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भारत 2023 INDIA
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स्वच्छ भारत
 एक कदम स्वच्छता की ओर

17th
NCB INTERNATIONAL CONFERENCE ON CEMENT, CONCRETE AND BUILDING MATERIALS

Moving Towards Net Zero Carbon Emissions

06 - 09 December, 2022
New Delhi, India

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17th NCB International Conference on Cement, Concrete and Building Materials

“Moving Towards Net Zero Carbon Emissions”

1. Background of NCB Conference

National Council for Cement and Building Materials (NCB), the apex body in India for research, technology development and transfer, education and industrial services for cement, allied building materials and construction industries, has organized the 17th NCB International Conference on Cement, Concrete and Building Materials as a follow-up of the Sixteen NCB International Seminars organized earlier. Hence forth this biennial event will be known as “NCB International Conference on Cement, Concrete and Building Materials”. The theme of this year’s Conference was “Moving Towards Net Zero Carbon Emissions”.



NCB Ballabgarh



The first NCB International Conference was held in the year 1987 and since then this is the 17th edition of the biennial event. The continued interest of participants over the years is indication of the benefits reaped by them.



Conference Venue

The Conference, therefore, provided an ideal opportunity to:

- Cement and Concrete professionals from policy makers' / Top management personnel to Senior and Middle level executives associated with manufacture of Cement, Concrete and Ready Mixed Concrete, and allied building materials
- Equipment / machinery manufacturers, designers and consultants
- Engineers, Technologists, Scientists, Academicians, Research Scholars, Students and Economists
- Users of cement and building materials and construction agencies to deliberate, share and assimilate the ideas of the world's leading experts.

The Technical Exhibition held concurrently as a part of the International Conference gave an additional exposure to the latest in available technologies and services for efficient operation of cement plants, making of concrete and construction activities.

The Scientific Committee comprising members from Niti Aayog, BIS, cement and construction industry, premier academic and research institutes was formed under the chairmanship of Dr A K Chatterjee, Chairman, Conmat Technologies Pvt. Ltd.



Scientific Committee

Chairman: Dr A K Chatterjee, Chairman, Conmat Technologies Pvt. Ltd.

Convenor: Dr B N Mohapatra, Director General, NCB

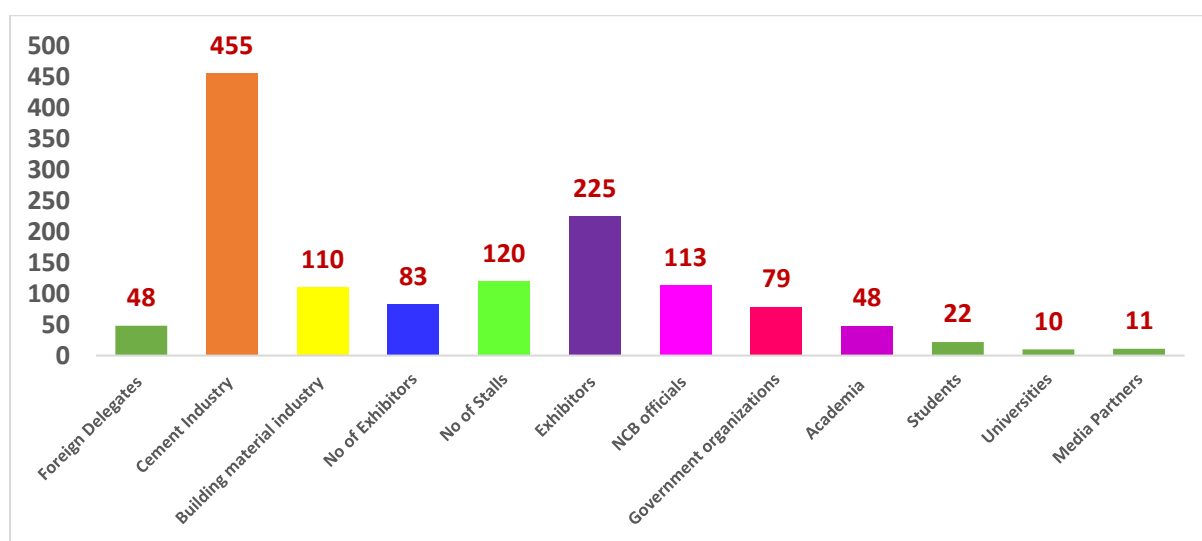
Organising Secretary: Dr S K Chaturvedi, Joint Director, NCB

Shri Neeraj Sinha Sr. Scientific Advisor, NITI Aayog	Shri P N Chhangani Whole Time Director, Shree Cement Ltd.
Dr R B Lal Addl Director, MoEF&CC, Govt. of India	Shri Jamshed N Cooper MD, HeidelbergCement India Ltd
Shri Sanjay Pant DDG (Standardization), Bureau of Indian Standards	Shri Rakesh Singh Executive President, The India Cements Ltd.
Prof D N Singh Department of Civil Engineering, IIT Bombay	Shri Deepak Khetrapal MD & CEO, Orient Cements Ltd.
Prof Ravindra Gettu Department of Civil Engineering, IIT Madras	Shri Madhav Singhania Deputy MD & CEO, J K Cement Ltd.
Prof Manoranjan Parida Director, CRRI	Shri Arun Shukla Director, J K Lakshmi Cement Ltd.
Prof KVL Subramaniam Department of Civil Engineering, IIT Hyderabad	Shri Arvind Pathak MD & CEO, Birla Corp Ltd
Prof Shashank Bishnoi, Department of Civil Engineering, IIT Delhi	Shri V S Narang Director (Technical), My Home Industries Pvt Ltd.
Prof Dinakar Pasla Department of Civil Engineering, IIT Bhubaneswar	Shri Raju Goyal Chief Technical Officer, UltraTech Cement Ltd.
Prof Saranjit Singh Pro Vice Chancellor, KIIT University	Shri Sanjay Joshi CMO, Nuvoco Vistas Corp. Ltd.
Dr M K Gupta Director, CPPRI, Sahranpur	Sh G V Ramakrishna Executive Director, Dalmia Cement (B) Ltd
Dr L P Singh Sr. Principal Scientist, CBRI Roorkee	Shri Dinesh G Randad Director (Works), Gujarat Sidhee Cement Ltd.
Dr Sada Sahu Sr. Principal Scientist, Solidia Technologies	Shri Pankaj Kejriwal Whole Time Director, Star Cement Ltd.



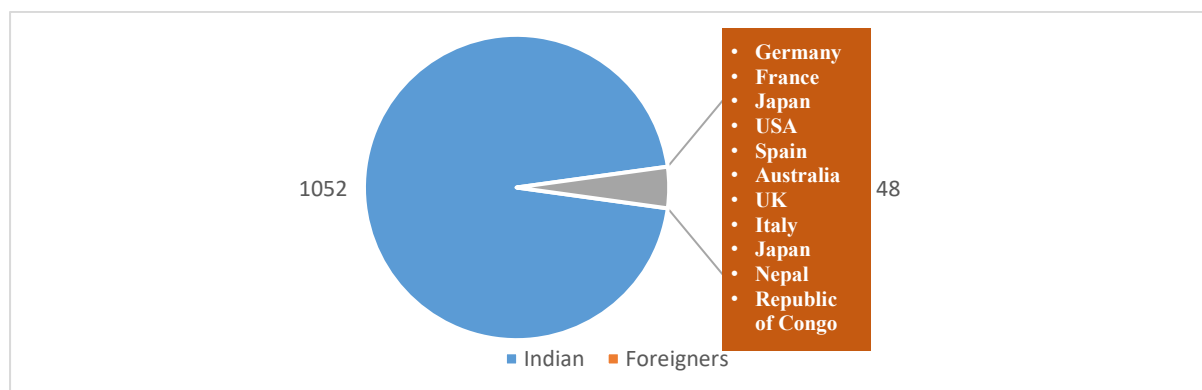
2. 17th NCB International Conference on Cement, Concrete and Building Materials

The 17th NCB International Conference on Cement, Concrete and Building Materials was held from 06 - 09 December 2022 at Manekshaw Centre, Parade Road, New Delhi. The theme of this year's Conference was chosen as ***"Moving Towards Net Zero Carbon Emissions"***.



