

# **Beyond the Mix Design: Achieving Lower-Carbon Concrete Through Digital Workflows**

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**Product Spotlight | Command Alkon**

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**Cementitious materials account for 80-90% of concrete's carbon footprint.**

**Reducing the cement (clinker) content and choosing the right materials are the silver bullets for the concrete industry.**



**The remaining 10-20% is controlled by the Process. The Process can be monitored using Digital Workflows.**



# Carbon footprint and the concrete production cycle



## Where Do We Find Opportunities to Reduce Carbon?

Waste hides in the gaps between design, batching, and delivery.



### MATERIAL VARIABILITY

Built-in safety margins add cost

- Unauthorized additions of materials
- Improved batch uniformity
- Real-time confirmation of material compliance (raw materials & concrete)
- Recognition of testing variations
- **Variation in materials, batching and testing results in variable concrete**



### MATERIAL WASTE

Rework erodes sustainability gains

- Out-of-spec loads and returned concrete after the load is shipped
- Unnecessary overages of ordered concrete
- **Erodes sustainability gains that were already earned**



### DISCONNECTED PLANT DATA

Waste hides between systems

- Batching, quality, and dispatch systems that don't talk to each other
- Lack of production oversight enables plant settings to drift
- **Hides waste until it's too late to fix**



# At the Plant: Reduce Batched Cement Without Adding Risk

Powered by Batch AI



## DOSE PRECISELY

Hit target weights more consistently

- Batch AI adjusts feed rates and jog timing as plant conditions change.
- Tighter dosing helps avoid cement overshoot and unnecessary material waste.



## STAY IN TOLERANCE

Prevent waste before the load leaves

- Real-time correction reduces standard deviation vs Target before a load leaves the plant.
- More in-tolerance loads mean fewer rejected, remade, or returned loads.



## LOWER OVERDESIGN

Give QC confidence to tighten margins

- Consistent production gives QC confidence to reduce cement safety margins.
- Repeatable performance helps scale lower-carbon mixes across every plant.



# Batch AI

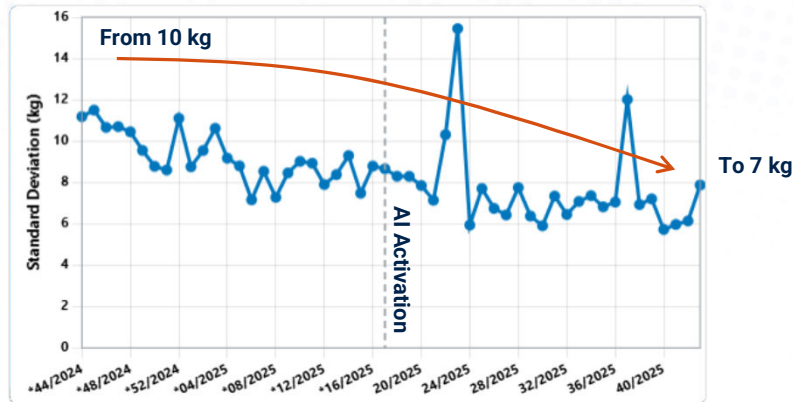
Real-time feed optimization for more precise batching



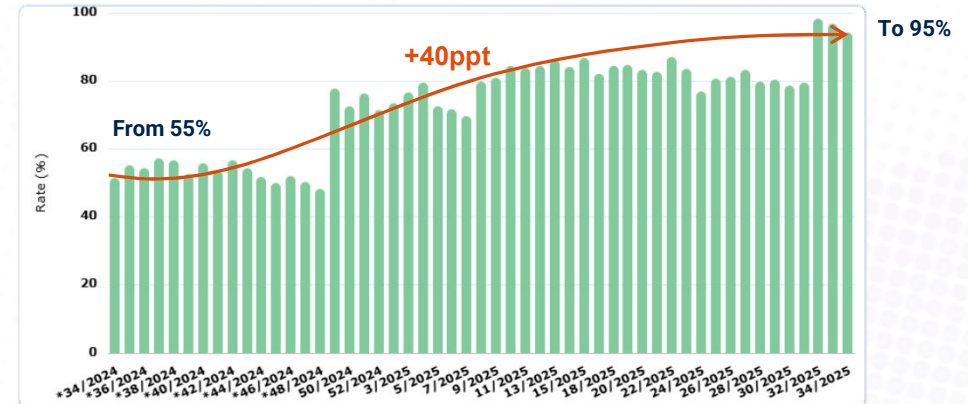
*Through material savings alone, I estimate that Batch AI saved \$100,000 across the ten activated plants within six months of its installation.*

- MCC Inc.

Cement Variability Improvement



Out-of-tolerance Batching Improvement



**30%** Improved Cement Variability

**40%** Improved Out-of-tolerance Batching

Auto-adjust batching in real time to reduce over- and under-batching, improve production consistency, and limit overdesigned mixes.



## Across Plants: Make Carbon Waste Visible and Actionable

Powered by Batch in Command Cloud + Plant Analytics



### CONTROL THE MIX

One approved source for mix and material data

- Centralized mix and material management keeps approved lower-carbon designs aligned across locations.
- Updates can be standardized without relying on manual entry at each plant.



### SEE THE WASTE

Plant-by-plant visibility into material usage

- Plant Analytics exposes cementitious material overuse, batching accuracy, and in-tolerance trends.
- Teams can compare plants and focus corrective action where carbon waste is actually occurring.



### CLOSE THE LOOP

Same-day action from trusted operational data

- Batch history, dashboards, and KPIs connect QC, production, and operations around the same facts.
- Same-day visibility helps correct trends before they create rejected loads or excess cement use.



# Beyond the Plant: Protect the Carbon Savings in Delivery

Powered by TrackIt, Digital Fleet, Dispatch + Load Assurance



## RIGHT LOAD, RIGHT TIME

Coordinate dispatch, production, and delivery

- Connected dispatch, production, and delivery workflows improve timing from ticket to pour.
- Better coordination reduces expired loads, remakes, and avoidable returned concrete.



## FEWER IDLE HOURS & MILES

Use fleet visibility to intervene earlier

- TrackIt and Digital Fleet provide live ETAs, truck status, and delivery visibility.
- Dispatchers can reduce waiting, deadhead miles, and jobsite congestion before they escalate.



## PROTECT THE LOAD

Verify performance from loading to placement

- Load Assurance helps verify concrete performance from loading through placement.
- Protecting the load reduces the risk of replacement loads that add cost and carbon.



# EPDs & Quality Control: Carbon Reporting



## LCAs & EPDs

Connected data feeds the Life Cycle Analysis

- Sources of materials
- Plant Locations
- Raw material deliveries
- Third party data
- Builds the EPD model



## QC

QC feeds the EPD

- Enables rapid mix & EPD adjustments
- Ties EPDs to production
- Enables benchmarking & compliance reporting



## Connecting Technologies Across the Workflow

| Technology      | Role in the Digital Workflow                                                                |
|-----------------|---------------------------------------------------------------------------------------------|
| Material Supply | Improves raw material inventory management, reducing shortages and unnecessary inventory    |
| Dispatch        | Ensures the correct mix is delivered at the right time, reducing operational inefficiencies |





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**Lower-carbon concrete isn't just  
about designing a better mix.  
It's about consistently producing  
and delivering that mix every day  
through better process control,  
connected operations, and smarter  
decision-making.**



# Contact Information

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