NCB NEWS

March 2020

Ballabgarh-Head Office

Hyderabad-Unit

Ahmedabad-Unit

Bhubaneswar-Project Office

COVID-19

HEADLINES

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From the desk of Director General

Dear Readers,

In this poignant hour, we all have seen a rapid escalation of cases of COVID-19. More cases and deaths have now been reported around the world. We have also seen a rapid escalation in social distancing measures, like closing schools, cancellation of sporting events and other gatherings. This is a defining global health crisis of our time and days ahead will test our resolve, our trust in science as well as solidarity. Such crisis brings out the best and worst in humanity and even though we may have to be physically apart from each other for a while, we have to come together in ways we never have before, not only for ourselves but for others. Till we see these events through and tide over this pandemic, I along with my NCB family request each one of you to take all requisite precautions as prescribed by MoHFW, GoI and WHO. I assure that we at NCB are also taking all possible and requisite precautions to avoid this pandemic from spreading further.

The Government's intent to push infrastructure development can be clearly seen from the Union Budget where emphasis on highways and roads development is well placed. Cement industry hopes that rural demand gets revived and it assists in job creation also. With active engagement of cement industry with government on the National Logistics Policy, it is expected that up-gradation and modernization of rail infrastructure are particularly carried out in near future. The Cement Industry also plays a pivotal role in accomplishment of the Swacchh Bharat Mission. The reaffirmation of commitment towards clean air, Climate Change mitigation efforts in the Union Budget give the sector an impetus to invest towards ensuring a greener future for our generations to come. Infrastructure development, new 100 airports and emphasis on road would go a long way to revive cement demand.

This version of NCB e-news covers the 57th NCB day celebration where we had the privilege of hosting Sh Som Parkash Ji, Hon'ble Minister of State for Commerce and Industry at our NCB Ballabgarh premises along with other esteemed dignitaries from cement & concrete sector and other government organizations. The Minister during his speech reiterated that there are no shortcuts to success and each citizen of this country must work hard to realize the dream of becoming a US$5 trillion dollar economy, envisioned by our Hon'ble Prime Minister. The version also gives glimpses about the conferences attended, interaction with cement industry and academia in various parts of the country, training programs carried out to enhance competency of industry professionals as well as NCB officials. It briefly tells us about the release of Bharatiya Nirdeshak Dravya (BND) for Coal, ongoing work on the revision of IS 456:2000 and lists out papers published by NCB officials in recent past.

We have recently concluded the 72nd Research and Advisory (RAC) meeting at NCB Ballagarh. During the meeting, status on 16 ongoing projects was discussed in detail. 11 of these projects are nearing completion and shall be completed by end of March 2020. The Committee also approved 12 new projects well aligned to the needs of the industry, nation & society at large. Whilst making proposals for taking up such new projects, NCB had kept in mind the growing concern for sustainability in cement and concrete sector, increased utilization of industrial wastes and secondary fuels, durability of concrete structures and alternatives to aggregates. A Committee meeting was also conducted in Hyderabad where valuable inputs were received from Committee members on future projects to be undertaken by various Centers of NCB. We have received highest assurances for valuable guidance and direction for carrying out the projects from the cement and concrete fraternity and look forward to live up to the expectations of our stakeholders in near future.

I hope NCB's efforts in sharing knowledge and information through e-NCB NEWS are quite helpful to the cement and construction industry. I wish all a better innovative future.

Dr. B N MOHAPATRA

NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS

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

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57th NCB Day Celebration

In pursuit of Excellence: The History

NCB is the apex R&D organization in the field of cement, building materials and construction technologies. In order to provide the much needed technical and technological support to the cement and allied building materials industry, it was registered as Cement Research Institute of India (CRI) under the Societies Registration Act 1860 on 24 December 1962. Till 1978, CRI continued to serve under the umbrella of CSIR, when consequent upon a Government review about the utility of having all the research institutes centralized under CSIR, it was decided by the Government to de-link some of the research institutes from the CSIR- fold and place them directly under the control of the respective user Ministries. Thus, CRI got attached to the Ministry of Industry (Department of Industrial Development) in 1978. Subsequently, effective 1st April 1985, the Cement Research Institute of India (CRI) was re-designated as National Council for Cement and Building Materials with a view to have a wider spectrum of activities to serve other building material industries also. Since then, 24th December is celebrated as NCB Day to commemorate the founding of NCB. In 2001, Ahmedabad Project Office was opened and 2016 saw the opening of Bhubneswar Project Office.

The 57th NCB day was celebrated at NCB Ballabgarh (Head Office) on 15th January 2020 with Sh Som Parkash- Hon'ble Minister of State for Commerce and Industry as the Chief Guest for the occasion. At the program, release of "*NCB Darpan*"-Hindi Magazine by NCB, 3000 kN Compression Testing Machine and release of NCCBM Newsletter- "*16th NCB International Seminar Special Issue*" by the Chief Guest, took place. The occasion was graced by notable dignitaries from Ministry of Commerce and Industry, BIS, CPPRI and Cement Industry.

After invocation and lamp lighting ceremony by the Chief Guest and dignitaries on the dais, DG-NCB highlighted the current Research and Innovation activities being carried out at NCB, which are in line to the current requirements of the cement and building materials sector. Sh Mahendra Singhi- Chairman NCB, President-CMA, MD & CEO- Dalmia Cement (B) Ltd. made important points on achievements of cement industry, efforts of the industry in turning challenges to opportunities and emerging challenges. He also spoke about the contributions made by the cement industry and NCBs scientists and engineers towards improving the productivity of the sector and making the sector, future ready.

