

PRESS BRIEF

Celebrating LC³ -The Green Cement that pivots Construction Sector onto the road of Decarbonisation.

LC³ becomes a reality-In an historically significant sustainability initiative-TARA (an affiliate of Development Alternatives Group) & PROMAC Engineering sign an MOU initiating the process to commercialise LC³ globally

New Delhi 20th March

TARA is proud to have been one of the main contributors in the journey of discovering the process of creating green cement of the decade- LC³ cement. Limestone Calcined Clay Cement or LC³ is a new type of composite cement based on a blend of clinker, calcined clay and raw limestone. Clinker content is as low as 50%. LC³ technology has several advantages over Ordinary Portland Cement (OPC) and Portland Pozzolanic Cement (PPC), namely-

Reduces emission of CO₂ up to 40% compared to OPC

Lower energy consumption

Comparable strength with OPC

Improved durability.

LC³ cement will pave the way for significant emission reduction and improved resource efficiency; as availability of high-grade limestone and fly-ash stagnates while demand continues to escalate in India. It is clear that LC³ will be a viable solution to decarbonize the cement industry in India due to wide availability of kaolinite bearing clay resources"

TARA today organized an LC³ Celebration Day at its Head Office in New Delhi. The event been supported by the Swiss Agency for Development and Cooperation, New Delhi, India was kick started by the signing of an MoU with PROMAC engineering. PROMAC engineering will cater to cement companies in India and across the globe and provide them a turnkey solution from ground-to-gate for producing calcined clay cement. The event was attended by representatives from various cement industries like Ultratech Cements, JK Lakshmi Cements, JK Cements, Star Cements, SCC Lanka Ltd., Balaram Cements to name a few alongwith various construction companies and bilateral and multilateral agencies.

Various speakers from cement industries across India and the globe presented the readiness of their companies in producing LC³ and the need for it. By 2024, LC³ will be available in the Indian market fuelled by a strong demand as expressed by various construction agencies attending the Celebration Day.

Dr. Arun Kumar, President Emeritus, Development Alternatives Group expressed that support from the Government of India is necessary to accelerate the uptake of LC³. This can be in the form of preferential procurement by the GOI for infrastructure and housing projects, easy availability of green finance and GST benefits for producing green cement.

As we celebrate the coming of age of LC³ in India, Jonathan Demenge, Head of Cooperation, Swiss Agency for Development and Cooperation, New Delhi congratulated the pioneering efforts of cement companies, user agencies and Bureau of Indian Standards in making this happen in such a short period of time.

In its endeavour to popularize the LC³ and ensure its uptake across the country and the world, Dr. Soumen Maity, Chief Technology Officer, TARA announced to launch an yearly "Low Carbon Cement Summit". This will be in association with cement and construction companies, academics and various governments in India and across the world.

Mr. Jayaram S. Reddy, Chairman and Managing Director, Promac Engineering Industries Ltd, stated that the cement industry has largely benefitted from positive market demands. Many big cement producers are trying to increase efforts to produce cements with lower carbon emissions. A clear trend is now emerging to produce 'green cement' and achieving 'net zero' emissions within tight time lines they have set for themselves. The challenge is to bring to market cost effective/sustainable technologies and solutions to address the pressing priority.

In his vote of thanks, Anand Shukla, Senior Advisor, Swiss Agency for Development and Cooperation, stated that we all are excited for the future and very optimistic that this strategic alliance between Promac and TARA on March 19, 2024 will become a trend setter towards de-carbonising the cement industry.

About CO₂ & Construction Sector- The Building and Construction sector significantly contributes to climate change. As per the 2022 Global Status Report for Buildings and Construction, buildings and construction sector accounted for about 21% of GHG emissions. As per the report released on November 9, 2022, at the COP27 at Sharm El-Sheikh, Egypt; in the year 2022 buildings were responsible for 34% global energy demand and 37% of energy and process-related carbon dioxide (CO₂) emissions. This is equivalent to a 5% increase from 2020 levels, the highest after the pandemic. Out of this, energy consumed for building energy uses (e.g. heating, cooling, cooking, lighting, and equipment) was responsible for around 27% of global operational-related CO₂ emissions (10 GtCO₂). The production of materials used in the construction of buildings, including steel, aluminium, concrete, glass, and brick, accounted for around 37% of global energy and process-related emissions.

