From Recommendation to Verification

The Next Chapter in AI-Driven Concrete QC

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THE ARGUMENT

Overdesign is the premium we pay for a recommendation nobody can confirm.

Three gaps keep it that way. This session is about closing them.

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Twice the overdesign the code asks for.

What ACI 301 requires at the industry's own standard deviation

631 psi
REQUIRED

What the industry actually carries



1,420 psi
INDUSTRY AVERAGE

789 psi
of overdesign the code does not ask for

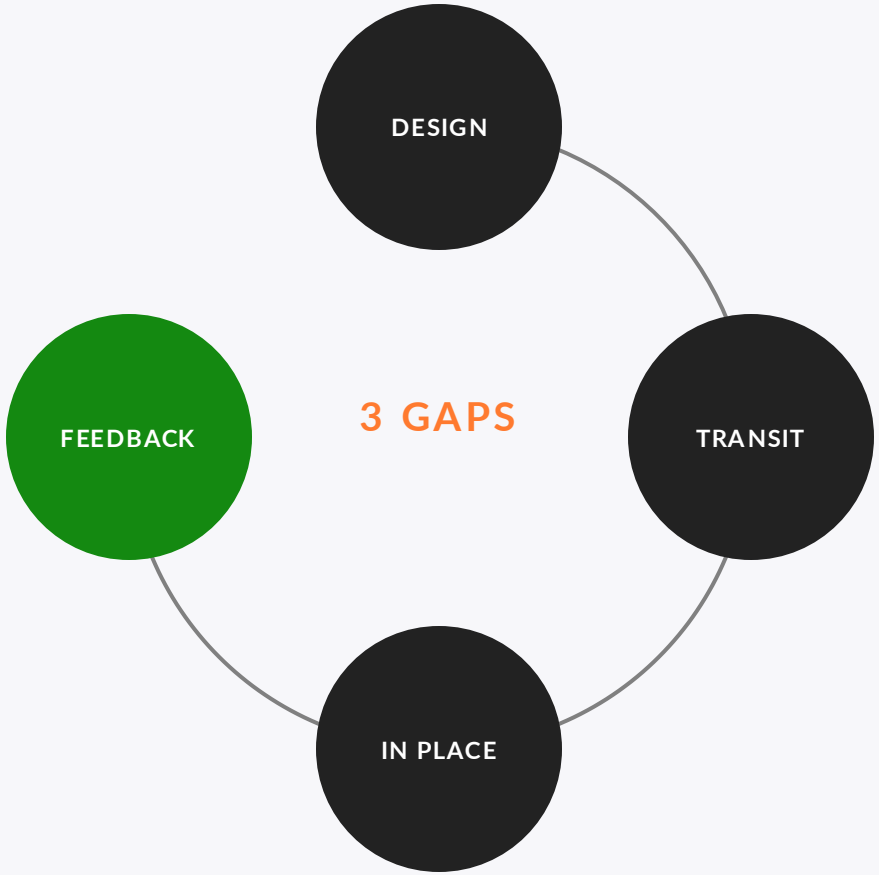
And this is the smaller number.
Mixes governed by a minimum cementitious content or a maximum w/cm are excluded here — and those carry closer to 3,000 psi.

Source: NRMCA Quality Benchmark Report 2025 (published February 2026); prescriptive figures from Snell, Obla & Carino, Concrete International, Nov 2024.

REAL DATA.
REAL IMPACT.
STRONGER TOMORROWS.

THE LOOP

Four stages. Three gaps. One open loop.



DESIGN

A prediction, not a measurement.

TRANSIT

Actual w/cm at discharge is unknown.

IN PLACE

Confirmation arrives weeks late, from a rack.

Safety margin is replacing missing information.

“

Concrete producers are left “flying in the dark,” and to protect themselves, they overdesign the concrete mixtures.

SNELL, OBLA & CARINO

“Excessive Overdesign of Concrete Mixtures for Strength,”
Concrete International, November 2024

THE OPEN LOOP · WHY IT MATTERS

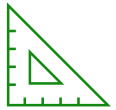
Uncertainty has a cost

Three places where missing information turns into missing margin.