Participation in the 17th NCB International Conference

17th NCB International Conference saw participation of 1100 delegates from cement industry, building materials industry, exhibitors, NCB officials, foreign delegates, government organizations, academia, media partners etc. The Conference witnessed 48 foreign delegates from 11 countries across the globe.



Registration Statistics of the 17th NCB International Conference



During the four days of the Conference, the technical deliberations comprised of about 160 presentations in 20 technical sessions covering wide spectrum of themes relating to cement, concrete and construction sectors.

Scientific Programme Statistics

SESSIONS	No. of Sessions	No. of Presentations
Panel Discussions	4	6-8 Panelists in each session
Special Technical Sessions	4	01 in each session
Parallel Sessions	20	160

Special technical sessions with eminent Keynote Speakers on emerging topics like

- Promise of Energy Efficiency for addressing climate change by **Dr Ashok Kumar**, Deputy Director General, Bureau of Energy Efficiency
- Durability Design of Concrete Structures by **Prof Manu Santhanam**, Professor, Department of Civil Engineering, IIT Madras
- From Pollution to Solution-Bringing Cement and SCM to Net-Zero by **Dr Sada Sahu**, Sr. Principal Scientist, Solidia Technologies

and

Four Panel discussions with distinguished Panellists on

- Moving towards Net Zero Carbon Emissions in Indian Cement Industry
- Sustainability and Circular Economy in Cement & Construction Sector
- Enhancing AF & ARM utilization in Indian Cement Industry and
- National Mission on Sustainable Habitat -2030

were the highlights of this Conference.

The 3rd edition of Compendium – The Cement Industry - India 2022, a publication on “Alternative Fuels – A Green Solution for Indian Cement Industry” and NCB Guide Norms on Cement Plant Operation were released by Chief Guest Shri Anurag Jain, Secretary, DPIIT, Ministry of Commerce and Industry, Govt. of India.



3. Sponsors and Media Partners

Like the previous ones in the series, the 17th NCB International Conference was also sponsored by a number of leading cement companies, cement plant machinery suppliers/OEMs, supported by various government departments/organizations with active participation of media partners.

Sponsors

Sl. No.	Name of Sponsors	Category
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- Ministry of Environment, Forest, and Climate Change (MoEF&CC), Govt. of India
- Council for Scientific and Industrial Research (CSIR)
- Bureau of Indian Standards (BIS)
- Bureau of Energy Efficiency (BEE)
- Cement Manufacturers' Association (CMA)

Media Partners

Industrial Angles	Indian Cement Review	Construction World
International Cement Review	World Cement	ZKG International
Civil Engineering & Construction Review (CE&CR)		

17th NCB INTERNATIONAL CONFERENCE ON CEMENT, CONCRETE AND BUILDING MATERIALS

06-09 December, 2022 | New Delhi, India

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Industrial Angles

ZKG Cement Lime Gypsum

World Cement

Construction World

Civil Engineering & Construction Review

9



Welcome Get-together & Registration



4. Inauguration of 17th NCB International Conference

With an underlying theme of Moving Towards Net Zero Carbon Emissions, four days 17th NCB International Conference on Cement, Concrete & Building Materials inaugurated on 6th December 2022 by Chief Guest Shri Anurag Jain, Secretary, Department for Promotion of Industry and internal trade (DPIIT), Ministry of Commerce & Industry, Govt. of India at prestigious Manekshaw centre and released the 4 Nos. of NCB Publications, Shri Anil Agrawal, Additional Secretary, DPIIT, Guest of Honour delivered the speech on outlook of Indian Cement Industry.

Shri KC Jhanwar, Chairman, NCB, President, Cement Manufacturers Association & MD, UltraTech Cement deliberated his views on “Indian Cement Industry- Future Outlook, Challenges & Opportunities. Shri Mahendra Singhi, MD & CEO, Dalmia Cement (Bharat) Ltd deliberated his view on “Cement Industry Global Perspective. The programme was initiated by Dr. BN Mohapatra, DG-NCB by his Welcome Address and Dr SK Chaturvedi, Jt. Director & Organising Secretary, 17th NCB International Conference proposed Vote of Thanks. Inaugural session was attended by more than 1000 delegates from India & abroad. The 4 days event comprises of 4 Nos of panel discussions, 3 Nos special technical sessions and 20 Nos. technical sessions covering 160 papers on Cement, Concrete & Building Materials.



Inauguration of Conference by lamp lighting

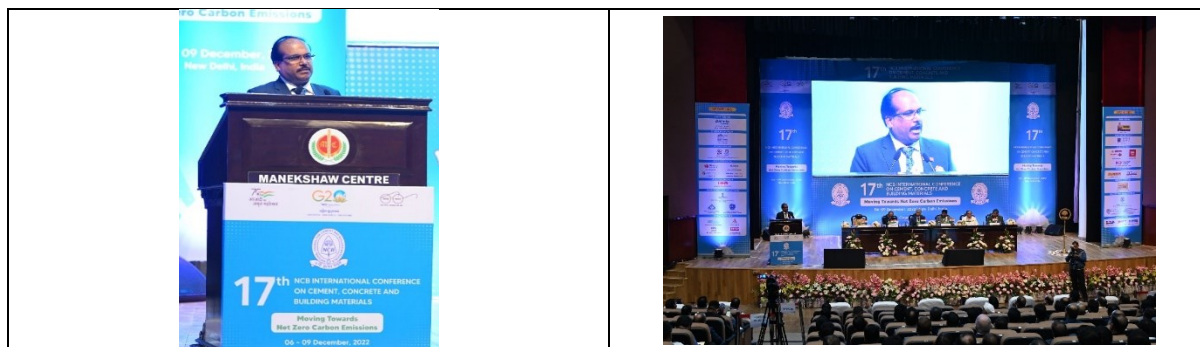


Inaugural Session



4.1 Welcome Address by Dr B N Mohapatra, Director General, NCB:

Dr B N Mohapatra gave the welcome address and spoke on the recent initiatives of NCB for the cement industry. He highlighted the progress on NCB's research activities like development of low carbon cements, increasing TSR by RDF gasification & improved chute design, various studies on utilization of industrial waste and by-products like phosphogypsum and FGD gypsum, development of BNDs, dissemination of research outcomes by conduction national workshops with BEE, webinars conducted and collaboration with premier academic and research institutions.



4.2 Indian Cement Industry - Challenges, Opportunities and Future Outlook by Shri K C Jhanwar, Chairman-NCB:





4.3 Cement Industry Global Perspective by Shri Mahendra Singhi, MD & CEO, Dalmia Cement (B) Ltd.:



4.4 Government Initiatives for Cement and Construction Sector:





4.5 Inaugural Address by Chief Guest Shri Anurag Jain:



The complete speech of Shri Anurag Jain, Secretary-DPIIT is available at <https://youtu.be/aRChIXRdcak>.

