Example of Day-to-Day Adoption and Benefits of AI Tools in the Concrete Industry

Giatec
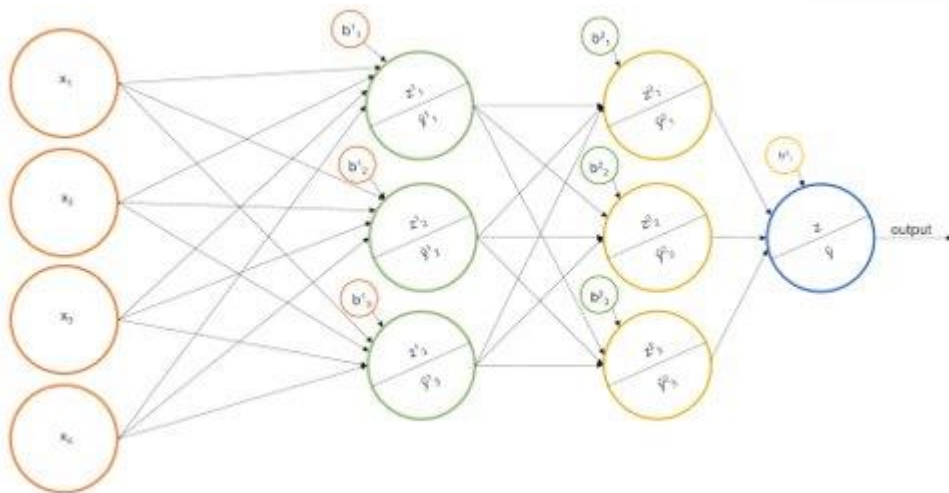
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Agenda

- Introduction
- Examples:
    1. Concrete pouring time detection
    2. Maturity calibration validation and mix performance
    3. Concrete mix optimization
- Conclusion

