# Geopolymer Concrete pavements in India

*An opportunity to scale up Geopolymer technology and fight climate change.*

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# Before we proceed: Hold on to this thought..

Politicians: Carbon reduction is too expensive! → Bizarre Statement!
A Short-term focus at the expense of Future

But what is the true cost of damage to the atmosphere?

When we burn fossil fuels, we never factor the ultimate cost of damage to the atmosphere caused by excess CO2.

In many countries, if you pollute a waterway, you have to clean it up or pay a substantial fee for the damage – that cost has to be factored in to the cost of running your business.

HOWEVER, In the case of emitting CO2 into the atmosphere, you can do that **for little or no upfront and immediate cost**.
Are we offended by people polluting waterways because it is literally in your face whereas CO2 is a transparent gas?

*- Dave Lowe (The Alarmist, Fifty years measuring the climate change)*

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# Overview

- About the company
- Environmental Problems with OPC Concrete
- Need for Geopolymer Concrete?
- Why in India?
- Opportunities

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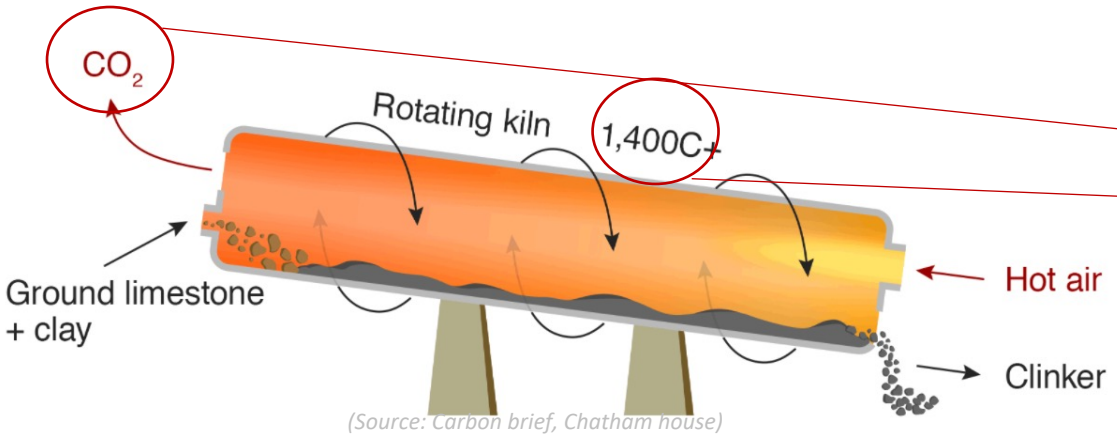
# Mangla Redimix Pvt. Ltd.



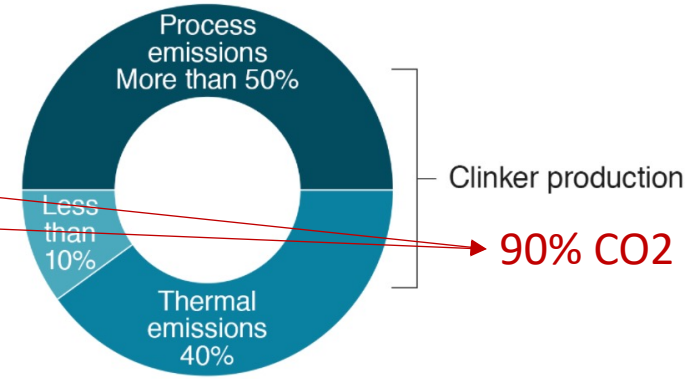
- Mangla RMC is a privately owned independent market leading ready-mixed concrete production company and a class -1 contractor for undertaking various government projects in New-Delhi NCR region (India)
- Established in 2007 and currently operating in 3 different cities
- The company has pioneered in the construction of public concrete road works with the aim to improve the road infrastructure of India.
- Built more than 500 kms of concrete roads
- Project record: >1000

# Environmental Problems with OPC Concrete




(Source: Carbon brief, Chatham house)

- Quarrying & transport
- Grinding & preparation of raw materials
- Cooling, grinding, mixing




(Source: Carbon brief, Chatham house)

- Concrete most used material in the world after water.
- Global Cement Production (**4.2 billion tonnes/year** as of 2020) accounts for **8-10% anthropogenic CO2** emissions per year globally.
- Ordinary Portland cement - a serious atmospheric pollutant. For **every ton of Cement produced, 1.0 ton of CO2 is released in the atmosphere**.
- Estimated Global demand for OPC to increase by 200% in 2050 as compared to 2010 levels.

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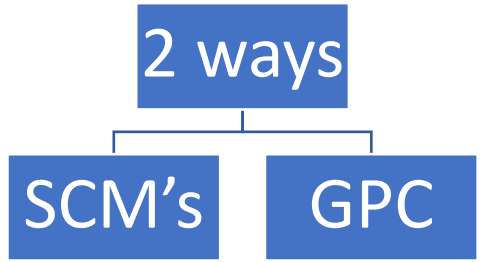
# Need for Geopolymer concrete

- Urgent need to shift to sustainable methods of concrete production.
- This can be achieved at a commercial large scale through Clinker Substitution.




Supplementary Cementitious Materials.
Partial Replacement of OPC,
eg. CEM III-B 60-70% GGBFS

Geopolymer Concrete.
**100% Replacement of OPC**
By industrial by products like fly-ash, blast furnace slag, etc.
A promising Solution that can reduce CO2 emissions upto 80% in comparison to OPC concrete

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# Why India?

- Coal-phase out in Europe and transition of blast furnace steel industry by 2030 will limit the production of fly-ash and slag
- However, In India: Fly-ash production is yet to reach its peak in the next 10-20 years (>200 million tons / year)
- A lot of local steel manufacturers do not quench and treat their waste, rather pay to the local government to get rid of toxic waste
- Very few Alkali silicate producers in the market but very few and expensive

**A lot in the news but not in the field**

- Large scale application of Geopolymer concrete is still far from sight

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# Challenges for Commercialisation:

## Sourcing Raw Materials

Needs a stable supply of consistent quality.

Various sources available

Stable Supply-Chain

## Costs

CO2 taxation

Subsidy from Govt.

Readily/locally available raw material

Cheap chemical activators

## QC/QA

Manufacturing similar to OPC production with a few different steps.

Trained Technical Operators can ensure a good QC/QA

## Long Term Performance

Many examples to prove the long term serviceability

## Standardization

Still to be achieved.

Needs a consensus from the majority of stakeholders in the Standardization Committee

## Customer Acceptance

Sufficient convincing technical facts comparing OPC

Good product Education

Technical Advocates

Win Confidence

All are linked to one another

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# Opportunities

- Potential for large scale application of Geopolymer concrete!
- Geopolymer concrete (pavements) would help in utilizing the enormous industrial waste streams & bolster sustainable construction
- With an experience of 15 years in concrete production and road construction
- Mangla RMC is dedicated to sustainable construction and  is strongly willing to collaborate with the local government to initiate pilot projects for geopolymer concrete roads by the end of 2021
- To make this possible: we invite Geopolymer institute, private researchers or organizations and various industries for collaboration

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# Thank you for your attention!

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