

# The Next-Gen Concrete Producer: 4 Tech Innovations to Boost Productivity

April 15, 2021



**CARBON  
CURE™**



**Command  
Alkon**



**GIATEC**

# Thank You for Joining our Webinar!

- You will be muted
- Webinar recording will be shared
- For best results, use high-speed internet
- Chat window on lower right
- Q&A and survey at the end



# Disclaimer

*This webinar is provided for general information purposes only and does not constitute legal or professional advice. No user should act on the basis of any material contained in the webinar without obtaining proper professional advice specific to their situation.*



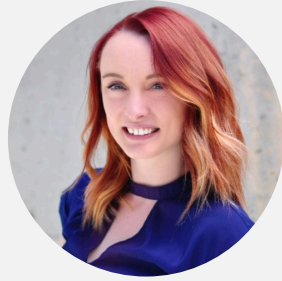
# The Speakers



**Ryan Cialdella**  
VP of Innovation and  
Market Development  
Ozinga



**Jeff Van Grootel**  
Optimization Sales Manager  
Command Alkon



**Sarah McGuire**  
Sr. Director of Sales  
Giatec



**Chris Erickson**  
CEO, Co-Founder  
Climate Earth

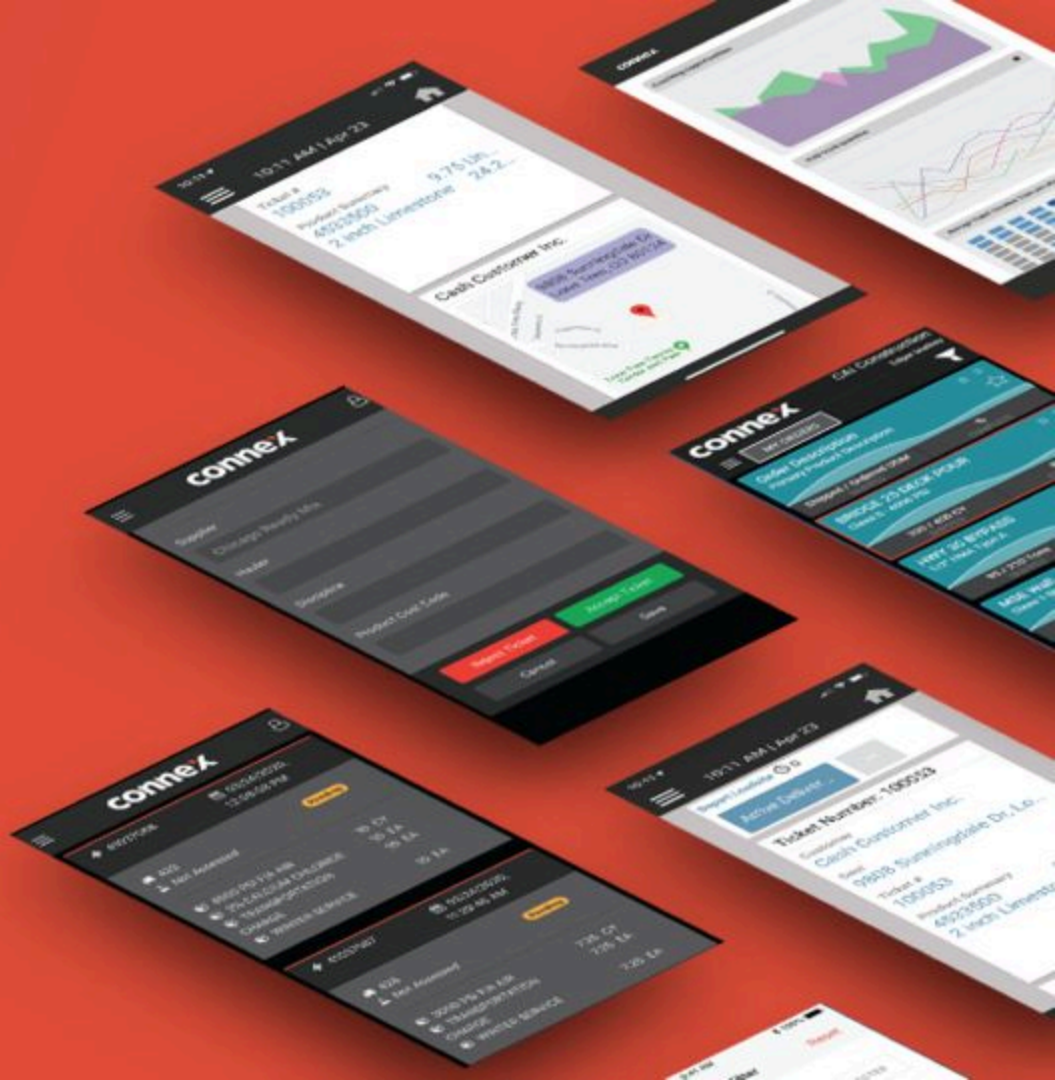


**Christie Gamble**  
Sr. Director of Sustainability  
CarbonCure



**Command  
Alkon**