Introduction

- Validation
- Alerting
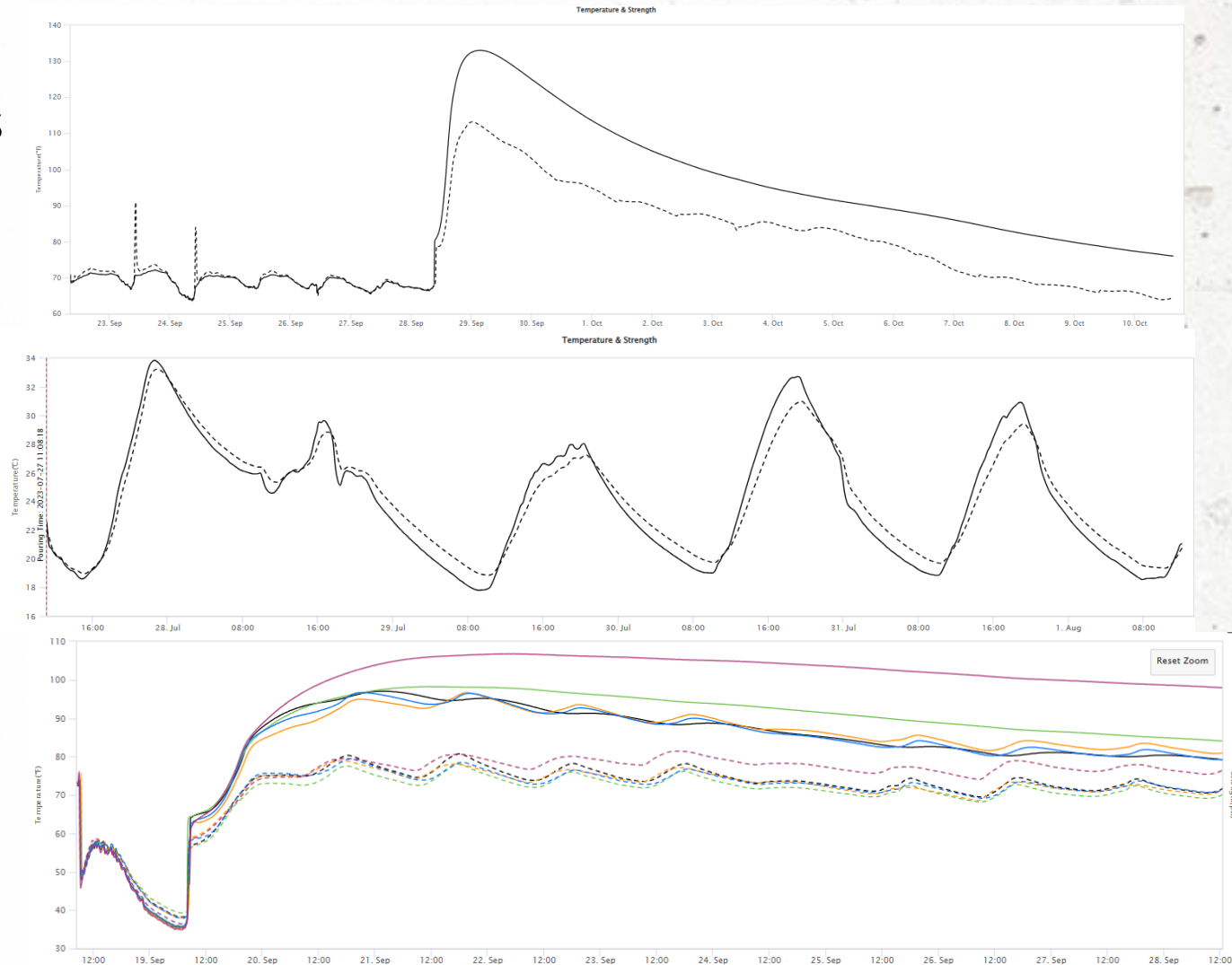- Suggestion

More tools to make decisions !

Concrete pouring time detection
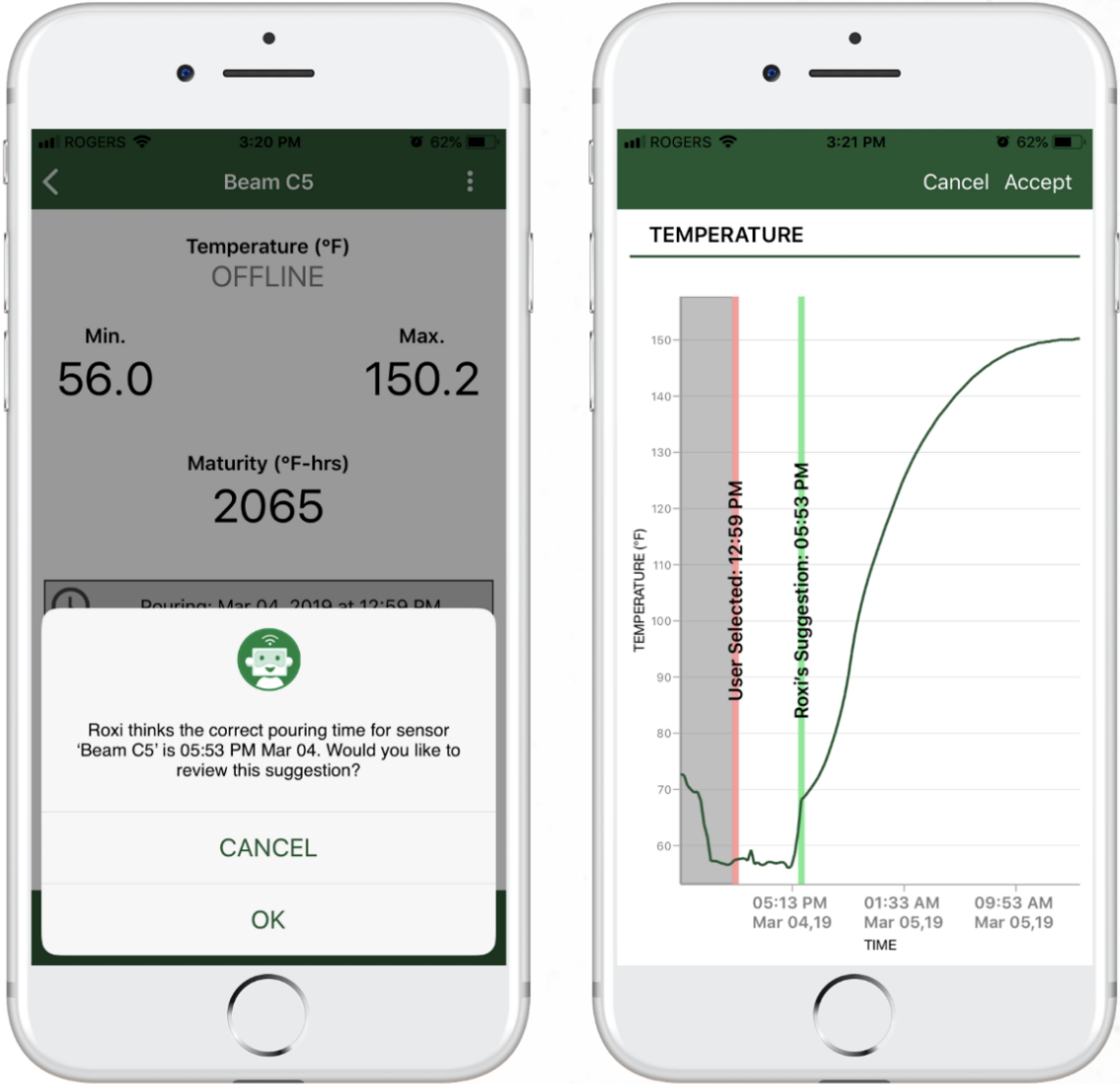
IOT Sensors & Data Collection