57th NCB Day Celebration

During his speech, Hon'ble Minister of State for Commerce and Industry, Sh Som Parkash, highlighted the importance of R&D for the industry, congratulated NCB for its achievements and also asked everyone to contribute gainfully through hard work and determination for India to realize the aim of becoming 5 trillion dollar economy.

Afterwards, awards for Best Scientist (Sh Brijesh Singh), Best Employee- Technical & Administrative staff (S/Sh Abhishek Agnihotri, P K Das, Bhupinder Singh), Long Service Award (Dr S K Chaturvedi) and Hindi Samiti awards were given to the employees. The program ended with a vote of thanks to the Chief Guest and notable dignitaries by the Organizing Secretary of the occasion.

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72nd Research Advisory Committee Meeting- Ballabgarh 11th February 2020

The Committee comprised of 1 member of GoI, 09 from other Govt. organizations, 05 from CSIR labs, 02 from Academic institutions, 19 from cement & construction sector, 01 Consultant and 07 from NCB. Chairman of RAC, Sh Ashwani Pahuja, expressed his happiness that NCB's R&D Programme, comprising of on-going projects as well as new proposals, covering development of reactive belite cement using low grade lime stone, improving the performance of composite cement by separate grinding, development of Portland Composite Cement based on fly ash and limestone, formulation of new clinker standard for blended cements, development of Geopolymer concrete, effect of supplementary cementitious materials on service life of concrete structures, development of UHPC, Fresh, hardened and durability performance evaluation of concrete made with Portland Limestone cement, use of 3D printing in construction and use of drones for structural assessment are well aligned to the needs of the industry, nation & society at large. Through its R&D activities, NCB has been contributing to both revision of existing cement standards and providing technical input to formulation of new standards in the areas of cement construction and building materials.

S.No.	List of Ongoing projects	Remarks
01	COB-11: Investigation for Standardization of High Magnesia (*MgO*) Clinker for the Manufacture of Blended Cement such as PPC and PSC.	On-going.
02	COB-09: Development of Reactive Belite Cement Using Low Grade Lime Stone and Different Dopants.	Scheduled to be completed by March 2020.
03	COB-10: Improving the Performance of Composite Cement by Separate Grinding of Constituents.	Scheduled to be completed by March 2020.
04	WAU-16: Investigations on Development of Portland Composite Cements Based on Fly Ash and Limestone.	On-going.
05	WAU-15: Investigations on multi component blended cements using limestone, calcined clay and other mineral additives.	Scheduled to be completed by March 2020.
06	WAU-14: Improvement of Fly ash quality, through chemical / mineral doping in coal during its generation in thermal power plant, and study its effects in cement and concrete.	Members desired that lignite ash should also be explored for doing the investigations.
07	CTM-02: Development of Geo-polymer concrete for application in pavements and precast concrete construction.	Scheduled to be completed by March 2020.
08	SOD-09: Studies on the Effectiveness of Different Repair Systems for repair, restoration and strengthening of Corrosion Damaged Structures.	Scheduled to be completed by March 2020.
09	SOD-10: Effect of supplementary cementitious material (*SCM's*) (*Single and Multi Blends*) on service life of concrete structures including studies to improve green cements to meet durability/ service life requirements.	Scheduled to be completed by March 2020.
10	SOD-11: Experimental Study on Shear & Compression Design of High Strength Concrete including effect of Fibre on enhanced ductility & fire resistance.	Scheduled to be completed by March 2020.
11	CTM-03: Use of advanced electronics in construction and condition assessment of concrete structures.	On-going.
12	CTM-04: Model Low Cost Housing Sustainable Technology for Mass EWS & LIG/MIG Housing Scheme using precast/prefab systems with emphasis on maximization of waste-based materials.	Scheduled to be completed by March 2020.
13	CON-14: Development of Ultra-High-Performance Concrete (*UHPC*)– Including use of Nano Technology for UHPC.	Scheduled to be completed by March 2020.

72nd Research Advisory Committee Meeting- Ballabgarh

S.No.	List of Ongoing projects	Remarks
14	CON-15: Enhancing the Utilization of Construction and Demolition Waste and Other Waste Based Aggregates in Concrete Structures and Pavements.	Scheduled to be completed by March 2020.
15	CON-16: Fresh, Hardened and Durability Performance Evaluation of Concrete made with Portland Limestone Cement (*PLC*).	Scheduled to be completed by March 2021.
16	CLS-02/2017: Development of Calibration methodologies with improved Accuracy.	Scheduled to be completed by March 2020.
S.No.	**List of New Projects**	
01	CDR-CTM: Studies on Mechanical and Durability properties of High Strength Geopolymer Concrete.	
02	CDR-CON: Study of Carbonation and Carbonation induced reinforcement corrosion in new cementitious system.	
03	CDR-CON: Cathodic Protection (*CP*) of RCC structures to enhance service life of new and existing structures using three systems (Sacrificial anode, ICCP and hybrid system).	
04	CDR-SOD: Studies on mechanical and time dependent properties of Very High Strength Concrete (*100 to 130 MPa*) and Ultra High Strength Concrete (*130 To 180 MPa*).	
05	CDR-CON: Utilization of Coarser Flyash (*having fineness between 250 m^2/kg to 320 m^2/kg*) in Concrete as a cementitious material	
06	CRT-01/20: Investigations on Fly Ash based Geopolymer Coarse Aggregate.	
07	CRT-02/20: Investigations on Utilization of Coarse Flyash (*200-250 m^2/kg*) in Cement.	
08	CRT-03/20: Development of new clinker system using industrial by products and low limestone content.	
09	CRT-04/20: Investigations on role of Particle Size Distribution (*PSD*) on performance of blended cements and concrete (*Additional Proposal Tabled during the meeting*).	
10	CME-01/20: Process design and integration of RDF Gasification in cement manufacturing process.	
11	CME-02/20: Solar thermal calcination of phosphor gypsum for cement manufacture.	
12	CME-03/20: Design and Development of Transfer Chute to Handle Alternate Fuels and Their Mix in Indian Cement Plants.	