**Command Alkon technology helps  
you procure, make, dispatch, sell,  
or track and trace your heavy  
building materials.**



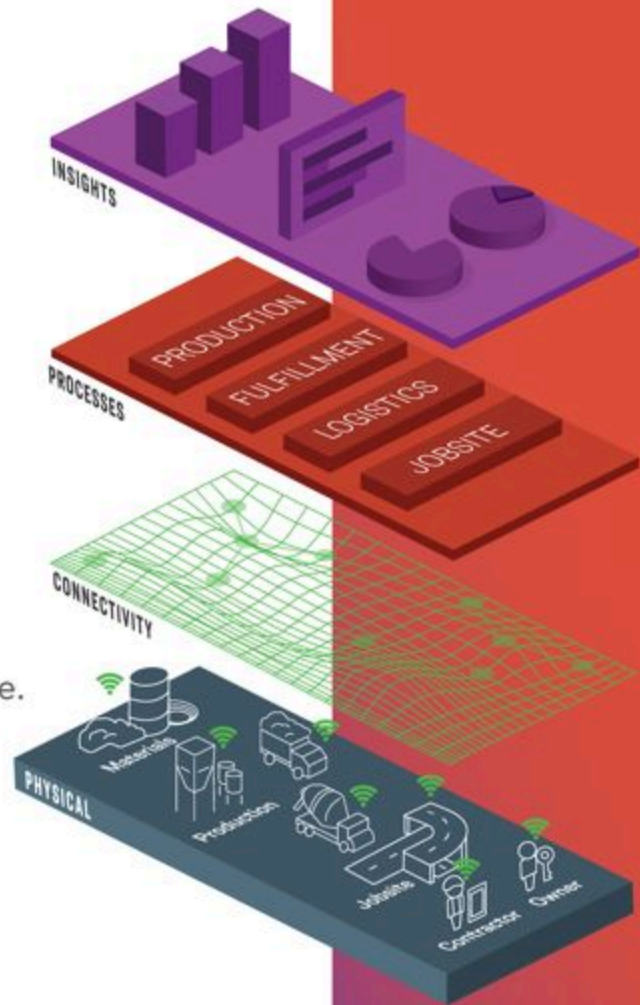
# connex

By Command Alkon

## The Supplier Collaboration Platform for Your Heavy Work

Harness the problem-solving energies of your business, replace manual processes to streamline your operations, simplify data across your supply chain partners, and gain visibility into your future.

**We accomplish more when we see, work, and grow together.**



# CONNEX Jobsite

Proof of delivery and peace of mind

Automated ticket entry and more

Trading partners work from one version of the truth

Say goodbye to paper!

- Automate and standardize your material ordering
- Know and manage your waste daily
- Remove paper tickets
- Electronically accept/reject material deliveries
- Eliminate the need for Excel tracking sheets
- Clock-in / Clock-out onsite trucking electronically





# CONNEX is more than just eTicketing

The CONNEX Platform facilitates every step in your workflow, from initial orders through to paying the final bill.



