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Concrete: Carbon Impacts and Opportunities

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- Trade association for aggregate, concrete, asphalt, and mineral producers, and recyclers in California.
- Concrete members are primarily ready mixed concrete producers
- Large and small companies
- There are about 300 ready mixed concrete batch plants in the membership

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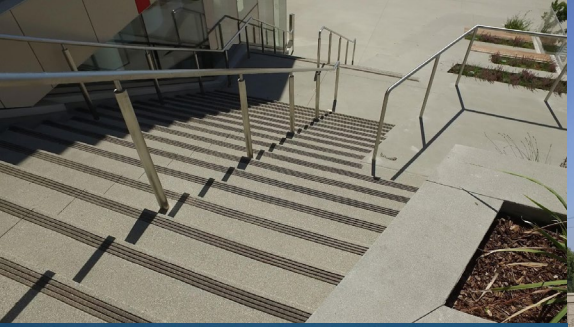
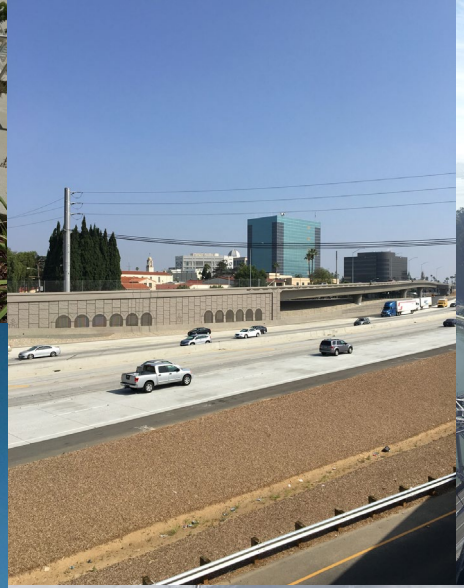
Concrete

- What it is
- How it is made
- Carbon Impact
- Challenges
- Opportunities





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Concrete - What it's made of

- 60-75% aggregates
- 10-15% cement
- 15-20% water by volume
- A local material

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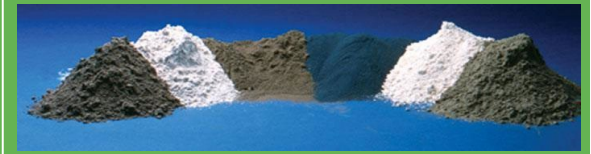
Concrete's Ingredients

Aggregates	
Cement	
Water	
SCMs	
Admixtures	

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Making Concrete

- Ingredients mixed in a batch plant
- The mix is in a liquid state
- It is discharged into the drum of a mixer truck
- The mixer truck's drum rotates to continue mixing process
- Perishable

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Making Concrete

- At the construction site, the mixer truck is backed up and the concrete is discharged through a chute
- Many locations use a concrete pump

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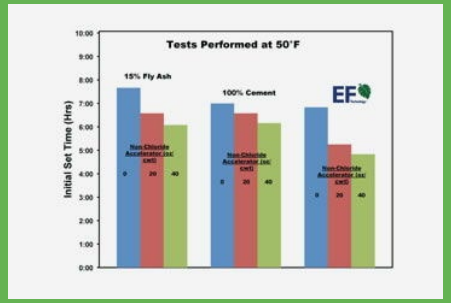
Making Concrete

- Batch plants have quality control labs that test mixes before they leave a plant
- Hundreds of mix variations
- Concrete is tested, again, at the job site
- The mixing and testing of concrete is governed by ASTM C94



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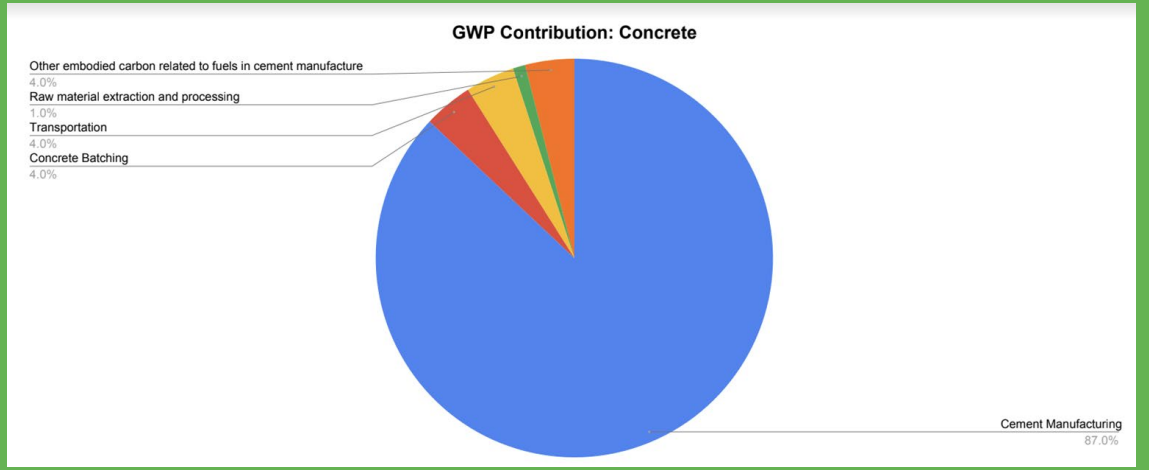
Concrete & Carbon



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Carbon & Concrete: Additive & Subtractive

- *Additive* - Concrete production adds less than 10% of carbon impact
- *Subtractive* – Concrete producers subtract from the carbon impact of cement through selection and substitution of materials
- Concrete producers nationally reduced the carbon footprint by 21% from 2014 to 2021

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Concrete in the Construction Value Chain

For design and purchasing…*at the bottom*

For production…*in the middle*

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Challenges

- Regional variation in materials
- Specifications and codes that over-emphasize cement content
- Not always a party to decision-making
- Over-ordering of concrete

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Challenges

- Limits on use of recycled materials
- Space limitations at concrete plants
- Re-carbonization not often measured
- Not every concrete producer at the same point

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Opportunities - Specifications & Codes

- Develop performance specifications
- Expand specifications for recycled concrete
  - Crushed concrete
  - Returned plastic concrete

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Opportunities - Materials

Use low carbon cements

- Portland Limestone Cement
- Type IP
- Type IS
- Type IT
- Exotic new cements

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Opportunities - Materials

Expand use of SCMs

- Harvested fly ash
- Blended SCMs
- Natural pozzolans
- Ground glass
- Bio-related SCMs

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Opportunities - Collaboration

- Project designers increase engagement with concrete producers in construction planning
- Concrete producers educating contractors, engineers, architects, and owners on low carbon options
- Research and development on new cements, SCMs, and other ingredients

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Opportunities - Other

- Additional storage facilities at batch plants
- Adding re-carbonization calculations into project impacts
- Recycling carbon into concrete
- More environmental product declarations
- Expanded buy clean initiatives
- Plant efficiency
- Cleaner delivery trucks

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Questions?

CalCIMA - Charley Rea
crea@calcima.org
916-600-4492