NCB NEWS

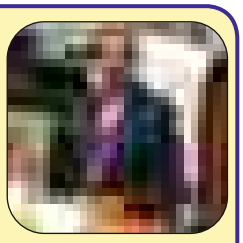
June 2021 Half Yearly Edition

HEADLINES

- **Persons in Spotlight**
  - New Members of NCB's BoG 2021-22
  - Sh K C Jhanwar-New President, CMA
- **NCB's contribution in important Committees & Sub- committees . of NITI Aayog**
- **NCB's contribution to MoRTH, GoI & Indian Road Congress**
- **Highlights of Ongoing R&D Projects**
- **NCB in NEWS**
- **Visit of Dignitaries at NCB-B**
  - Visit of Joint Secretary, DPIIT
  - Visit of Additional Secretary, DPIIT
  - Visit of CPPRI officials
  - Visit of EESL officials
- **Webinars & Conferences**
  - Webinar by FICCI on By-product management for Indian Steel Industry
  - ICR Panel discussion on Usage of MSW as a Fuel in cement kiln
  - Construction Industry"Challenges & Opportunities in Quality and Productivity"- Udyog Manthan
  - NML webinar on Utilization of Steel Slags in Indian Cement and Construction Industry
  - Metalogic PMS webinar on Building Materials for Sustainable Construction
  - 17th Green Cementech 2021: Preparing for a Net Zero Carbon future
- **Visit of DG-NCB to Odisha**
- **MoUs signed with various organizations**
- **DG visit to important institutions and project sites**
- **Homage**
- **Important days observed at NCB**
- **Training Programme 2021-2022**

Editor: Sh Saurabh Bhatnagar
Designed by: Sh Devender Baghel

From the desk of Director General



Dear Readers,

The devastating second wave of COVID-19 affected many families throughout the country. Many of us lost their loved ones during this terrible time. NCB family prays for the departed souls and also wishes a speedy recovery to those who've been infected by the dreaded virus.

Awareness of the community and its involvement is paramount and there is a need to continue *Jan Bhagidari* and *Jan Andolan* for COVID-19 management. The five-fold strategy of Testing, Tracing, Treatment, Covid-Appropriate Behaviour and Vaccination is a must. We at NCB are taking all necessary precautions to stem the spread of this pandemic, which has not only taken the world by surprise but has also shaken it to its core.

On the bright side, green shoots of growth in cement industry are now visible as slew of measures have been announced during the union budget presentation on infrastructure-led economic revival. The cement industry is set to hit a decadal high volume growth of approximately 13% in the next fiscal, helped by an expected revival in demand from the infrastructure and urban housing sectors.

Cement industry has been working on four principles of sustainability viz. continuous improvement of environmental profile by reducing emissions and becoming more energy efficient; principle of what is good for environment is also good for business; earning the right to operate from society; and the belief to take the society along with the industry. The industry plays a pivotal role in Circular Economy concept in our country by utilizing wastes of other industries. NCB is also carrying out research studies to maximize the utilization of red mud in industry.

Now, it's high time again to rethink about '*manufacturing responsibly*' and '*building right*'. For this, the industry must support start-ups also which are coming with breakthrough and disruptive technologies. The world is often unkind to new creations but the new needs friends. Such new technologies if supported in time by the industry might turn out to be a game changer in reducing the much talked about CO_2 footprint of the industry. NCB has already started working in this direction by signing MoUs with prestigious academic institutions where we get the opportunity to interact with young engineers, scientists and budding researchers having unique approach to problems and solutions.

In this edition of NCB-eNEWS, one can find about the latest activities taking place at NCB. We congratulate and welcome our new members of Board of Governors. We also pay our respect to the '*Naari Shakti*' by celebrating International Women's Day at NCB. We also pay homage to our mentor Dr. Guruprasad Mohapatra as well as NCB employees who left us for heavenly abode during and in the aftermath of the second wave of COVID-19.

I'd also like to inform you that our flagship event, 17th NCB International Conference on Cement, Concrete and Building Materials is planned to be organized in **Virtual Mode** in December 2021. In-depth details related to technical papers, sessions and technical exhibition shall be shared with all in due time by my team. This event, like its predecessor is expected to provide a rare learning and networking opportunity and I appeal you all to take maximum advantage of the event.

I wish you all a very innovative and successful future. Jai Hind!

Dr. B N MOHAPATRA

Ballabgarh-Head Office

Hyderabad-Unit

Ahmedabad-Unit

Bhubaneswar-Project Office

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, BALLABGARH-121004, HARYANA. INDIA

Ph: +91-129-4192222 / 2242051 E-mail: nccbm@ncbindia.com

Website: http://www.ncbindia.com

Due to COVID-19, Quarterly Edition could not be released in April 2021

NCB NEWS is exclusively electronic and for internal circulation only

NCB welcomes its new Members of Board of Governors for the years 2021-22

Board of Governors

- **Shri Shashank Priya** – ASFA-DPIIT, GoI
- **Dr. Vandana Kumar** – Joint Secretary -DPIIT, GoI
- **Shri K C Jhanwar** – MD, Ultratech Cement Ltd. President-CMA
- **Shri Sukhbir Singh Sandhu** – Chairman, NHAI
- **Shri Abhay Bakre** – DG-BEE
- **Shri Jamshed N Cooper** – CEO & MD, Heidelberg Cement India Ltd.
- **Shri Rajendra Chamaria** – VC & MD, Star Cement Ltd
- **Shri Deepak Khetrapal** – MD & CEO, Orient Cement Ltd.
- **Shri Neeraj Akhoury** – MD & CEO, Ambuja Cements Ltd.
- **Shri Jayakumar Krishnaswamy** – MD, Nuvoco Vistas Corp. Ltd.
- **Shri Rakesh Singh** – Executive President, The India Cements Ltd.
- **Shri Satish Magar** – Chairman, CREDAI
- **Dr B N Mohapatra** – Director General
- **Shri PN Chhangani** – Wholetime Director, Shree Cements Ltd.
- **Shri K V Muralidharan** – MD, TANCEM Corp Ltd.

Dr S K Chaturvedi – Secretary - NCB

Secretariate (SEC)

Executive Committee (EC)

Nodal officers / Committees

- **Ms K V Kalyani** – Convenor – Internal Complaint Committee
- **Shri Kapil Kukreja** – Public Grievance Officer
- **Shri Anupam** – Transparency Officer and Nodal Appeal Authority
- **Shri Amit Trivedi** – I/c – PPM & IPR
- **Shri P N Ojha** – Chief Vigilance Officer (CVO)
- **Sh Sanjay Mundra** – Central Public Information Officer

Unit In-charge

- **Shri Ashutosh Saxena** – Ballabgarh
- **Ms K V Kalyani** – Hyderabad
- **Shri P N Ojha** – Ahmedabad
- **Dr B Pandu Ranga Rao** – Bhubaneswar

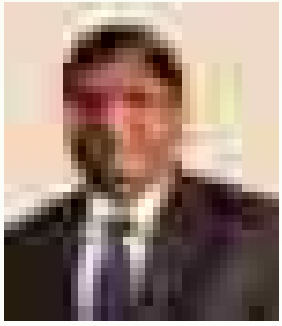
Head of Centres

- **Dr S K Chaturvedi** – CRT
- **Shri Ashutosh Saxena** – CME
- **Shri P N Ojha** – CDR
- **Shri Amit Trivedi** – CQC
- **Shri Anupam** – CIS
- **Dr D K Panda** – CCE

Head of Services

- **Dr S K Chaturvedi** – FAS
- **Shri Ashutosh Saxena** – HRS
- **Shri Amit Trivedi** – MMS
- **Shri TVG Reddy** – ETS

NCB congratulates Sh K C Jhanwar on becoming President of CMA



Mr K C Jhanwar, Managing Director of UltraTech Cement Limited, is a veteran of Aditya Birla Group with a career spanning more than 38 years in the group. He is a Chartered Accountant and started his career with the Cement Business of Aditya Birla Group in 1981.

He has worked across finance, operations and general management roles in the cement and chemical sectors and has exceptional relationship building skills with customers.

NCB gives its heartfelt congratulations to Sh K C Jhanwar on becoming the President of Cement Manufacturers Association and wishes him success for all his future endeavors in this capacity.

NCB's contribution in important Committees & Sub- committees of NITI Aayog

Sub-committee on Circular Economy in Construction & Demolition Waste management

The world is increasingly becoming conscious to the pattern and efficiency of resource utilisation. The convergence of different disciplines- industrial ecology, environmental sustaining, sustainable production and consumption, end of life management of products – have evolved to an overarching vision of Circular Economy.
Niti Aayog has taken a number of initiatives on sustainability aspect of growth.
Niti Aayog has now constituted committees in 11 areas of concerns for the preparation of comprehensive action plan for transformational change. On such area is the Municipal Solid Waste and Liquid Waste which continues to pose considerable challenge and needs to be addressed in a holistic manner. Accordingly, a Committee under the Chairmanship of Sh Kamran Rizvi, Additional Secretary(*D*), Housing and Urban Affairs has been constituted.
Municipal Solid Waste includes plastic, biomedical, hazardous, construction and demolition waste, food waste, paper, faecal sludge and waste water, treatment plant sludge etc. The Committee on Municipal Solid Waste and Liquid Waste is further divided and **sub- committee on Circular Economy in Construction & Demolition Waste management** under the chairmanship of DG-NCB is constituted to prepare a comprehensive action plan on C&D waste. The Sub-Committee shall examine the current situation and propose an action plan for Resource Efficiency practices in the management of C&D waste in the country and further to suggest a roadmap for introducing necessary principles for Circular Economy, Governance and Regulation for the Construction Industry (*primarily in human settlements, roads and railways*).

Committee on Circular Economy in Gypsum

NITI Aayog has taken the lead to expedite the transition of the country from a linear to a circular economy and identified 11 focus areas. Each of the focus areas is assigned to the concerned line ministry. Department for Promotion of Industry and Internal Trade has been assigned Gypsum as the focus area. Consequently, a committee was formed under DPIIT comprising of domain experts, academics, representatives from industry, regulatory bodies, officials from MoEF&CC, NITI Aayog and others.
Two major by-product streams have been identified as challenge areas for detailed action plans – Phosphogypsum-a by-product from fertilizer plants and Flue Gas Desulphurization (*FGD*) gypsum-a by-product from thermal power plants. Phosphogypsum generation is already posing threat to environment and ecosystem due to its generation and huge legacy stocks whereas FGD gypsum is expected to pose a grave threat in near future once all FGD systems get installed in thermal power plants. Recommendations have been prepared based on a comprehensive action plan for each of the by-product gypsum. The implementation of action plan will result in achieving Circular economy in Gypsum. DG-NCB has volunteered to house the Secretariat of the Committee on Gypsum at NCB. Under his leadership, NCB has worked for doing extensive research, organizing stakeholder consultations, compiling all recommendations, and preparing the final report.

NCB's contribution to MoRTH, GoI & Indian Road Congress

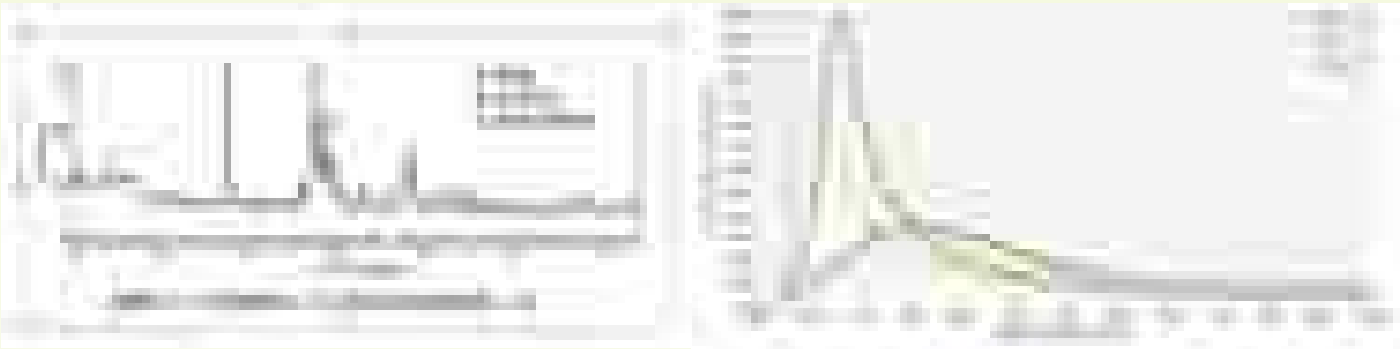
State-Of-the-Art Report (SOAR) & Guidelines for usage of FRP bars in highway projects

Ministry of Road Transport and Highways through Indian Roads Congress constituted an Expert Committee for formulating guidelines for Use of Fiber Reinforced Polymer Bars in National Highway works during March 2021. The first meeting of this Expert Committee (*1st May 2021*) deliberated the International Practices regarding the use of FRP reinforcement in concrete structures as an alternate to carbon steel mainly due to its corrosion resistance in countries like Japan, USA, Canada and Australia.
FRP composites have been used for rehabilitation of bridges even in India. Though, it is not a new material and predominantly used in aerospace applications, the extent of the use of FRP rebars for structural applications needs to be studied. The mechanical properties and behaviour of FRP rebars is different from that of carbon steel rebars. Therefore, a change in the traditional design philosophy of concrete structures is needed for use of FRP reinforcement in highway infrastructure components after identifying the various suitable applications. NCB team comprising of Sh. P N Ojha & Sh. Brijesh Singh is contributing currently along with CRRI, IIT Bombay and other eminent experts in preparation of State-of-the-Art Report (*SOAR*) on the use of Fibre Reinforced Polymer (*FRP*) bars in Highway Projects for developing "***Guidelines for use of Fibre Reinforced Polymer in NH Works in Different RCC Structures***". The SOAR contains number of chapters and covers materials, manufacturing, design methods, quality control and quality assurance, and site requirements. Thereafter, this State-of-the-Art Report will help in framing specification and test method for evaluation of GFRP bars for Bureau of Indian Standard and Indian Road Congress. NCB team is also contributing as member in working group on Bureau of Indian Standard (*BIS*) FRP Standard committee under sectional committee CED-54.