Order Materials



Track Materials



ePOD



Receive Materials



Reconcile Invoices



Pay Invoices



Insights



# COMMANDassurance

Real time visibility of concrete properties in transit.

Integrated across your enterprise.

Empower users with data to improve operational efficiency and product quality.

Historical data view for mix improvements, or claims.

- Savings on wash rack times, and on job wait times
- Returned materials information to dispatch enables reuse
- Eases new driver training
- Reduction of rejections from out of spec loads
- Reduce excursions of drivers up ladder
- Identify & correct unsafe driver behaviors



# COMMANDoptimize

**Increase Productivity with Finite Resources – 5-10 more loads per month per truck!**

**Balances costs and desired customer service levels**

**Reduce Non-Productive Time & Running Time Waste**

**Reschedule the entire dispatch day in seconds**

**Reduce Variable Delivery Costs – more than \$1/yard savings on average!**

- **Pre-allocate loads to trucks for the entire dispatch day**
- **Forecast plant loading and material requirements**
- **Precision driver-call in schedule**



**TOGETHER**

we are triumphant when

**WE**

collaborate as craftsmen and technologists from all facets  
of the Heavy Work supply chain community to

**BUILD**

the structures that lay the foundations for the

**AMAZING**

world where we live, work, and play.

# Vision: Revolutionizing the Construction Industry



# Challenge: How to Measure Concrete Strength?

Field-cured specimens



Does not represent the actual concrete in-situ (smaller volume and different temperature)

Lab-cured specimens



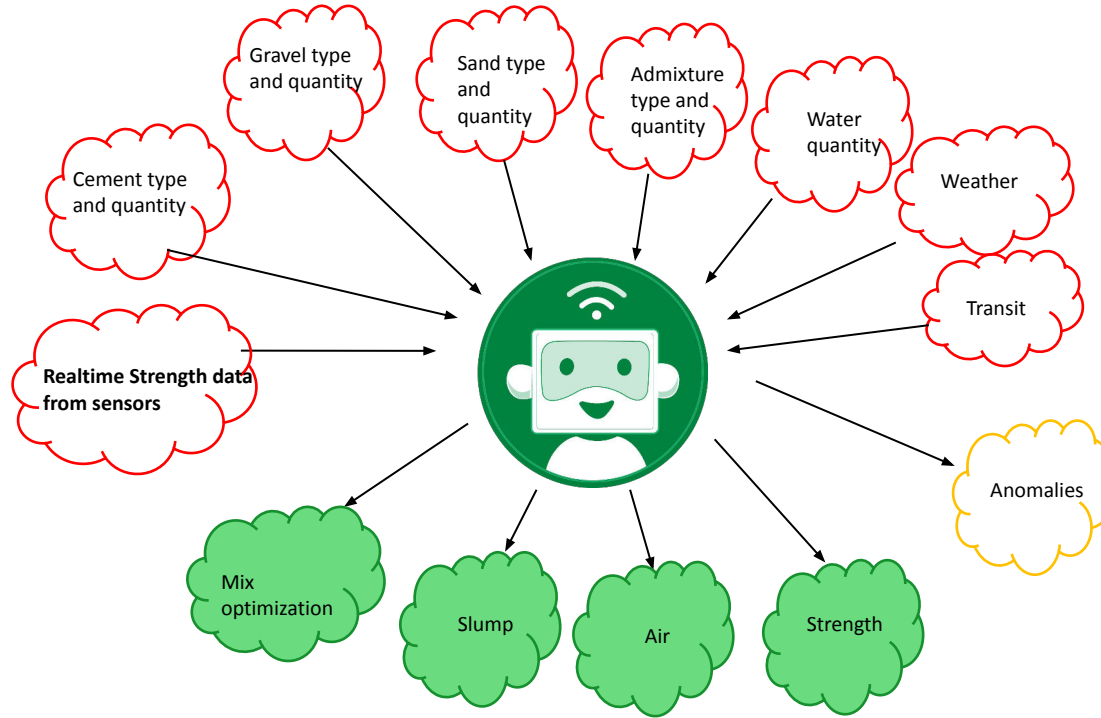
Does not represent neither the curing condition nor the in-situ concrete

Maturity meters



Measures the real temperature and strength in the concrete element

# Concrete Performance Prediction



# Results



## Optimize Mix Proportions

Evaluates mix's prescriptive requirements and suggests adjustments in ingredients and proportions without jeopardizing its designed compressive strength, workability, and air content.



