police Post to Gol Chakkar telephone exchange along R Block & Gol Chakkar telephone exchange to GT road along backside of Telephone exchange in Dilshad Garden, & Improvement Development of Market adjoining B block in Dilshad Garden Ward No. 239 AC-62	Executive Engineer (Pr-I), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
340.	3484	Evaluation of Concrete Materials & Concrete Mix Proportions for Civil Work of TG Area for NTPC - Solapur Civil Works	NTPC Ltd, Solapur Super Thermal Power Project, Solapur, Maharashtra
341.	3486	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Main road deteriorated links of Gharoli village by pdg RMC in Ward No. 216, Shah (S) Zone	Executive Engineer (M-IV), Shah-S, East Delhi Municipal Corporation, Shakarpur, Delhi
342.	3493	Testing and Evaluation of Excavated Materials i.e. Coarse Aggregate of Shahpurkandi Dam Project Hydel Channel	Executive Engineer, Shahpurkandi Dam project, Irrigation Work Punjab, Pathankot
343.	3496	Performance Study of Steel Fibre Reinforced Shotcrete (SFRS) Lining of the Desilting Chambers of Nathpa Jhakri Hydro Power Station (6x250 MW)	SJVN Limited, Nathpa Jhakri Hydro Power Station, Jhakri, Simla, Himachal Pradesh
344.	3499	Third Party Quality Assurance/Quality Audit for Work of Improvement of development of main road IIIrd Pusta at Jagjeet Nagar by Pdg. RMC in Brahmpuri Ward No. 254 Shah (N) Zone	Executive Engineer (M-II), Shah-N, East Delhi Municipal Corporation, Yamuna Vihar, Delhi
345.	3502	Third Party Quality Assurance/Quality Audit for Work of Providing CC Pavement in Various Lanes / Construction of Drain and Providing RMC at seven sites in Najafgarh Zone	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Kashmere Gate, Delhi
346.	3503	Testing and Evaluation of Materials and Concrete Mix Design for Main Works Package for NETRA Complex Greater Noida	NTPC Limited, NCR-HQ, Noida
347.	3506	Third Party Quality Assurance/Quality Audit for Work of Improvement/Development of drain on both sides in F-block Mansarover Garden SH: Improvement Development of drain on both sides in F-block by pdg. B/W in C-98/KBZ in Mansarover Garden	Executive Engineer (Pr.), KBZ, North Delhi Municipal Corporation, Old Rajender Nagar, Delhi
348.	3513	Condition Assessment of Buildings Complex of GAIL, Agartala	GAIL (India) Limited, Agartala, Tripura
349.	3514	Third Party Quality Assurance/Quality Audit for Work of Improvement of road by providing RMC along with drainage system from H.NO. J-147 to H.No. J-115 and J-61 to J-144 in J-Block Ashok Vihar, Phase-I in C-67/ CLZ	Executive Engineer (Pr.-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
350.	3515	Third Party Quality Assurance/Quality Audit for Work of I/S of internal roads of Mansarover Garden, Ramesh Nagar and Sharda Puri in Ward No. 98 in KBZ SH: Improvement to drainage system and side berms	Executive Engineer (Pr), KBZ, North Delhi Municipal Corporation, Rajinder Nagar, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
351.	3517	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Vijay Coat Market, Shastri Park, SH:1- Construction of boundary wall of Vijay Coat Market, Shastri Park in Ward No. 233 Shah-S Zone SH: 2 Improvement of common open space at Vijay Coat Market by providing RMC, Shastri Park in Ward No. 233 Shah (S) Zone	Executive Engineer (M-I), Shah-S, East Delhi Municipal Corporation, Geeta Colony, Delhi
352.	3519	Structural Assessment of present health of construction/ adequacy for Structural Safety of Commercial Office Complex of Dalmia Company Situated at Plot No. 12 & 12A, Kaushambi Commercial Complex, Kaushambi, Ghaziabad	Dalmia Cement (Bharat) Ltd, New Delhi
353.	3520	Third Party Quality Assurance/Quality Audit for Work of Improvement and Strengthening of 13.5m Row roads in sector-16 Rohini SH: Improvement of side berms	Executive Engineer (Pr.I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
354.	3523	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Park near Mod Apartment and Vishal Apartment in Vasundhra Enclave by providing Boundary Wall, walkway & washed Marble chips plaster in W. No. 214/AC-56, Shah (S) Zone	Executive Engineer (M-III), Shah-S, East Delhi Municipal Corporation, Shakarpur, Delhi
355.	3524	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Lane by providing RMC and drain from 12/286 to out fall drain and 1/1 to 4/30 in Ward No. 210, Trilok Puri, Shah (S) Zone	Executive Engineer (M-III), Shah-S, East Delhi Municipal Corporation, Shakarpur, Delhi
356.	3527	Third Party Quality Assurance/Quality Audit for Work of Construction of physical education centre adjacent to M C Pry. School, Satyawati Nagar in C-66/CLZ SH: Construction of boundary wall	Executive Engineer (Pr.-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
357.	3533	Evaluation of Materials and Mix Design for Water Treatment Plant of Meja Thermal Power Project	Meja Urja Nigam Pvt Ltd, (Joint Venture of NTPC Ltd & UPRVUN Ltd), Allahabad
358.	3536	Third Party Quality Assurance/Quality Audit for Work of Construction of Improvement of strengthening of 9.0 ROW roads in Sharda Niketan, Saraswati Vihar in Ward No. 60 in Rohini Zone SH Stg of carriageway by RMC and improvement of drainage system	Executive Engineer (Pr-I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
359.	3537	Study of Installation of Suitable Monitoring/ Inspection Equipment inside lined Water Conducting System to monitor for performance of Lining without dewatering	SJVN Limited, Nathpa Jhakri Hydro Power Station, Jhakri, Simla, Himachal Pradesh