Collection of concrete temperature profiles

8+ years

- Different concrete types
- Different weather conditions
- Different type of applications
- Different installation depths
- Worldwide locations (85+ countries)

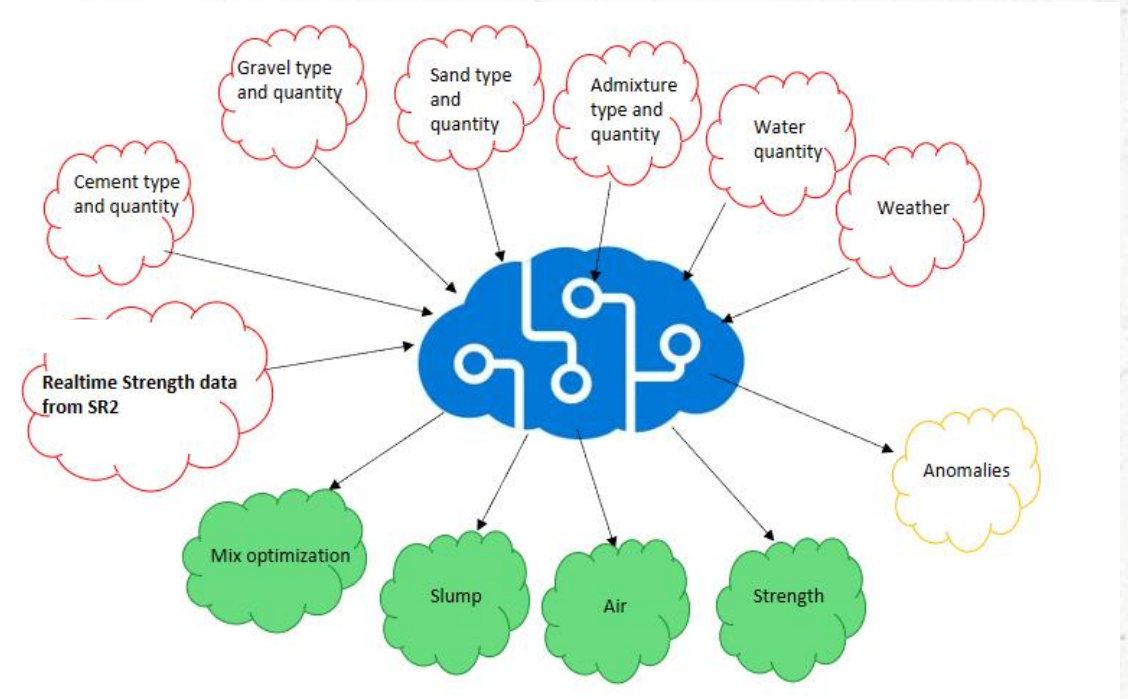# Prediction of pouring time, when did the concrete get in contact with the sensor?
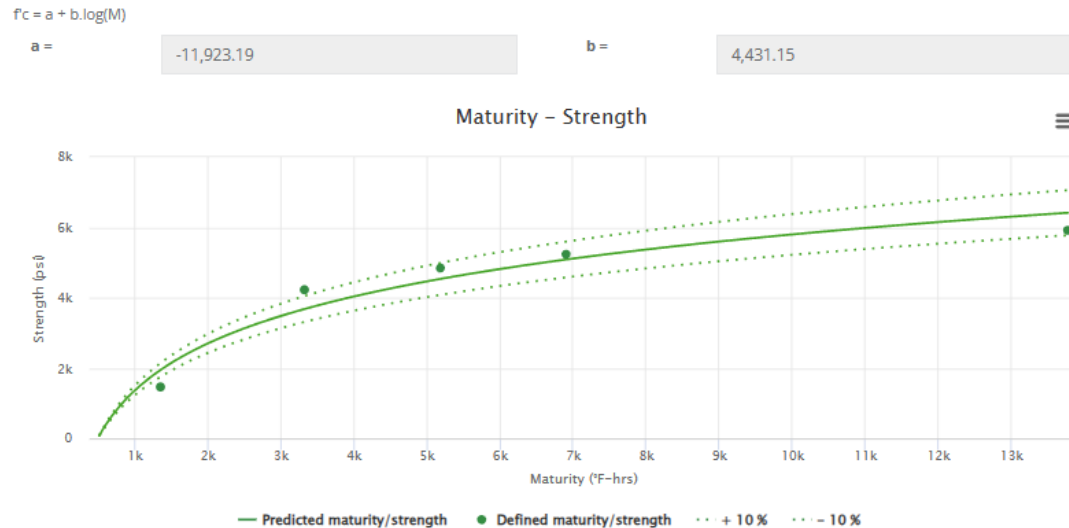