## Reduce Cement Usage

Examines concrete mix proportions to optimize strength gain, lower material costs, and reduce cement usage and resulting CO<sub>2</sub> footprint.



## Predict Mix Performance

Analyzes concrete mixture proportions, material characteristics, ambient conditions, and more to predict a mix's performance over time.

### Configure Mixes

Optimization Name

Unit  Number of Suggested Mixes  [1,25]

Select Materials

- Cement Type VIII
- Coarse Aggregate
- Fine Aggregate
- Water

Age  Specified Strength

Target Slump   in

Target Air Content   %

Water to Cementitious materials ratio   [0,1]

Cement Content   lb/yd<sup>3</sup>

Fine To Total Agg. Ratio   %

Maximum SCM Replacement Rate

- Max Fly Ash
- Max Silica Fume
- Max Slag

Optimize For

Materials Inventory

# Digital EPDs and the Next-Gen Producer

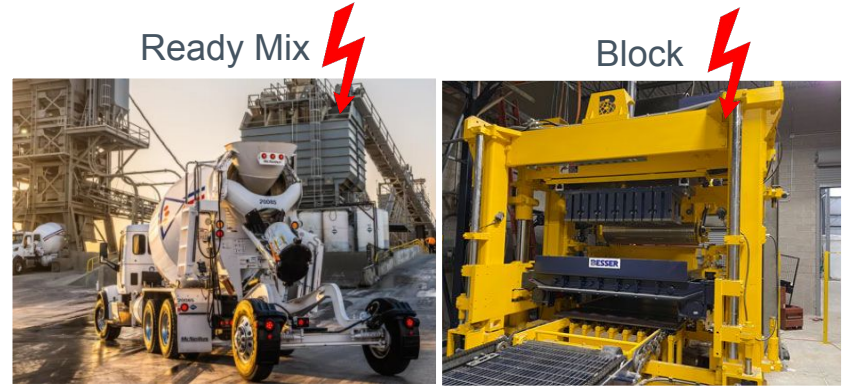




# Climate Earth is a provider of digital EPD solutions for the concrete industry

## The CarbonCLARITY™ Suite includes

- Instant Digital EPDs
  - › EPD Generator
- Digital marketing tools
  - › The Project Builder
  - › The Concrete Designer
- Data access and analysis
  - › EPD data analysis
  - › The digital API