DESIGN

You insure the mix.

Higher target strength protects against variability.



TRANSIT

You can't fully verify what arrived.

Water, air, moisture and time can change the load after batching.



IN PLACE

You learn too late.

Testing noise can inflate the variability you think you have.



Every uncertainty eventually gets priced into margin.

The goal is not to 'cut cement.' It is to reduce variability, verify performance, adjust incrementally and repeat.

WHAT THE OPEN LOOP COSTS

Three gaps. Three bills.

DESIGN

You insure the mix.

99 lb/yd³

of excess cementitious, industry-wide — about 16% of embodied carbon, spent on margin

TRANSIT

You can't fully verify what arrived.

2%

of production rejected at the jobsite or affected before it gets there — and a w/cm nobody can confirm

IN PLACE

You learn too late.

up to 20%

of strength understated by curing error — which inflates SD, which buys the cement straight back

Every uncertainty eventually gets priced into margin — and cement is where it gets paid.

Sources: NRMCA Quality Benchmark Report 2025; Snell, Obla & Carino, Concrete International, Nov 2024; Obla et al., Concrete International, Aug 2018.



GAP ONE OF THREE

Design

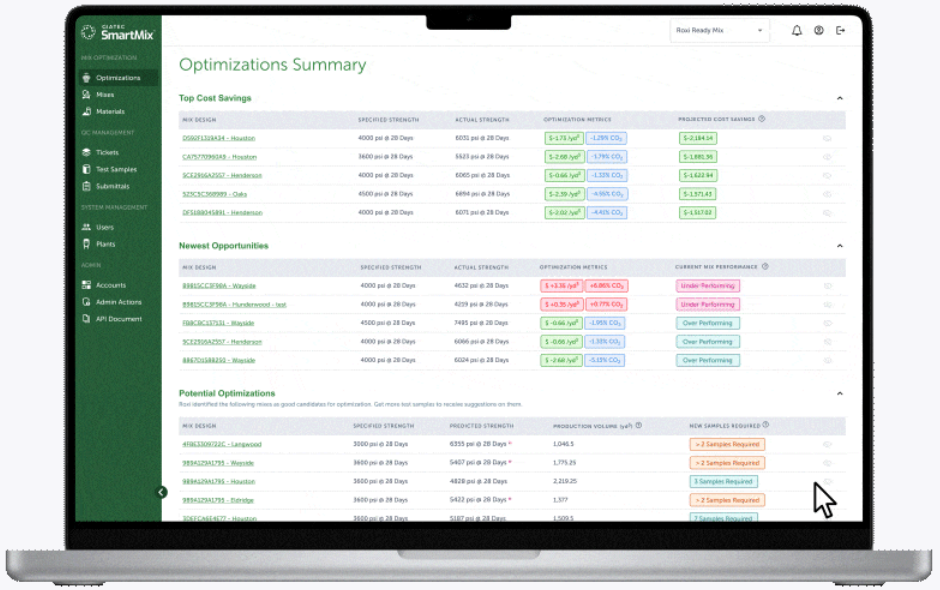
GIATEC SmartMix™

SmartMix advises.
Your QC team decides.

DESIGN · WHAT THE PLATFORM DOES

Three steps to optimized margins

The technology matters only if it helps QC make a safer, faster decision.



Reduce variability → verify performance → adjust incrementally → repeat

1 KNOW YOUR VARIABILITY

Automatic standard deviation, mix performance, batch and yield analysis.

2 FIND THE OPPORTUNITY

Rank the mixes where variability and overdesign create the biggest opportunity.

3 PROVE THE CHANGE

Break results, integrations and an audit trail make incremental adjustments defensible.

GUARDRAILS

You stay in control

This is not “cut cement.”

Reduce variability → verify performance → adjust incrementally → monitor → repeat.

Not: recommendation → remove 100 lb → hope.

Here is what keeps you in charge.

01. It advises. You decide.

Roxi proposes. Your QC team validates and signs. No model carries your seal.

02. It shows its work.

Every recommendation traces back to the mixes and results behind it. Full audit trail.