Development of Belite Calcium Sulpho-Aluminate Cement using Low Grade Limestone and Industrial Waste

Belite Sulfo-Aluminate Cements (*BSAC*) are an alternative to the Ordinary Portland Cements (*OPC*) and gaining the importance due to its potential in conserving limestone reserves and mitigating CO_2 emissions. In addition, these materials require lower operating temperature of the kilns, ~1250°C and they are easily ground due to their higher porosity. The production process of BSAC requires sulphate source such as gypsum or anhydrite as major raw material. But, the availability of gypsum is not uniform throughout the India. In order to address these concerns, the present study highlights the effect of the addition of typical Jarosite as a substitute for sulphate source, generally gypsum in BSAC raw mixes prepared with other conventional raw materials. Burnability studies conducted at temperatures of 1150, 1200 and 1250°C with a retention time of 20 min showed rapid formation of BSAC clinker mineral phases with low LSF (~*70*) of raw mix. The mineral phase developments such as dicalcium silicate (C_2S) and ye'elimite ($C_4A_3\$$) of laboratory clinkers fired at 1250°C. XRD, Scanning Electron Microscope (*SEM*) and Optical Microscope confirmed the formation of ye'elimite ($C_4A_3\$$) and C_2S through microstructural and morphological characterization. Isothermal conduction calorimetry study showed that the heat liberation of BSAC were higher at early age compared to conventional OPC. With these results, the synthesized jarrosite-based belite-rich cement shows significant potential for commercialization.
A new class of clinkers for making cements with similar mechanical performance to conventional OPCs, and which can be produced in existing cement plants, while giving significantly lower CO_2 emissions (*25%-30%*) in production. The technology also used industrial by products such as Jarosite, lime sludge, FCC E-cat etc.

SEM micrographs for BSAC



Investigations on role of Particle Size Distribution (*PSD*) on performance of blended cements and concrete

Project Background:

It is known that the quality and type of cement are significant factors to determine the strength development of concrete, which is specifically affected by the fineness and mineral composition of cement. The fineness of cement also affects its reactivity with water. Generally, the finer the cement, the more rapidly it will react. However, the cost of grinding and the heat evolved on hydration sets some limits on fineness.
It is reported in the study that the rate of reactivity and the strength development can be enhanced by finer grinding of cements. It is generally agreed that cement particles larger than 45×10^{-6} m are difficult to hydrate and those larger than 75×10^{-6} m could never hydrate completely. However, an estimate of the relative rates of reactivity for similar cement composition cannot be made without knowing the complete Particle-Size Distribution by sedimentation methods.

Fineness of grinding constitutes (*clinker and gypsum*) an important variable in the behavior of Portland cement. Everyone is well aware of the opinions that while increasing the fineness of the cement sample increases the strength characteristics. Unfortunately, the substantial data is not available to correlate the percentage of performance of improvement while increasing the fineness of the cement. Particularly, how much percentage of compressive strength of the cement enhances while increasing the fineness and what is optimum level of fineness for obtaining the better properties? In addition to this, no substantial data was available regarding the parameters which influences the fineness of the material and how the mineralogical aspects influence on the residue or Particle Size Distribution while increasing the fineness of cement.

The behavior of particles of different sizes has a significant effect on such obvious properties of paste as consistency, strength, setting time and durability. In view of the above limitations of the supporting data and to justify the observed findings on the evaluated product, this research work planned systematically for understanding the correlation between fineness & performance characteristics of the blended cements. In addition to this, correlation between the residue and Particle Size Distribution on the fineness of the product. It is the aim of this article to discuss in brief, how clinker quality influences on residue and Particle Size Distribution and their reactivity. This work at present merely touches on the fringes of some significant developments that are increasing our understanding of blended cements properties on its performance characteristics.

Present Study:

To investigate which quality parameter (*like Blaine fineness or Residue or Particle Size Distribution*) gives appropriate relevance for different grinding systems, NCB has taken up a study on "*Investigations on role of Particle Size Distribution (PSD) on performance of blended cements*". As a part of the study, initially, inter ground and separately ground PPC samples were prepared and tested at NCB laboratories and further testing of PPC cement samples manufactured with same clinker in different mills like Roller Press with Ball Mill in semi finish mode and Vertical Roller Mill from various regions of the country are under process at NCB laboratories. Results of inter ground and separate ground samples are given in figures below . Results shows that the compressive strength of separate ground PPC samples (*OPC Blaine fixed and the fly ash Blaine increased*) are having higher initial strength and inter ground samples are having lower compressive strength whereas inter ground samples compressive strength increased gradually.

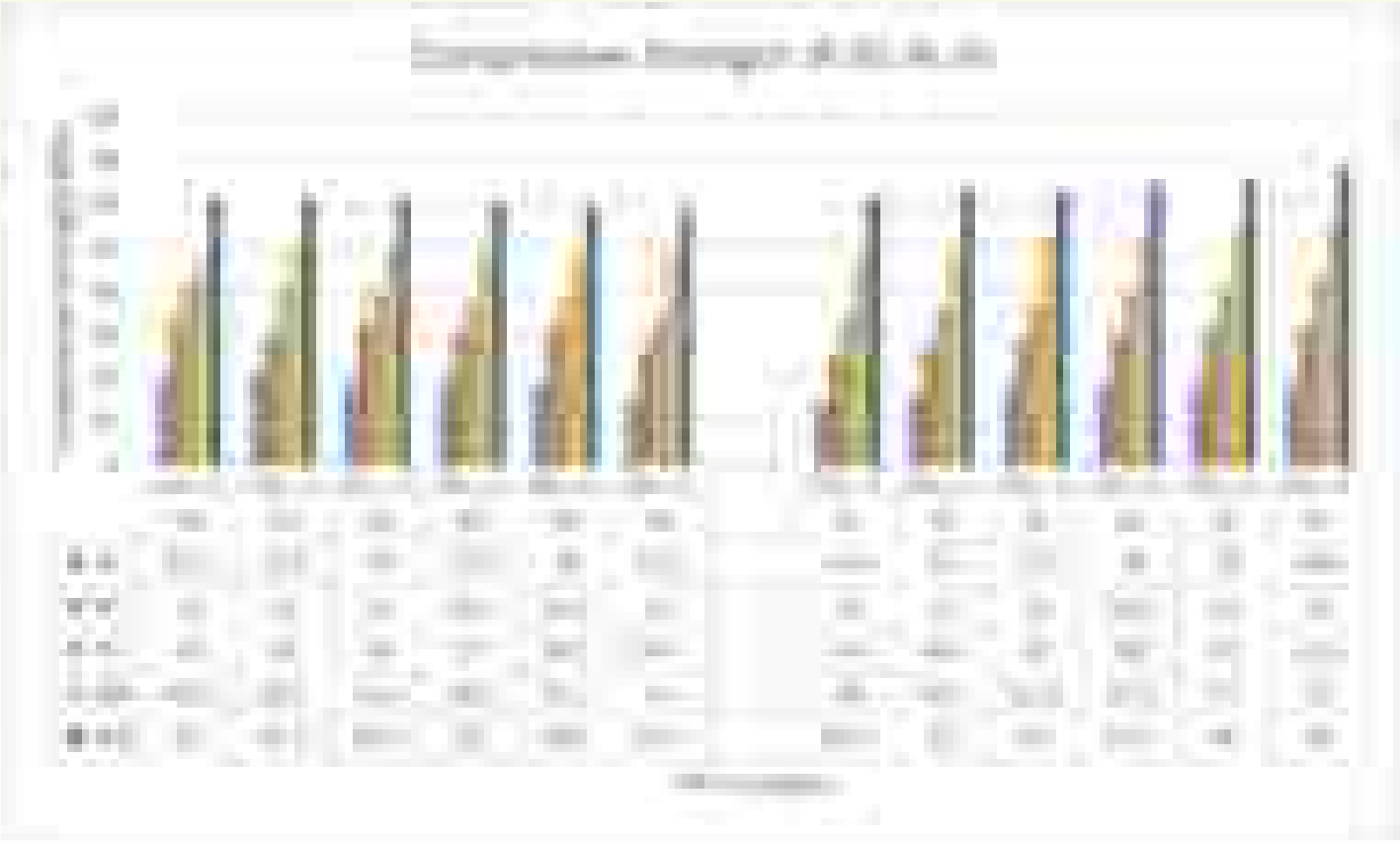


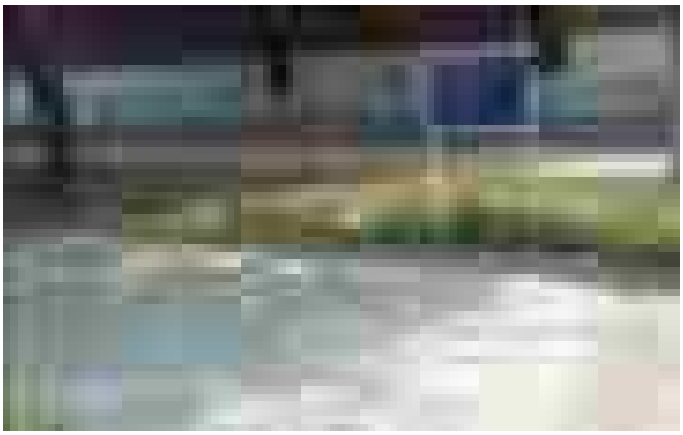
Fig: Compressive Strength of Separate Grinding v/s Inter Grinding

Results of the commercial PPC samples manufactured with similar clinker in different mills like Roller Press with Ball Mill and Vertical Roller Mill from various regions of the country are under process at NCB laboratories and will be published in future editions of Newsletters.

Studies on mechanical and durability properties of High Strength Geopolymer Concrete

In view of the serious impact of carbon dioxide on the environment and the continued anticipated growth of industrialization and urbanization, there is a need to redirect the construction industry away from its overwhelming reliance on Portland cement by developing alternative binder systems like geopolymer (*or alkali activated*) binders. In such systems, an alkaline liquid is used to react with Silicon (*Si*) and Aluminium (*Al*) in a source material of geological origin or in by-product materials such as fly ash or Granulated Blast Furnace Slag to produce cementitious binders. NCB took up a project to develop the geopolymer concrete and study its properties for precast products. All the geopolymer concrete mixes were evaluated for different fresh, hardened and long term durability properties and an experimental stretch was cast in NCB premises using geopolymer paver blocks. Based on the study, NCB drafted guidelines for developing geopolymer concrete mixes for precast products. Based on those guidelines and recommendations, IS 17452 (*Use of Alkali Activated Concrete for precast products- Guidelines*) was formulated in 2020. The key achievements of completed project are shown below:

2017 **2018**



2019 **2020**

Based on expertise gathered in previous study, a new research project was taken up which aims to study the hardened and durability properties of normal and high strength geopolymer concrete. This study also aims at preparation of guidelines for structural design based on the mechanical properties whose validation will be done by limited testing on beams and columns of selected grades of reinforced geopolymer concrete. The intended project tries to develop deeper understanding on feasibility of usage of other materials in geopolymer concrete. In present study, the study on mechanical properties of finalized mixes of M40 grade has been completed. Further trials of higher grades (*M75 and M90*) with different combinations are under progress along with carrying out study on mechanical properties of High Strength Geopolymer Concrete.

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*)

Studies on Mechanical Properties of Normal and High Strength Concrete using different types of indigenous aggregates for concrete grades from M35 to M100 has been carried out recently at NCB. Based on the study, the design parameters for revision of IS: 456-2000 has been already proposed and is being incorporated. The study included comparison of tested mechanical parameters with different International Codes wherein stress block parameters for flexural design, stress strain characteristics, empirical equation for modulus of elasticity, flexural strength, split tensile strength, shear strength of concrete including effect of span to depth ratio etc.

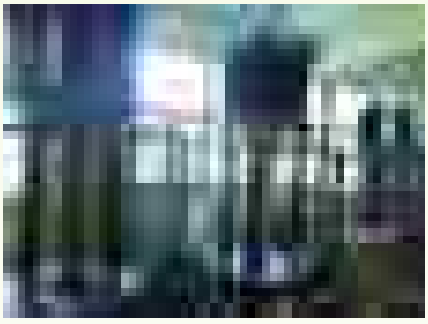
carried out. Effect of Supplementary Cementitious Materials (*SCMs*) including comparison of fractured behavior for normal and high strength concrete has also been studied for various mechanical properties of Normal and High Strength Concrete.

NCB completed an R&D project for development of Ultra High Performance Concrete (*UHPC*) with compressive strength in excess of 150 MPa, in which guidelines for developing UHPC using indigenous materials were prepared. Mixes were prepared with cementitious materials comprising OPC-53, GGBS, UFGGBS, Silica fumes and Nano Silica and were theoretically optimized for maximum particle packing with the help of Modified Andreasen and Andersen equation. To overcome challenges of lump formation and non-uniform mixing during preparation of UHPC mixes using conventional pan mixer, NCB developed a planetary mixer with variable speed for producing a homogeneous UHPC mix. Planetary mixer has high mixing efficiency and helps in producing homogeneous mix with high powder content and low water to binder ratio. It can be operated at three different speed ranges i.e. low speed (*0-125 rpm*), medium speed (*125-250 rpm*) and high speed (*250-325 rpm*).

Planetary mixer developed at NCB for preparation of UHPC

Based on the knowledge and expertise gathered in aforementioned studies, a new research project was taken up to evaluate mechanical and time dependent properties of Very High Strength Concrete (*100 to 130 MPa*) and Ultra High Strength Concrete (*130 to 180 MPa*). This study will cover the critical issues in Very High Strength Concrete and Ultra High Strength Concrete with respect to stress-strain characteristics, modulus of elasticity, flexural strength, split tensile strength, shear strength of concrete and time dependent properties such as creep and shrinkage. The study also aims to study the performance these very high grade concrete using steel fibres of different strength and performance of polypropylene fibres on fire resistance behavior of these very high grade concrete. Currently, Indian Standard under revision covers concrete grade M100 and outcome of study will provide data for up gradation of the Indian Standard of design for higher grade concrete above M100.

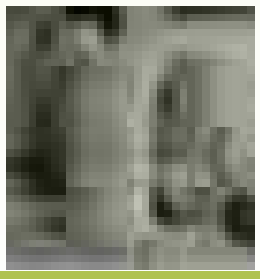
Under present study, comparison of creep coefficients derived from different creep models like Bazant's B-3, ACI, AASHTO, GL-2000 and FIB model code 2010 for concrete mixes (*normal and high strength*) having water to cementitious ratio of 0.47, 0.36, 0.27 and 0.20 was done for a relative humidity of 60% and design life of 100 years. For comparison of creep coefficient using different models the age at loading are kept as 7, 28 and 365 days. Thereafter, values are compared with experimentally obtained results of concrete mixes having water to cementitious ratio of 0.47 and 0.20 for age at loading of 28 days and up to 180 days loading period. Time induced creep strain of high strength concrete was determined using creep rig of capacity 2000 kN as shown in figure below. Findings of study were proposed to BIS for revisions of relevant Indian Standards and same were disseminated through research papers in national and international journals.