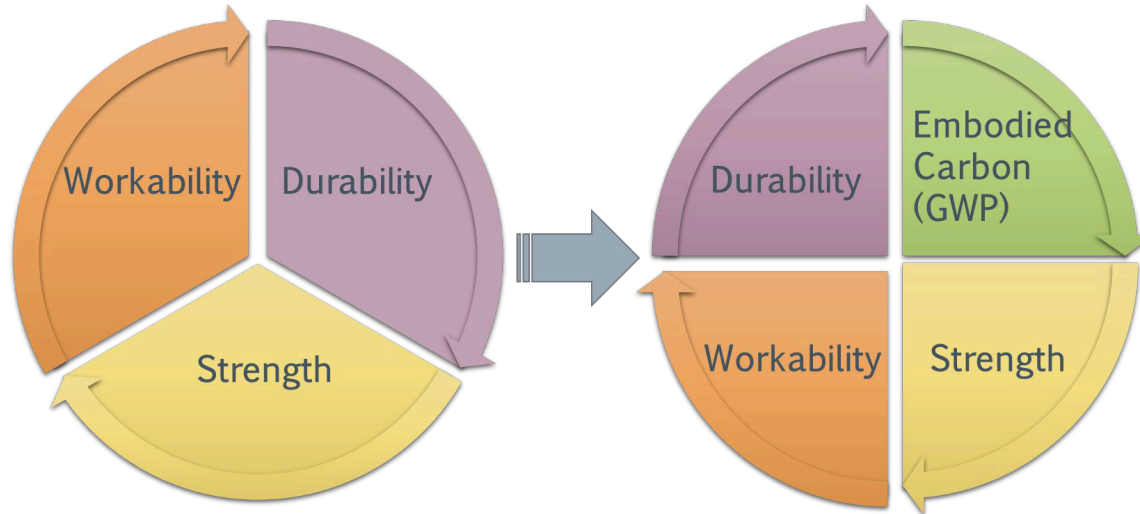


# In a Changing World: The EPD for the Next-Gen Producer

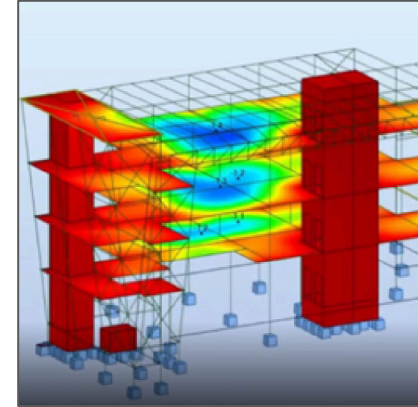
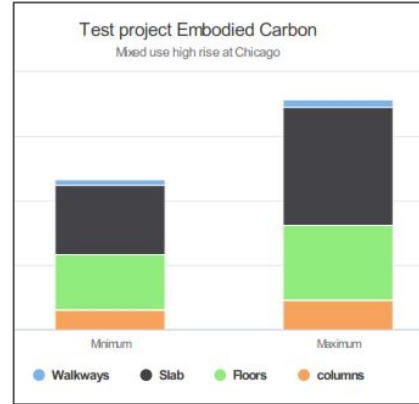


GWP is a new concrete performance metric

- Driving a shift from prescriptive to performance-based specs
- Instant Digital EPDs offer the needed speed, access, and low cost to meet the new demand for low carbon concrete



# The Role of the EPD in the Next-Gen Producer



› Uses instant digital EPDs to measure embodied carbon of every mix

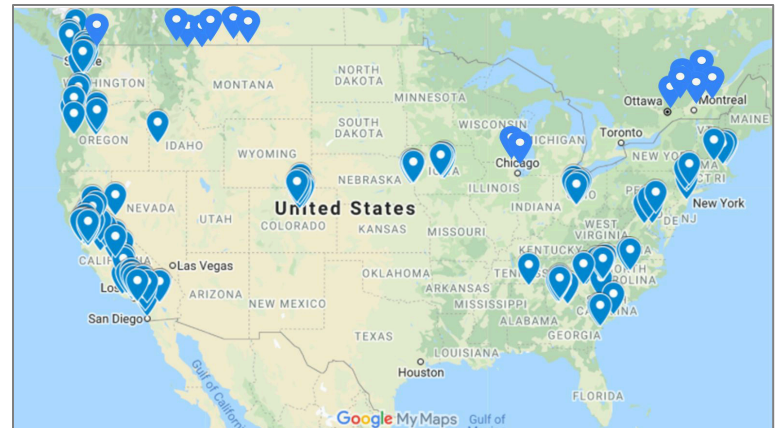
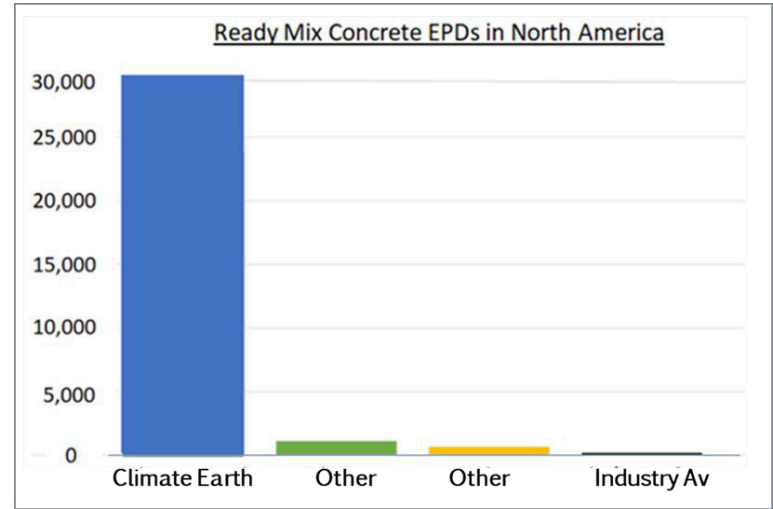
› Utilizes digital tools to market and demonstrate low carbon mix design expertise