Sl. No	SP. No.	Projects Title	Sponsor
360.	3540	Third Party Quality Assurance/Quality Audit for Work of Improvement of road by providing RMC from SDMC Pry. School to Pradhan Chowk Wali gali and their adj. lanes in Sadh Nagar Ward No. 146/NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Near Dhansa Stand, Delhi
361.	3541	Third Party Quality Assurance/Quality Audit for Work of Providing RMC from Amit Associates to Vishwash Park Ext. in Madhu Vihar C-148, NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Near Dhansa Stand, Delhi
362.	3551	Third Party Quality Assurance/Quality Audit for Work of (i) Improvement of road surface by providing RMC from D.P School to flood drain, Khandelwal store to RZ123/313, RZ-21/284 in Gitanjali Sagarpur Ward No. 131/NGZ (ii) Improvement of road surface by providing RMC from RZ-20B/1G to transformer in gali and adjoining lanes in between gali no.3 and gali no.5 in main Sagarpur, Ward No. 131 NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Near Dhansa Stand, Delhi
363.	3561	Evaluation of Materials and Mix Design for Concreting work in 400 KV Switchyard of Stage-V for NTPC, Vindhyachal	NTPC Limited, Vindhyachal Super Thermal Power Project, Vindhyanagar, Singrauli, Madhya Pradesh
364.	3562	Third Party Quality Assurance/Quality Audit for Work of Construction of drain and side berm, providing and laying of RMC at eight sites of Rohini Zone	Executive Engineer (M-I), Rohini Zone, North Delhi Municipal Corporation, near Keshavpuram, Delhi
365.	3563	Evaluation of Materials and Concrete Mix Design for the Work of Cooling Tower Stage-II at NTPC-Mouda	NTPC Limited, Mouda Super Thermal Power Project, Nagpur, Maharashtra
366.	3565	Quality Assessment of Hardened Concrete of RCC Well Intake Structure Covering one Raft Wall and one Pile at Raj Ghat, Delhi	Parmar Construction Co, New Delhi
367.	3566	Quality Assessment of Concrete in Water Flood Track (400m length and 4.5m wide) using Ultrasonic Pulse Velocity Testing as per IS:13311-1992 (Part-I) and Rebound Hammer Testing as per IS:13311-1992 (Part-II)	International Centre for Automotive Technology, IMT Manesar, Gurgaon
368.	3568	Third Party Quality Assurance/Quality Audit for Work of R/R charges permission accorded for laying of Natural gas pipe line for connecting Inderpuri in C-151/KBZ SH: Restoration of cut (made by IGL) and improvement of back lanes in full width and length by pdg RMC in Inderpuri in C-151/KBZ	Executive Engineer (M-I), KBZ, North Delhi Municipal Corporation, Old Rajender Nagar, Delhi
369.	3569	Third Party Quality Assurance/Quality Audit for Work of Construction of Community Hall Over Piece of Land in Front of A-4/26 Nand Nagari Old Tanga Stand Between CTC Complex Ward No. 234 in Shahadara North Zone	Executive Engineer (Pr-I), Shah-N, East Delhi Municipal Corporation, Geeta Colony, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
370.	3570	Third Party Quality Assurance/Quality Audit for Work of R/R charges permission accorded for laying of Natural gas pipe line for connecting Inderpuri in C-51/KBZ SH: Restoration of cut (made by IGL) and improvement of back lanes in full width and length by pdg RMC in Inderpuri in C-151/KBZ	Executive Engineer (M-I), KBZ, North Delhi Municipal Corporation, Old Rajender Nagar, Delhi
371.	3576	Evaluation of Materials and Concrete Mix Design for Construction of Two IDCTs at NTPC, Lara Super Thermal Power Project	NTPC Limited, Lara Super Thermal Power Project, Raigarh, Chhattisgarh
372.	3579	Third Party Quality Assurance/Quality Audit for Work of (i) P/L RMC and drain in Village Tajpur Khurd in C-134/NGZ (ii) Dev. of U/A Colony in Rajapuri Madhu Vihar in C-148/NGZ. SH:- Const. of Road and drain in Rajapuri in C-148/NGZ.	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
373.	3580	Third Party Quality Assurance/Quality Audit for Work of Improvement of Internal Roads by Pdg. CC Pavement and Imp./Dev. Drainage System of Pocket 13, Manglapuri in Ward No. C-145/NGZ Palam	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
374.	3582	Third Party Quality Assurance/Quality Audit for Work of Construction of Drain and Pdg. Cement Concrete in Lanes of Harizan Basti in Village Bindapur Ward No. C-128/West Zone	Executive Engineer (M-II), West Zone, South Delhi Municipal Corporation, Near Honda Showroom, New Delhi
375.	3584	Third Party Quality Assurance/Quality Audit for Work of Str. Imp. of Katras SH: Improvement of common space by providing sewer line, RMC in lanes, Construction of open Surface Drains & Repairing of toilets in Kamla Nagar Ward No. AC-18 Model Town	Executive Engineer, C-7, Delhi Urban Shelter Improvement Board, Rana Pratap Bagh, Delhi
376.	3586	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony BY Const. of Road and Drain at four sites Regn. No. 252 in Rajapuri, Madhu Vihar in C-148/Najafgarh Zone	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
377.	3587	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony by Imp. of Road and Drain at five sites at S.No. 1066/536/848/848B/383/1639 in C-137 Najafgarh Zone	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
378.	3589	Third Party Quality Assurance/Quality Audit for Work of Development of Urbanized Village NGZ. N.O.W: Providing RMC on the approach roads of Kishangarh Village from JNU Marg in W. No. 172, NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Near Dhansa Stand, Delhi
379.	3590	Third Party Quality Assurance/Quality Audit for Work of Development of Urbanized Village in NGZ. N.O.W: Providing RMC from Mahipalpur Road to Baba Laturia Madir in Kishangarh Village in W. No. 172/NGZ	Executive Engineer (Project), NGZ, South Delhi Municipal Corporation, Near Dhansa Stand, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
380.	3594	Third Party Quality Assurance/Quality Audit for Work by Providing RMC and drain at four sites in C-140, Najafgarh Zone	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
381.	3595	Third Party Quality Assurance/Quality Audit for Work of P/L RMC from Goyla Dairy Road to Tajpur on Goyla Chhawla Road in C-134/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
382.	3597	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony Regn. No. 737 in Rajapuri, Madhu Vihar in C-148/NGZ SH: Construction of Road and Drain in Rajapuri in C-148/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
383.	3599	Third Party Quality Assurance/Quality Audit for Work of Construction of Drain and Road by Pdg. Cement Concrete on approach road Bindapur Cremation Ground in Ward No. C-128/West Zone	Executive Engineer (M-II), West Zone, South Delhi Municipal Corporation, Near Honda Showroom, New Delhi
384.	3600	Third Party Quality Assurance/Quality Audit for Work of Dev. of U/A Colony Regn. No. 737 in Rajapuri, Madhu Vihar in C-148/NGZ. SH: Const. of road and drain in Rajapuri in C-148/NGZ.	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
385.	3602	Third Party Quality Assurance/Quality Audit for Work of Imp. Dev. of lane by pdg. RMC and Relaying Kota Stone in Vishnu Garden in C-108/WZ in Khyalla	Executive Engineer (M-II), West Zone, South Delhi Municipal Corporation, Near Honda Showroom, New Delhi
386.	3603	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of lane by pdg. RMC and relaying Kota Stone in Khyalla/ Chowkhandi JJ colony in Ward No. C-107/WZ	Executive Engineer (M-II), West Zone, South Delhi Municipal Corporation, Near Honda Showroom, New Delhi
387.	3605	Third Party Quality Assurance/Quality Audit for Work of Dev. of U/A Colony by P/L RMC and Constr. of Drain at four sites Regn. No. 252 in Rajapuri in C-148/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
388.	3610	Third Party Quality Assurance/Quality Audit for Work of Remodeling and Covering of drain (Gali No.5, East Azad Nagar-Road No-57) by providing drain from Gali No. 5 East Azad Nagar to road No-57 in 235 AC-61 in Azad Nagar Shahdara South Zone	Executive Engineer (Project-I), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
389.	3614	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.1265 in C-137, NGZ. SH: Const. of road by pdg. RMC and drain in Prem Nagar A-Block in C-137, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
390.	3615	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No. 415/1639 in C-138, NGZ. SH: Const. of road by pdg. RMC and drain in Uggersain Park in C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
391.	3616	Third Party Quality Assurance/Quality Audit for Work of Development of U/A colony at S.No. 1057/1639 in C-139, NGZ.SH: Const. of road by PdG, B/P and O/S/D in all back lanes in C-139 Gopal Nagar P-Block and Gopal Nagar Extn. E,F,G and H Block main Dhansa Road in C-139, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
392.	3623	Third Party Quality Assurance/Quality Audit for Work of Construction of drain from Gali No.14 Shanti Mohalla (Behind Basti Vikas Kendra/Community Hall) to out fall drain of basic Vikas Kendra/Community Hall in Ward No.235 Shahdara South Zone	Executive Engineer (Project-I), Shah-S, East Delhi Municipal Corporation, Krishna Nagar, Delhi
393.	3624	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of main lanes of L-block, Laxmi Nagar near H.NO. L-45, L-52, L-15 and main lanes of J and K Block, Laxmi Nagar near H.No. J & K 141, J and K 104, J&K 60 and J and K 51 by pdg RMC and drainage upto outfall drain I AC-58 Shah. S Zone in Laxmi Nagar	Executive Engineer (M-IV), South-S, East Delhi Municipal Corporation, Shakarpur, Delhi
394.	3625	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.1403B/1639 in C-138, NGZ. SH: Const. of road by pdg. RMC and drain in Dharampura –I in C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
395.	3626	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.538/1639 in C-138, NGZ. SH: Const. of Road and drain by RMC in Deepak Vihar C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
396.	3627	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.939/1639 in C-138, NGZ. SH: Imp. of Road by pdg. RMC and drain from in Shiv Nagar C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
397.	3628	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.985 in C-137, NGZ SH: Const. of drain and pdg. RMC in Dharmapura H and I Block C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
398.	3630	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.989/1639 in C-137, NGZ. (i) SH: Const. of road and drain by pdg. RMC in Laxmi Vihar Near D K Depot C-139,NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
399.	3631	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.1040/1639 in C-137, NGZ. (i) SH: Imp. of road and drain in Shiv Nagar New Roshanpura C-137, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi

Sl. No	SP. No.	Projects Title	Sponsor
400.	3632	Third Party Quality Assurance/Quality Audit for Work of Strengthening Improvement of internal roads and lanes by RMC in Urban Village Patparganj in Ward No. 220/AC-57, Shah. (S) Zone	Executive Engineer (M-IV), South-S, East Delhi Municipal Corporation, Shakarpur, Delhi
401.	3634	Third Party Quality Assurance/Quality Audit for Work of Construction of Pucca School Buildings at M C Pry. School at HU Block, Pitampura (North) in Rohini Zone SH: Construction of underground water storage tank, water drain, internal roads/paths permanent finish boundary wall, development of compound and parking area	Executive Engineer (Pr-I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
402.	3636	Third Party Quality Assurance/Quality Audit for Work of Construction of two nos additional toilet block in M C Pry. School BB Block, Shalimar Bagh in Ward No. 55 in Rohini Zone	Executive Engineer (Pr-I), Rohini Zone, North Delhi Municipal Corporation, Rohini, Delhi
403.	3640	Evaluation of Materials and Concrete Mix Design for the Work of R&M of STP and RO Plant at NTPC-Badarpur Thermal Power Station	NTPC Limited, Badarpur Thermal Power Project, Badarpur, New Delhi
404.	3644	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S. No. 72/1639 in C-138/NGZ SH: Imp. of Road by Pdg. RMC and drain in Ekta Vihar, Bahadurgarh Road in C-138/NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
405.	3645	Third Party Quality Assurance/Quality Audit for Work of Construction of Link Road Between Ajay Park S. No. 332 to Guru Nagar, S No. 1542 in C-138 NGZ SH: Construction of Road by Pdg. RMC from Sai Properties to PP No. 91 in C-138, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
406.	3648	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of Lane from H.No.133 Ram Nagar to 173 Gopal Park by pdg. RMC from and providing drain in Anarkali. SH: Improvement Development of Lane from H.No.134 Ram Nagar to K-14 Krishna Nagar by Pdg. RMC from and Providing drain in Ward No. 232 AC-60 in Anarkali.	Executive Engineer (M-I) Sleak-S, East Delhi Municipal Corp. Geeta Colony, Delhi
407.	3649	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.1276D/1639 in C-139, NGZ. SH: Const. of road and drain by pdg. RMC in All back Lanes in 1276-D, Gopal Nagar Extn. A-Block in C-139, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
408.	3650	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and Const. of Drain in Village Rewla Khan Pur in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi

Sl. No	SP. No.	Projects Title	Sponsor
409.	3651	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and drain in Village Daulatpur in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
410.	3652	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and Const. of drain in Village Badu Safai in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
411.	3653	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Imp. of Road by RMC and drain in Lokesh Park and Heera Park Extn. in C-138, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
412.	3654	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and const. of drain in Village Dariyapur in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
413.	3655	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Const. of road and drain by pdg. RMC in C1276 D Gopal Nagar Extn. A-Block in C-139, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
414.	3656	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Const. of Road by RMC and drain in Maksudabad in C-138, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
415.	3659	Third Party Quality Assurance/Quality Audit for Work of (i) Construction of Link Road SH: Construction of Road by Pdg. RMC in C-38 NGZ (ii) Development of U/A Colony SH: Construction of road and drain by Pdg. RMC C-139, NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
416.	3660	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony S.H: Const. of drain and outfall Nala and pdg. RMC from at four site in C-137 & C-139, Najafgarh Zone	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
417.	3661	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Const. of road and drain by pdg. RMC at two sites in C-139, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
418.	3671	Third Party Quality Assurance/Quality Audit for Work of Construction of Phirni Road by providing RMC from Jharoda to Neelwal road of village Tikri in C-30 Narela Zone	Executive Engineer (Pr.), Narela, North Delhi Municipal Corporation, Narela, Delhi
419.	3672	Third Party Quality Assurance/Quality Audit for Work of Improvement Development of lane/back by pdg. RMC in B3 Block in Ashok Vihar Ph-II Sawan Park in C-66.	Executive Engineer (Pr.-IV), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi



Sl. No	SP. No.	Projects Title	Sponsor
420.	3675	Third Party Quality Assurance/Quality Audit for Work of Improvement of Internal Roads/lanes by pdg CC pavement in Palam Extension, Part-II Connecting Nasirpur Road in Palam in C-145/NGZ	Executive Engineer (M-III),NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
421.	3679	Third Party Quality Assurance/Quality Audit for Work of PdG. RMC and drain at two sites in C-140, Najafgarh Zone	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
422.	3680	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony in Najafgarh C-137/NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
423.	3681	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Construction of Drain and Road by PdG. RMC in Gopal Nagar B-Block in C-137/NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
424.	3682	Third Party Quality Assurance/Quality Audit for Work of PdG. RMC and drain in Village Ujwa in C-140, NGZ.	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
425.	3683	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH: Construction of Drain and Road by PdG. RMC in C-137/NGZ	Executive Engineer (M-I), South Delhi Municipal Corporation, Near Delhi Gate, Delhi
426.	3684	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony SH:- Const. of drain and road by pdg. RMC in New Roshan Pura Extn. in C-137, NGZ.	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
427.	3685	Third Party Quality Assurance/Quality Audit for Work of Development of U/A Colony at S.No.1263/1639 in C-137, NGZ. SH: Const. of Nalla from Sharma Properties to Malik Properties in Roshanpura Q,Z-Block in C-137, NGZ.	Executive Engineer (M-I), NGZ, South Delhi Municipal Corporation, Near Delhi Gate, Delhi
428.	3687	Evaluation of Materials and Concrete Mix Design for Construction of CHP Package for Stage-V (1 x 500 MW) of NTPC-Vindhyachal	NTPC Limited, Vindhyachal Super Thermal Power Project, Vindhyanagar, Singrauli, Madhya Pradesh
429.	3688	Third Party Quality Assurance/Quality Audit for Work of Improvement of different lanes in A, B & D Block Kabir Nagar by pdg CC Pavement in C-258, Kardamuri.	Executive Engineer (M-III), Shah-N, East Delhi Municipal Corporation, Liza Flats East of Loni Road, Delhi
430.	3695	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and construction of Drain in Village Rawta in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
431.	3697	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and Const. of Drain in Village Ghumenhera in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi

Sl. No	SP. No.	Projects Title	Sponsor
432.	3700	Third Party Quality Assurance/Quality Audit for Work of P/L RMC and Const. of Drain in Village Jhuljhuli in C-133/NGZ	Executive Engineer (M-III), NGZ, South Delhi Municipal Corporation, Dwarka, New Delhi
433.	3706	Evaluation and Conducting Concrete Mix Proportions for Integrated Township - Civil work of NTPC-Solapur	NTPC Ltd, Solapur Super Thermal Power Project, Solapur, Maharashtra
434.	3711	Third Party Quality Assurance/Quality Audit for Work of Construction of road in front of Shiv Shakti Valmiki Temple in Shukla Bazar in Malkaganj in C-9/CLZ	Executive Engineer (Pr.-II), CLZ, North Delhi Municipal Corporation, Shakti Nagar, Delhi
435.	3713	Concrete Mix Design for Comprehensive Development of Corridor (Outer Ring Road) between Mukarba Chowk to Wazirabad Chowk at Delhi	Continental Engineering Corporation, Gurgaon
436.	3731	Development of Materials & Technology having High Abrasive Performance of Concrete for Spillway and Glacis	NHPC Limited, Faridabad
437.	3742	Integrity Testing of Silo Raft Foundation (1 No) at NTPC-Sipat, Stage-I, Bilaspur, Chattisgarh	Techpro Systems Ltd, Gurgaon
438.	3744	Third Party Quality Assurance/Quality Audit for Work of Improvement of SC/ST Basti in NCT of Delhi., SH: Improvement of different Gallies in Punjabi Basti Anand Parbat (EB No.1 to 12) AC-24, Patel Nagar	Executive Engineer C-10, Delhi Urban Shelter Improvement Board, Inder Lok Delhi
439.	3745	Third Party Quality Assurance/Quality Audit for Work of Improvement of SC/ST Basti in NCT of Delhi. SH: Providing and laying RMC over deteriorated area approach road & Providing Storm water drainage at Rajasthani Colony. (EB NO. 50-51) AC-24, Patel Nagar	Executive Engineer C-10, Delhi Urban Shelter Improvement Board, Inder Lok Delhi
440.	3750	Preliminary Inspection of CHP Coal Bunkers (24 Nos) and 6.9 Km Pipe Conveyor to Prepare Suitable Scope Work for Condition Monitoring of these Structures at 4x250 MW Jindal Power Plant, Tamnar	Jindal Power Limited, O P Jindal Super Thermal Power Plant, Tamnar, Raigarh, Chattisgarh