Available for > 4 years

Maturity calibration validation and mix performance

Performance prediction

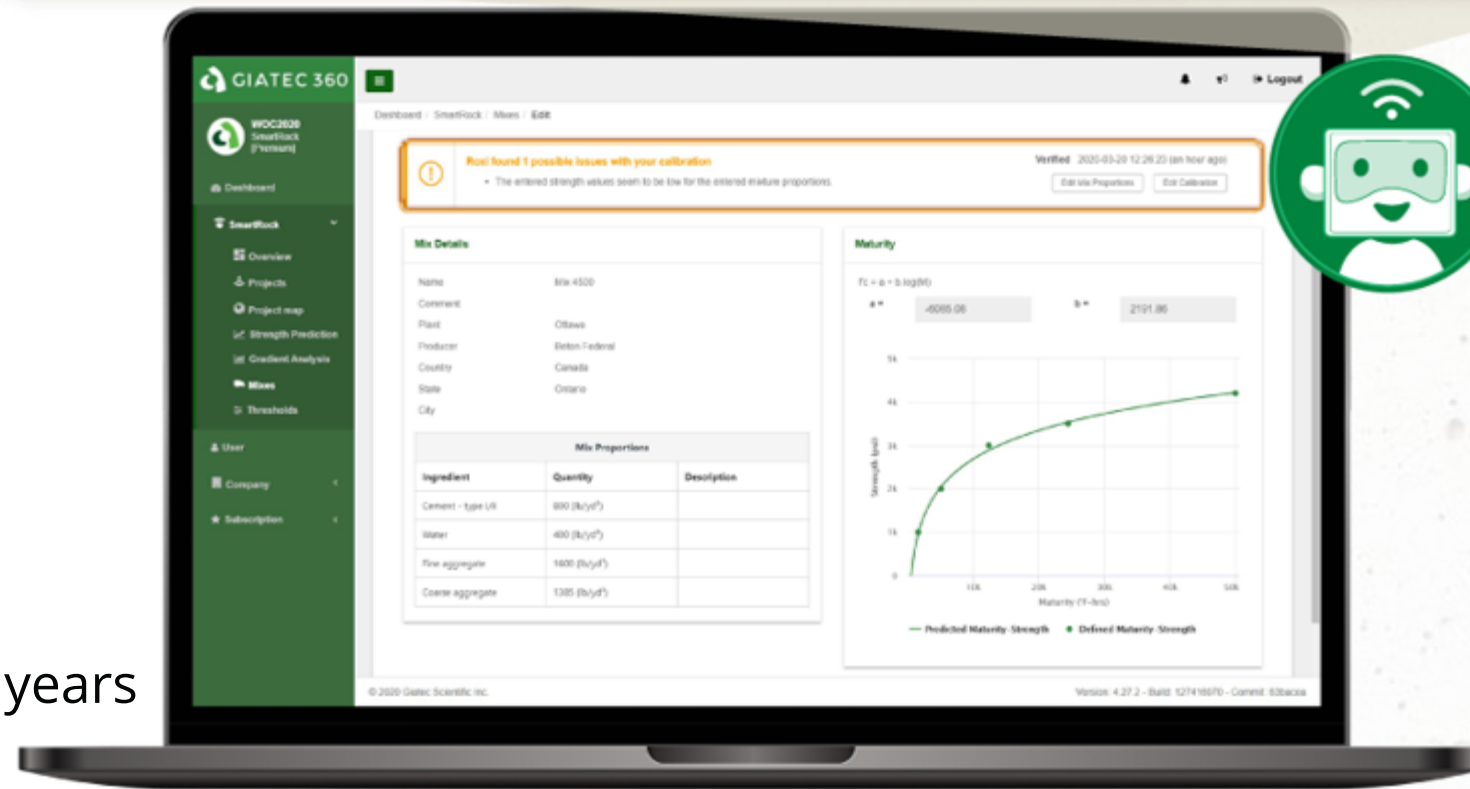- **1000+** Maturity calibrations
- **12+** producer partners

$f'c = a + b.log(M)$

a = -11,923.19

b = 4,431.15

Maturity – Strength

Strength (psi)

8k

6k

4k

2k

0

1k 2k 3k 4k 5k 6k 7k 8k 9k 10k 11k 12k 13k

Maturity (°F–hrs)

— Predicted maturity/strength ● Defined maturity/strength ·· + 10 % ··· − 10 %

Gravel type and quantity

Sand type and quantity

Admixture type and quantity

Water quantity

Weather

Cement type and quantity

Realtime Strength data from SR2

Anomalies

Mix optimization

Slump

Air

Strength

Is the maturity calibration provided within acceptable range?