› Offers EPD data integration with BIM systems, whole building LCA, and purchase analysis tools

# Digital EPDs Today

- › Over 31,000 Generated
- › Deployed at over 275 plants

Thank You





# Did You Know?

**Embodied carbon** is expected to account for nearly **50%** of the carbon footprint of new construction.

**Concrete** is typically the largest contributor to embodied carbon on a project.



# What is CarbonCure?

## CO<sub>2</sub> Utilization in Concrete

CarbonCure's technology beneficially repurposes carbon dioxide to reduce the carbon footprint of concrete without compromising concrete performance.

# CarbonCure Concrete Impact



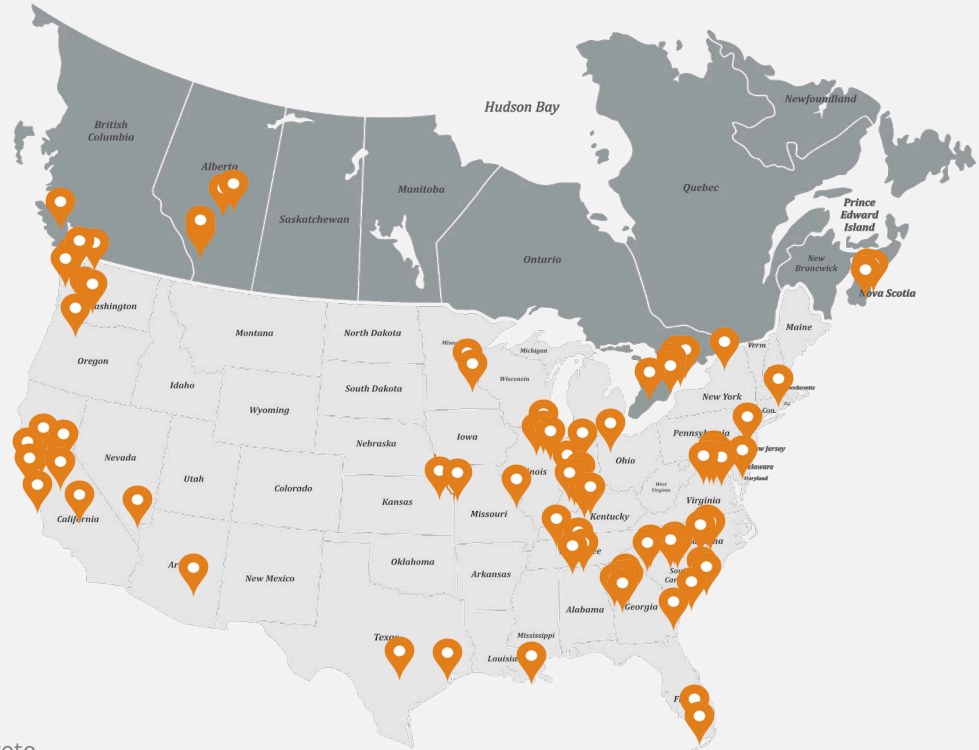
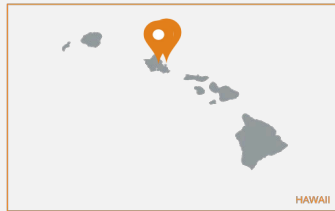
Operating at  
**300+ Concrete Plants**