Chairman RAC encouraged NCB to take up more research projects on Low carbon technologies like Magnesia based cement and Carbon Capture & Utilization. More research projects and activities should be taken up on utilization of dolomitic limestone, utilization of high sulphur limestone, to improve quality of clinker using low grade limestone and on problems faced by industry with the use of alternate fuels.

21st Advisory Committee Hyderabad
20th February 2020

Meeting of "ADVISORY COMMITTEE for NCB-HYDERABAD" was held on 20th February 2020 at NCB Hyderabad unit. The RAC comprised of 08 members from the Central/ State Govt deptts., 23 members from cement and construction industry and 05 members from research institutes like IIT, NIT and BITS.

Sh V S Narang, Director (Tech), My Home Industries Pvt. Ltd, chaired the committee meeting. Apex level officials of various Government bodies, cement plants, construction sectors viz., BIS, TSPCB, NTPC, CPWD, Telangana state R&B, Irrigation departments Ultratech Cement Ltd., Dalmia Cement Ltd., Orient Cement Ltd., Shree Cement, JK Cement, Zuari Cement Ltd. (Heidelberg), Sagar Cement, NCL Industries participated in the meeting. Discussions were held on research activities being carried out at NCB and inputs were given by the industry on new areas where the detailed studies are required.

Following is a gist of the meeting:

- Members suggested carrying out durability studies of concrete made from high MgO clinker. Members were of the view that applicability of autoclave for blended cements needs to be ascertained. Suggestions were given to beneficiate MgO containing limestone instead of modifying the cement standards for utilization of high MgO limestone. Members suggested that NCB should take up cluster-wise approach for solving limestone-based problems. Members appreciated NCB initiative in preparation of XRF calibration standards for cement plants, using plant specific materials.
- Members also suggested that NCB should focus more on fundamental research and collaborate with IITs/NITs to save time on investigations. Members suggested setting up an Alternate Fuel and Raw Materials (AFR) laboratory at Hyderabad unit, as many high TSR plants are located in South India.
- It was suggested to carry out more research on alternatives to natural coarse and fine aggregates.
- DG informed that NCB proposes to establish force calibration laboratory at NCB-B and NCB-H unit.
- Members suggested starting 4/6 weeks course in NCB-H on Cement Manufacturing Technology for GETs of cement industry. It was also suggested to conduct a 2/3 weeks course for marketing executives covering Cement Quality and Concrete Technology. Customized program on specific topics such as AFR and Safety may also be devised at NCB-H. Members also suggested starting webinars / online training courses in NCB.
- Members suggested that NCB should take up Sustainability studies and also develop & standardize the methodology of sustainability reporting for Cement Industry.
- Sh Rafi Ahmad from Department of Mines and Geology expressed interest in signing MoU with NCB for conducting LCF studies in the state of Telangana.

Seminars & Conferences

One- day conference on "Promoting Awareness & Usage of Iron and Steel Slag: Ushering a New Era" was organized at FICCI Federation House, New Delhi in August 2019. Dr. B N Mohapatra, Director General delivered a talk on '*Iron & Steel Slag Utilization in Cement and Concrete*' which was well received by the audience attending the conference.

NCB team led by DG-NCB, attended 15th International Congress on the Chemistry of Cement (15th ICCC-2019) in September 2019 at Prague, Czech Republic along with Sh. Brijesh Singh, Manager-NCB and Sh. Puneet Kaura, Deputy Manager-NCB. During the five day conference, Director General-NCB and a Member of the Scientific Committee, 15th ICCC-2019 chaired the Technical Session on Supplementary Cementitious Materials (SCMs). He also presented a technical paper on **"Improving the Reactivity and Quality of Clinker through Enhanced Combustion Kinetics in Kiln Main Burner"**. NCB team also presented four technical posters on:

1. Superiority of Composite Cement over Binary Blended Cement
2. Effect of Chemical and Mineralogical Parameters of Cement on Concrete Workability
3. Study on Alkali Aggregate Reaction and Sulphide Attack on Aged Concrete Large Dams
4. Service Life Design of RC Structures Prone to Carbonation using Accelerated Test Methods

Technical experts and eminent professors from academic institutes, cement and construction industries shared their experiences and current areas of research in the field of cement and construction sector. To meet the requirements of sustainable future, low carbon binders, hybrid binders, digital concrete, improvement in climate performance of cement based binders, geopolymer concrete etc. in the field of cement and construction industry, DG NCB shared with all international experts that NCB has already taken up various activities in line with the issues of cement and construction industries.

DG NCB participated in the CMA conference "**CONSERVE GREEN & SUSTAINABLE RESOURCES**" held in New Delhi in September 2019 and was panelist in the session on "**Technology and Innovations for Sustainability**". During the session, DG NCB presented the current status of thermal substitution in Indian cement industry and future potential of waste availability. He also highlighted the challenges faced by cement plants and modifications required for increasing Alternate Fuel utilization. He showcased NCB's contribution towards utilizing alternate raw materials, reducing clinker factor by increasing usage of supplementary cementitious materials and development of new clinker. He also shown the efforts made by cement plants in increasing AF utilization in India. For the problems faced by cement plants while using AF, DG NCB highlighted the futuristic technologies like gasification of RDF, torrefaction of MSW/biomass, new technology by CEMEX to tackle the problem of chlorine evaporation etc.