Creep Testing Arrangement

Further, the stress strain characteristics for concrete above 100 MPa was studied and the stress strain parameters were determined for Very High Strength Concrete. The strain at peak stress and ultimate strain obtained was in the range of 2095 micron to 2204 micron for the cylindrical compressive strength in the range of 119.45 MPa to 139.89 MPa. While for high strength concrete the strain at peak stress and ultimate strain are in the range of 2500 to 2600 micron. The stress strain curve obtained are linear same as obtained in the case of high strength concrete. Therefore, for UHPC the design parameters or stress block parameters which governs the flexural design of RCC members needs to be modified accordingly for safe and efficient design.Mechanical properties and Stress Strain characteristics for High Strength Concrete (*Up to 100 MPa*) was also studied at elevated temperature. Studies were carried out by incorporating polypropylene fibers which improves the spalling resistance of concrete at higher temperatures. Results from the studies were proposed to BIS for revisions of relevant Indian Standards and same were disseminated through research papers in national and international journals.

(a) Sample under testing after fire exposure



(b) Sample texture after fire exposure

DG-NCB interview in Indian Concrete Journal

Question 1: Compared to Global Initiatives, how would you benchmark the status of sustainability initiatives in India?

Answer: Sustainability and sustainable development are trending topics of 21st century. Sustainability initiatives at global level and in India too is being benchmarked and assessed within framework of trivet structure of triple bottom line philosophy. This is a holistic approach to sustainability and sustainable development under which an country or an organization works for people, prosperity and planet (3P) to make itself socially, economically and environmentally (or ecologically) sustainable. Economic growth of the India can't be ensured without addressing our social and environmental priorities. In order to create a better and more sustainable future for all and to achieve sustainability at social, economic and environmental front, India has taken holistic and integrated approach in its policies and programs related to sustainable development, climate change, resource efficiency and air and water pollution. Policies, programs and strategies formulated and implemented by the Government of India are in line with the 17 Sustainable Development Goals (SDGs) and agenda 2030 of United Nations. Government of India initiatives in the direction of achieving SDGs includes Swachh Bharat mission, Beti Bacho Beti Padhao, Pradhan Mantri AwasYojana, Smart Cities, Pradhan Mantri Jan Dhan Yojana, Deen Dayal Upadhyay Gram Jyoti Yojana and Pradhan Mantri UjjwalaYojana etc. The Namami Gange Mission is a key policy priority of India towards achieving the SDG-6 (clean water and sanitation.). Major components include sewerage project management, urban and rural sanitation, tackling industrial pollution, water use efficiency and quality improvement, ecosystem conservation and Clean Ganga Fund, among others. Government of India has launched a National Clean Air Programme in 2019 as a pan-India time bound national level strategy for prevention, control and abatement of air pollution besides augmenting the air quality monitoring network across the country. India has harmonized its National Policy on Resource Efficiency (RE) as a major tool to meet the resource needs of the country, at the least possible cost to the environment. India stands at 11th position in global country ranking and accounts for 33% of the Certified Climate Bonds by number in emerging markets in line with Paris Agreement which emphasizes the role of climate finance in strengthening the global response to climate change. India is one sixth of the global community, our development needs are enormous. Government initiatives are not sufficient to fulfil all the development needs of the country. Therefore, government is ensuring active participation of all stakeholders.

Question 2: Are you seeing any sustainability trends impacting the construction business in India?

Answer: The Indian government has made considerable strides on its path to sustainability and paid attention to the construction sector. Agencies like GRIHA – Green Rating for Integrated Habitat Assessment (2007), adopted as the national green building rating system, and the Indian Green Building Council (IGBC, 2001), were brought about to support energy efficiency and conservation in construction. According to the IGBC, India holds the second largest registered Green Building footprint (3.59 billion sqft), second only to the U.S.A. India has also joined the UN Paris Agreement for Climate Change and in 2016 announced its first 20 Smart Cities, pledging to propel the country in the direction of sustainable and smart development. The government has also incentivized going green for builders and consumers by offering discounts and other benefits. However, in India, there are no incentives for building sustainable homes or commercial spaces, and the construction industry, in particular, faces several challenges while trying to be eco-friendly. The public, especially in the rural and semiurban areas, believe that it is extremely expensive, largely because of a lack of awareness and administrative support. However, sustainable living is slowly taking centre stage in the real estate industry in India because of the advent of green buildings. The aim is to create natural and healthy living spaces for the Indian consumers through buildings that have a long service life and high performance by maximizing recycling of materials and minimizing environmental impact. Slowly but steadily, more and more people will be opting for green homes since these homes promote sustainable living and promise a far better future for the people and the environment. In considering sustainable practices that construction industry of India must adopt, an analysis is required for each stage of construction. And for this we need to have a grade based certification system or a comprehensive plan for sustainable construction of every structure in country such as : A) Planning, design and specifications, B) Current Practices in Construction Industry, C) Material Conservation and Selection, D) Use of Construction Demolition and recycled Material, E) Energy Conservation, F) Innovation, G) People associated with construction. I see the durable, sustainable, responsive and green construction requirement for sustainable development is going to be the trend which will have major impact on construction business in India.

Question 3: As a leader, how do you view your organisation's obligations to sustainability?

Answer: As a premier R&D organization for cement, concrete and construction sector, we clearly understand our responsibilities and obligation to the sustainability. We also understand the infrastructure development need and demand of cement and concrete in the journey of economic progress and holistic and integrated sustainable development. We cannot think of construction without concrete. It is the largest man made material which has a per capita consumption of 1.5 tons per annum in India. National Council for Cement and Building Materials (NCCBM) is currently doing research & innovation across the value chain of cement, concrete and construction industry. Our research focus is based on principle of "Creating waste to wealth" i.e. on how to use more and more inorganic and organic waste of other industrial process and

into values added product such as use of fly ash and other cement substitutes in development and use of low carbon cements, use them as an alternate fuel & raw materials for cement sector etc. Similarly, we are focusing on use of manufactured fine and coarse aggregate, use of sintered fly ash lightweight aggregate, use of Construction demolition and Recycled aggregates, durable construction, use of local materials to reduce the carbon footprint associated with transport, energy conservation, renewable energy etc. NCCBM is supporting Bureau of Indian Standard and other standards & policy makers in formulating the Indian Codes and guidelines for enhancing the usage of sustainable materials in construction. Our research is supporting the country's cement industry in the mission of reducing its carbon footprint by 45 per cent by the year 2050. It is also working on future technologies which can have huge impact on construction sector in future. Few such examples are Geopolymer concrete, Digital concrete etc.

Question 4: What are some of the typical challenges that you foresee in India while implementing sustainable construction?

For implementing sustainable construction, strategies need to be ambitious, action-oriented and collaborative, and to adapt to different levels of development. Sustainable development will need to be inclusive and take special care of the needs of the poorest and most vulnerable. The main hurdle in implementing sustainable construction practices is a time lag between research
outcome and commercialization & transfer of technology in the field. Major challenges India may face while implementing sustainable construction are: • Inadequate government's policies & procedures • Deficient incentives to encourage adoption • Expensive equipment and products • Lack of skilled manpower and subject matter experts • Awareness in the people Therefore, in my opinion academia, research institutes, industry and government needs to work in coherence to overcome these challenges.

Question 5: What are some of the initiatives that the concrete construction fraternity needs to immediately implement for achieving sustainable development?

Answer: Construction fraternity needs to recognize and immediately implement the following aspects in developing a sustainable infrastructure in our country: • Plan, design and adopt specifications based on performance and service life • Adopt sustainable construction practices • Select sustainable construction materials • Use construction and demolition waste • Focus on energy conservation We need to encourage the

DG-NCB interview in Naxatra News- Excerpts (*interview available on YouTube*)

During the interview with Naxatra news, DG- NCB told that it is his endeavour to bring the energy and efficiency of private sector in NCB. During the last two years, NCB has reached up to a certain level of research and innovation and now target is to make NCB one of the top most cement research institute of the world. DG informed that NCB has set an internal target of AtmaNirbhar NCB to become financial sustainable by 2023.

During the last two years, NCB has seen a cultural change with implementation of **Change Management System** by applying **Total Quality Management** like **Enhanced Employee Engagement**, **Management by Walking Around**, **Daily Morning meetings**, **monthly mass communication meeting with staff** and **formation of Quality Circles/Small Group Activities/Kaizens** formed to solve day-to-day problems involving different levels of staff. The same has resulted in increased footprint of the institute, enhanced interaction with all stakeholders of NCB like government departments, cement industry, construction industry, PSUs etc. and time bound applied research.

DG told that NCB is fully aligned with the vision and mission of Govt. of India like AtmaNirbhar Bharat and Make in India, and has developed 16 Bhartiya Nirdeshak Dravya (*BNDs*), four of which were launched by Hon'ble Prime Minister of India Shri Narendra Modi ji on 04 January 2021. NCB is also contributing its part in Swachh Bharat Mission and is closely working for Smart Cities Mission, reduction of CO_2 emissions under Paris climate agreement, Skill India mission etc. Under PAT scheme of Bureau of Energy Efficiency, NCB has conducted more than 150 energy audits in cement plants to improve energy efficiency.

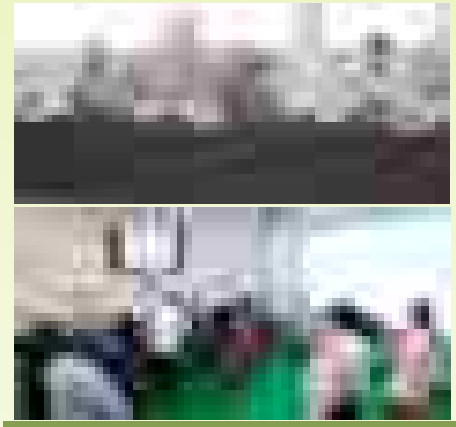
By developing low carbon cements and working in areas like Waste Heat Recovery (*WHR*), AFR, Energy efficiency NCB is working with cement industry to reduce the carbon footprint of Indian Cement Industry. DG also spoke of the new areas in R&I in cement manufacturing. NCB is also contributing towards development of standards for cement and concrete.

DG also told how NCB can contribute in Odisha's infrastructure development and plans of expansion of Bhubneswar unit. He also informed that NCB is working in coordination and collaborating with other research institutions like IITs and CSIR.

He informed that NCB imparts training for Cement, Concrete and Construction to Engineers/ Scientists of various government departments /cement plants. The Post Graduate Diploma in Cement Technology imparted by Centre for Continuing Education Services of NCB makes the youth more employable in cement and concrete sector.

Visit of Senior Officials from DPIIT

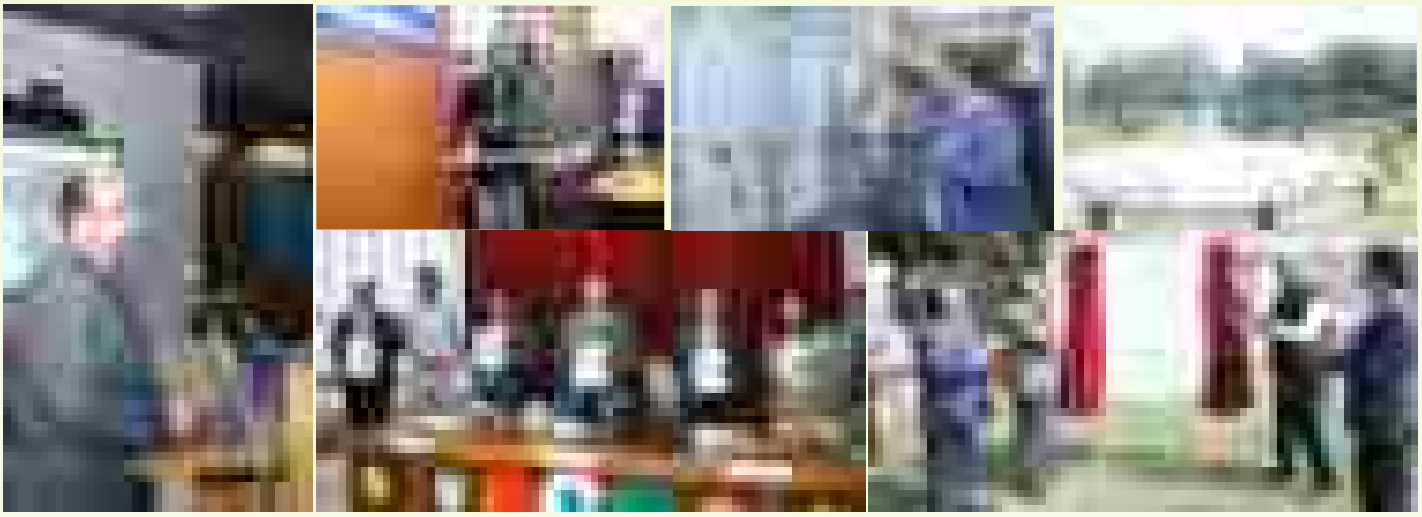
Visit of Joint Secretary, DPIIT



Dr. Vandana Kumar, Joint Secretary, DPIIT, Govt. of India visited along with Dr. S S Gupta, SDO, DPIIT in June 2021.

Dr. Kumar took a review of the current status of research work as well as key sponsored projects that are being carried out NCB. She also interacted with Head of Centres & Services to understand the working of various departments within NCB. During the visit, Dr. Kumar and Dr. Gupta also visited various laboratories of NCB to understand research and testing work being carried out. She congratulated NCB for carrying out quality research work and for the vision of becoming financially self sufficient. She also asked NCB to continually improve its activities in research field as all projects undertaken are all the more relevant in today's scenario. She also reassured the support and guidance of DPIIT in this venture.