Available for > 3 years

Suggestion on cement reduction

Concrete mix optimization

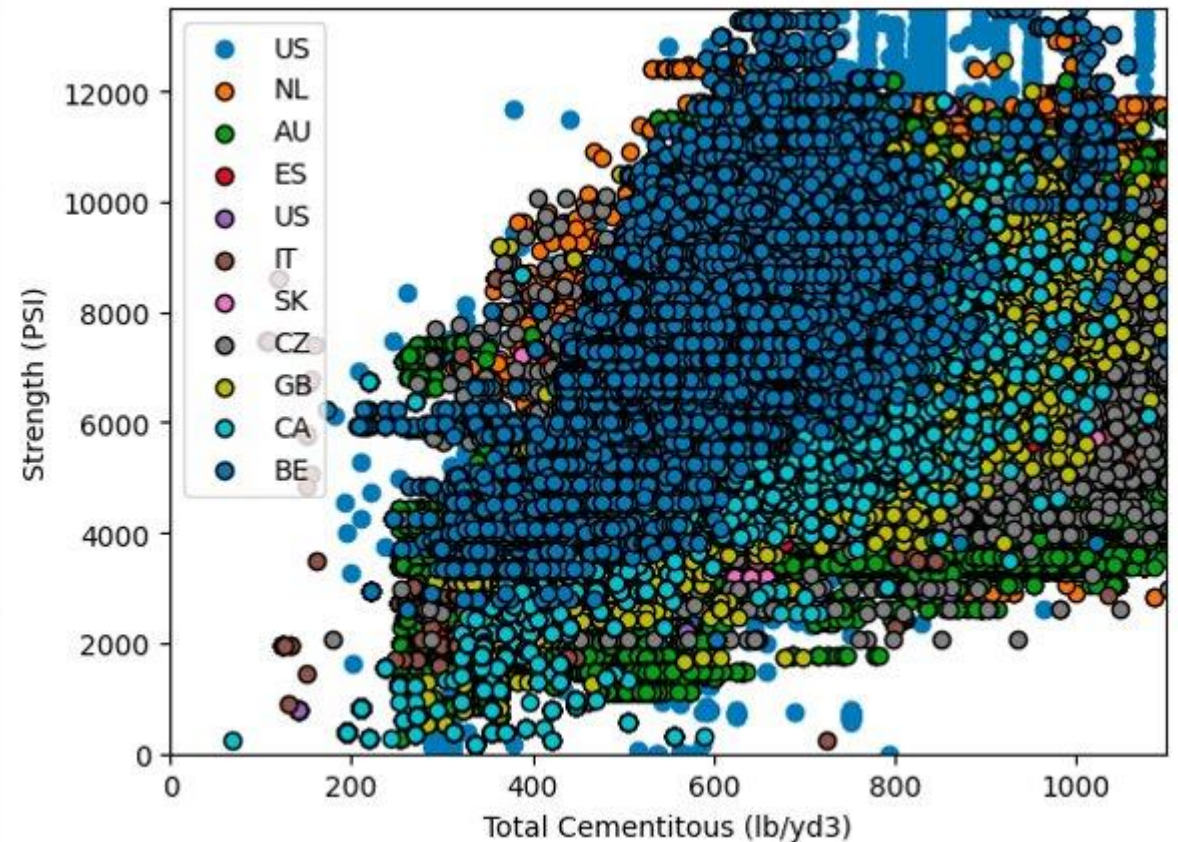# Reducing cement content and Concrete CO2 footprint
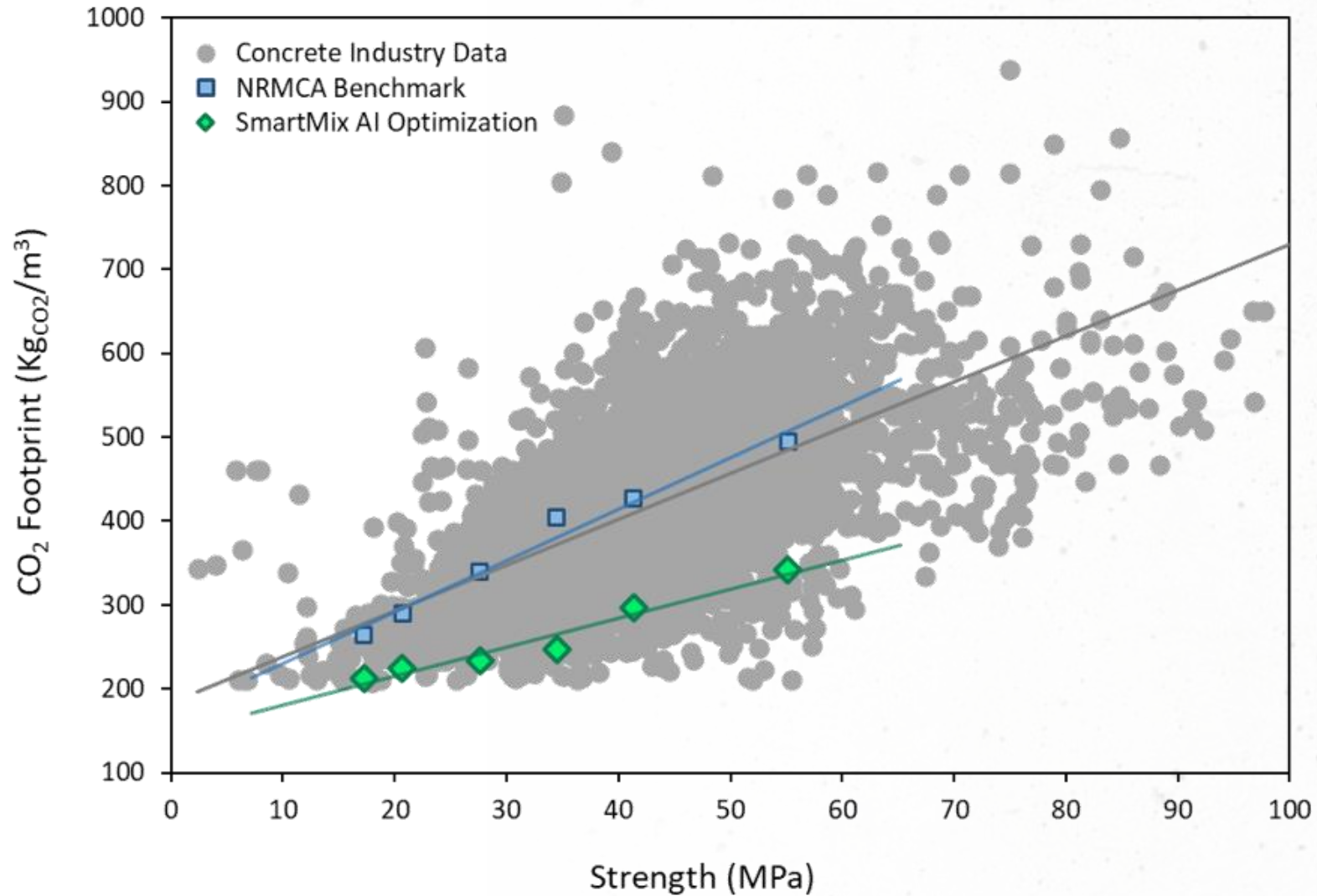
We came a long way

