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- BRIDGES
- SUSTAINABILITY
- WATERPROOFING

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Sustainability
A Merger of Science and Sociology
for Construction Chemicals Industry

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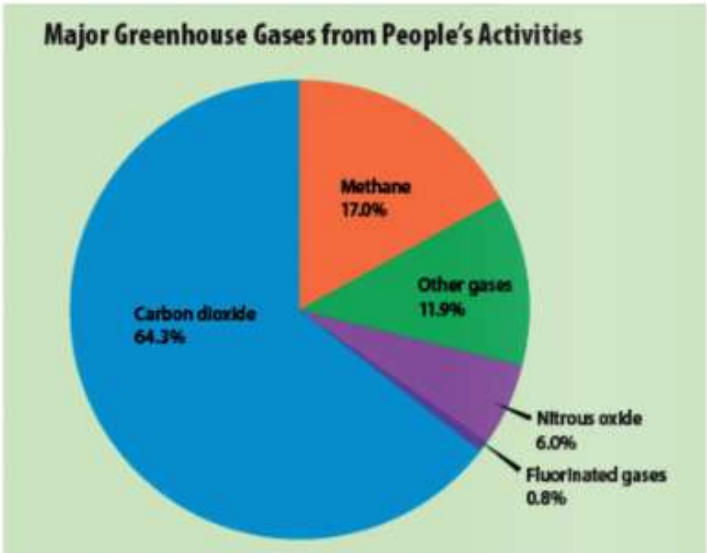
Every discussion on this subject revolves around - choice of materials, process of construction, expected service life and reusability. And all of this pointing the first target as to reduce emission of greenhouse gases. For the sake of beginners, greenhouse gases (GHG) are those gases which absorb and trap Sun's radiation after it is reflected back from the Earth's surface. Presence of these gases in excess volume within earth's atmosphere results in higher absorption of this energy and subsequent release, causing global warming and effecting climate cycle in a disruptive manner. Among these gases, the highest contributor happens to be carbon dioxide, released mainly through production of electric energy, transportation and industrial processes.

We must know that the building and construction industry happens to be one of the largest emitter of greenhouse gases, accounting from 35 to 40% of global emissions. Till few years back, in India, each ton of cement produced was capable of releasing an equal quantum of carbon dioxide to the atmosphere. This has changed drastically, through upgradation of processing technologies and induction of alternative fuels. Today's emission rate by cement producers, as available from various sources, indicates that per ton of cement production is resulting in CO_2 emission of approx. 0.6 tons.



Source: https://archive.epa.gov/climatechange/kids/basics/today/greenhouse-gases.html

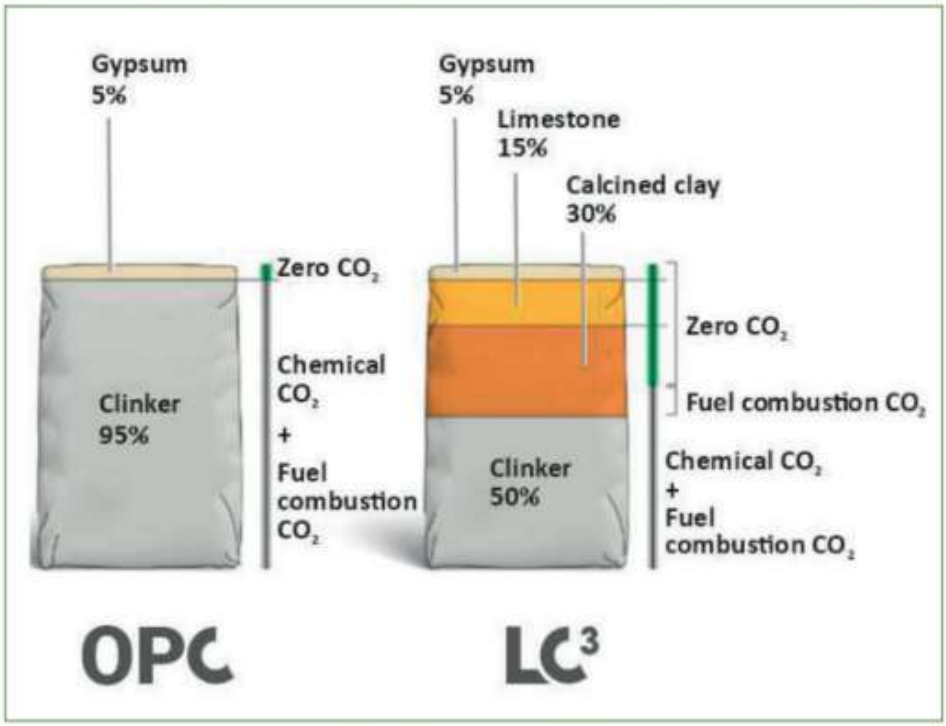
The second important step towards reducing cement consumption in construction process is achieved by utilizing supplementary cementitious materials (SCMs). This has brought about a lot of change, particularly in the infrastructure industry and as a country, India has moved forward in utilizing various types of SCMs by providing codal provisions for the specifier. Fly ash (Class C & F), Ground granulated blast furnace slag (GGBS), Micro silica, Pozzolanic clays, Limestone, Rice husk, etc. are amongst several materials which can reduce the consumption of Ordinary Portland cement (OPC), by a small or large quantity and in addition also contribute significantly to durability of concrete.