4.6 Release of NCB Publications

Chief Guest Shri Anurag Jain, Secretary-DPIIT, Ministry of Commerce and Industry, Govt. of India released four NCB publications during the inaugural session of 17th NCB International Conference on 6th December 2022 at Manekshaw Centre, Delhi. These publications were:

- The 3rd edition of Compendium – The Cement Industry - India 2022
- Publication on “Alternative Fuels – A Green Solution for Indian Cement Industry”
- NCB Guide Norms on Cement Plant Operation
- NCB Conference Proceedings containing full papers published in conference



The 3rd edition of Compendium “The Cement Industry – India 2022” was published by NCB in association with DPIIT, Ministry of Commerce & Industry. It contains updated information about best practices, technology roadmap, issues, challenges and opportunities for cement plants and an exhaustive directory of cement plants in India.

The publication on “Alternative fuels –A green solution for Indian cement industry” will be very much useful and reference document for Indian cement industry covering AF characterization, system design and process optimization concepts etc.



5 Panel Discussions

Four Panel discussions with distinguished Panellists were conducted on

- Moving towards Net Zero Carbon Emissions in Indian Cement Industry
- Sustainability and Circular Economy in Cement & Construction Sector
- Enhancing AF & ARM utilization in Indian Cement Industry and



- National Mission on Sustainable Habitat -2030

1st Panel Discussion on “Moving towards Net Zero Carbon Emissions in Indian Cement Industry”:

The first panel discussion was moderated by Shri Raju Goyal, Chief Technical Officer, UltraTech Cement Ltd. and the distinguished panelists of the panel discussion were as given below:

- Shri Jamshed N Cooper, Managing Director, HeidelbergCement India Ltd.
- Shri Kiran Patil, Managing Director, Wonder Cement Ltd.
- Shri V S Narang, Director (Technical), My Home Industries Pvt Ltd.
- Shri Ganesh Jirkuntwar, National Manufacturing Head, Dalmia Cement (B) Ltd.
- Mr. Matthias Mersmann, Chief Technical Officer, KHD Humboldt Wedag International, Germany
- Dr B N Mohapatra, Director General, NCB





2nd Panel Discussion on “Sustainability and Circular Economy in Cement & Construction Sector”:

The second panel discussion was moderated by Shri Sudhir Kumar, Advisor (Industry & Circular Economy), Niti Aayog and the distinguished panelists of the second panel discussion were as given below:

- a) Shri Sanjay Pant, DDG (Standardization), BIS,
- b) Shri Neeraj Sinha, Sr Advisor (S&T), NITI Aayog
- c) Prof. D N Singh, Professor, Department of Civil Engineering, IIT Bombay
- d) Prof. Manoranjan Parida, Director, CSIR-CRRI
- e) Shri K J Patel, Director & Unit Head, IFFCO Paradeep
- f) Ms Madhumita Basu, Chief Strategy & Marketing Officer, Nuvoco Vistas Corp Ltd.
- g) Dr S K Chaturvedi, Joint Director, NCB





3rd Panel Discussion on “Enhancing AF & ARM utilization in Indian Cement Industry”:

The third panel discussion on Enhancing AF & ARM utilization in Indian Cement Industry was moderated by Shri G V Ramakrishna, Chief Technology Officer, Dalmia Cement (B) Ltd. and the distinguished panelists of the third panel discussion were as given below:

- a) Shri Arun Kumar Shukla, CEO & Director, J K Lakshmi Cement Ltd.
- b) Shri Vivek Agnihotri, CEO & Executive Director, Prism Johnson Ltd.
- c) Shri Pankaj Kejriwal, Whole Time Director & COO, Star Cement Ltd.
- d) Shri Sanjay Joshi, Chief Manufacturing Officer, Nuvoco Vistas Corp Ltd.
- e) Shri S K Rathore, Chief Manufacturing Officer, J K Cement Ltd.
- f) Shri G Veera Babu, Chief Manufacturing Officer, JSW Cement Ltd.
- g) Shri Bimal Modi, Head (AFR), UltraTech Cement Ltd.
- h) Dr B N Mohapatra, DG-NCB



4th Panel Discussion on “National Mission on Sustainable Habitat -2030”:

The fourth panel discussion on National Mission on Sustainable Habitat -2030 was moderated by Prof. Shashank Bishnoi, Professor, Department of Civil Engineering, IIT Delhi and the distinguished panelists of the panel discussion were as given below:

- a) Dr Shailesh Kr. Agrawal, Executive Director, BMTPC
- b) Dr B Bhattacharjee, Emeritus Professor, Department of Civil Engineering, IIT Delhi
- c) Prof. K V L Subramaniam, Professor, Department of Civil Engineering, IIT Hyderabad
- d) Prof. Amit Hajela, Director and Domain Head, Amity School of Architecture and Planning
- e) Shri Yatin Choudhary, Fellow, TERI



f) Shri P N Ojha, Jt. Director, NCB



6. Special Technical Sessions: Keynote Presentations

1st Keynote Presentation - Promise of Energy Efficiency for addressing Climate Change by Dr Ashok Kumar, Dy. Director General, Bureau of Energy Efficiency:

In the backdrop of COP 27, the realization provided by reports from IPCC is that the promise of keeping the global temperature rise below 1.5 degree is becoming increasingly elusive. India is perhaps the only shining star that is walking the talk among the big economies which is on track with Nationally Determined Contributions (NDCs) committed under the Paris Agreement. In continuation to announcement of the concept of LiFE at COP 26 by Hon'ble Prime Minister, the urgency of imbibing and integrating the concept to involve masses in combating this global challenge is increasingly becoming imperative than ever before.



India despite being Paris Agreement Complaint has raised its ambition to tackle climate change and has updated the NDCs. The updated NDCs are as under:-

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change.
2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
3. India will meet 50 per cent of its cumulative electric power installed capacity with non- fossil fuel sources by 2030. This will include achieving 500 GW of power capacity from non-fossil sources.
4. By 2030, India will reduce the carbon intensity of its economy by 45 per cent from 2005 level. This will be achieved by additional reduction of 1 billion tonne of CO₂ emissions from now onwards.
5. By 2070, India will achieve the target of net zero emissions.

Among the various interventions to address climate change, energy efficiency holds tremendous potential as it is estimated to contribute about half of the mitigation required.

In order to steer the implementation of various initiatives including energy efficiency at different sectors of economy for achievement of said NDCs, an Inter-Ministerial Committee was constituted at the Ministry of Power, Government of India. Under the aegis of Ministry of Power, Bureau of Energy Efficiency has conducted several stakeholder consultations with key line Ministries/Departments etc. that control various energy intensive sectors such as Cement, Iron & Steel, Aluminium, Textile etc.

The primary objective of this consultation was to discuss the trajectory for achieving the 1 billion tonne of CO₂ emission reduction and 45% emission intensity reduction by 2030. In this process studies and analysis were made to see how the required targets could be met from intervention both at supply and demand side. Sectoral analysis has been carried out and indicative targets to each sector has already been defined. As cement is one of the key sector having significant contribution to emission causing global temperature rise, BEE has conducted stakeholder meeting with Cement



sector, which was attended by Research Institution such as NCCBM, Cement Manufacturers Association and various cement industries such as Shree Cement, ACC, Ambuja, Dalmia Cement (Bharat), My Home Industries etc. During the consultative meeting indicative CO₂ emission target by 2030 were showcased and the key technological interventions for achieving the target were discussed.