03. It will not outrun your data.

Optimizations surface only where the test record supports them. High scatter is a signal to fix testing first.

04. And a prediction is still not a verification.

Even Meta says of its own open-source model: predictions may differ from field performance. Which is exactly why the next two gaps matter.



GAP TWO OF THREE

Transit

TRANSIT · WHAT THE BENCHMARK SHOWS

What happens between plant and pour

0.68%

of production rejected at the jobsite

More than double the 0.31% reported for 2024.

1.3%

affected by internal quality / delivery issues

Up from 0.73% the year before.

14%

of producers adjust 30–60% of loads

Slump or air, corrected at the jobsite.

55%

calibrate moisture probes weekly

Aggregate moisture error feeds straight into w/cm.

None of this is incompetence. It is a measurement gap — the truck is a factory on wheels with no instrumentation on the process it is running.

Source: NRMCA Quality Benchmark Report 2025.

TRANSIT • THE BLIND SPOT

The Water Nobody Metered

ASTM C94 recognizes multiple contributors to total mixing water.

- Batch Water
- Ice
- Aggregate Moisture
- Residual Wash Water
- Jobsite Additions
- Admixture Water



Only one of these sources is routinely metered and documented.

The delivery ticket captures only part of the total mixing water picture. Optimizing to w/cm often relies on inputs that cannot be independently verified at the jobsite.

TRANSIT · CLOSING IT

Measure 100% of loads

GIATEC MixPilot™

Plant to pour

Non-invasive, self-calibrating in-transit sensing.

A hydraulic pressure sensor plus a magnetic drum sensor — no drum modification, no manual calibration.

Coverage is the breakthrough — not accuracy.

1–2% of batches

what a typical producer tests

3% of batches

what a world-class one manages

100% of loads

instrumented fleet



Slump · Temperature · Volume · Water added after batching

Every load. Every trip. And ASTM C94 already contemplated instrumented trucks — it permits in-transit water addition where automated slump monitoring is fitted.



GAP THREE OF THREE

In place

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A Noisier Signal Than We Admit

~50%
ASTM C31 Non-Compliance
Colorado testing-adherence program

Up to 20%
Strength Loss
Poor initial curing

277 psi
Variability
ACI 214 example

More
Overdesign
More cement required

Bad testing drives higher cement, cost, and carbon.

Higher Cement | Higher Cost | Higher Carbon

Sources: Obla et al., "Who is Watching Out for the Cylinders?" Concrete International, Aug 2018; Snell, Obla & Carino, Nov 2024; ACI CODE-318; ACI 214.

IN PLACE · CLOSING IT

You don't have to choose

Cylinders are not the enemy. An unverified cylinder is.

Most producers should fix the cylinder path first — it is cheaper and already in your process. Maturity is what you add when schedule decisions and in-place confirmation start to matter.

GIATEC SmartRock®

01. **Make cylinders trustworthy — and fast.**

Control initial curing, then get break results into the model in days, not filed in a binder.

02. **Add maturity for in-place strength.**

ASTM C1074 reads strength from the structure's own thermal history.