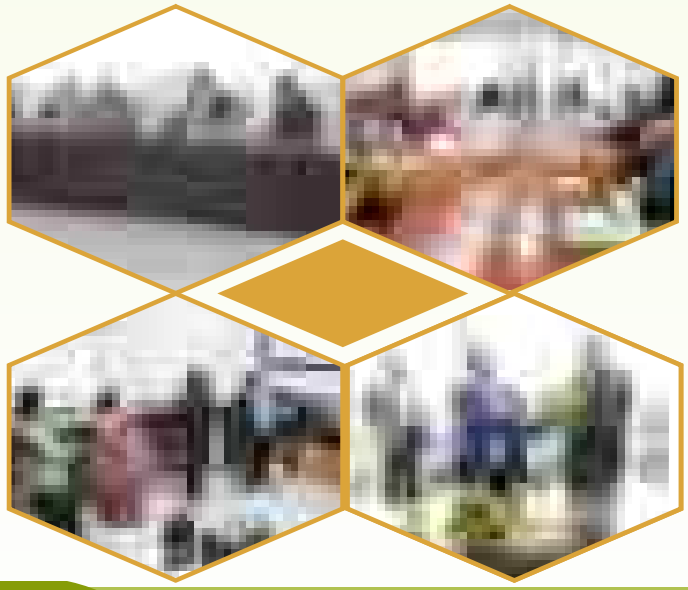
Visit of Additional Secretary, DPIIT



Shri Anil Agrawal, Additional Secretary-DPIIT, Govt. of India along with Dr. S S Gupta, SDO, DPIIT visited NCB Ballabgarh in February 2021. During the visit, he inaugurated the Optical Microscopy Lab and interacted with NCBs scientists and engineers. In his address to the NCB entire family, Sh Agrawal emphasized on importance of being a National Council and encouraged all to collectively work in making NCB a trusted brand.

He also inaugurated the SUNDIAL constructed by NCB team using the waste generated during the testing of laboratory samples. During his visit he also released the second edition of Hindi magazine "दर्पण (*Darpan*)" published by NCB's Hindi Rajbhasa Samiti.

Visit of CPPRI officials at NCB



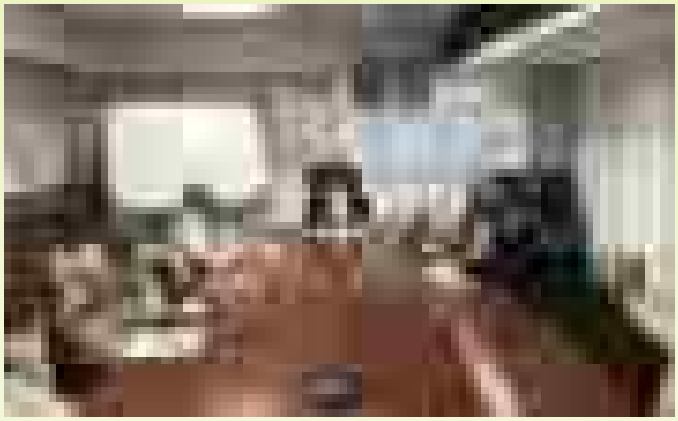
Dr. B P Thapliyal, Director-CPPRI, Dr. M K Gupta, Scientist-F and other Senior Scientists of CPPRI visited NCB laboratories at Ballabgarh on 28th January 2021 where DG - NCB and other NCB scientists briefed CPPRI team on the latest activities being carried out in NCB in the field of R&D.

Dr. B P Thapliyal was felicitated by DG-NCB for his superannuation on 31st January 2021 in presence of Dr. S S Gupta. Senior Development Officer – DPIIT, Govt. of India and other scientist and engineers from NCB and CPPRI. He also gave a brief introduction of achievements of Dr. Thapliyal and said that NCB looks forward for collaboration with CPPRI on joint research projects in waste utilization.

Visit of EESL officials at NCB-B

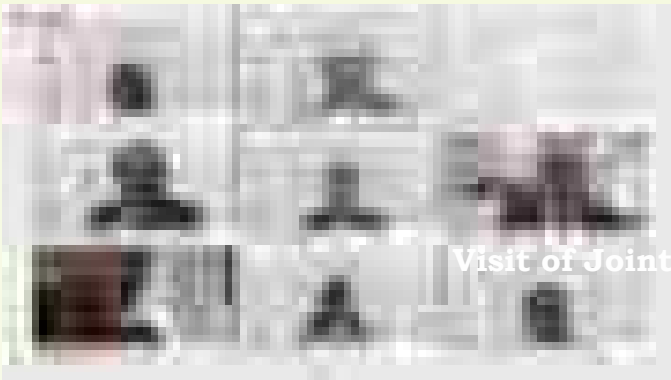
EESL officials visited NCB-Ballabgarh to interact with DG-NCB with a view of fostering collaboration between the institutions and promote usage of biomass pellets as an alternative fuel in the cement industry.

DG informed EESL officials how NCB is working towards helping plants achieve higher Thermal Substitution Rates (*TSR*) in the cement kilns. The cement industry currently has a TSR of 4% and the target is to achieve 25% TSR by 2030. NCB is also providing process solutions to cement plants which face problems during increase of TSR in their cement kilns.



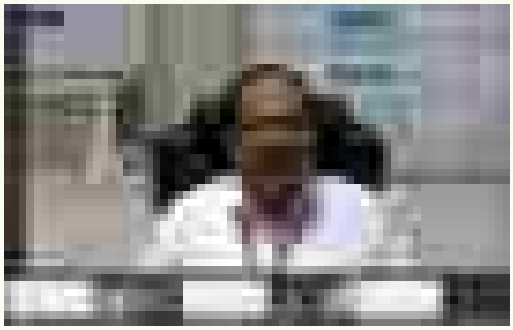
Webinars & Conferences

Webinar by FICCI on By-product management for Indian Steel Industry-Ecosystem, Opportunities and Challenges



During the webinar held in January 2021, DG-NCB told about Utilization of Slags in Indian Cement Industry. He gave an insight in to the Indian cement industry and explained how slag, by-product of steel industry is current being used by the cement industry to make blended cements. He also gave an insight into the properties, characterization, chemical composition and mineralogy of slag and explained the advantages of slag in concrete. He also told about the existing barriers in utilization of Iron and steel slag. As a way forward DG-NCB told that slag should be included as an aggregate for infrastructure & construction activities and in standards and regulations. Steel slag should be treated, not as a "*by-product but as a co-product*" in the steel making process. Carbon credits should be allotted to (*slag*) user departments that can be shared with steel industry. DG also asked to identify collaborative research opportunities to identify areas where different quantity and quality of slags can be used, and also anchor a mission mode approach with all stakeholders to find out optimal use of opportunities for steel slag in Indian infrastructure sectors.

ICR Panel discussion on Usage of MSW as a Fuel in cement kiln



During the panel discussion, DG-NCB told that two major alternate fuel sources available in India to meet the energy demand of cement industry are MSW and Biomass. The generation of Municipal Solid Waste (*MSW*) is growing by 5% annually. Out of the total RDF of 28,676 tonnes per day, approx. 13,600 tonnes per day of RDF will be available for co-processing in the cement plants, which can fulfill about 7-8% of the total thermal energy requirement of the cement industry. DG lauded the initiatives taken by the Government to increase the TSR in cement kilns. The TSR of Indian cement industry is 4% and is targeted for 25% TSR by 2030. He told that NCB is giving optimal solutions to plants which are facing problems like CO peaks while using RDF. He also told that in future, other problems may arise while co-processing the waste.

DG-NCB informed that there is wrong perception that co-incineration is a dump yard and any kind & size of waste can be co-processed in cement kilns– This perception needs a change. The waste co-processed in cement kilns needs to be processed to transform it into proper size and quality. This requires investment at plant site. Similarly, the personnel working in the plants need to have experience of running the kiln with high % utilization of alternate fuels.

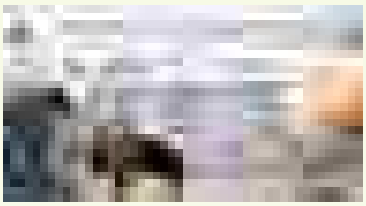
Webinar on Construction Industry "Challenges & Opportunities in Quality and Productivity"- Udyog Manthan

During the webinar held in February 2021, DG-NCB gave a presentation on the Best Practices of Improvement in Quality & Productivity in Cement Industry. He spoke about significance of TQM in today's manufacturing process and steps to establish TQM in the organization. He enlightened the attendees about National Standardization Committees and how NCB is contributing in standardization in the field of services provided by Construction and related Engineering service providers with respect to the construction work for buildings and civil engineering, installation and assembly work, Services related to Pre-construction, building completion and finishing work including architectural and engineering services and other related services including maintenance, renovation and restoration.He told that launching a real digital strategy has become essential for continuous success in the years to come. Building Information Modelling (*BIM*) should be regarded as the backbone of the new way of working triggered and targeted by the digital strategy. He also highlighted the gaps for sustainable construction and areas where support is required by R&D institutions from Government for improving quality and productivity. Finally, he told that strengthening Quality Control/Assurance at all construction projects and skill development of man power working in cement/ construction sector is mandatory for achieving set goals.

NML webinar on Utilization of Steel Slags in Indian Cement and Construction Industry

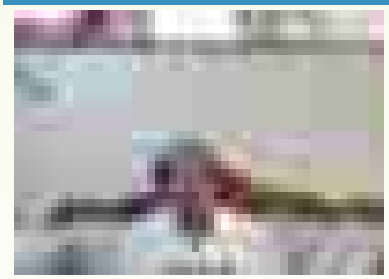
During the webinar held in February 2021, DG-NCB gave a presentation on the present scenario of slag usage in the Indian Cement industry. He told about the advantages of slag addition in concrete, chemical composition, mineralogy and characterization of steel slag. He also told that NCB has taken up studies for utilization of slag as an alternative to natural fine and coarse aggregates. He also talked about barriers in utilization of steel slag. During the presentation he also told about the various R&D and sponsored projects carried out and services that are given by NCB to the cement and construction sector towards nation building. He briefly discussed about all the R&D projects and the latest equipment procured by NCB to carry out frontline research activities in the field of cement and concrete.

Metalogic PMS webinar on Building Materials for Sustainable Construction



During this webinar held in February 2021, DG-NCB talked about the current trends of the Indian Cement Industry and research and development activities that are carried out for the cement and construction sector. He enlightened the audience about various studies undertaken on improving the sustainability and resource conservation in the construction sector. He talked about Quality improvisation and explained cement plant quality audit pyramid. He also gave an insight on the future outlook of the cement industry towards carbon capture and utilization in the cement industry, low carbon clinker & cement and technology of mineralization of CO_2 in concrete. He told that 22 Expertise Groups of NCB are made with a vision to carry out research on issues significant to the industry & demanding further attention, paving a way for the sustainability of the industry.

17th Green Cementech 2021: Preparing for a Net Zero Carbon future



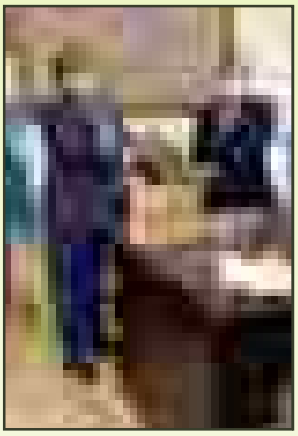
During the virtual conference held in May 2021, DG-NCB shared initiatives taken at NCB which will aid the cement industry in meeting net zero carbon emissions. NCB's research and initiatives are aligned with government policies and schemes such as India's Intended Nationally Determined Contributions commitment at COP-21,Paris to reduce CO_2 emission intensity by 33-35% by 2030, BEE-PAT Scheme, Skill India, Smart City, Make in India and Swachh Bharat Mission.

He told that NCB has taken several initiatives in furthering the cause and is working towards enhancing its knowledge as well as disseminating knowledge to the industry which shall lead to net zero carbon emissions in areas including development of Low Carbon Cements and Clinker, utilization of AFR, improving energy efficiency, enhancing Waste Heat Recovery, utilization of Renewable Energy, carbon capture, storage and utilization. He also told that to expedite the above activities, NCB has formed 22 expert groups working on various key areas which will act as a catalyst to the cement industry in achieving this net zero by 2030. Further, the groups will be extended with the members from industry fraternity and academic institutes.

He reiterated that NCBs Research and Innovative initiatives, are well aligned to industry requirement, national priorities and society at large and also informed that NCB is closely working with industry and Government towards net zero by taking steps like collaboration with different prestigious institute's like IITs, NIT's, CSIR and other research institutes for arriving at sustainable solutions .

Visit of DG-NCB to Odisha

Meeting with Chief Secretary, Odisha



DG-NCB met with Shri Suresh Chandra Mohapatra, Chief Secretary, Govt. of Odisha in January 2021 and discussed on collaborative working of NCB with Govt. of Odisha through Memorandum of Understanding (*MoU*) for quality assurance/ quality control of construction projects to create sustainable & durable infrastructure, structural assessment & rehabilitation of old structures and skill development in the state of Odisha. Chief Secretary said that for better and durable infrastructure development, NCB should sign MoUs with state owned engineering departments and local bodies of Odisha as per their requirements in consultation with Engineer-in-Chiefs.

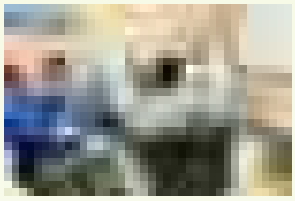
DG-NCB appraised Chief Secretary about the expansion plans of NCB-Bhubaneswar unit including newly established cement & building materials testing laboratory which has been accredited by NABL. Dr. B. Pandu Ranga Rao, Unit In-Charge of NCB-Bhubaneswar was also present during the discussions.

Meeting with CMD, IDCO

DG-NCB along with UIC NCB-Bhubaneswar met CMD Odisha Industrial Infrastructure Development Corporation (IDCO), to appraise about the expansion plans of NCB-Bhubaneswar unit including newly established cement & building materials testing laboratory. The NCB team discussed with CMD about the expansion plans of Bhubaneswar unit and sought the support from IDCO for allocation of additional space.

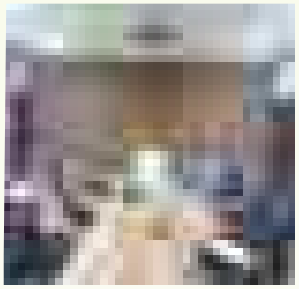
NCB is planning to expand its services in eastern part of the country by setting up a unit in Odisha which caters to the requirement of Odisha and neighboring states like Chhattisgarh, West Bengal and Jharkhand because of geographical proximity.

Meeting with CGM, IDCO



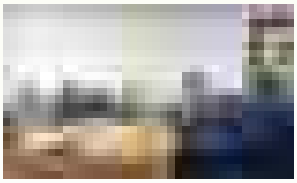
DG-NCB along with UIC NCB-Bhubaneswar met Dr. Bhakta Kabi Das, Chief General Manager (P&C), IDCO- Odisha and discussed on allocation of additional space at IDCO Central Stores, Mancheswar, Bhubaneswar for expansion of laboratory facility. It was also agreed by both NCB & IDCO to extend the validity of existing MoU by another 5 years for providing third party quality assurance and audit of IDCO projects.