The major technological interventions include Waste Heat Recovery System, Increase usage of AFR percentage, production of blended cements. Subsequently, BEE in association with NCCBM has organized regional seminars on Dissemination of Waste Heat Recovery System in Indian Cement Plants where latest technologies related to WHRS was presented and exhibited to all the designated consumers of the cement sector.

Presently, under the PAT scheme, 175 Nos. of cement units has been covered which includes Integrated Cement Plants and Cement Grinding units. Coverage shall be further increased in the coming PAT cycles. The total energy consumption of these notified Cement Plants is about 26 million tonnes of oil equivalent. The energy savings of Cement sector in PAT Cycle-I was 1.48 million tonne of oil equivalent against the target of 0.816 million tonne of oil equivalent thus overachieving the target by 81.37% and subsequently in the PAT Cycle-II, the energy savings were 1.56 million tonne of oil equivalent against the target of 1.05 million tonne of oil equivalent thus overachieving the target by 48.57% which implies that the cement sector has always overachieved the PAT Cycle target. Similarly, cement being the hard to abate sector, has achieved 4.34 and 5.50 million tonnes of CO₂ reduction in PAT cycle-I and II respectively.

Finally, in addition to the target for 2030, India has also pledged to arrive at Net Zero by 2070. That would require further actions more particularly from sectors such as cement.



Dr Ashok Kumar, DDG, BEE

2nd Keynote Presentation: Durability Design of Concrete Structures by Prof. Manu Santhanam, Professor, Department of Civil Engineering, IIT Madras

Concrete structures are designed to last long. The primary challenge affecting service life is the deterioration of the concrete and reinforcing steel with time, due to the effect of the external environment. Hence, it is essential to devise strategies for designing concrete for durability.

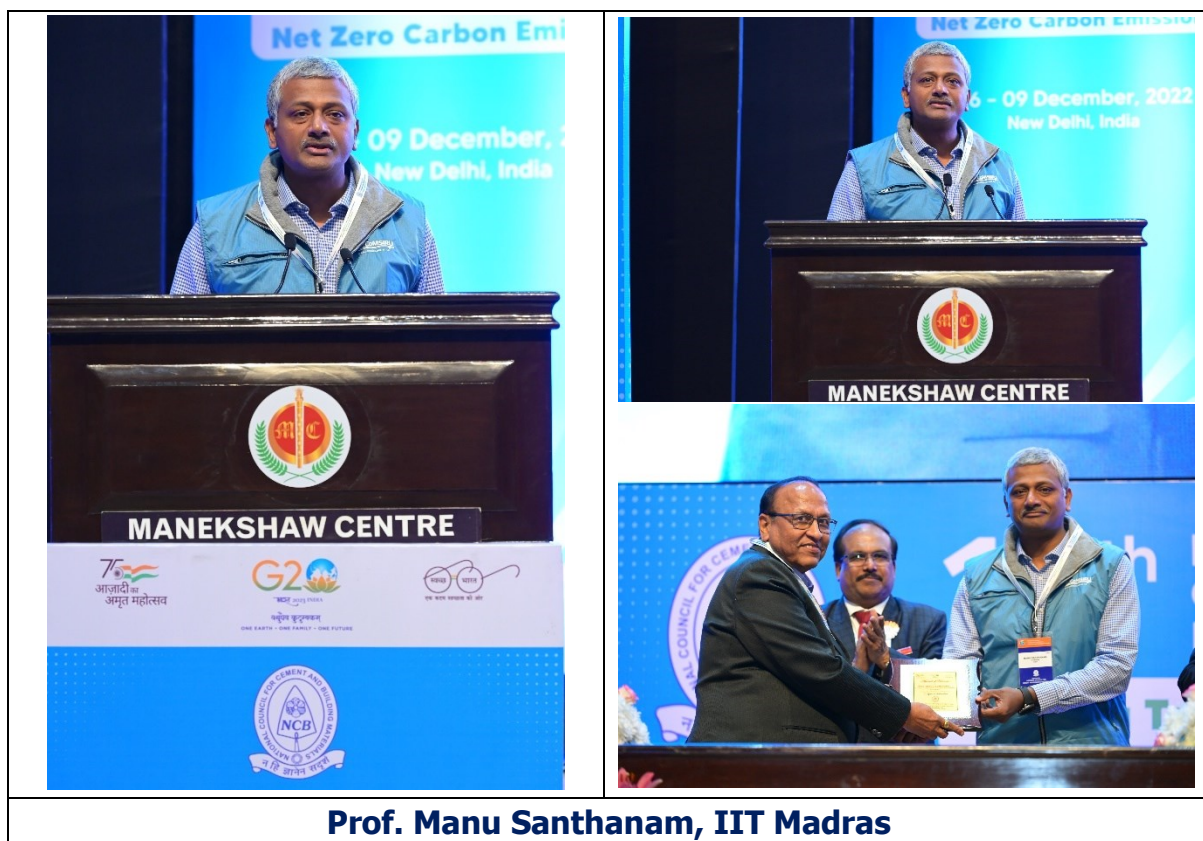
The first step towards achieving durability design is the identification of the exposure environment, and of the possible mechanisms of deterioration in the specific service condition. While concrete as a material is subjected to several types of deterioration, the most critical durability issue faced by concrete structures is the corrosion of the reinforcing steel. Corrosion is a resultant effect of many factors, but two phenomena that drive it are carbonation and chloride penetration. The essence of durability design for avoidance of corrosion is, therefore, linked to the understanding of the penetration of chloride and carbon dioxide into concrete. In this context, the mechanisms of transport are important to understand. Concrete structures can be in various states of saturation in practice, and the mechanism of fluid and ionic transport into the concrete can vary depending on the circumstances. This leads to the next important question – how to define the parameters to be used to assess the resistance to transport and what tests to use to determine the same. While a range of accelerated tests are available, it is important to choose the test that reflects the correct mix of transport



mechanisms that are in operation in a given service environment. At the same time, it is absolutely essential to understand the limitations of the test methods, and also the influence of the use of blended cements on such tests. Linking the transport parameters to the service life is the next level of challenge.

As we move into the future, there is bound to be a greater emphasis on the sustainability of concrete construction. While durability is the key to achieving sustainable construction, the use of low carbon binders is increasingly attracting the attention of a large number of researchers. The use of ternary blended systems provides a way to reduce the impact of cement in concrete. Further, the availability of large quantities of low-grade materials and recycled aggregates presents an opportunity for furthering the cause of sustainability. However, it is important to address the aspect of durability in such scenarios. With suitable understanding, it would be possible to apply the durability design concepts to such systems also.

Prof Santhanam impressed upon the participants that the time to act with respect to concrete durability is now!