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

441.	2925	Development of clinker and PPC Standards for calibration of X-ray analyzer	Panipat Cement Works, Panipat
442.	3384	Assessment of Quality Assurance System and competence of laboratory	BJCL at Babupur and Bhilai
443.	3491	Assistance in NABL Accreditation of Quality Control Laboratories	Wonder Cement Ltd, R K Nagar

## Appendix - IV

# Research and Development Programme 2014-15

Sl. No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
<b>I PLAN FUNDED PROJECTS</b>				
1	CCE-09	Modernization & upgradation of training facilities for cement, concrete and construction industries at NCB units	April 2012	March 2017
2	IIS-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 2013	March 2017
4	EMG-03	Studies on evaluation of technologies for co-generation of power utilizing waste heat in cement manufacture	April 2013	March 2016
5	FBR-12	Investigations on fly ash based geopolymeric cements	April 2013	March 2017
6	FBR-13	Investigations on nanoparticle blended cements and cement based nano-composites	April 2013	March 2017
7	COB-04	Development of composite cements based on OPC	April 2013	March 2017
8	SOD-07	Development of methods for service life design for concrete structure	April 2013	March 2017
9	SOD-08	Development of design parameters for high strength concrete	April 2013	March 2016
<b>II CESS FUNDED PROJECTS</b>				
10	PSD-01	Development of system design for storage, handling and firing of different types of alternate fuels/waste in cement plants	April 2012	March 2015
11	REC-10	Evolving Guidelines for Improved Refractory Engineering Practices for Modern High Capacity Cement Plants	April 2014	March 2016

Sl. No.	Project No.	Project Title	Date of Commencement	Target Date of Completion
12	CON-09	Performance Evaluation of M40, M60 & M80 Grade Fibre Reinforced Concrete for Performance Improvement of Concrete Structures	April 2014	March 2017
13	CON-10	Development of accelerated mix design method for concrete using PPC or fly ash with OPC	April 2012	September 2014
14	CON-11	Development of Alternatives to Natural Sand for Use in Concrete Masonry / Plaster	April 2014	March 2017
<b>III OTHER PROJECTS</b>				
15.	INT-02	Testing Services as per Standard Specifications and Established Procedures	April 2014	March 2015
16.	GMR-08	Updating of National Inventory of Cement Grade Limestone Deposits	April 2014	March 2015
17.	EMG-01	Study of Energy, Environment and Quality Performance Achievements and Creating Conditions for their Consistent Improvement	April 2014	March 2015
18.	INF-01	Collection, Storage, Retrieval and Dissemination of Bibliographical and Other Technical Information	April 2014	March 2015
19.	PBL-01	Dissemination of Research Results and Information on NCB	April 2014	March 2015
20.	SMC-01	Organisation of National and International Seminars/Conferences	April 2014	March 2015
21.	HRD-01	Long Term Courses	April 2014	March 2015
22.	HRD-02	Updating Knowledge and Skills of NCB Officials	April 2014	March 2015
23.	CCE-02	Short Term Refresher Courses	April 2014	March 2015
24.	CCE-03	Contact Training Programmes for Industrial Personnel	April 2014	March 2015
25.	CCE-06	Special Programmes for Industry Personnel from India and Abroad	April 2014	March 2015
26.	SBC-01	Simulator Based Courses	April 2014	March 2015
27.	CLS-01	Calibration Services	April 2014	March 2015
28.	SRM-01	Development of Standard Reference Materials	April 2014	March 2015
29.	SRM-02	Supply of Standard Reference Materials	April 2014	March 2015