Meeting with Water Resources Department, Odisha



DG-NCB along with NCB-Bhubaneswar team of engineers met Shri Dhiren Kumar Samal, Engineer-In-Chief, Water Resources Dept., Govt. of Odisha and Sh.VSS Patro, Superintending Engineer, OCTMP(WR). Shri Samal suggested NCB to prepare and submit a concept note for improving and inculcating 'Quality' inherently to their engineers in various level. He also suggested NCB that IT and latest technologies can be integrated in training the engineers. Sh. Patro suggested NCB to establish Soil Testing & Concrete Testing Laboratory at Bhubaneswar unit at the earliest possible time so that OIIPCRA construction works shall opt the services in their ongoing and upcoming works.

Meeting with DS cum Project Director, OIIPCRA

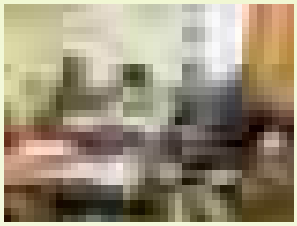


DG-NCB along with NCB-Bhubaneswar team of engineers met Ms. Madhusmita Sahoo, IAS Dy. Secretary, Govt. DoWR cum Project Director, OIIPCRA and discussed on training plan for recently awarded capacity building of 150 engineers. Project Director assured that scope of NCB services in capacity building training will be explored further. NCB also submitted Request for Proposal for third party quality assurance and audit of OIIPCRA projects funded by World Bank, which is under active consideration.

Meeting with Commissioner, Bhubaneswar Municipal Corporation

DG-NCB along with UIC NCB-Bhubaneswar met Sh. Prem Chandra Choudhary, IAS, Commissioner- Bhubaneswar Municipal Corporation (*BMC*) & Sh. Satyanarayana Patro, Executive Engineer, BMC to brief the services offered by NCB. Sh. Choudhary mentioned that NCB shall forward an introductory letter along with the credentials so that BMC can consult NCB and opt for its services in near future.

Meeting with Odisha Works Department



DG-NCB met Sh. Anil Kantha Tripathy, Engineer- In-Chief, Works Dept. Govt. of Odisha and Sh. Durga Prasanna Mishra, Superintending Engineer, Buildings Dept. Govt. of Odisha and explained NCB activities. Sh. Tripathy suggested NCB to submit introductory letter with all credentials so that OWD can consult for various services like TPQA, SAR, CCE etc. Sh. Mishra also mentioned that he and Chief Engineer will visit NCB Bhubaneswar Laboratory to assess the facilities and to explore possibilities for opting the services of NCB in near future.

Meeting with NSDC and Rural Development

DG-NCB met Shri Debi Prasad Mohanty, Consultant- National Skill Development Corporation (*NSDC*) and Dr. Pradeep Rout, Rural Development (*RD*) to discuss on collaboration with NSDC & RD for skill development programs in hybrid mode for the benefit of construction trade workers. Dr. Rout also suggested NCB to join hands with Odisha Knowledge Corporation for imparting training in vernacular language.

Interactive meeting with key officials of Cement Industry in Odisha

An interactive meet with key officials of cement industry in the state of Odisha was organized at Hotel Suryansh, Bhubaneswar in January 2021. Sh. Dibyendu Chakrabarti, Scientist –F & Head BIS, Bhubaneswar was the Chief Guest. Representatives of Cement Industry were offcials of M/s JSW Cement, JK Lakshmi Cement, Nuvoco Vistas Cement, Toshali Cement & My Home Cement. Seniors offcials from NCB- Ballabgarh, Hyderabad and other stake holders also connected through online platform.

DG highlighted the services of NCB, various Research Projects undertaken by NCB on cement and building materials, particularly Portland Dolomite Cement, High MgO content in cement, Optimized use of high-grade Lime Stone Mineral Resources, Utilization of Low-Grade Lime Stone, Coarser fly ash in cement manufacturing etc.

NCB's role in developing 16 BNDs Certified Reference Materials (*CRMs*) on various types of cements and state of the art testing facilities available at NCB Ballabgarh were also showcased. Recent challenges faced by manufacturers in cement manufacturing were also discussed. Research needs in plant blending mechanism of blending PSC and PPC uniformly and in an optimized way to customize and to produce tailor made cements as per the demand of various projects and customers were discussed. It was also informed that several studies on sponsored basis to provide techno economical feasible options for manufacturing such tailor-made cements can be taken up by NCB.

Visit of DG-NCB to Odisha

Shri Dibyendu Chakrabarti, Scientist –F & Head BIS, Bhubaneswar recalled the professional association of NCB and BIS & opined that in the coming days, NCB Bhubaneswar can play a major role in providing various services to the cement manufacturing plants in Odisha and neighboring states like Chhattisgarh, West Bengal and Jharkhand because of geographical proximity.

DG-NCB visited NCB-Bhubaneswar Unit to review the activities of the unit where he interacted with Engineers, Scientists and staff of NCB.

He also visited IDCO Central testing laboratory at Mancheswar where he interacted with officials on current works being carried out by the lab.All participants expressed their views on research needs and requested NCB's support for viable solutions. Forth coming amendments in various IS Codes in cement were also discussed in brief. DG & UiC NCB-Bh explained the facilities available at NCB Bhubaneswar and short-term vision of NCB Bhubaneswar in getting NABL Accreditation in Chemical discipline and getting LRS of BIS in the coming few months. DG-NCB invited all the participants to visit NCB Bhubaneswar. Representatives of Cement Manufacturing offcials have expressed that '*Concrete Mix Design Laboratory facility*' should be established at NCB Bhubaneswar at the earliest so that industry can get benefit from the facility. DG assured the participants that setting up '*Concrete Mix Design Laboratory*' at NCB Bhubaneswar shall be taken up on Top Priority.

DG-NCB visited NCB-Bhubneswar Unit to review the activities of the unit where he interacted with Engineers , Scientists and staff of NCB.

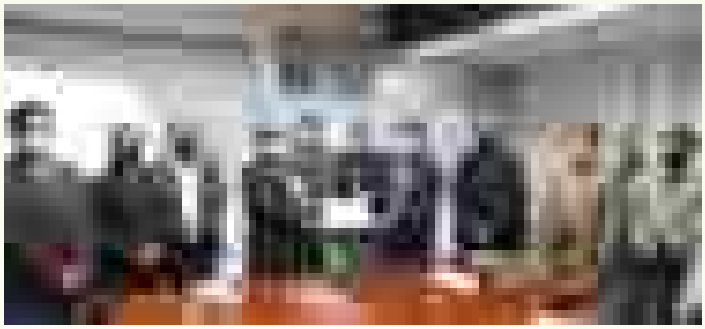
He also visited Central testing laboratory at Mancheswar where he interacted with officals on current works being carried out by the lab.

MoUs signed with various organizations

NPC

An MoU was signed between NCB and NPC on 15th March 2021 with the objective of fostering collaboration between the two institutions to promote research, development & innovation activity at both the institutions. DG-NCB also visited the facilities available at NPC, New Delhi and explored opportunities for further areas of collaboration.

CPPRI

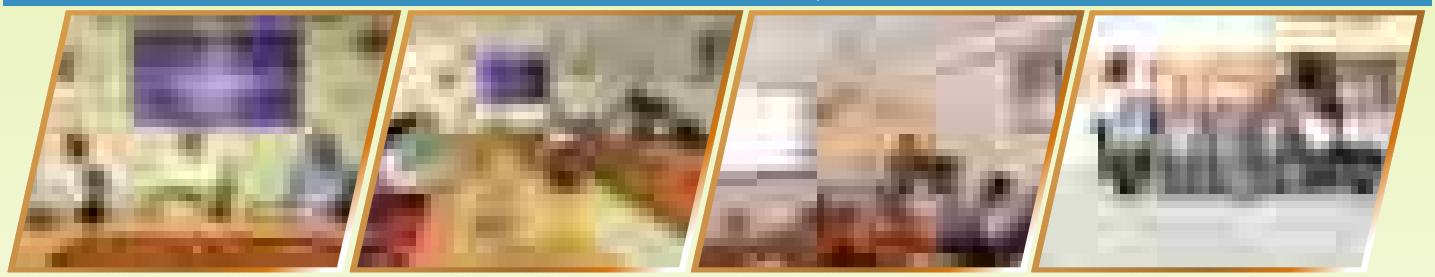


NCB and CPPRI entered into an MoU on 05th January 2021 for collaboration on joint research projects on waste utilization.

IIT Bhubneswar & NIT Rourkela

With a view to enhance its academic outreach, NCB signed a MoU with Prof. Sujit Roy, Dean (*Research & Development*), IIT-Bhubaneswar on 29th January 2021 and Prof. Animesh Biswas, Director, NIT-Rourkela on 23rd February 2021 with the objective of fostering collaboration between the institutions to promote academic and research interactions. The MoU covers submission of collaborative research projects, students' training, FDPs, availability of instrumentation facilities, laboratory & library facilities and other aspects of capacity building in order to bridge the industry- academia gap. The MoUs are set to increase the pace of research and expedite in expanding NCB's footprint in cement and construction sector.

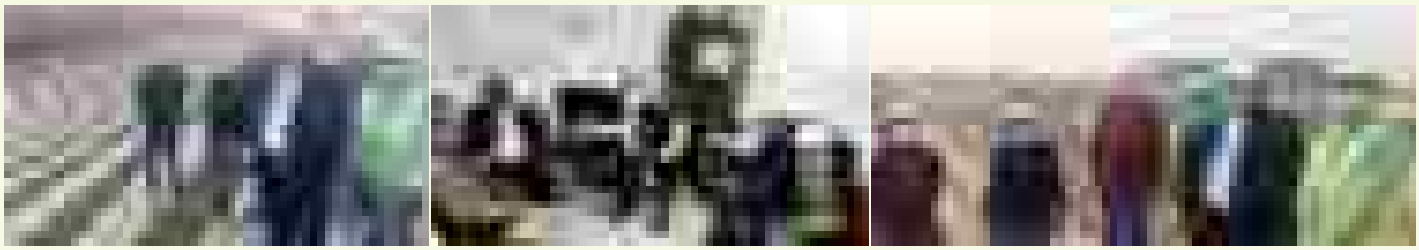
Visit of DG-NCB at GSI, Faridabad



DG-NCB was invited on the occasion of celebration of 170th Foundation Day of Geological Survey of India on 04th March 2021 by Dr. Ravindra Kumar, Deputy Director General (*G*), National Centre of Excellence in Geoscience Research, GSI, Faridabad. On this occasion Mr. G. C. Pati, Chairman, Central Ground Water Board, Shri G. K. Sharma, Head of Department of Geology, Kumaon University, Nainital, Dr. Sanjay Wahi, Director, Geology (*retd.*), Ajay Singh, Deputy General Manager, Geology, NHPC Faridabad, Shri R. L. Kashkari, Deputy Director General (*retd.*), GSI and Dr. Smt. Sheel Singh, Principal, KL Mehta Dayanand College Women, Faridabad were also present.

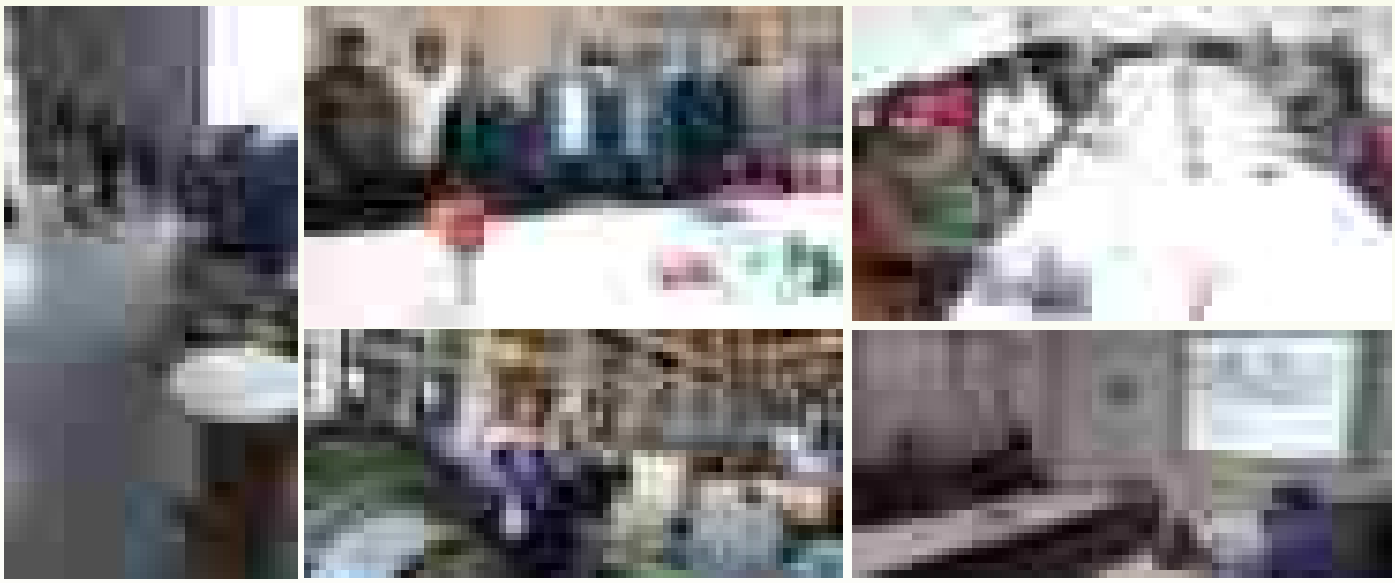
The purpose of this visit was to explore new avenues for collaborations in the area of R&D, mineral inventory etc. DG- NCB gave a presentation on various activities carried out at NCB. During the visit, NCB team interacted with experienced scientists to explore the possibilities of joint research work in the area of Mineralogy and Petrography of Raw materials and Clinkers. A quick visit to NCEGR, GSI Faridabad state of the art laboratories facilities was also undertaken.

Visit of DG-NCB to IPTO, Pragati Maidan



DG-NCB visited ITPO to review the status of project of International Exhibition-cum-Convention Centre (*IECC*) at Pragati Maidan, New Delhi. The project envisages development of Exhibition halls (*GRIHA-3 Rating*) and an iconic Convention Centre of 7000 pax. (*GRIHA-4 rating*) along with an Amphitheatre with seating capacity of 3000 pax. ITPO has appointed National Council for Cement and Building Materials (NCCBM) for Third Party Inspection/Quality Assurance for implementation of the aforementioned project.