India is also not far behind. The construction sector of India is also responsible for 39% of carbon emissions of the country. Out of these hard-to-abate building materials like steel, cement and bricks contributed to around 20%. The cement sector accounted for 5.6% to the total carbon emissions of the country. In keeping with the Honourable Prime Minister's commitment to achieve net-zero emissions by 2070, there is a need for radical transformation of the building and construction sector. While emphasis has been made on reducing operational energy of buildings, the embodied energy of the building materials being used, needs to be significantly reduced.

About Cement Sector-After China, India is the second-largest emitter of CO₂ from cement manufacturing across the globe. This is despite the fact that the carbon intensity of Indian cement production is one of the best in the world at around 0.66tCO₂/t of cement

produced. India produces around 67% of fly ash based pozzolana cement and 8% of Portland slag cement which significantly reduces the carbon emissions compared to a scenario of producing only Portland cement. However, the sheer volume of cement being produced contributes greatly to total emissions per year. From around 149 MtCO₂ in 2021, the carbon dioxide (MtCO₂) emission rose to 164 MtCO₂ in 2022, an increase of around 10% in just one year. With Indian cement industry expected to reach higher than 1000 million tonnes by 2050, it is now appropriate to look at ways and means of reducing this emission.

Baseline estimates done by CEEW, show that nearly 56% of the total 0.66 tCO₂/t cement produced is due to the calcination of limestone in the kilns. Of the remaining emissions, 32% is due to the combustion of fuels for process-heating applications, while only 12% is due to the electricity used for manufacturing. There is a growing trend of reducing the emissions from fuels by using AFR. However, a fuel substitution of more than 10% is not possible due to the inherent unsegregated nature of the waste being produced in the country. Our cement industries is already at the operating threshold of fuel substitution including the use of renewable energy. Thus, the industries have no other option but to look at reducing emissions from clinker replacement. This can easily be done through the production and use of Limestone Calcined Clay Cement or LC³ and does not need high capital investment. Unlike many beliefs, it is even cheaper to produce LC³ compared to other cements.

LC³ in India and Globally

TARA in association with academic institutions and the cement industry has been leading the application and commercialization of LC³ in India and across the world especially in Africa, Asia, Pacific, Middle East and CIS countries. In association with Indian Institute of Technology Madras, Indian Institute of Technology Bombay and Promac Engineering Industries Ltd as well.

The properties of LC³ has been extensively studied by academic institutions in India led by IIT Madras and applied in various demonstration structures by construction companies. The unmatched results have led to the publication of BIS standards i.e. BIS 18189: 2023 by Bureau of Indian Standards. Pioneering cement companies like JK Lakshmi Cements Ltd; JK Cements Ltd., Ultratech Cements Ltd., have already conducted pilot production trials and are on the verge of commencing commercial production.

Companies in other countries e.g. SCCC Thailand and Sri Lanka, Pacific Cements, Fiji, Shayona Cements, Malawi; and other cement companies across more than 25 countries are investing in exploring the feasibility of LC³ with TARA. To produce LC³ one of the prime raw materials is calcined clay. There has been a myth that adequate quality and quantity of clays are not available in India. However, a decade long study by TARA across India and other countries have shown that required quality of clays are abundantly available across the globe.

In India appropriate quality and quantity of clays are available across more than 26 states. States in Northeast are endowed with clays. Thus, it is highly feasible to produce LC³ in Northeast, since fly ash is not available and have to be transported from Bihar or West Bengal which is gradually being unviable due to cost of transportation. All the 25 countries being studied by TARA has revealed extensive deposits of clays which can cater to cement production for a minimum period of 50 years or more.

About TARA

TARA is a social enterprise set up in the year 1985 at New Delhi, India. It is an "incubation engine" of the Development Alternatives Group which has been providing development solutions in India and elsewhere. It is dedicated to sustainable development and is a research and action organisation striving to deliver socially equitable, environmentally sound, and economically scalable development outcomes.

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