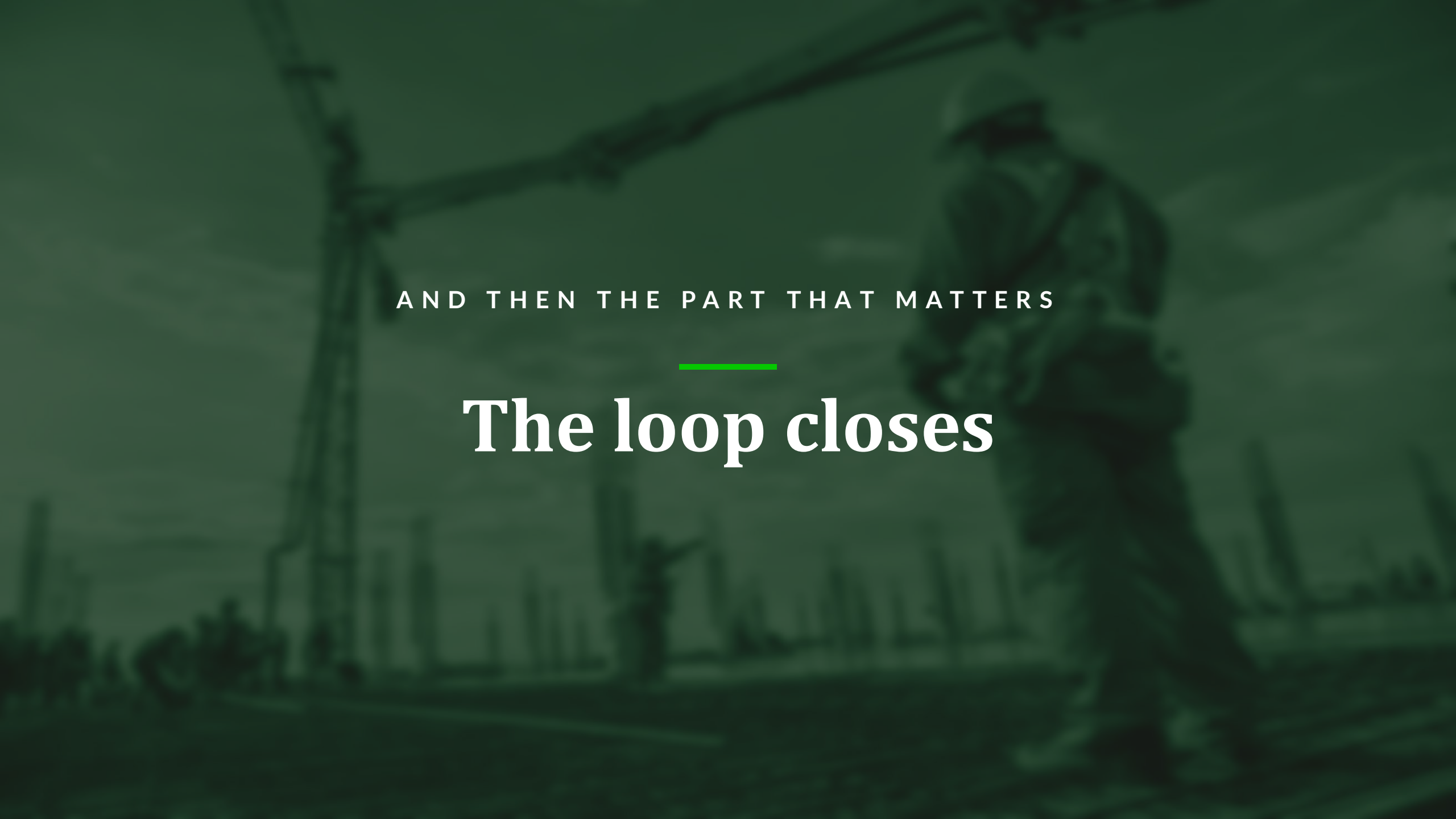
03. **Know what maturity cannot tell you.**

It captures thermal history — not a w/cm or air deviation. Which is why transit data matters too.

04. **And water is not the only variable.**

Air, aggregate moisture, batching tolerance, materials and testing all contribute. Each one you measure removes uncertainty.





AND THEN THE PART THAT MATTERS

The loop closes

THE LOOP CLOSES

The loop is the platform.

A recommendation you cannot confirm is a hypothesis you have to insure.

A recommendation you can confirm is an input to the next one.

That is the whole difference between optimizing once and optimizing continuously.

REAL DATA.
REAL DECISIONS.
STRONGER CONCRETE.

1



Transit and in-place data land back in SmartMix.

Slump, temperature, water and maturity return to the same place the mix was designed. That is the mechanism, not a metaphor.

2



Every measured result sharpens the next call.

Each cycle narrows the distribution — and it is the distribution, not the average, that sets your overdesign.

3



And it follows your data wherever it goes next.

Batching, dispatch, delivery. The feedback spine does not stop at the mix design.

A STRONGER MIX TOMORROW

SmartMix™
CONTINUOUSLY BETTER.

TOMLINSON READY MIX | GIATEC

Verification is what licensed the cut.