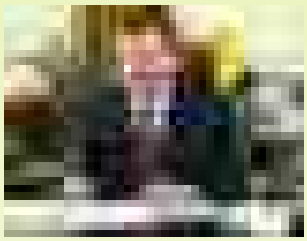
Visit of DG-NCB to KHD



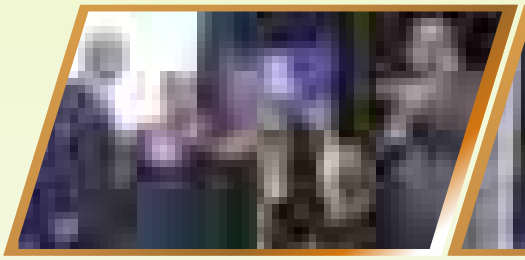
DG-NCB with NCB team visited KHD Humboldt Wedag India Head Office to discuss about installation of pilot plant at NCB-Ballabgarh. They also visited KHD's fabrication yard to gain insight on the ways that fabrication of such machinery is carried out and shall be carried out on pilot basis.

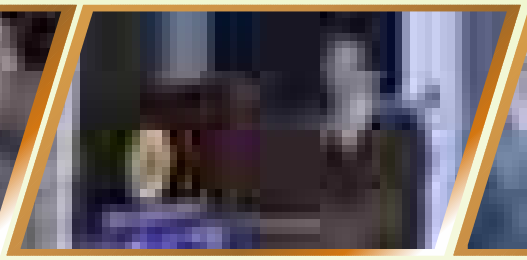
Homage to those who will be deeply missed

Dr. Guruprasad Mohapatra, Secretary, DPIIT, Ministry of Commerce & Industry, GoI



NCB family is deeply saddened to learn about the demise of Dr. Guruprasad Mohapatra, Secretary, DPIIT, Ministry of Commerce and Industry, GoI on Saturday, 19th June 2021. He was an able, hardworking and dynamic administrator, one with a great innovative zeal who inspired all of us with his simplicity, high principles and exemplary leadership.The country will forever appreciate the contributions he made to manufacturing sectors, FDI, and ease of doing business as Secretary, DPIIT which will continue to positively impact industrial sector in times to come.





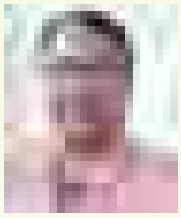
As a mentor to NCB, his wisdom and guidance on various matters gave great confidence and strength to us. It was his guidance that led to the grand success of 16th NCB International Seminar on Cement, Concrete and Building Materials. After inaugurating the Seminar, Dr Mohapatra also interacted with the cement industry leaders, giving them new ideas and insights about how to produce and consume cement responsibly.

Most recently, ***Guru Sir*** were present in an online meeting for nominating members of Board of Governors for NCB. During the meeting, one could clearly see his keenness to learn about the inner workings of NCB. Administrative skills and out of the box ideas came naturally to him.

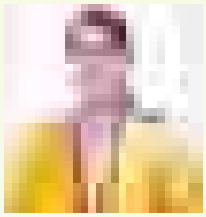
NCB is proud of working with a humble public servant and exceptional leader like ***Guru Sir***. His legacy will continue to guide us and NCB family will keep drawing strength from the vision he had for us.

DG-NCB on behalf of entire NCB family prays to the Almighty to grant eternal peace to his soul and strength to his family and friends to bear this loss.

Sh. M M Jamali and Ms. Mitlesh Sharma, Employees of NCB



Sh. M M Jamali
Asst. Manager



Ms. Mithlesh Sharma
Deputy Manager

The Director General and staff of National Council for Cement and Building Materials deeply mourn the sudden and untimely demise of Sh M M Jamali and Ms Mithlesh Sharma who had been with us for more than 20 years.They were devoted colleagues who had endeared themselves to one and all by their sincerity and mild manners. We solemnly condole their demise and pray to God for granting peace to their souls and fortitude to their family to bear the irreparable loss.

Important days observed at NCB

International Day of Yoga

NCB employees and their families practicing Yoga during Intl' Yoga Day 2021

Yoga is a physical, mental and spiritual practice which has originated in our great country. The world today is feeling the necessity of practising yoga even more after the COVID-19 pandemic. The boundation to live a restricted life under the constant fear of infection risks has led to continuous anxiety or stress that manifests many other health conditions like high blood pressure, muscle tension and breathing issues. Through all this pain and chaos, yoga can act as the best element to take care of our mind, body and soul.

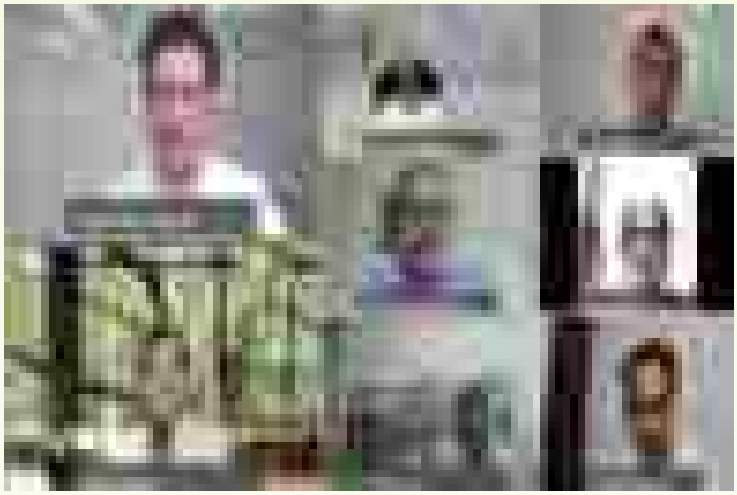
Today, many people world over are taking advantage of the benefits provided by Yoga not only to stay away from diseases but also to fully recover from them. Yoga also gives us patience, fortitude, self-confidence and mental strength to beat stress and continue to fight and win our daily battles in various facets of life.

NCB celebrated the International day of Yoga on 21 June 2021 where Sh. Ramesh Nichani, Secretary, Yog Vigyan Manav Kalyan Trust and his team taught NCB employees and their families about various aasans of yoga that help to boost immunity and strength of respiratory system.

World Environment Day 2021: Re-imagine, Recreate, Restore

On the eve of World Environment Day 2021, Dr Vandana Kumar, Joint Secretary-DPIIT, Govt. of India planted sapling at NCB Ballabgarh campus during her visit on 04th June 2021

Carbon Capture & Utilization and Renewable Energy



Chief Guest: Sh. Jamshed Naval Cooper, MD, Heidelberg Cement India Ltd.

Guest of Honour: Sh. Raju Goyal, Chief Technical Officer, Ultra Tech Cement Ltd.

Environment Day Address: Dr. B N Mohapatra ,Director General, NCB

Three Expert Lectures:

- "*Carbon Capture and Utilization Techniques*" by Prof. Paritosh Mohanty, Professor, IIT Roorkee
- "*Slag Mineral Carbonation efforts at Tata Steel*" by Dr. Sabuj Halder, Head-Blast furnace & AIT, Tata Steel Ltd.
- "*Renewable Energy*" by Dr. Manoj Kumar Soni,Associate Professor, BITS Pilani

Attendees from organizations

Heidelberg Cement
UltraTech Cement Ltd
J K Cement Ltd
Dalmia Cement (B) Ltd
Bharathi Cement
Shree Cement
ACC Ltd & ACL
Star Cement
Nuvoco Vistas Corp.
J K Lakshmi Cement
Orient Cement
Chettinad Cement
The India Cements Ltd
JSW Cement
Birla Corporation
Prism Johnson Ltd.
Shree Jaya Jyothi Cement
Wonder Cement
ParashaktiCement
Goldstone Cement
Cement Corporation of India
IIT Roorkee
Central University of Jharkhand
BITS Pilani
NIT Rourkela
CSIR-CBRI
CSIR-IMMT
NPC

Webinar Highlights

Total 546 participants attended the webinar

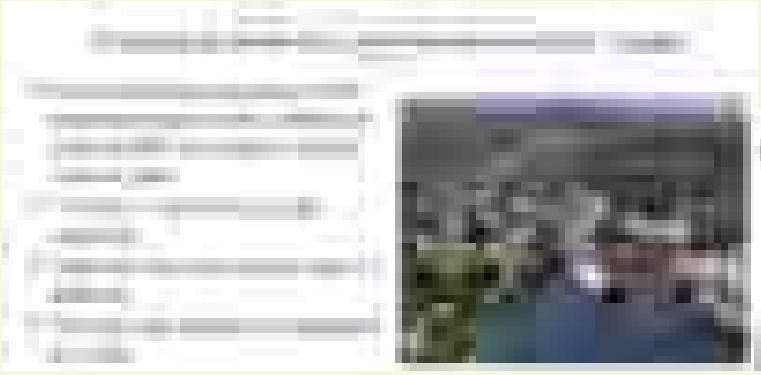
- **372 participants from all the major Indian cement companies**
- **79 NCB Scientists/Engineers**
- **62 from Academic Institutions**
- **33 from Research organizations / Government deptt. / companies**

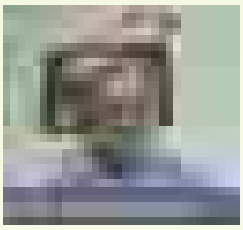
Shri Jamshed N Cooper
Managing Director
Heidelberg Cement India Ltd

Chief Guest Shri Jamshed N Cooper, discussed about CO_2 emissions scenario of cement industry, decarbonization technologies and highlighted various initiatives of Heidelberg Cement in Carbon Capture Technologies globally.
He also presented environment foot print of Heidelberg Cement India Ltd. like becoming 5.2 times water positive, installing WHRS, target of 30% AFR by 2025, use of Renewable Energy and reduction in carbon foot print.

Shri Raju Goyal
Chief Technical Officer
Ultra Tech Cement Ltd

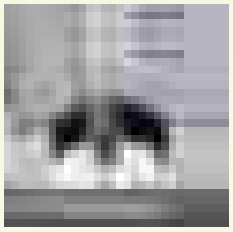
Shri Goyal highlighted the commitment and initiatives of cement industry towards sustainable development in the area of Energy, Environment, Waste Heat Recovery System, water positive, green belt development etc.
He also discussed about the need for innovative technologies required for the higher energy efficiency, utilization of AFR in Indian cement industry and to be come carbon negative.





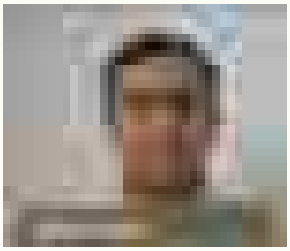
Dr. Paritosh Mohanty,
Professor, IIT Roorkee

Dr. Mohanty discussed about the concept of Carbon Capture and shared the out come of extensive research carried out by IIT Roorkee in alternative ways of Carbon Capture and for converting the captured CO_2 in to useful products for utilization.



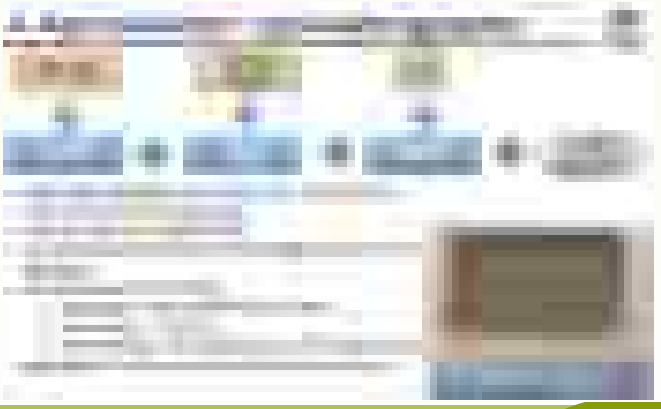
Dr B N Mohapatra
Director General
NCB

DG-NCB in his Environment Day address highlighted NCB's contribution towards decarbonization of Indian Cement Industry. He showcased steps taken to lower the CO_2 emissions from cement industry and support provided by NCB to cement industry like development of Low carbon cements, new clinker and maximization of alternative fuels utilization in Indian cement industry.



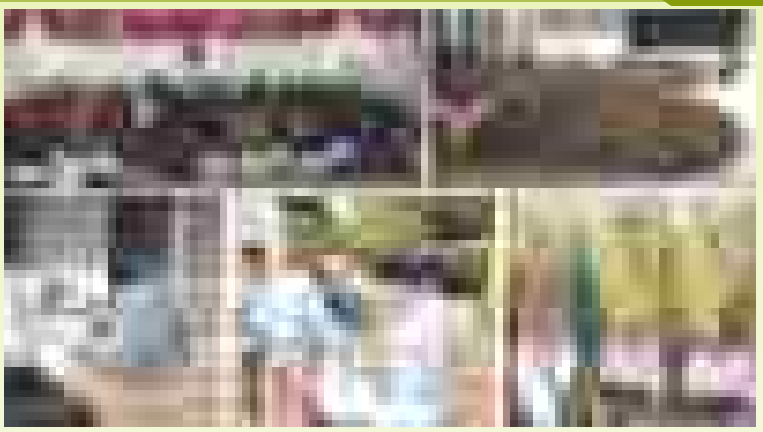
Dr Sabuj Halder,
Head-Blast furnace & AIT,
Tata Steel Ltd

Dr. Sabuj Halder presented TATA Steel's CO_2 road map, challenges in mineral carbonation and streams of carbonation of BOF Slag. He show cased proof of concept by Tata Steel like converting BOF slag into light weight aggregates; production of precipitated $CaCO_3$, Cement free Pre-cast Concrete and future plans of Tata Steel towards mineral carbonation.

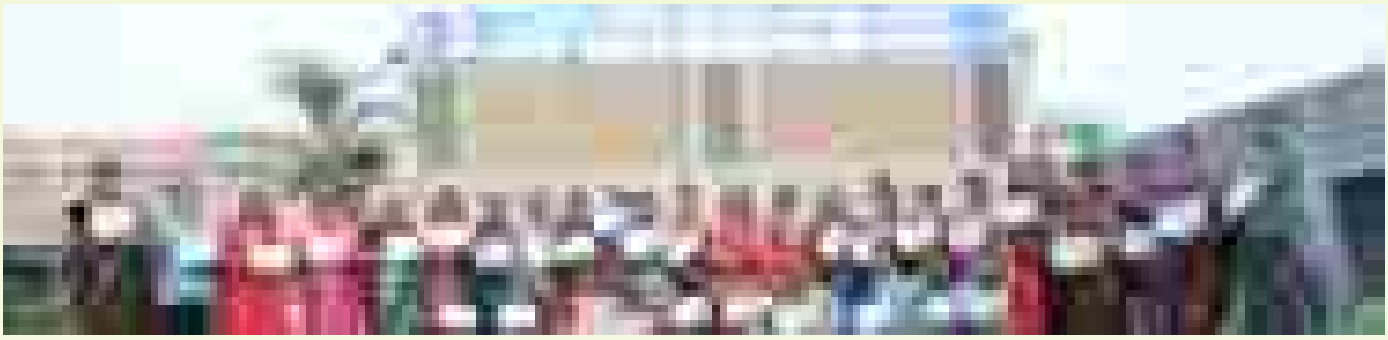


Dr. Manoj Kumar Soni, Professor, BITS Pilani highlighted recent developments in application of renewable energy sources like Solar, Geo thermal and Fuel Cell. He presented his work in solar thermal and geo thermal energy.