## Appendix - V

### NCB Patents in force as on 31 March 2014

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

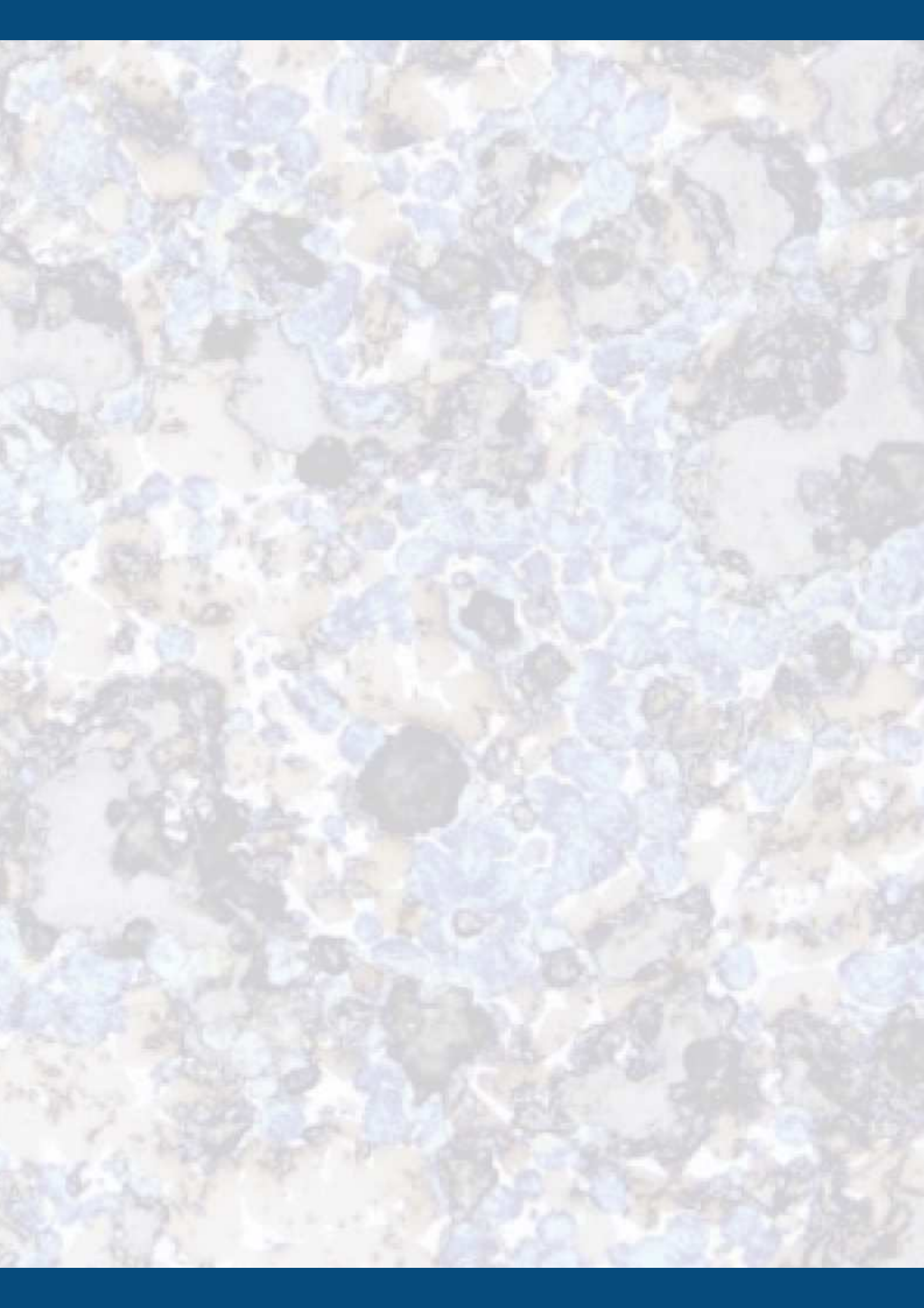


---

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 Kafly

---







## **NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS**

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