Prof. Manu Santhanam, IIT Madras

3rd keynote Presentation: From Pollution to Solution – Bringing Cement and SCM to Net-Zero by Dr Sada Sahu, Solidia Technologies, USA

Portland cement production is a very energy-intensive process and a significant contributor to global greenhouse gas (GHG) emissions. World cement production reached 4.3Gt in 2021 (International Energy Agency) and is estimated to contribute about 8% of total anthropogenic CO₂ emissions each year. To meet the 2 Degree Celsius Scenario (2DS) by following IEA's guideline, the World Business Council for Sustainable Development's (WBCSD) Cement Sustainability Initiative (CSI) group has developed a Global Technology Roadmap called "Low-Carbon Transition in Cement Industry" (wbcsdcement.org). This roadmap has set a target to reduce the CO₂ emissions from 2.2 Gt emitted in 2014 to 1.7 Gt by 2050. This must be accomplished despite a predicted 12 to 23% growth in worldwide cement production. To achieve



this goal, four drivers have been identified: 1) Improvement in thermal energy efficiency; 2) Switching to low-carbon fuel; 3) Reduction of clinker-to-cement ratio (clinker factor); and 4) Innovative technologies (including carbon capture utilization and storage (CCUS)). According to this road map, most of the CO₂ reduction will be achieved by reduction in clinker factor and CCUS.

To achieve the net-zero goal, Solidia Technologies has developed a new type of cement that is made using the same raw materials that are used to make ordinary Portland cement (OPC). The raw mixture proportions are adjusted in a way to produce low-lime-containing calcium silicate phases such as CS, C₃S₂, and C₂S instead of the high-lime-containing phase C₃S. This new cement requires 30% less lime when compared to Portland cement and is sintered at 1250oC. It has been demonstrated that in industrial-scale production the total CO₂ emissions are about 30% lower when compared to OPC production. Addition of gypsum is not required during grinding of this clinker. The new cement does not harden by a regular hydration process. Rather, the cement hardens during a carbonation process. The main carbonation products of the cement are CaCO₃ and SiO₂. Primarily, the CaCO₃ is present as calcite with small amounts of vaterite and aragonite. The SiO₂ is present in a non-crystalline form. During the carbonation process this cement can utilize and permanently store up to 300 kg of CO₂ per ton of cement. The concrete made using this technology is durable.

In his keynote presentation, Dr Sahu highlighted the technology demonstrated by Solidia for application of carbonated Solidia Cement (Solidia SCM) as a synthetic substitute to traditional SCMs such fly ash and slag. During this carbonation process CO₂ from the flue gas can be directly captured and utilized. Substitution of OPC by Solidia SCM significantly improves the durability of concrete. With this technology, Solidia has demonstrated a means of transforming CO₂ ...a pollutant produced in the value chain of concrete...into a solution for its most threatening impact that can help pave the way to a net-zero future.



7. Technical sessions

160 papers were presented in 20 technical sessions based on specific themes like:



- Low Carbon Cements
- Other Binders and Building Materials
- Alternate / Waste Fuels and Raw Materials
- Net Zero Emissions, Carbon Capture, Utilisation & Storage (CCUS)
- Cement Plant Machinery and Project Engineering
- Productivity Enhancement and Process Optimization
- Energy Conservation Systems
- Performance and Durability of Concrete
- Concrete Deterioration Mechanisms and Advanced Concrete System
- Advances in Grinding Systems
- Emerging Trends



- Total Quality Management
- Analytical Methods and Lab Automation
- Smart and High Performance Concrete
- Environmental Management and Sustainable Development
- Distress Investigation, Repair/ Strengthening/ Retrofitting of Concrete Structures
- Sustainable Construction Practices and Other Building Material and Binders

Chairman & Co-Chairman of the Technical Sessions:

The chairman and co-chairman of the technical sessions were chosen from the senior executives of major cement companies. The papers were presented by cement plants personnel, cement plant machinery suppliers/OEMs, NCB scientist & Engineers, students from IITs, NITs, BITS Pilani etc.

Technical Session	Chairman	Co -Chairman
I A (Low Carbon Cements)	 <p>Dr A K Singh Sr Vice President, Head-Product Assurance & Services UltraTech Cement Ltd.</p>	 <p>Shri Arun Kumar Head-Civil Engineering Department Bureau of Indian Standards</p>
I B (Other Building Materials & Binders)	 <p>CHAIRMAN</p>	 <p>CO-CHAIRMAN</p>



Technical Session	Chairman	Co -Chairman
	Dr S K Saxena Sr Vice President J K Lakshmi Cement Ltd.	Dr.(Mrs.) Caroline Irene Woywadt Director-Process Technology Gebr. Pfeiffer SE
Ii-A (Cement Plant Machinery & Project Engineering - I)		
	Shri Manish Kumar Singh President & Plant Head Prism Johnson Ltd.	Dr.-Ing. Roger Meier GM-Business Development EMEA, CIS & India FCT ACTech
II B (Alternate / Waste Fuels and Raw Materials-I)		
	Shri Vivek Bhatia MD & CEO thyssenkrupp Industries India	Shri Rajpal Singh Shekhawat Process Head, J K Lakshmi Cement
III A (Net Zero Emissions, Carbon Capture, Utilisation & Storage (CCUS))		
	Shri Vimal Jain Director Technical HeidelbergCement India Ltd.	Shri Kaustubh Phadke India Head GCCA India



Technical Session	Chairman	Co -Chairman
III B (Concrete Durability, Distress Investigation, Repair & Rehabilitation-I)	 <p>Dr V Ramachandra Head - Technical Services UltraTech Cement Ltd</p>	 <p>Prof. S. Suriya Prakash Professor Department of Civil Engineering IIT Hyderabad</p>
IV-A (Productivity Enhancement And Process Optimization-I)	 <p>Shri Dinesh G Randad Director (Works) Gujarat Sidhee Cement Ltd.</p>	 <p>Shri Sanjeev Srivastava Joint President UltraTech Cement Ltd +91-9702266712</p>
IV-B (Performance-Based Design Of Concrete Structures)	 <p>Shri Pranav Desai Vice President & Head – Construction, Development & Innovation, Nuvoco Vistas Corp Ltd.</p>	 <p>Prof. S. Suriya Prakash Professor Department of Civil Engineering IIT Hyderabad</p>



Technical Session	Chairman	Co -Chairman
V A (Advances In Grinding Systems –I)	 <p>Shri A K Dembla President & MD KHD Humboldt Wedag India Pvt. Ltd.</p>	 <p>Shri V Ganeshan COO Chettinad Cement</p>
V B (Latest Innovations & Trends)	 <p>Dr L P Singh Sr. Principal Scientist Central Building Research Institute</p>	 <p>Shri Rahul Goel Vice President & Technical Head – North Zone UltraTech Cement Ltd.</p>
VI A (Advances In Grinding Systems –II)	 <p>Shri R. B. M. Tripathi President (O) & Unit Head- Nimbahera & Mangrol J K Cement Ltd.</p>	 <p>Dr. Stefan Diedenhofen Senior Project Manager- Product Group Ball Mill, Polycom & MGP ThyssenKrupp Industrial Solutions AG</p>



Technical Session	Chairman	Co -Chairman
VI B (Concrete Durability, Distress Investigation, Repair & Rehabilitation- II)	 <p>Dr Nasim Akhtar Sr. Principal Scientist Central Road Research Institute</p>	 <p>Prof Benu Mohapatra Professor & Director, Consultancy Services KIIT deemed to be University</p>
VII-A (Logistics, CSR Initiatives & Total Quality Management)	 <p>Shri Vinay Saxena Sr Vice President Shree Cement Ltd.</p>	 <p>Shri Jai Prakash Vratl HoD-Quality Control Ambuja Cement Ltd (Adani Group)</p>
Vii-B (Cement Plant Machinery & Project Engineering - II)	 <p>Mr. Justus Von Wedel Director IKN Engineering India Pvt. Ltd.</p>	 <p>Shri Sunanda Sengupta Executive Vice President (SM CC) TRL Krosaki Refractories Ltd.</p>