Dr. Soni show cased various application of solar energy for cooking and drying like Solar Cookers, Solar dryers, production of bio mass pellets which can be used by cement plants for CSR activities.



International Women's Day



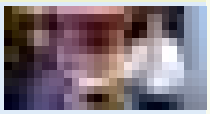
08th March 2021 was observed as "**International Women's Day**" at National Council for Cement and Building and Materials (*NCB*) for celebrating the social, economic, cultural and political achievements of women.

On this occasion, Ms Madhumita Sahoo, IAS, Deputy Secretary, Water Resources Department, Govt. of Odisha was the chief guest along with Guest of Honor Dr. Maitreyee Bhattacharya, Principal Scientist, CSIR-NML present via. online mode and Guest of Honor Dr. Megha Bansal, Associate Professor, Manav Rachna University, Faridabad was present physically on the occasion.

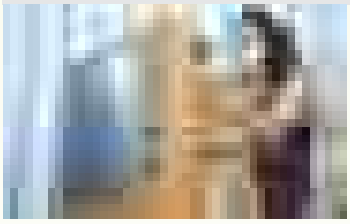
Ms Madhumita Sahoo, IAS, discussed about the history of International Women's Day celebrations, highlighted the gender bias that exist in the society and steps taken by government for women empowerment.

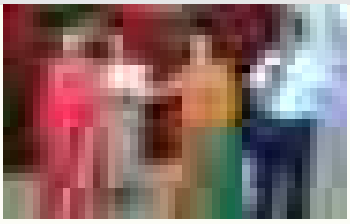
Dr. Maitreyee Bhattacharya, quoted the sloka from Manusmriti "यत्र नार्यस्तु पूज्यन्ते रमन्ते तत्र देवताः" and emphasized that there are lot more accomplishments which are yet to be made by women in our country.

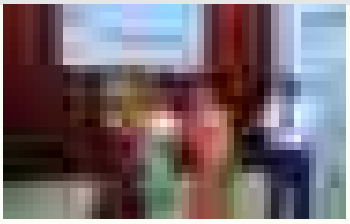
Dr. Megha Bansal encouraged women officials and staff of NCB to outshine in their areas of working. She also distributed appreciation certificates to the women employees of NCB.

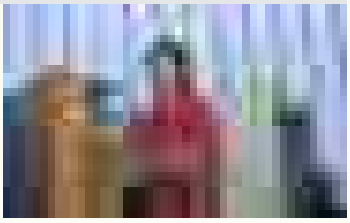


DG - NCB highlighted the achievements of women in India and also acknowledged the contribution of Nari Shakti of NCB. He described women as true multi taskers. He also interacted with women officials and staff of NCB and appreciated their hard work and contribution in the success of NCB.

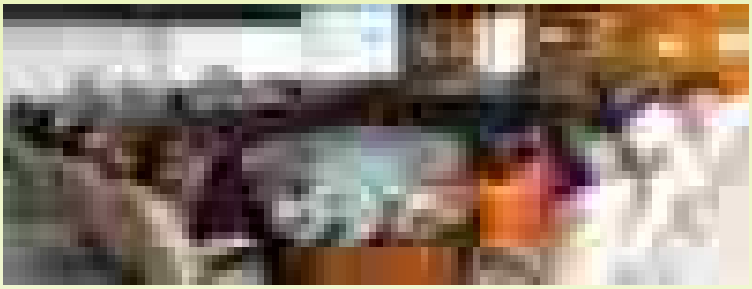








As part of celebrations of International Women's Day, Dr Sunit Brahma, a leading gynecologist & Obstetrician delivered an interactive talk for women officials and staff on 05th March 2021 on the health issues faced by women and how to tackle them effectively. The program was chaired by Mrs. Namita Mohapatra and it turned out to be a very fruitful session with important discussion regarding the latest and mandatory health checkup tips. The meeting was attended by women official of all units of NCB. It included a session on sharing the individual experiences and challenges faced at various levels during daily working of the staff and also displaying the contributions of eminent women personalities for encouragement of the women staff.

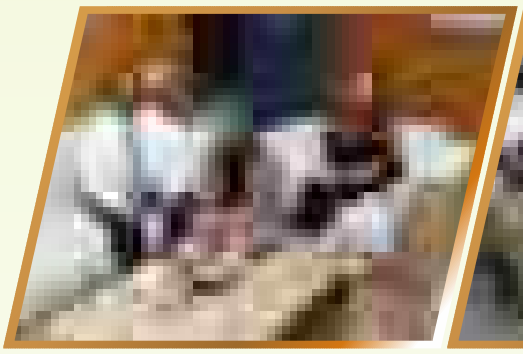
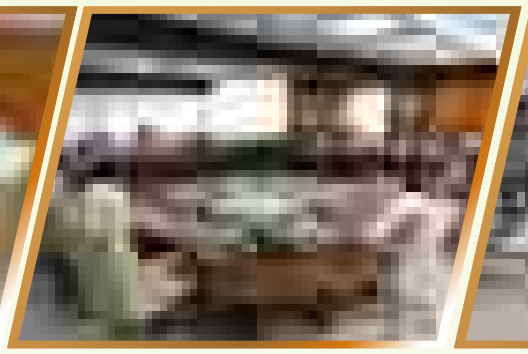
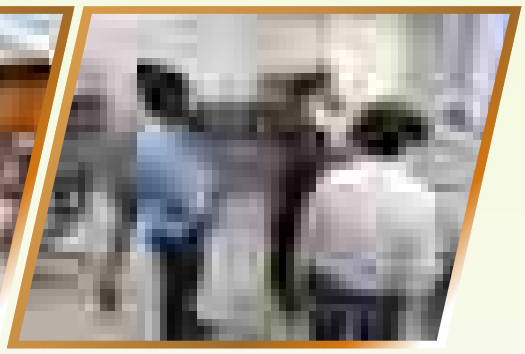


Visit of SDM Ballabgarh at NCB-Ballabgarh

As part of International Women's Day celebration, Ms Aparajita, an IAS officer of 2018 Haryana cadre and presently, SDM Ballabgarh since August 2020 was also invited to NCB-Ballabgarh campus. Although due to other pressing engagements, she could not grace the occasion on the day. She visited NCB on 18th March 2021. Ms Aparajita earlier was Assistant Commissioner, Gurugram, Haryana. She completed her Chemical Engineering from BIT Mesra in 2013 and had worked as Deputy Manager (*Environment*) in ACC Ltd. at Tikaria Grinding Unit for 2 years.

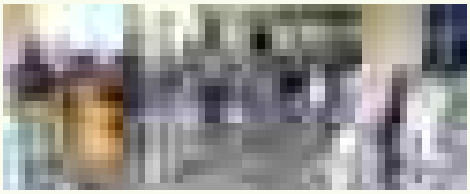
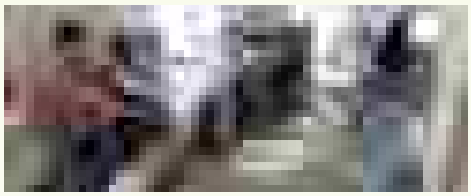
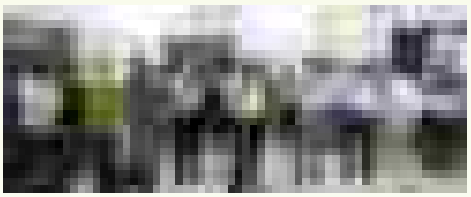
During the COVID-19 pandemic she ensured supply of food and other essentials to the needy. In view of her exceptional efforts, she recently got recognized for doing exceptional work during COVID-19 pandemic.

During her visit at NCB-B, she was briefed about the current status cement industry, sponsored and R&D works carried out by NCB to reduce carbon footprint of the cement industry and how the women officials of NCB have given their contribution in research work. She also visited NCB laboratories where she was briefed about the testing equipment available with NCB for carrying out such sponsored as well as R&D activities.

National Safety Day

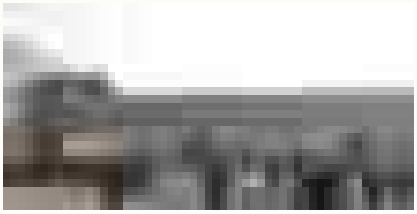
National Safety Day was first observed at NCB on 04th March 2021,the foundation day of the National Safety Council in 1972 set up by the Ministry of Labour and Employment to develop and bring into practice a voluntary routine on Safety, Health, and Environment. The theme for this year is 'Sadak Suraksha (*Road Safety*).' A Safety and Health pledge along with a pledge for road safety was administered to all NCB staff.

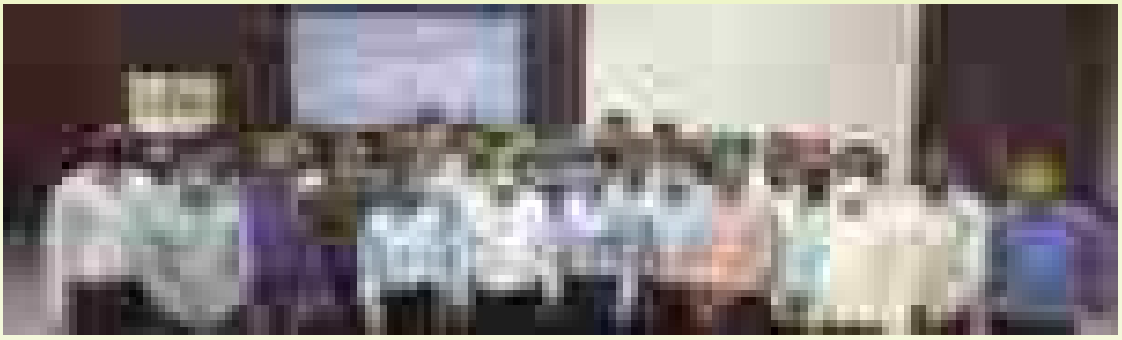
NCB officials of various Centers and Services taking pledge on National Safety Day 2021

72nd Republic Day

During celebration of 72nd Republic Day on January 26, 2021 at NCB Ballabgarh unit, DG-NCB congratulated entire NCB staff and spoke about importance of the day. He asked NCB's engineers and scientist to work towards making NCB Atmanirbhar. He told that NCB has to work towards becoming a leading organization in Research and Innovation in the field of cement and concrete and contribute towards the vision laid down by Hon'ble Prime Minister of India.



Sl. No.	Title of the Course with Reference No.	Duration / Date	Venue
I	**LONG TERM COURSES (LTC) – FULL TIME**		
	Post Graduate Diploma in Cement Technology (CCE-02/LTC-1/Cem/B/2021)	1 Year September 2021-August 2022	NCB-B



Special Group Training Programme on Quality Control & Assurance in Concrete Construction for the Engineers of M/s DMRC Ltd.

II	**SHORT TERM COURSES (STCs)**		
A	**Cement Technology Related Areas**		
1	Consumer Complaint and Handling Technique in Cement Marketing (CCE-02/STC-12/Mkt /B/2021)	2 days 15-16 July 2021	NCB-B
2	Technologies for Reducing PM, NO_x, SO_x and CO_2 in Cement Industry (CCE-02/STC-14/Cem/B/2021)	2 days 05-06 August 2021	NCB-B
3	Calibration and Measurement of Uncertainty of Laboratory Equipment (CCE-02/STC-15/Cem/B/2021)	3 days 11-13 August 2021	NCB-B
4	Sampling, Testing of Cement as per BIS Standards (CCE-02/STC-16/Cem/H/2021)	2 days 12-13 August 2021	NCB-H
5	Alternate Fuels and Raw Materials in Portland Cement Manufacture (CCE-02/STC-18/Cem/B/2021)	2 days 02-03 September 2021	NCB-B
6	Instrumental Methods of Analysis in Cement Plant (CCE-02/STC-20/Cem/B/2021)	3 days 15-17 September 2021	NCB-B
7	Energy Efficiency in Grinding Systems (CCE-02/STC-21/Cem/H/2021)	2 days 23-24 September 2021	NCB-H
8	Alternate Cementitious Materials (CCE-02/STC-23/Cem/B/2021)	2 days 07-08 October 2021	NCB-B
9	Best Practices for Quality & Productivity in Cement Plant (CCE-02/STC-24/Cem/B/2021)	1 day 22 October 2021	NCB-B
10	Optimization of Raw Mix to Improve Clinker and Cement Quality (CCE-02/STC-26/Cem/H/2021)	2 days 28-29 October 2021	NCB-H
11	Optimization of Cement Grinding Systems to Improve Productivity and Energy Conservation (CCE-02/STC-28/Cem/B/2021)	3 days 15-17 November 2021	NCB-B
12	Sampling and Testing of Cement as per BIS Standards (CCE-02/STC-30/Cem/B/2021)	3 Days 12-14 January 2022	NCB-B
13	Optimization of Pyroprocessing Systems in Cement Industry (CCE-02/STC-32/Cem/H/2021)	2 days 27-28 January 2022	NCB-H
14	Importance of CRMs for Quality Assurance & Quality Control in Cement & Building Material and Role of Proficiency Testing in Cement & Building Material (CCE-02/STC-33/Cem/B/2021)	1 day 28 January 2022	NCB-B
15	Laboratory QMS and Internal Audit as per ISO/IEC 17025:2017 (CCE-02/STC-35/Cem/B/2021)	4 days 15-18 February 2022	NCB-B
16	Safety Practices in Cement Industry (CCE-02/STC-37/Cem/H/2021)	2 days 24-25 February 2022	NCB-H
17	Diagnostic Studies on Process and Refractory related Problems in Cement Rotary Kiln (CCE-02/STC-38/Cem/B/2021)	3 days 07-09 March 2022	NCB-B
18	Total Quality Management in Cement Industry (CCE-02/STC-40/Cem/B/2021)	2 days 17-18 March 2022	NCB-B
19	Technologies for Reducing PM, NO_x, SO_x and CO_2 in Cement Industry (CCE-02/STC-41/Cem/H/2021)	2 days 24-25 March 2022	NCB-H