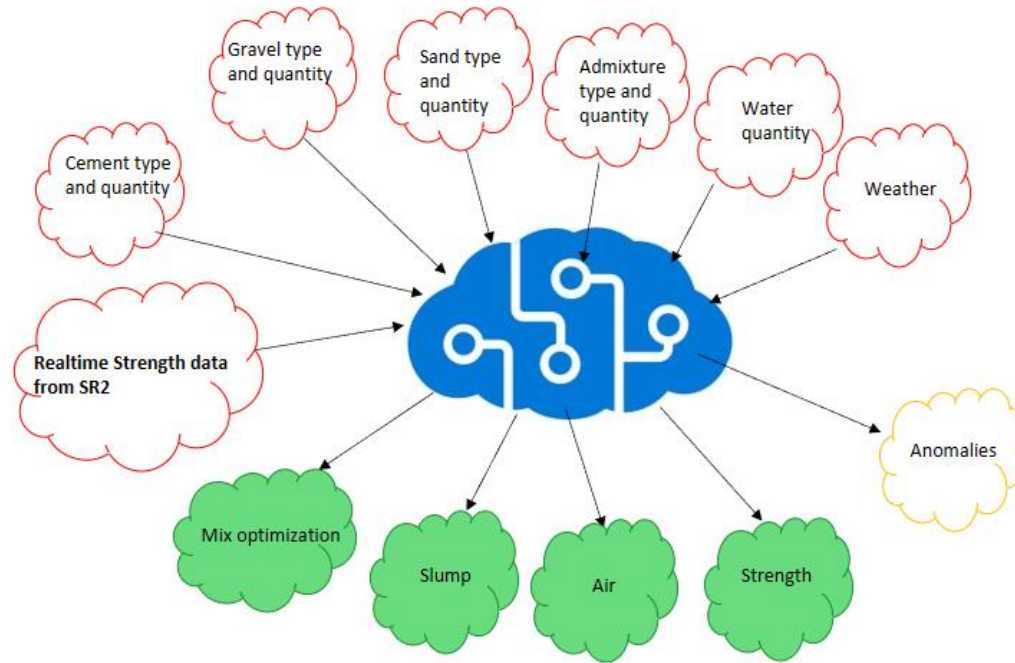Algorithms powered by the largest database of concrete performance encompassing:

- **200,000+** concrete mixes (**1500+** plants)
- **50M+** concrete deliveries
- **10,000** raw materials
- **20** countries