Technical Session	Chairman	Co -Chairman
VIII-A (Alternate /Waste Fuels & Raw Materials- II)	 <p>Shri K N Rao Corporate Head-Energy, Environment My Home Industries Pvt. Ltd.</p>	 <p>Shri Uma Shankar Choudhary Unit Head-Muddapur J K Cement Works</p>
VIII-B (Smart Concrete, 3D Printing & Ultra High Performance Concrete)	 <p>Prof. S K Singh Chief Scientist Central Building Research Institute</p>	 <p>Ms Lopamudra Sengupta Sr Vice President (Technical Services) JSW Cement Ltd.</p>
IX A (Energy Conservation Systems)	 <p>Shri Rajesh Kakkar President Birla Corp</p>	 <p>Mr. Detlef Blümke MD, Loesche GmbH</p>



Technical Session	Chairman	Co -Chairman
IX B (Environmental Management, Sustainable Development and Safety)	 <p>Dr R B Lal Additional Director Ministry of Environment, Forest and Climate Change, Govt. of India</p>	 <p>Shri Rajendra Kumar Joshi Vice President - Mining & Geology, Environment Star Cement Ltd.</p>
X-A (Productivity Enhancement And Process Optimization- II)	 <p>Shri K. Vinayagamurthi Executive Director, Dalmia Cement (B) Ltd.</p>	 <p>Dinesh Kumar Sr. Vice President (Prod.), Prism Johnson Ltd.</p>
X B (Sustainable Construction Practices And Other Building Materials And Binders)	 <p>Shri Pranav Desai Vice President & Head – Construction, Development & Innovation, Nuvoco Vistas Corp Ltd.</p>	 <p>Shri Magan Agarwal Sr. Vice President and Customer Services Head , HeidelbergCement India Ltd.</p>



8. Concluding Session

The concluding session of 17th NCB International Conference was held on 9th December 2022 and attended by Chief Guest Shri Som Parkash, Hon'ble Minister of State for Commerce & Industry, Govt. of India and Guest of Honour Shri Shashank Priya, Special Secretary & Financial Advisor, DPIIT, Ministry of Commerce and Industry, Govt. of India along with Shri Jamshed N Cooper, MD, Heidelberg Cement India Ltd.; Dr B N Mohapatra, Director General-NCB and Dr S K Chaturvedi, Organising Secretary, 17th NCB International Conference.

8.1 Awards for papers of High Merit: During each technical session, the chairman and co-chairman evaluated each technical paper in terms of four different parameters:

- Innovativeness/originality of the paper
- Significance, impact and relevance to industrial application
- Presentation quality and skill
- Timeliness of the presentation

Based on evaluation done by the respective Chairman and Co-chairman of the technical session, one paper from each technical session has been selected as paper of high merit out of the 160 papers presented in the 17th NCB International Conference in 20 technical sessions.

Technical Session No. & Title	Paper Title	Authors & Organization
Technical Session- I A: Low Carbon Cements	Comparative study between the flow behaviour of LC ³ and OPC systems: The thirst of clay	Ashirbad Satapathy, Manya Gupta, Gopala Rao Dhoopadahalli and Shashank Bishnoi, <i>Indian Institute of Technology Delhi, India</i>
Technical Session-I B: Other Building Materials & Binders	Feasibility study on use of FGD gypsum	Satyendra Kumar, Pravesh Kumar Sharma,



Technical Session No. & Title	Paper Title	Authors & Organization
	replacing natural mineral gypsum in OPC & PPC: A case study	Dinesh Agrawal and Manish Kumar Singh <i>Prism Johnson Limited, India</i>
Technical Session-II A: Cement Plant Machinery & Project Engineering–I	Recent Trends in Indian Cement Industry – A Pragmatic Approach	A K Dembla, Sandeep Zutshi and Deepti Varshney, <i>KHD Humboldt Wedag India Private Limited, India</i>
Technical Session-II B: Alternate/Waste Fuels and Raw Materials –I	Journey of green fuels utilization	GV Ramakrishna, Rajiv Sadavarti, Anand Pratap Singh and Gaurav Patel, <i>Dalmia Cements (Bharat) Limited, Delhi, India</i>
Technical Session-III A: Net Zero Emissions, Carbon Capture, Utilization & Storage	Role of carbon capture and utilization (CCU) for decarbonization of cement Industry	B N Mohapatra, S K Chaturvedi, P N Ojha, Brijesh Singh and Anand Bohra <i>National Council for Cement and Building Materials, India</i>
Technical Session-III B: Concrete Durability, Distress Investigation, Repair & Rehabilitation -I	Calcium sulphoaluminate cement: acid resistance and early-age strength development	Tom Damion and Piyush Chaunsali, <i>Indian Institute of Technology Madras, India</i>
Technical Session-IV A: Productivity Enhancement and Process Optimization-I	Case study for mitigation of yellow core appearance in clinker	Narendra Diwakar, Pravesh Kumar Sharma, Dinesh Agrawal and Manish Kumar Singh, <i>Prism Johnson Limited, India</i>
Technical Session -IV B: Performance-Based Design of Concrete Structures	Shear behaviour of reinforced alkali activated slag and fly ash concrete under ambient curing: comparison with OPC based concrete	Amit Trivedi, Brijesh Singh, Abhishek Singh, P N Ojha, Pranay Singh and Dinesh Kumar <i>National Council for Cement and Building Materials, India</i>



Technical Session No. & Title	Paper Title	Authors & Organization
Technical Session-V A: Advances in Grinding Systems- I	Multiple materials, one solution – roller press comminution, sustainable & proficient systems	Niko Hachenberg, <i>Humboldt Wedag GmbH, Germany</i>
Technical Session -V B: Latest Innovations & Trends	Development of artificial limestone Aggregate using fly ash through mineral carbonation	Mohd Hanifa, L P Singh, P C Thapyal and U Sharma, <i>CSIR- CBRI & AcSIR, India</i>
Technical Session -VI A: Advances in Grinding Systems –II	OEE, sustainability KPI monitoring & benchmarking for cement mill through IOT Data	R Manikandan, <i>FLSmidth A/S, Denmark</i> , Kiranmai Sanagavarapu, <i>FLSmidth Pvt Ltd</i>
Technical Session-VI B: Concrete Durability, Distress Investigation, Repair & Rehabilitation-II	Influence on physical and chemical characteristics of clay upon calcination	Mehnaz Dhar and Shashank Bishnoi, <i>Indian Institute of Technology Delhi, India</i>
Technical Session -VII A: Logistic, CSR Initiatives & Total Quality Management	Development of CRM-targeting quality product and excellency in competency	S K Shaw, V Nagar Kumar, A Agnihotri & Amit Trivedi, <i>National Council for Cement and Building Materials, India</i>
Technical Session -VII B: Cement Plant Machinery & Project Engineering -II	State of the art performance improvement with near infra-red online analysis	Petra Mühlen, <i>SpectraFlow Analytics AG, Switzerland</i> & Shyamal Roy, Sanjeev Srivastava, Amit Shah and Raju Goyal, <i>UltraTech Cement, Mumbai, India</i>
Technical Session -VIII A: Alternate /Waste Fuels & Raw Materials- II	Right approach for tr& Frequent failure of alumina brick in safety & calcination zone – reason & remedy ansfer chute design for handling alternative fuels	Kapil Kukreja, B N Mohapatra and Soubhagya Ranjan, <i>National Council for Cement and Building Materials, India</i> M S Soni,