Sl. No.	Title of the Course with Reference No.	Duration / Date	Venue
3	EDTA Methods of Analysis for Cement and Raw Materials	2 days	NCB-B / NCB-H
4	Estimation of Free Silica	2 days	NCB-B / NCB-H
5	Testing of Pozzolanic Materials	3 Days	NCB-B / NCB-H
6	Proximate and Ultimate Analysis of Coal	3 Days	NCB-B / NCB-H
7	Physical Testing of Cement	3 Days	NCB-B / NCB-H
8	Determination of Bond Index for Raw Materials and Clinkers	4 Days	NCB-B / NCB-H
9	Evaluation and Quality Assessment of Limestone, Slag and Cement Clinker by Optical Microscopy	3 Days	NCB-B / NCB-H
10	Estimation of Sulphide Sulphur in Granulated Blast Furnace Slag / Portland Slag Cement	3 days	NCB-B / NCB-H
VI	**SPECIAL GROUP TRAINING PROGRAMMES**		
	These are customized training programmes on various aspects of cement, concrete, construction and related areas for a group of persons from a single organization		
A	**Cement Technology Related Areas**		
1	Overview of Portland Cement Technology for Sr. Executives / Engineers	10 Days	NCB-B / NCB-H
2	Portland Cement Manufacturing Technology for Entry Level Executives	4/8 Weeks	NCB-B / NCB-H
3	Strengthening of Capabilities of Techno Marketing Executives of Cement Industry	3 Days	NCB/On site
4	Energy Audit and Energy Conservation of Cement Plant & Captive Power Plants	5 Days	NCB/On site
5	Operation and Maintenance of Cement Kilns and Mills	3 Days	NCB/On site
6	Condition Monitoring of Equipment and Machinery	3 Days	NCB/On site
7	Quality System Documentation, Auditing ISO-9001 / ISO-14000 etc.	3 Days	NCB/On site
8	Comparison Study of Method of Testing of Cement and Building Materials as per IS, ASTM and EN Standards	2 Days	NCB/On site
9	Application of XRD and Optical Microscope (OM) in Quality Control and Process Optimization in Cement Industry	2 Days	NCB
10	Future Clinker/Cement Systems	2 Days	NCB/On site
B	**Concrete and Construction Technology Related Areas**		
1	Testing and Evaluation of Concrete Making Materials	5 Days	NCB
2	Ready Mixed Concrete Technology	3 Days	NCB
3	Application of Special and Blended Cements in Construction Industry	3 Days	NCB/On site
4	IS:456-2000 : Code of Practice for Plain and Reinforced Concrete	2 Days	NCB/On site
5	IS:2386-1963 (Part I–VIII) Tests for Aggregate	3 Days	NCB/On site
6	Concrete Mix Design and Quality Control	5 Days	NCB/On site
7	Quality Control and Quality Assurance in Concrete Construction	5 days	NCB/On site
8	Modern Construction Practices for Concrete Construction	3 Days	NCB/On site
9	Cost Effective Construction Technologies	3 Days	NCB/On site
10	Design and Construction of Earthquake Resistant Concrete Structures	3 Days	NCB/On site
11	Project Management and Project Financing	3 Days	NCB/On site
12	Special Concrete in Aggressive Environments including Coastal Construction	4 Days	NCB/On site
13	Corrosion in Reinforced Concrete Structures and Remedial Measures	3 Days	NCB/On site
14	QC and QA in Concrete Construction for Hydro-electric Projects	4 Days	NCB/On site
15	Advances in Concrete Technology	4 Days	NCB/On site
16	Properties and Application of Admixtures, Corrosion Inhibitors and Permeability Reducing Chemicals including Compatibility Issues and Economic Gains	3 Days	NCB/On site
17	Repair, Retrofitting and Rehabilitation of Reinforced Concrete Structures for enhanced Service Life	3 Days	NCB/On site
18	Field and Lab Investigation Techniques for Mass Concrete Structures including causes of Distress	3 Days	NCB/On site
19	Mix Design, Optimization and Application of Fibre Reinforced Concrete for Durable Construction	3 Days	NCB/On site
20	Design of High Strength Concrete and High Performance Concrete including Material Selection and its Applications	3 Days	NCB/On site

Sl. No.	Title of the Course with Reference No.	Duration / Date	Venue
B	**Concrete and Construction Technology Related Areas**		
1	Seismic Evaluation and Retrofitting of Reinforced Concrete Buildings (CCE-02/STC-10/Conc/B/2021)	2 days 28-29 June 2021	NCB-B
2	Corrosion in Reinforced Concrete Structures and its Remedial Measures (CCE-02/STC-11/Conc/H/2021)	2 days 08-09 July 2021	NCB-H
3	Production of Durable Concrete (CCE-02/STC-13/Conc/B/2021)	4 days 27-30 July 2021	NCB-B
4	Concrete Mix Design and Acceptance Criteria of Concrete (CCE-02/STC-17/Conc/B/2021)	3 days 25-27 August 2021	NCB-B
5	Cracks and Leakages in Concrete Structures: Causes, Prevention and Repair (CCE-02/STC-19/Conc/H/2021)	2 days 02-03 September 2021	NCB-H
6	Non-destructive Testing and Evaluation of Concrete Structures (CCE-02/STC-22/Conc/B/2021)	3 days 27-29 September 2021	NCB-B
7	Use of Blended Cements for Durable Concrete (CCE-02/STC-25/Conc/B/2021)	3 days 27-29 October 2021	NCB-B
8	Concrete Mix Proportions and Acceptance Criteria (CCE-02/STC-27/Conc/H/2021)	3 days 11-12 November 2021	NCB-H
9	Durability & Service Life Design of Concrete Structures (CCE-02/STC-29/Conc/B/2021)	2 days 22-23 December 2021	NCB-B
10	Design, Construction and Quality Control Practices for Concrete Roads for Highway & Low Volume Roads (CCE-02/STC-31/Conc/B/2021)	3 days 19-21 January 2022	NCB-B
11	Quality Control and Quality Assurance in Concrete Construction (CCE-02/STC-34/Conc/H/2021)	3 days 09-11 February 2022	NCB-H
12	Repair and Rehabilitation of Concrete Structures (CCE-02/STC-36/Conc/B/2021)	3 days 23-25 February 2022	NCB-B
13	Non-destructive Testing and Evaluation of Concrete Structures and Repair & Rehabilitation methods of Concrete Structures (CCE-02/STC-39/Conc/H/2021)	3 days 09-11 March 2022	NCB-H
III	**SIMULATOR BASED COURSES (SBCs)**		
1	Operation, Control and Optimization of Modern Precalciner Kilns (CCE-02/SBC-2/Sim/B/2021)	4 days 06-09 July 2021	NCB-B
2	Operation, Control and Optimization of Modern Grinding System based on Vertical Roller Mills (CCE-02/SBC-3/Sim/B/2021)	3 days 08-10 September 2021	NCB-B
3	Operation, Control and Optimization of Modern Grinding System based on Roller Press and Ball Mills (CCE-02/SBC-4/Sim/B/2021)	3 days 15-17 December 2021	NCB-B
4	Operation, Control and Optimization of Modern Grinding System based on VRM and Roller Press/Ball Mill System (CCE-02/SBC-5/Sim/H/2021)	4 days 18-21 January 2022	NCB-H
5	Operation, Control and Optimization of Modern Precalciner Kilns (CCE-02/SBC-6/Sim/B/2021)	4 Days 01-04 February 2022	NCB-B
6	Operation, Control and Optimization of Modern Precalciner Kilns (CCE-02/SBC-7/Sim/H/2021)	3 days 02-04 March 2022	NCB-H
7	Operation, Control and Optimization of Modern Grinding System based on Vertical Roller Mills (CCE-02/SBC-8/Sim/B/2021)	3 days 23-25 March 2022	NCB-B
IV	**CONTACT TRAINING PROGRAMMES (CTPs)**		
	Contact programmes are designed to suit the specific requirements of individual participants. These are practice-oriented wherein the participants practice in the laboratory right from day one to master the relevant technique/method of testing and analysis.		
Sl. No.	**Title of the Course with Reference No.**	**Duration / Date**	**Venue**
1	Application of XRD for Quality Evaluation of Clinker, Cement and Raw Materials	3 Days	NCB-B/ NCB-H
2	Mineralogical and Microstructural Evaluation of Coarse and Fine Aggregates, Hardened Concrete, Hydrated Cement by Optical Microscopy	3 Days	NCB-B/ NCB-H
3	EDTA Methods of Analysis for Cement and Raw Materials	3 Days	NCB-B / NCB-H
4	Estimation of Free Silica	3 Days	NCB-B / NCB-H
V	**HANDS ON TRAINING**		
1	Estimation of Chloride in Cement	2 Days	NCB-B / NCB-H
2	Estimation of Alkalies in Cement	2 Days	NCB-B / NCB-H

Sl. No.	Title of the Course with Reference No.	Duration / Date	Venue
21	Pervious, Permeable and Geopolymer Concrete and Its Applications	2 Days	NCB/On site
22	Recent Advances in Codal Provisions in Cement and Concrete Standards in India	3 Days	NCB/On site
23	Crack and Leakages in Concrete Structures and Repair Techniques for Durable and Sustainable Construction	3 Days	NCB/On site
24	ISO:17020 requirements for Quality Control and Quality Assurance	2 Days	NCB/On site
25	Uses of Supplementary Cementitious Materials for Sustainable Construction including Codal Provisions	3 Days	NCB/On site
26	Contract Management and Quality Assurance Procedures during Construction Contract Execution	2 Days	NCB/On site
27	Performance based Design of Concrete Structures from Durability Point of View	3 Days	NCB/On site
28	Effect of Mineral and Chemical Admixtures on Rheology of Concrete	2 Days	NCB/On site

TRAINING COURSES TO BE HELD AT NCB-BALLABGARH

Centre for Continuing Education Services (CCE)
National Council for Cement and Building Materials 34 Km Stone, DelhiMathura Road (Nh2)-Ballabgarh - 121 004 (Haryana), INDIA
Tel : +91-129-4192245 / 468 / 467, 2241453
Fax : +91-129-2302300 (Telefax), 2242100, 2246175
E-mail : cceb@ncbindia.com
Website : http://www.ncbindia.com

PAN No.: AAATN2477N	**TAN No. :** DELN09625A	**GST No. :** 06AAATN2477N1Z6	**Mode of Payment: Online**

Details for ECS Payment:
i) SBI Collect:

www.onlinesbi.com → SB collect → Proceed → State of corporate/Institution: (All India) → Type of corporate/Institution: (Govt. Department) → National Council for Cement and Building Materials → Training → Submit.

ii) State Bank of India, CRI Faridabad Branch (Code 03794), Faridabad-121004, Haryana, India

SB Account No. : 37301477161, 10383962218	**MICR Code :** 110002194	**IFSC Code :** SBIN0003794

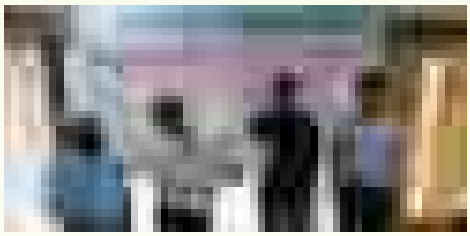
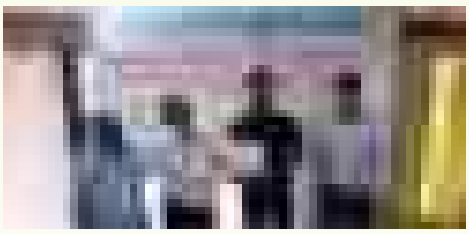
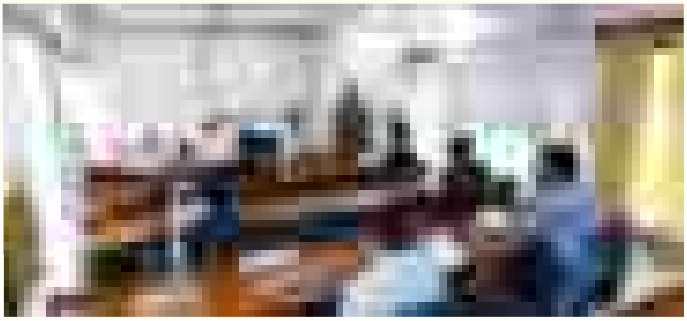
TRAINING COURSES TO BE HELD AT NCB-HYDERABAD

Centre for Continuing Education Services (CCE)
National Council for Cement and Building Materials
NCB Bhawan, Old Bombay Road, (Mehidipatnam-Gachibowli Road)
Hyderabad-500 104 (Telangana), INDIA
Tel : +91-40- 23180439, 23180424, 23180413, 23180400, 23002427
23180417 (After Office Hours)
Fax : +91-40-23000343, 23006739
E-mail : cceh@ncbindia.com, hyd2_ncbhrc@bsnl.in, 2015cceh@gmail.com

PAN No.: AAATN2477N	**TAN No. :** HYDN00104G	**GST No. :** 36AAATN 2477N1Z3	**Online Payment**

Details for ECS Payment:
State Bank of India, Darga Branch, Raidurg (Code 20540), Hyderabad 500008 (TS)

SB Account No. : 52119331455	**MICR Code :** 500002347	**IFSC Code :** SBIN0020540

DG-NCB regularly interacts with the students availing the training courses. The GETs of M/s DCBL received training certificates from DG-NCB after successful completion of their residential training course on Cement Manufacturing Technology.

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

(Under the Administrative Control of Ministry of Commerce & Industry, Govt of India)
34 Km Stone, Delhi-Mathura Road (NH-2), Ballabgarh-121 004, Haryana, India
Tel: +91-129-2242525, 4192222, 2242051
E-mail: dg@ncbindia.com, nccbm@ncbindia.com

Hyderabad Unit
NCB Bhavan, Old Bombay Road, Gachibowli
Hyderabad-500 008, (Telangana)
Tel: +91-40-23180400, 23180426
E-mail : uicncbh@ncbindia.com
uicncbh@gmail.com

Ahmedabad Unit
Smeet Bungalows, B/h. Planet House-2 (PH-2)
Opp. Shukan Shubh-Labh Aptt., Off. Judges Bungalows Road
Boadakdev, Ahmedabad-380 054, (Gujarat)
Tel: +91-79-26855840
E-mail: brcncb@rediffmail.com

NCB Bhubaneswar-Project Office
Plot No. 145, Zone-B, Shed No.4
IDCO Central Store
Mancheswar Industrial Estate
Bhubaneswar-751 010, (Odisha)
Tel: +91-9010325172
E-mail: ncbodisha@gmail.com