Ideas exchange with Cement Industry

NCB team led by Mrs. K V Kalyani, JD & Unit In-charge, Hyderabad visited cement plants in Tandur cluster of Telangana & Karnataka to discuss activities being carried out and services offered to the industry. During the programme, NCB team visited M/s Cement Corporation of India, M/s Penna Cement Industries, and M/s Chettinad Cement.

Mr Tenzin, CEO, Penden Cement Authority Ltd, Bhutan, visited NCB Hyderabad unit and held discussions for conducting special group training programs for their executives in 2-3 batches on various topics viz., testing of cement, pyroprocessing, environment and concrete related topics. He also visited NCB laboratories.

DG NCB visited Global Cement and Concrete Association (*GCCA*) India's office at Mumbai to discuss on various collaborative projects and studies on cement sector focussing on the long term sustainability with Mr Kaustubh Phadke, General Manager, GCCA and Shri Shashi Gaggar, VP of UltraTech Cement Ltd.

LafargeHolcim Innovation Center Team, France comprising of Mr Edelio, Head-R&D; Mr. Christophe, Scientific Director and Mr. Yatin Joshi, R&D Project Manager alongwith officials of Ambuja Cement Ltd. & The ACC Ltd. visited NCB in December 2019 for interaction with DG-NCB and NCB officials about the R&D activities. The team also visited NCB laboratories.

NCB organized an interactive meet with representatives of cement industries of Odisha under the stewardship of DG-NCB at IDCO Conference Hall, Bhubaneswar in January 2020. The meet was attended by senior officials like Dr B K Das, CGM (*P&C*), Shri Sushant Mohanty, CGM (*Land*) and divisional heads of IDCO; Shri Kalyan Mohanty, CGM-IPICOL; Shri S C Naik, Scientist from Bureau of Indian Standards and scientists from NCB. The interactive meet was also attended by representatives of cement companies like UltraTech Cement, Dalmia Cement (*B*) Ltd., J K Lakshmi Cement, JSW Cement, My Home Industries, Emami Cements, Toshali Cements.

The program started with the opening remarks by Shri Kalyan Mohanty after which DG-NCB gave a detailed presentation on the challenges faced by cement industry in terms of availability of raw material, utilization of various industrial wastes like fly ash, steel slag, red mud, phospo-gypsum etc. and NCB's initiatives towards sustainability namely development of Portland Limestone Cement, Portland Composite Cement, High MgO clinker for blended cements, New Clinker Systems & synthetic slag. He also highlighted the technical services, testing and calibration offered by NCB through its units at Ballabgarh, Hyderabad, Ahmedabad and Bhubaneswar to cement and construction sectors. The activities of BIS were highlighted Shri S C Naik in his brief presentation.

Representatives of cement industry exchanged their views and raised issues of raw materials, process, grinding of clinker & quality control they are facing in their cement plants. The above interactive meeting provided a platform to the stakeholders of cement production in Odisha. The meeting was successful and all participants commended the role of NCB in providing technical services for sustainable growth of cement and construction industry and the steps taken for bringing together all cement manufacturing units in the cluster. All participants felt the need for such interactions at regular intervals.

Shri Sushant Mohanty in his closing remarks briefed about the initiatives of the Odisha government in helping the cement companies for setting up of their units in Odisha.

Shri Sanjay Mathur, Executive President & Head SIG and Shri Shashi Gaggar, Vice President from M/s UltraTech Cement Limited visited NCB-B Laboratories in January 2020 and interacted with senior officials of NCB Centres regarding various collaborative projects and studies.

DG – NCB participated in the inauguration of 1st Cement and Concrete Conclave, Satna Cluster 2020 in February 2020 and released the souvenir of the conclave. The conclave was organized by Indian Concrete Institute, UltraTech Cement Ltd. and AKS University. Dr Mohapatra gave a special lecture on the topic "Superiority of Composite Cement over Binary Blended Cement" and also participated in the Special Technical Session on "Satna Smart City and Cement Park".

Release of NCB BND 5091 (Coal)

Memorandum of Understanding (MOU) between CSIR-NPL and National Council for Cement and Building Materials NCB for BND Certifications was signed on the occasion of World Metrology Day on 21st May 2018 in CSIR-NPL.

First batch of NCB BNDs was released by Honorable Minister Dr Harsh Vardhan at a glittering function on 16th August 2018 in CSIR-NPL auditorium in New Delhi, in the presence of Dr D K Aswal (Director-NPL), Sh Ashutosh Saxena DG (Actg.)-NCB, Dr S K Breja (Centre Head, CQC) and NCB team.

The second batch of NCB BNDs was released on NCB day on 1st January, 2019 by DG-NCB and Head of Centres at NCB Ballabgarh.

On 4th January 2020, NCB BND 5091 (Coal) was released in the presence of Dr D K Aswal (Director-NPL), other dignitaries and NCB team at CSIR-NPL, New Delhi.