Technical Session No. & Title	Paper Title	Authors & Organization
		<i>Birla Institute of Technology & Science, Pilani Rajasthan, India</i>
	LC ³ clay mapping and their selection criteria in Indian scenario	Aastha Singh and Shashank Bishnoi, <i>Indian Institute of Technology Delhi, India</i>
Technical Session -VIII B: Smart Concrete, 3D Printing & Ultra High Performance Concrete	Effect of curing regime on compressive strength of ultra high strength concrete	Brijesh Singh, P N Ojha, Amit Sagar, Abhishek Singh, Pranay Singh and Ravi Yadav, <i>National Council for Cement and Building Materials, India</i>
Technical Session - IX A: Energy Conservation Systems	An innovative vortex reducer to reduce pressure drop by 20% in preheater top cyclones	Mohammad Fazil, Jayateerth V Joshi, Sanjeev Srivastava and Raju Goyal, <i>UltraTech Cement, Mumbai, India</i>
Technical Session - IX B: Environmental Management, Sustainable Development & Safety	Estimation of OPC, fly ash and slag contents in blended and composite cement by selective dissolution method	Suresh Palla, Suresh Vanguri, Rashmi Gupta, S K Chaturvedi and B N Mohapatra <i>National Council for Cement and Building Materials, India</i>
	An incredible journey of highest green fuel co-processing in cement kiln – a commitment towards sustainable future	Raj Kumar Singh, Chandra Kanta Nayak, Ajay Kumar Singh and Prabhat Kumar Singh <i>Dalmia Cement (Bharat) Limited, Belgaum, Karnataka, India</i>
Technical Session - X A: Productivity Enhancement & Process Optimization –II	Correlation of chemistry and process parameters on formation of alite in Portland clinker	Jaiprakash Vrati, Ambuja Cement Ltd, India Suresh Palla, Suresh Vanguri, S K Chaturvedi and B N Mohapatra, <i>National Council for Cement and Building Materials</i>



Technical Session No. & Title	Paper Title	Authors & Organization
Technical Session -X B: Sustainable Construction Practices & Use of Alternate Aggregates	Utilization of mining waste as an aggregate	Arunachala Sadangi, Aswathy Rajendran and Pranav Desai, <i>Nuvoco Vistas Corporation Ltd, India</i>



Awards for papers of High Merit



8.2 Distribution of National Awards by Shri Som Parkash, Hon'ble Minister of State for Commerce & Industry, Govt. of India and Shri Shashank Priya, Special Secretary & Financial Advisor, DPIIT:

Emanating from a suggestion at the first NCB International Conference in 1987, and at the instance of the Ministry of Industry, the scheme of National Awards for Energy Efficiency was started from the year 1986-87 and since then these Awards are being given regularly to the best performing cement plants.

The scheme of these awards was designed in consultation with various experts and organizations including Ministry of Power, Advisory Board on Energy (ABE), Bureau of Industrial Costs & Prices (BICP), Cement Manufacturers' Association (CMA), National Productivity Council (NPC) and Chief Executives of Cement Plants. Keeping in view, the prevalent scenario of the Indian cement industry, the scheme is revised and updated periodically, in consultation with experts from industry and consultants as well as based on suggestions from Technical Committee members.

The Technical Committee is constituted of Director General- National Council for Cement and Building Materials (NCB), Chairman and members from DPIIT, Bureau of Indian Standards (BIS), The Ministry of Environment, Forest and Climate Change (MOEF&CC), Quality Council of India (QCI), National Productivity Council (NPC), and Bureau of Energy Efficiency (BEE).

The objective of these awards is to create motivation in the industry for competitive improvement in the thrust areas of Energy, Environment & Total Quality. Total Quality Excellence Award is aimed to give special recognition to organizations that contribute significantly towards the quality movement of India. This award is in line with other prestigious quality awards like the Rajiv Gandhi National Quality Award of India, Malcolm Baldrige National Quality Award of the United States, European Quality Award of the European Union and the Deming Prize of Japan. The scheme of awards for energy excellence and environment excellence awards were revised and two new



award categories (Achieving Circular Economy in Cement Plant Operation and Energy & Environment Excellence in Grinding Unit Operation) were added.

The Government of India has been actively formulating policies and promoting projects to drive the country towards a circular economy. As cement industry is at the heart of any circular economy initiative, this year, a new award on Achieving Circular Economy in Cement Plant Operation has been introduced to motivate the sustainable development of the cement industry and utilization of industrial waste in cement plant operation.

As there are about 115 grinding units in India and the no. is increasing every year. Two new awards on Energy and Environment Excellence in Grinding Units have been introduced. The objective of these awards is to motivate competitive improvement in the energy performance and creation of better environment in and around grinding units

The National Awards for Energy Efficiency, Environmental Excellence and Total Quality Excellence in the Indian Cement Industry for years 2019-22 were distributed by Shri Som Parkash, Hon'ble Minister of State for Commerce & Industry, Govt. of India and Shri Shashank Priya, Special Secretary & Financial Advisor, DPIIT in the Concluding Session of 17th NCB International Conference on 09 December 2022 at Manekshaw Centre, New Delhi.





Awardees of National Awards



The list of recipients of national awards as well as commendation certificates for the years 2019-22 is given below:

LIST OF RECIPIENTS

S.NO.	AWARDS	Plant Name
I. Awards for Energy Excellence in Integrated Cement Plants		
1.	Best Award for Energy Excellence in Integrated Cement Plants	RCCPL Pvt. Ltd., Maihar, Madhya Pradesh
2.	Second Best Award for Energy Excellence in Integrated Cement Plants	Sree Jayajothi Cements Pvt. Ltd., My Home Group Industries, Nandyal, Andhra Pradesh
3.	Third Best Award for Energy Excellence in Integrated Cement Plants	J K Cement Works, Muddapur, Karnataka
4.	First Consolation Prize for Energy Excellence in Integrated Cement Plants	UltraTech Cement Ltd., Unit: Kotputli Cement Works, Rajasthan
5.	Second Consolation Prize for Energy Excellence in Integrated Cement Plants	J K Lakshmi Cement Ltd., Sirohi, Rajasthan
II. Awards for Environment Excellence in Integrated Cement Plants		
1.	Best Award for Environment Excellence in Integrated Cement Plants	Dalmia Cement (Bharat) Ltd., Belagavi Unit, Karnataka
2.	Second Best Award for Environment Excellence in Integrated Cement Plants	Dalmia Cement (Bharat) Ltd., Dalmiapuram, Tamil Nadu
3.	Third Best Award for Environment Excellence in Integrated Cement Plants	J K Cement Works, Muddapur, Karnataka
4.	First Consolation Prize for Environment Excellence in Integrated Cement Plants	Shree Beawer Cement Plant, Ajmer, Rajasthan
5.	Second Consolation Prize for Environment Excellence in Integrated Cement Plants	Dalmia Cement (Bharat) Ltd., Ariyalur, Tamil Nadu
III. Awards for Total Quality Excellence in Integrated Cement Plants		
1.	Best Award for Total Quality Excellence in Integrated Cement Plants	Shree Cement Ltd. (RAS), Pali, Rajasthan
2.	Second Best Award for Total Quality Excellence in Integrated Cement Plants	Birla Corporation Ltd. Unit: Birla Cement Works & Chanderia Cement Works, Chittorgarh, Rajasthan