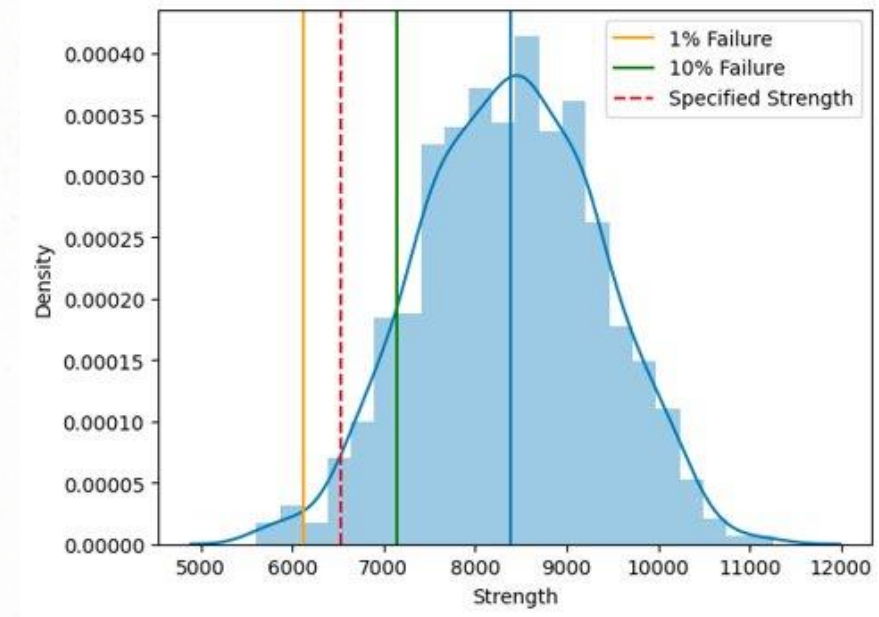
A very big thank you to all our partners !

Let's do the reverse !