Intellectual Capital Enhancement
NABL Assessors at NCB

P N Ojha

Amit Trivedi

Abhishek Agnihotri

Bharatram Sharma

The National Accreditation Board for Testing and Calibration Laboratories (NABL) provides third-party accreditation of Conformity Assessment Bodies according to international standards. NCB is glad to inform that four of its officials have successfully received certification of NABL Assessor. Sh. P N Ojha, Sh. Amit Trivedi and Sh. Abhishek Agnihotri attended the 5-day NABL Assessor course as per ISO 17025:2017 conducted in January 2020. Sh Bharat Ram Sharma has already received the certification earlier. NABL Assessor's role is to conduct on-site assessment of CAB to adjudge the compliance. The objective of any on-site assessment is to obtain evidence on compliance with respect to the ISO/IEC 17025:2017 '**General Requirements for the Competence of Testing and Calibration Laboratories**' or ISO/IEC 17043:2010 '**Conformity Assessment -- General Requirements for Proficiency Testing**' or ISO 17034:2016 – '**General Requirements for the Competence of Reference Material Producers**'.

Interaction with Odisha Govt. Officials

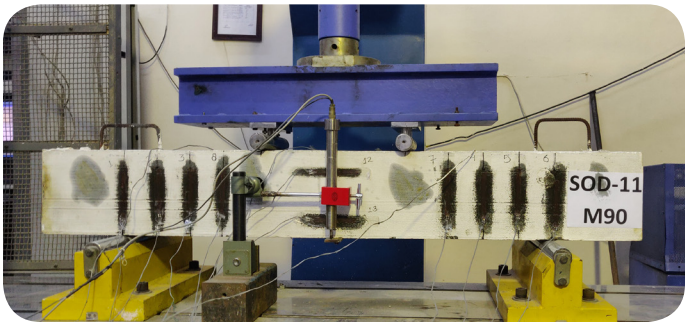
DG-NCB and NCB team met Sh. Suresh Chandra Mohapatra, IAS, DC-cum-ACS & Secretary-Planning & Convergence, Odisha and discussed on expansion of NCB -Bhubaneswar unit and sought his support.

DG-NCB and NCB team met Dr B.K.Das, Chief General Manager (P&C), IDCO- Odisha. They discussed on allocation of IDCO buildings for expansion of NCB -Bhubaneswar unit.

Odisha Integrated Irrigation Project for Climate Resilient Agriculture [OIIPCRA] representatives Sh.VSS Patro and Sh. Mainak Sarkar met Senior officials from NCB-CDR highlighting training requirements of their technical group.

DG-NCB and NCB team met Ms Rashmita Panda, IAS, Director Employment & CEO OSDA, Odisha where he discussed on feasibility of undertaking skill development activities by NCB in Odisha.

Ongoing work on revision of IS 456:2000



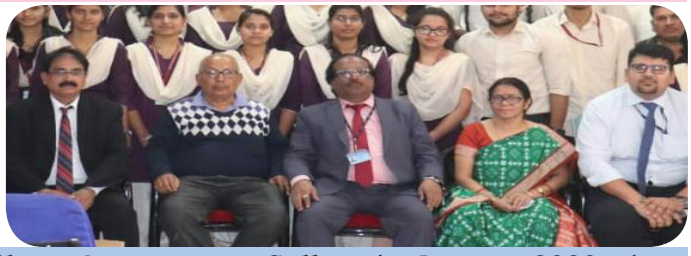
"Shear Strength Test on High Grade Concrete Reinforced Beams for Development of High Strength Concrete Design Parameters"

With advances in Concrete Technology and increased use of High Strength Concrete in Construction Industry, design guidelines become very important for an efficient, durable and safe infrastructure. Centre for Construction Development and Research (CDR) of NCB, is currently working on Development of Design Parameters for High Strength Concrete for incorporation in IS: 456-2000. For development of Shear design parameters, RCC beams of high grade were tested under two-point loading and total eleven electrical resistivity type strain gauges on concrete and two strain gauges on reinforced bars per beam were used. LVDT was placed in center of beam to measure mid-point deflection. The test was done on 50T capacity displacement controlled machine.

Academia Connect

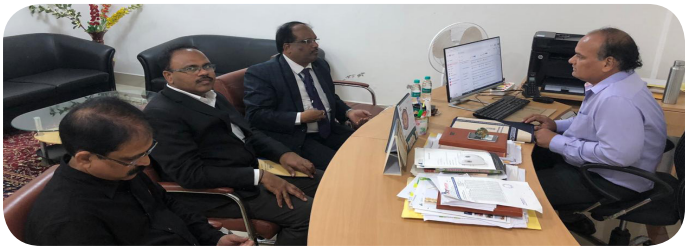
IIT Bhubaneswar, Berhampur University, Khallikote Autonomous College, Utkal University

NCB team led by Director General visited **Berhampur University** in January 2020 and held discussions with Prof. (Dr.) G J Chakrapani, VC and faculty members of Chemistry department of Berhampur University. The interaction focused on activities and services of NCB for Cement, Construction and Building Materials Industries, current research projects carried out, laboratory facilities and training / skill development capabilities of NCB particularly PG Diploma in Cement Technology for MSc (Chemistry) students.



NCB team led by Director General-NCB visited **Khallikote Autonomous College** in January 2020 where they held discussions with HoD Dr Panchanana Gouda & Professors of Chemistry Department Dr. (Ms) Ellarani Pattnaik and Dr. Sunasira Mishra of Khallikote Autonomous College. DG-NCB gave a detailed presentation on Waste Utilization in Cement Industry to around 50 MSc (Chemistry) students.
Dr. D K Panda-GM, NCB then gave a presentation on Introduction to NCB activities and about PG Diploma course in Cement Technology of NCB. The students interacted with Dr. Panda on modalities of admission and other queries on PG Diploma course.