3.	Third Best Award for Total Quality Excellence in Integrated Cement Plants	UltraTech Cement Ltd., Unit: Aditya Cement Works, Chittorgarh, Rajasthan
4.	First Consolation Prize for Total Quality Excellence in Integrated Cement Plants	Shree Raipur Cement Plant, Shree Cement Ltd., Baloda Bazar, Chhattisgarh
5.	Second Consolation Prize for Total Quality Excellence in Integrated Cement Plants	J K Cement Works, Muddapur, Karnataka
IV. Awards for Achieving Circular Economy in Integrated Cement Plants		
1.	Best Award for Achieving Circular Economy in Integrated Cement Plants	UltraTech Cement Ltd., Unit: Reddipalayam Cement Works, Ariyalur, Tamil Nadu
2.	Second Best Award for Achieving Circular Economy in Integrated Cement Plants	J K Cement Works, Muddapur, Karnataka
3.	Third Best Award for Achieving Circular Economy in Integrated Cement Plants	Shree Beawer Cement Plant, Ajmer, Rajasthan
4.	First Consolation Prize for Achieving Circular Economy in Integrated Cement Plants	Dalmia Cement (Bharat) Ltd., Ariyalur, Tamil Nadu
5.	Second Consolation Prize for Achieving Circular Economy in Integrated Cement Plants	Nuvoco Vistas Corp. Ltd., Chittor Cement Plant, Chittorgarh, Rajasthan
V. Awards for Energy Excellence in Grinding Units		
1.	Best Award for Energy Excellence in Grinding Units	UltraTech Cement Ltd., Unit: Jharsuguda Cement Works, Odisha
2.	Second Best Award for Energy Excellence in Grinding Units	J K Lakshmi Cement Ltd., Kalol, Gujarat
3.	Third Best Award for Energy Excellence in Grinding Units	J K Cement Works, Jharli, Haryana
4.	First Consolation Prize for Energy Excellence in Grinding Units	Ambuja Cement Ltd. –Adani Group, Roorkee Grinding Unit, Uttarakhand
5.	Second Consolation Prize for Energy Excellence in Grinding Units	Calcom Cement India Ltd., Dalmia Cement (Bharat) Ltd., Lanka, Assam
VI. Awards for Environment Excellence in Grinding Units		



1.	Best Award for Environment Excellence in Grinding Units	My Home Industries Pvt. Ltd., Mulakalapalli, Anakappali, Andhra Pradesh
2.	Second Best Award for Environment Excellence in Grinding Units	Star Cement Ltd., Guwahati, Assam
3.	Third Best Award for Environment Excellence in Grinding Units	Dalmia Cement (Bharat) Ltd., Bokaro, Jharkhand
4.	First Consolation Prize for Environment Excellence in Grinding Units	J K Lakshmi Cement Ltd., Kalol, Gujarat
5.	Second Consolation Prize for Environment Excellence in Grinding Units	J K Cement Works, Jharli, Haryana

9. Technical Exhibition

The 17th NCB International Conference also had a Technical Exhibition, which was held concurrently at the Conference venue. The exhibition gave additional exposure to the latest in available technologies and services for efficient operation of cement plants, making of concrete and construction activities.





Technical Exhibition

The List of Exhibitors who showcased their equipment/services in 120 stalls of 17th NCB International Conference is as given below:

S. No.	Name of Exhibitors
1	FOSBEL INDIA
2	ALLAN SMITH ENGINEERING
3	ROTOLOK VALVES
4	SCHENCK PROCESS SOLUTIONS INDIA
5	RENK GEARS
6	JK CEMENT
7	KHOSLA PROFIL
8	PROMAC ENGINEERING INDUSTRIES
9	SPV ENGINEERS
10	HENKEL ADHESIVES



11	INDEXEL ENGINEERING
12	LOESCHE INDIA
13	TESTO INDIA
14	PRECICON ENGINEERING
15	FUCHS LUBRICANTS
16	DCL BULK TECHNOLOGIES
17	ATS CONVEYORS INDIA
18	POWERTRONICS CONTROL SYSTEM
19	THAMES SIDE SENSORS INDIA
20	ELECON ENGINEERING COMPANY
21	NANOPRECISE DATA SERVICES
22	CARL BECHEM LUBRICANTS INDIA
23	ENWEIGH INDIA
24	ALTSF PROCESS
25	ELEMENTAR INDIA
26	INVANSYS INFORMATICS
27	TECHCON CONSULTING AND ENGINEERING
28	HAMTEK TECHNOLOGIES INDIA
29	MAXTECH INDUSTRIES
30	FLUIDOMAT
31	EI GRAPHITE LLP
32	FLSMIDTH
33	BEUMER INDIA
34	CONTINENTAL CONVEYORS
35	HAVER & BOECKER INDIA
36	FIVES INDIA ENGINEERING & PROJECTS
37	S K G REFRACTORIES
38	SABIA BULK MATERIAL ANALYZER
39	SB ENGINEERS – XOPTIX
40	SB ENGINEERS – THERMOTEXNIX



41	HUMBOLDT WEDAG INDIA
42	CHANDERPUR WORKS
43	CHRISTIAN PFEIFFER INDIA
44	KSN VENTURES
45	VAUTID INDIA
46	FLEX-CLEAN SYSTEMS
47	AMCL MACHINERY
48	YARA ENVIRONMENTAL TECHNOLOGIES
49	WALCHANDNAGAR INDUSTRIES
50	JSW CEMENT
51	THYSSENKRUPP INDUSTRIES INDIA
52	MINISTRY OF HOUSING AND URBAN AFFAIRS
53	INVOTECH SOLUTIONS
54	GEBR PFEIFFER (INDIA)
55	THERMO FISHER SCIENTIFIC INDIA
56	ULTRATECH CEMENT
57	IKN ENGINEERING INDIA
58	PRISM JOHNSON
59	STOTZ GEARS
60	BRUKER INDIA SCIENTIFIC
61	ITECA INSTRUMENTS
62	EUREKA CONVEYOR BELTINGS
63	BHARTI HEAVY ENGINEERING COMPANY
64	DIFFUSION ENGINEERS
65	KOPPERN MACO SERVICES
66	UNICON ENGINEERS
67	CHIR AYU CONTROLS
68	SPECTRIS TECHNOLOGIES
69	ECODEA PROJECTS & CONTROL
70	ALFA THERM



71	TRL KROSAKI REFRACTORIES
72	WEARRESIST TECHNOLOGIES
73	VERDER SCIENTIFIC
74	FURMATS MARKETING (P)
75	INSMART SYSTEMS
76	IR TECHNOLOGY SERVICES
77	TOSHNIWAL INDUSTRIES
78	FRIGATE TEKNOLOGIES
79	CALDERYS INDIA REFRACTORIES
80	SAN GLOBAL SCIENTIFIC (OPC)
81	ICON SCIENTIFIC SYSTEMS
82	DALMIA BHARAT REFRACTORIES
83	ANVAL VALVES

10. Cultural Programme

A cultural programme was organised in the evening of second day of the Conference. The event saw extravaganza display of India's cultural diversity with performances of Odissi dance from Odisha, Ghoomar dance from Rajasthan, Kathak dance from UP, Bhangara from Punjab etc.





11. Industry Feedback

The Conference was received very well by the cement industry and many messages have been received appreciating the successful organization of Conference.