Used in  
**9,000,000+ yd<sup>3</sup> of concrete**



Resulting in  
**85,000+ tonnes CO<sub>2</sub> saved**



# How it works

Seamless retrofit technology that integrates with existing concrete operations



## Collection

CO<sub>2</sub> is collected from large emitters and purified by industrial gas suppliers



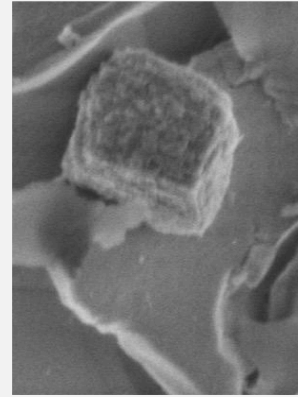
## Delivery

The CO<sub>2</sub> is delivered to concrete plants by gas suppliers and stored in pressurized tanks



## Injection

CarbonCure's technology delivers a precise, automated dosage of CO<sub>2</sub> into mixing concrete



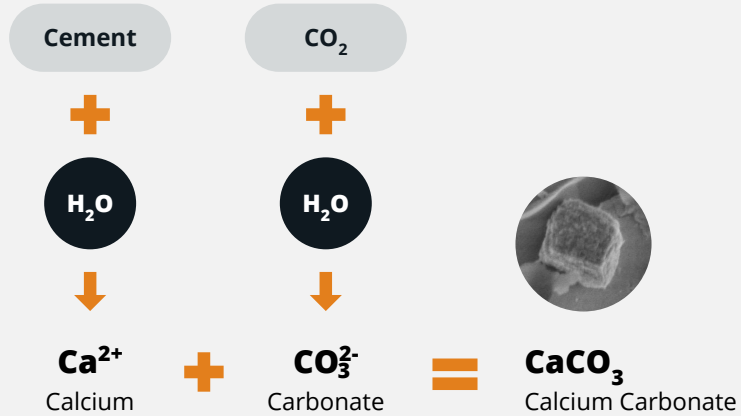
## Mineralization

The CO<sub>2</sub> converts into nano-minerals that become permanently embedded in the concrete



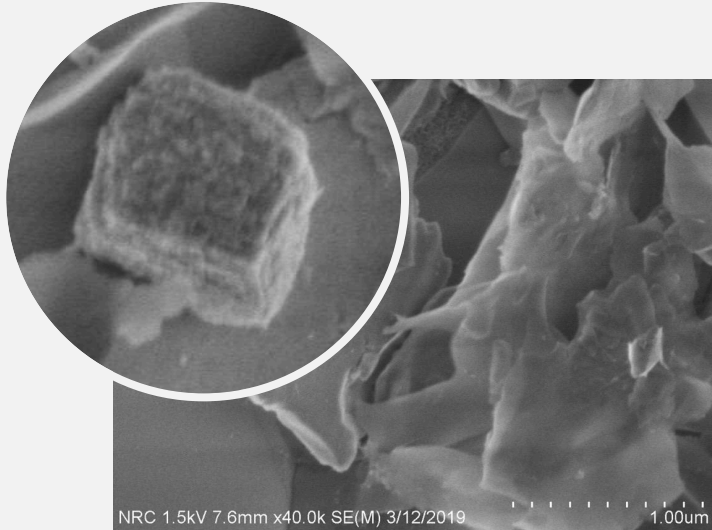


# What Happens When CO<sub>2</sub> is Injected?



- CO<sub>2</sub> mineralization reaction
- CO<sub>2</sub> converts into **CaCO<sub>3</sub> (solid limestone)**

# Converting CO<sub>2</sub> to a Mineral



**Carbonate product formed**  
about 400 nm dimension

**Nano-calcium carbonate particles** act as nucleation sites for hydration. Compressive strength benefits arise from this interaction.