NCB team led by Director General visited **Utkal University** Vani Vihar in January 2020 where they held discussions with Prof. (Dr.) Praful Kumar Sahu and Dr. Jaidev Dinda of Chemistry department of Utkal University. DG-NCB addressed students on the scope of research on waste utilization in cement industry to around 50 MSc (Chemistry) students. Dr. D K Panda then gave a presentation on Introduction to NCB activities and about PG Diploma course in cement technology of NCB.



NCB team led by Director General visited **IIT Bhubaneswar** in January 2020 and held discussions with Dr Ravi Pattnaik, Career Development Cell and Dr P Dinakar Of Civil Engineering Department of IIT-Bhubaneswar. DG-NCB and Dr D K Panda interacted with M.Sc students on their future plans and prospects of PG Diploma in Cement Technology course at NCB.

In the ongoing tour of colleges and universities, Director General-NCB and team of NCB officials visited

Ravenshaw University, Cuttack in January 2020. The team held discussions with Vice Chancellor Prof. Ishan Kumar Patro, Registrar Sh Ashok Kumar Dash, HoD-Chemistry Department-Dr. J P Das and Dr. (Ms) S P Das, Professor of Chemistry Department of Ravenshaw University. DG-NCB gave an inspiring talk to the young MSc (Chemistry) students on their vision for future. He presented the areas of research for MSc Chemistry students in Cement Industry and the need of competent manpower in cement industry.
Dr D K Panda-GM, NCB gave a detailed presentation on PG Diploma Course in Cement Technology of NCB. The students interacted with Dr. Mohapatra and Dr. Panda on modalities of admission and other queries on PG Diploma course.

Director General and team of NCB officials visited **Sambalpur University** in January 2020. At Sambalpur University, NCB team held discussions with Dr. Amitabh Mohapatra, HoD-Chemistry Department, Dr. Ajay Kumar Behera, Professor-Chemistry Department and Dr. Chinmay Purohit, Head-Training & Placement Cell. DG-NCB presented on various avenues for research to MSc (Chemistry) students in cement industry and highlighted the research carried out by NCB on waste utilization and sustainability. DG-NCB and Dr. D K Panda interacted with M.Sc students regarding various aspects of PG Diploma in Cement Technology course of NCB.

NCB team headed by DG-NCB visited **BITS-Pilani, Pilani Campus** in February 2020. NCCBM being a well-established Practice School Station (Internship for BITS Students), the purpose of this visit was to explore new avenues for further collaborations in R&D, implementation of Ph.D Aspirant Scheme for the scientists and Engineers of NCB, Joint conferences and joint courses for working cement industry professionals. This collaboration shall help the cement industry and nation to face the upcoming challenges and contribute to the Skill India mission of GoI.
NCB team interacted with experienced faculties of Mechanical, Civil and Chemical Engineering department to explore the possibilities of joint research work in the area of CCU, Solar thermal application in cement industry, waste utilization, sustainable manufacturing etc. A short visit of BITS state of the art laboratories facilities and Library was also done.
Visit was concluded with the long and fruitful discussion of NCB team with Dr. Souvik Bhattacharyya (Vice Chancellor-BITS-Pilani) and Dr. Sudhir kumar Barai (Director-Pilani Campus). NCB team extends its gratitude towards the support provided by the faculty members of BITS Pilani i.e. Dr. S Gurunarayanan, Dr. A P Singh, Dr. Manish Dave, Dr. Manoj Soni, Dr. Pratik N Seth, Mr. Mahesh Hamirwasia and Dr. G Muthukumar.

DG-NCB visited **BITS Pilani Hyderabad Campus** in February 2020 with NCB team. Discussions were held with BITS director and civil engineering department faculty for research collaboration in the areas of cement and concrete. DG-NCB also interacted with students on various research activities being carried out at NCB.

Competency Building

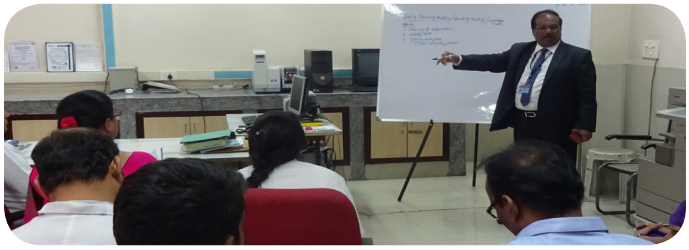
Mr Ali Saeed Al-Najri, Director of Training and Rehabilitation, Amran Cement Plant, Yemen with his team visited NCB Hyderabad unit and held discussions for conducting special group training programs for their executives from Amran, Bajil & Al-Barh Cement Plants on various topics on cement manufacturing. The team visited NCB laboratories having advance testing instruments like XRD, XRF, OM for Chemical & Physical testing as well as Energy & Environment Monitoring along with training and Hostel facilities.

A two day training program on "OPTIMIZATION OF CEMENT GRINDING SYSTEM TO IMPROVE PRODUCTIVITY AND ENERGY CONSERVATION" was organized by NCB in January 2020 at Ballabgarh unit.

Total Employee Engagement

To improve quality culture of the institute and Employee Engagement Score at all levels, DG-NCB frequently conducts regular meetings with all Centers. Such meetings help in gaining insights in to the infrastructure and training requirements of the officials thus helping management in making informed decisions. These meetings also review the current status of latest R&D and Sponsored projects carried out by each Centre. DG-NCB has also started a culture of morning meetings of the Centre officials with the Heads which has contributed immensely in improving work allocation. DG-NCB has recently started Management By Walking Around to evaluate the working conditions of employees.