Amongst these combinations of OPC with other materials, one of the most promising one, which is gradually leading researchers to dive deep into ways and means of adopting this format is LC3 or Limestone calcined clay cement. This combination limits the usage of ordinary portland cement to 50%, yet providing a reliable and durable binding mass for construction. Roughly it contains 50% OPC, 30% Calcined clay, 15% Limestone and 5% Gypsum. Gradually LC3 manufacturing is picking up in our country and in times to come can significantly contribute to the cause of sustainability and reusability.

Another major scope which is rather seeing a slow progress is finding ways and means of reusing Construction and Demotion (C&D) waste, apart from landfilling, where most of this material is put to use today. Separating, crushing, sieving, reprocessing, chemical treatment, etc. technologies and machineries are yet to become popular and commercially viable to bring about a radical change in the way C&D waste is perceived by the construction sector today. This apart, a major part played in creating a sustainable world is largely through creation of structures and materials that are more durable. Structures which can last longest and sometimes made through materials and designs that can be modified periodically through superficial facelift without disturbing most of the main structure, can dramatically bring down the load on earthly resources to repeatedly compensate for reconstruction or rehabilitation. Durability directly contributes to Sustainability, without fail.

Now coming to Construction Chemicals, without which building any structure is inconceivable. Chemicals, usually in liquid or powder form, having underwent a customized process of manufacturing is obtained through engineered industrial processes. Such a process for sure is not devoid of emission and effluent release and obtained through utilization of electric energy produced through fossil fuels. Use of materials with least volatile organic compounds (VOCs), which poses threat more to the sustainability of the user than the environment, must be encouraged through the route of – Compliment for Compliance. Such initiatives must be induced top down through regulations guiding the manufacturing unit, as well as the finished goods. Many large scale companies produce their finished goods through toll manufacturing from smaller manufacturers.

In such cases, clear mention of the manufacturing & emission / disposal standards, as practiced by the toll manufacturer is an essential metrological declaration, in order to distinguish between the norms followed by brand owners versus their white labelers. These practices, with inclusivity to human safety, should be pushed into the industry through mandatory regulations and encouraged



Source: https://taratarc.com/technology

through monetary exemptions. Several forms of system adoption and compliance approvals presently guide towards this direction, such as, ISO accreditations, ISI or CE marking, Green product certification, LEED, GRIHA, IGBC, ECBC, EPD, etc.

Source: https://en.wikipedia.org/wiki/Bureau_of_Indian_Standards

The last technical pie on the cake, that is, adoption of new materials and practices leading to sustainability must be parallelly supported by revising existing codes and inclusion of new codes to assist specifiers and designers. Without this, neither specifier nor asset owner shall have enough confidence to explore newer way of doing things. As an obvious example, the Indian market saw exponential growth in the tile adhesive market from 2019 onwards in spite of striking of a global epidemic in the subsequent year. We cannot discount the fact that in 2019, the codal provision for tile adhesives covered by BIS:15477 was expanded from a simplistic two type adhesives based on porosity of the tile, to an elaborated five type categorization. Needless to say, this provision gave confidence and logic for the industry to fast adopt to new materials.

However, we are riding the sports car of development, driven by commercial logic, faster ROIs and rising profitability. Remembering a popular caption on express highways, "Speed thrills, but kills", our industry needs to be looked in the same light. How safe is this sports car of development? Just imagine the 20 odd years of education, if was imparted upon us, in 10 years through a dead-lined crash course; Will we be the same professional? Can we head towards controlled, calculated and focused growth? Let's debate and explore. From a sociological view point, it is important to understand that Sustainability (without ignoring profitability) is perceivable, however, if as a society we expect to enjoy all the benefits that it shall reap in the present day, we will be completely wrong. Whatever sustainable practices we shall adopt, by making new roads, developing new habits, creating new goals, must become a part of our societal DNA, with this clear understanding that it is not we individuals who shall derive a massive benefit out of it, but our next generations who shall follow us. Only with this Empathy, can Sustainability become a Reality. ■