Concrete Mix Optimization

- Concrete is ordered to meet specific performance criteria

- Concrete mix optimization is very challenging as

Monitoring Tools for Raw Materials

Real-time Visibility into Concrete Performance

Integrated and Real-Time Optimization Solutions

- Concrete producers overdose cement by up to **20%** to mitigate the risk

Real time data collection and mix optimization
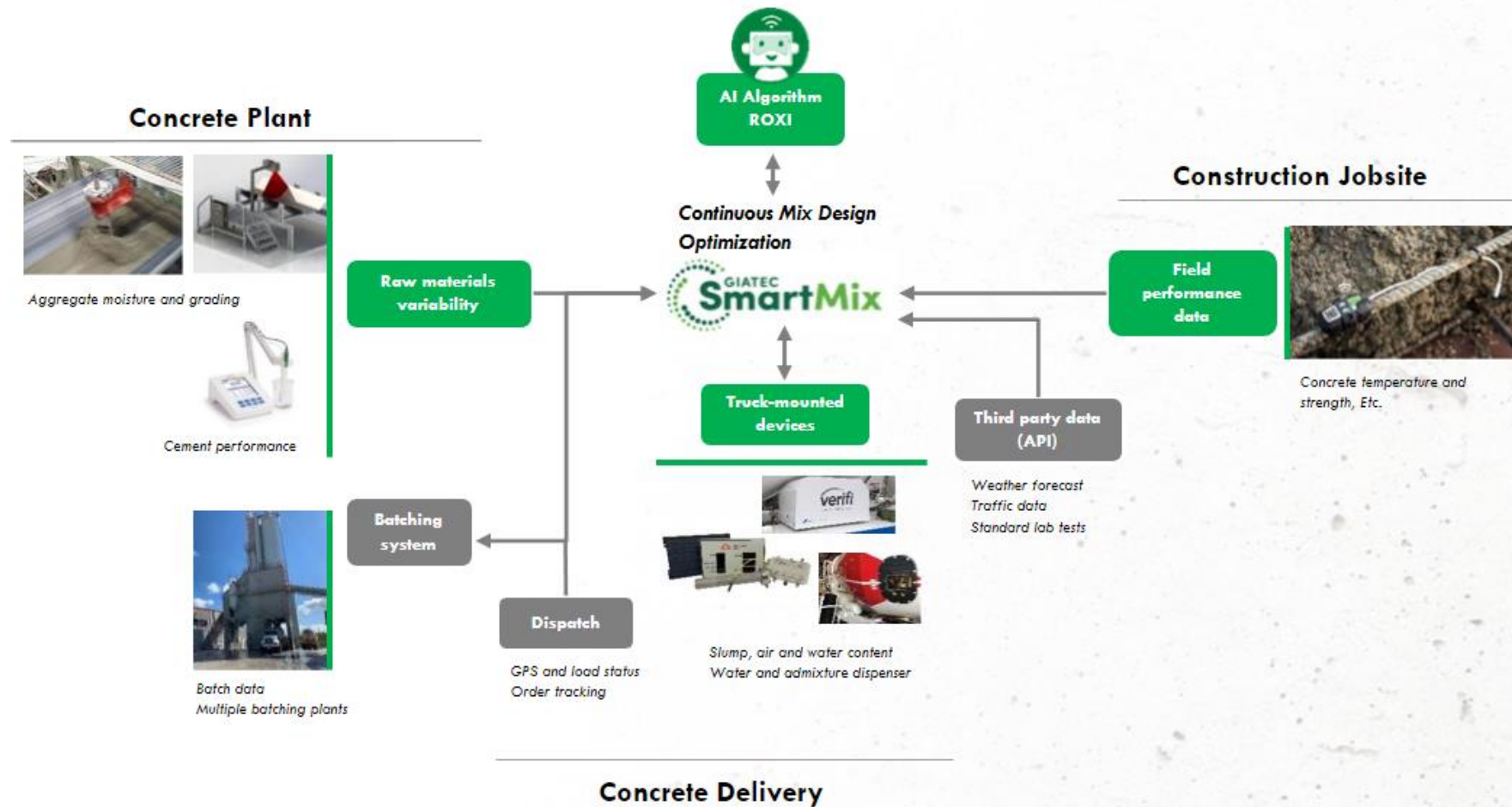
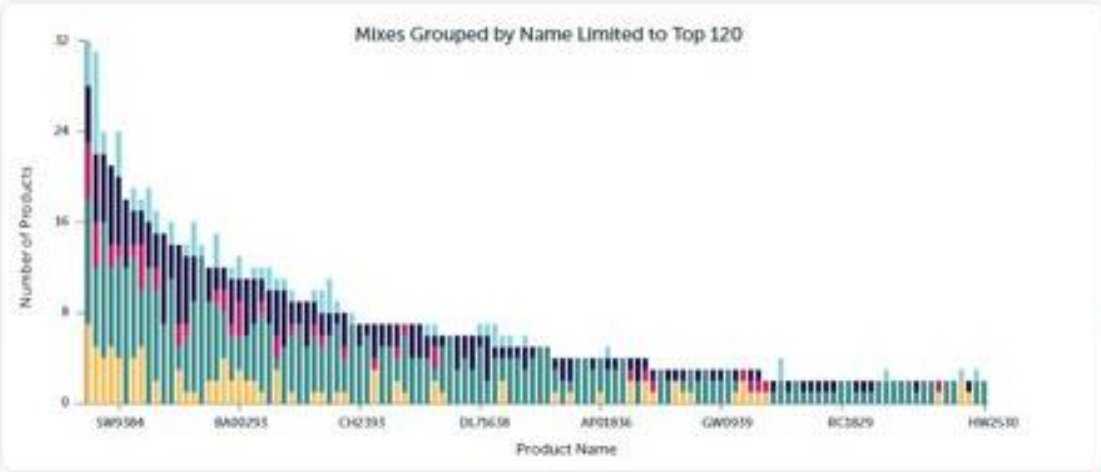# Opportunity identification and recommendation

Products

Generate Submittal   + Add Product

Search Samples | Batched Last 30 Days × | ▽+ | ⚙ | Group By: Product Name ▾   👁 Hide Insights

Mixes Grouped by Name Limited to Top 120

Total Batched ⓘ 2,890	**Normal** ⓘ 81
Over-Performing ⓘ 557	**Under-Performing** ⓘ 114
At Risk ⓘ 51	**Over-Yielding** ⓘ 235

PRODUCT NAME	PLANT NAME	COST($/Y³)	CO₂(LBS/Y³)	PRODUCTION VOLUME (Y³)	OPTIMIZATION		COV	AVG. ACTUAL STRENGTH	# OF TEST SAMPLES	STANDAR
▲ Product Name: GW7283 (6)		85.64	553.0	1285.60						
	160	84.37	574.10	725.18	-1.5% $	-5.1% CO₂	0.12	4154 psi @ 28 Days	11	699
	260	91.33	582.12	6554.53	-3.5% $	-1.1% CO₂	0.07	4764 psi @ 28 Days	6	450
	220	81.86	514.13	22.17	Excluded from optimization		0.01	4450 psi @ 28 Days	12	541
	900	92.18	514.13	162.09	-2.3% $	-1.0% CO₂	0.03	4346 psi @ 28 Days	12	623
	120	82.22	561.15	227.46	-3.1% $	-10.8% CO₂	0.01	4553 psi @ 28 Days	14	504
	140	81.86	513.12	22.17	Excluded from optimization		0.01	4219 psi @ 28 Days	10	614

Opportunity identification and recommendations

Thank you!

Questions?

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