A two day training program on "QUALITY CONTROL AND QUALITY ASSURANCE IN CONCRETE CONSTRUCTION" was organized by Centre for Continuing Education Services of NCB in January 2020 at Hyderabad unit. The program was inaugurated by Sh. V R K Murthy, Ex-Director, MES, Hyderabad. The program was well attended by 26 participants from various organizations like HPCL, ONGC, Maharashtra Maritime Board, NTPC, NPCI, NLC India Ltd., SCCL, JK Cement Works, Ultratech Cement Ltd., L&T Constructions, New Castle Constructions & B.L Kashyap & Sons Ltd, IITM, Jayamukhi Institute of Technological Sciences. Interactive sessions were held with the participants on various QA&QC aspects, test methods, along with lab demo on concrete mix design.



DG-NCB visited NCB Hyderabad laboratory facilities in February 2020 and monitored the activities that are being carried out in the unit. He also interacted with officials during competency building meeting and guided them on how to implement "Quality Management Systems" to the activities of NCB in a strategic manner to improve their efficiency at workplace.

A two day training program on "ENERGY EFFICIENCY INITIATIVES IN CEMENT INDUSTRY" was organized by NCB in February 2020 at their Hyderabad unit. The program was inaugurated by Mrs KV Kalyani, UIC & Jt.Director, NCB-Hyd along with Sh G Siva Rama Prasad, HOD (Process) The KCP Ltd. The program was well attended by 15 participants from various cement plants. Interactive sessions were held on various energy efficiency options adopted by cement plants in pyro & grinding systems, energy audit methodology, energy efficiency in electrical utilities, reducing clinker factor and utilization of alternative fuels.

Showcase of NCB's latest patent and papers

	Patent filed
	"Composition of PPC and PSC using High (MgO) Clinker", (Patent Application No. 201911049295), contributed by Dr B N Mohapatra, Dr S K Chaturvedi, G J Naidu, Giasuddin Ahamed
S.NO.	**Title of Papers with authors**
1	**Diagnosis of alkali aggregate reaction in Concrete Dams (An Indian case study)** – V V Arora, Brijesh Singh, Vikas Patel, and B N Mohapatra, Asian Concrete Federation Journal, Vol 5, No. 2 (December, 2019).
2	**Effect of Chemical and Mineralogical Parameters of Cement On Concrete Workability** – Dr B N Mohapatra, Pravesh Sharma, Shrikant Varpe, 15th International Congress on the Chemistry of Cement, Prague, Czech Republic, September 2019.
3	**Improving The Reactivity and Quality of Clinker Through Enhanced Combustion Kinetics in Kiln Main Burner** – Dr B N Mohapatra, K. Subbulakshmanan, Atul Kumar Chaturvedi, Ramsinh Chauhan, Reshu Chauhan, Rishi Kumar Joshi, Sukuru Ramarao, 15th International Congress on the Chemistry of Cement, Prague, Czech Republic, September 2019.
4	**Superiority of Composite Cement Over Binary Blended Cement** – Dr B N Mohapatra, P K Sharma, Prem Shrivastava, Rajesh Kothari, Subbaraidu Ayyagari, 15th International Congress on the Chemistry of Cement, Prague, Czech Republic, September 2019.
5	"**Energy Farming – A green solution for Indian cement industry**" – Kapil Kukreja, Dr B N Mohapatra, 7th International Conference on Advances in Energy Research (ICAER 2019), December 2019, IIT, Bombay.
6	"**Indian Cement Industry: A key player in the Circular Economy of India**" – Kapil Kukreja, Dr B N Mohapatra, 3rd Indo-German Conference on Sustainability in Engineering: Enhancing Future Skills and Entrepreneurship during September, 2019, BITS-Pilani.
7	"**Waste to energy: issues, opportunities and challenges for RDF utilization in Indian cement industry**" – Prateek Sharma, Dr B N Mohapatra, 7th International Conference on Advances in Energy Research (ICAER 2019), December, 2019, IIT, Bombay.
8	"**Recovery & Utilization of Heat Energy Wasted through Hot Kiln Surface in Cement Plant**" – Ankur Mittal, B N Mohapatra, 7th International Conference on Advances in Energy Research (ICAER 2019), December, 2019, IIT, Bombay.
9	"**Oxygen Enrichment Technology- an Innovation for Improved Solid Fuel Combustion and Sustainable Environment**" - Ankur Mittal, Dr B N Mohapatra, 3rd Indo-German Conference on Sustainability in Engineering: Enhancing Future Skills and Entrepreneurship during September, 2019, BITS-Pilani.
10	"**Oxyfuel Combustion Technology in Cement Plant**" - Ankur Mittal, Dr B N Mohapatra, 2nd International Conference and Exhibition on Energy & Environment: Challenges & Opportunities (ENCO 2019) during February, 2019 organized by CSIR-Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad at New Delhi.
11	"**Use of alternative fuels and raw materials in cement industry in India- Prospects and challenges**", Dr B N Mohapatra, S K Chaturvedi, A Saxena, Prateek Sharma, Anand Bohra at CMA Conserve Conference, New Delhi
12	"**Stress – Strain Behaviour and Performance Evaluation of High Strength Steel Fibre Reinforced Concrete**" - V V Arora, Brijesh Singh, Vikas Patel, Y N Daniel and Dr B N Mohapatra, Indian Concrete Journal, Vol No. 93, No. 12, December 2019
13	"**Investigations on Limestone Calcined Clay Cement System**" by S K Agarwal, Dr S Palla, Dr S K Chaturvedi, Dr B N Mohapatra, presented in 3rd International Conference on Calcined Clays for Sustainable Development", in October 2019, New Delhi
14	"**Investigation on Limestone Calcined Clay Cement System**", S K Agarwal, Dr S Palla, Dr S K Chatuiurvedi, Dr B N Mohapatra, published in book entitled "Calcined Clays for Sustainable Concrete", Chapter 52, DOI:10.1007/978-981-15-2806-4¬-52, RILEM Book Series, Vol.25, Springer
15	"**Investigations into the Mechanical Properties of Portland Slag Cement based on GBFS and Steel Slag**", S K Agarwal, Suresh Vanguri, Dr S K Chaturvedi, Dr B N Mohapatra (NCB), Anil Kumar, S Sen, A S Reddy, Ashok Kumar (Tata Steel Ltd., Jamshedpur), ZKG International, 12, 2019, p.28-41
16	"**Effect of Minor Mineral Additions on the Mechanical Properties of PPC**", S K Agarwal, Dr S K Chaturvedi, Dr B N Mohapatra, International Cement Review (accepted for publication)
17	Sh S K Agarwal of NCB reviewed following papers for British Journal: Advances in Cement Research • "**Incorporation of Zinc in Calcium Sulfoaluminate Cement Clinker**" Kleib J, Aouad G, Zakhour M • "**Early formation of belite in cement clinker raw materials with slag**", Viggh E, Eriksson M, Wilhelmasson B, Backman R • "**Effect of Ti on crystal transition and solid solution characteristics of white PC clinker**" Li J, Cheng G, Huang S, Huang L