Three incremental adjustments. Six weeks. No trial batches.

−35 kg/m³	−8.8%	−5%	0
CEMENTITIOUS CONTENT	CEMENT	COST	TRIAL BATCHES

A client required 100% of design strength at 7 days. The data showed the mix was reaching that strength at 3 days. That confirmation made a gradual reduction defensible.

> **"Although we knew the mix was overdesigned, it wasn't a high enough priority to address without SmartMix. With SmartMix enabling incremental adjustments, that is the game changer."**
>
> **Ryan Andre**
> QC Manager, Tomlinson Ready Mix

Cementitious content: −35 kg/m³ ≈ **−59 lb/yd³** (1 kg/m³ ≈ 1.686 lb/yd³)

REAL DATA.
REAL IMPACT.
STRONGER TOMORROWS.

WHERE TO START

One layer at a time.

Nobody closes this loop in one procurement cycle. The sequence matters more than the scope.

Cement is your largest cost and your largest carbon input. A closed loop lets you optimize it harder — because the safety margin rests on measurement instead of assumption.

LOWER CARBON

LOWER COSTS

THE SEQUENCE THAT WORKS

1



Consolidate what you have.

Mix designs, batch records and break results in one place.
Costs only effort.

2



Cut scatter before cement.

Every 100 psi of scatter removed earns overdesign reduction.
That psi is free.

3



Start where pain is loudest.

Rejected loads → transit.
Schedule → in place.
Cement cost and EPDs → design.

4



Then close the loop.

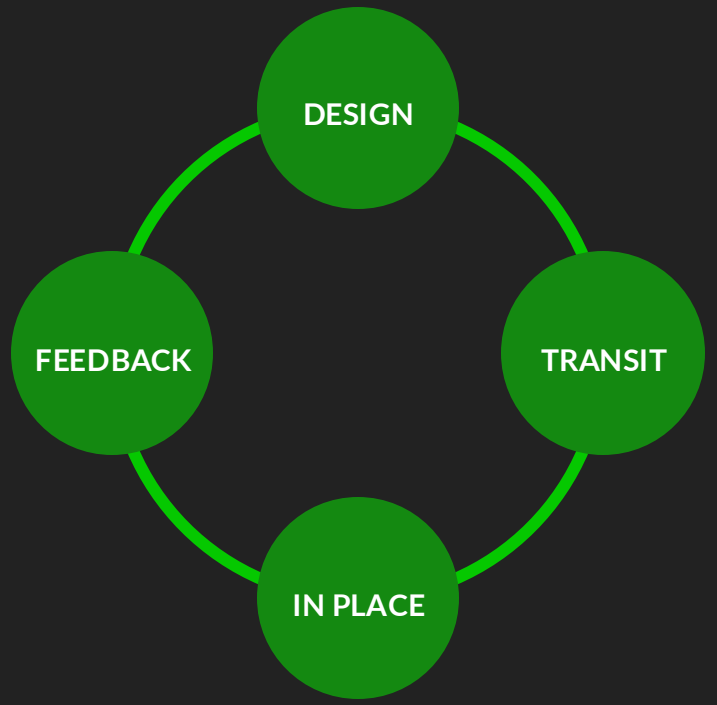
Any layer pays for itself.
Only the whole loop compounds.

SMART MIXES.
STRONGER TOMORROWS.

SmartMix.

CONTINUOUSLY BETTER.

THE LOOP, CLOSED



The industry doesn't need more predictions.
It needs more verification.

A closed loop lets the safety margin rest on measurement instead of assumption.

YOUR NEXT STEP

What's your number?

Take your last 12 months of strength data.

Your actual average strength

XXX

psi

–

ACI-required average strength

XXX

psi

=

YOUR OPPORTUNITY

XXX

psi

Bring me your standard deviation, specified strength and actual average strength.
We'll work the gap through together.

Reduce variability. | **Verify performance.** | **Adjust incrementally.** | **Lower costs.**

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Reduce variability.
Verify performance.
Adjust incrementally.



SMART MIXES. STRONGER TOMORROWS.