The increased strength allows concrete producers to reduce cement content, while maintaining original strength.



# CO<sub>2</sub> has a Neutral Impact on...

## Fresh Properties

- Setting time
- Workability/slump
- Concrete pumping
- Air content
- Temperature
- Finishing

## Hardened Properties

- Freeze-thaw
- pH
- Density
- Durability
- Color
- Texture

*Note: Peer reviewed papers are available to support the above information at [carboncure.com](http://carboncure.com).*



**CarbonCure for Ready Mix**

# How Much CO<sub>2</sub> Can Be Saved?

**20-35 lbs** CO<sub>2</sub> saved per yd<sup>3</sup>

CO<sub>2</sub> saved = CO<sub>2</sub> mineralized + CO<sub>2</sub> avoided by reducing cement

# Reference Projects



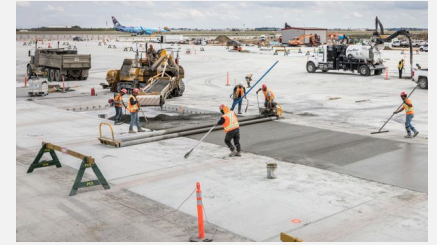
Atlanta, GA – 725 Ponce  
Concrete Producer: Thomas Concrete  
CO<sub>2</sub> Saved: 1,500,000 lbs



Mountain View, CA – LinkedIn Campus  
Concrete Producer: Central Concrete  
CO<sub>2</sub> Saved: 240,000 lbs



Indianapolis, IN – Infosys Innovation Hub  
Concrete Producer: Irving Materials  
CO<sub>2</sub> Saved: 240,000 lbs



Calgary, AB – East Deicing Apron  
Owner: YYC Calgary International Airport  
CO<sub>2</sub> Saved: 352,740 lbs (160 tonnes)



Chicago, IL – McDonald's Flagship  
Concrete Producer: Ozinga  
CO<sub>2</sub> Saved: 30,000 lbs



Kapolei, HI – Kapolei Interchange Demo.  
Concrete Producer: Island Ready-Mix  
CO<sub>2</sub> Saved: 1,500 lbs



Atlanta, GA – Georgia Aquarium  
Concrete Producer: Thomas Concrete  
CO<sub>2</sub> Saved: 330,000 lbs



Arlington, VA – Amazon HQ2  
Concrete Producer: Miller & Long  
CO<sub>2</sub> Savings (est.) : 2,500,000 lbs



# How can you help reduce concrete's carbon impact?

- ✓ **Communicate** your commitment to embodied carbon reduction throughout the supply chain *early* and *often*
- ✓ Design strengths for what you **need**
- ✓ Use **supplementary cementitious materials** and/or **low-carbon cement**
- ✓ **Remove** unnecessary prescriptive concrete specs such as minimum cement content
- ✓ Consider **performance**-based concrete specs
- ✓ Specify and/or approve **CO<sub>2</sub> mineralized concrete**



**CARBON  
CURE™**

# THANK YOU!



## **Jeff Van Grootel**

Optimization Sales Manager  
Command Alkon

E: [jvangrootel@commandalkon.com](mailto:jvangrootel@commandalkon.com)  
P: 205-879-3282 ex. 1180

## **Christie Gamble**

Sr. Director of Sustainability  
CarbonCure

E: [cgamble@carboncure.com](mailto:cgamble@carboncure.com)  
P: +1-902-220-9380

## **Sarah McGuire**

Sr. Director of Sales  
Giatec

E: [sarah@giatec.com](mailto:sarah@giatec.com)  
P: +1 (613) 804-3799

## **Chris Erickson**

CEO, Co-Founder  
Climate Earth

E: [chris@climateearth.com](mailto:chris@climateearth.com)  
P: 415-391-2725



[www.carboncure.com](http://www.carboncure.com)



@CarbonCure



CarbonCure-Technologies



CarbonCure.Technologies