Har Kaam Desh Ke Naam

NCB through its main laboratories at Ballabgarh and units located at Hyderabad, Ahmedabad and Bhubneswar is committed to pursue global standards of excellence and re-dedicates itself to the service of the nation through its activities like meticulousy designed training programmes for cement & concrete industry professionals & college interns, research on sustainable use of natural resources, Energy Audits, TPQA projects of national importance and developments of B&Ds to name a few. We thank the industry and governement who have reposed their faith in NCB which has encouraged and inspired us in all our endeavours.

To solve the problem of stubble burning in NCR region, NCB collected 18 stubble samples (6 from Punjab and 12 from Haryana) and detailed testing and analysis was carried out at NCB labs for co-processing of stubble in cement kilns and power plants.

Scientific methodology developed by NCCBM for estimation of limestone consumption during cement manufacture are used for estimating royalty payable to state governments. So far, NCB has carried out more than 200 LCF studies for cement plants from all over the country.

During 2019-20, 61 Training Courses were organized for cement and concrete professionals with a total of 1010 participants attending the training programmes.

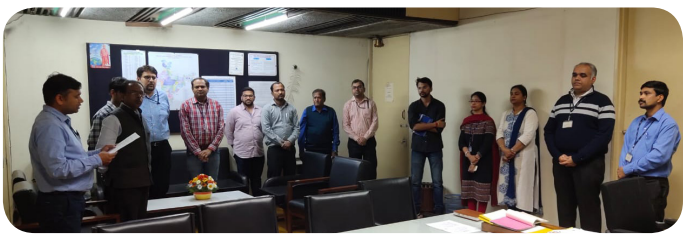
10 Bhartiya Nirdeshak Dravyas (BND), an Indian Reference Material whose traceability has been certified by CSIR-NPL India for Indian Cement Industry were developed by NCB in 2018-19. 2 BNDs were developed in 2019-2020.

NCBM is presently executing Third Party Quality Assurance (TPQA) projects for projects of national importance like Redevelopment of ITPO, Pragati Maidan and Construction of Indian International Convention and Expo Centre (IICC), Dwarka.

NCB has carried out Energy Audits at 06 cement plants under Performance Achieve and Trade (PAT) Scheme of Bureau of Energy Efficiency (BEE) for improvement of energy efficiency of Cement Plants.

NCB has been imparting training to engineering and post-graduate students of various colleges like BITS Pilani (PS1 & PS2), JC Bose University of Science and Technology (YMCA), Manav Rachna University, Amity University, NPL, Deen Bandhu Chotu Ram University of Technology. So far, 82 interns have been trained in various ongoing projects in different fields at NCB.

Important days observed and celebrated



UNITY DAY

On the occasion of National Unity Day, NCB remembered the role of Sardar Vallabhbhai Patel in independence and integrity of nation. All NCB staff took pledge towards integrity in work environment and development of nation with DG NCB.

CONSTITUTION DAY

The Constitution day was observed at NCB where officials read the Preamble to our Constitution and pledged to cherish and preserve the noble principles of Justice, Liberty, Equality and Fraternity, enshrined in our Preamble which have constituted our beloved country in to a Sovereign, Socialist, Secular, Democratic Republic.

REPUBLIC DAY

During celebration of 71st Republic Day on January 26, 2020 at NCB Ballabgarh unit DG-NCB spoke about importance of the day and NCB's diversified role in cement research and construction activities which will lead to nation building.

ABOUT THE COUNCIL

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

Centre for Cement Research & Independent Testing (NCB-CRT) - Fundamental and Basic Research, Cement and other Binders, Waste Utilization, Refractories & Ceramics and Testing Services.

Centre for Mining, Environment, Plant Engineering & Operation (NCB-CME) - Geology, Mining & Raw Materials, Process Optimization & Productivity Enhancement, Energy Management, Plant Maintenance, Project Engineering & System Design, Environmental Management.

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

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

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

Centre for Quality Management, Standards & Calibration Services (NCB-CQC) - Total Quality Management, Calibration Services, Development and Supply of Certified Reference Materials.

National Council for Cement and Building Materials

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