

Central Concrete Leverages Big Data to Improve Operational Efficiency

Serving the San Francisco Bay Area for more than 70 years, Central Concrete Supply Co., Inc., a Northern California business.



Project	Actionable data improves concrete quality, from batching to delivery
Company	Central Concrete, U.S. Concrete West Region
GCP solutions	VERIFI® in-transit concrete management system

The Project

Serving the San Francisco Bay Area for more than 70 years, Central Concrete Supply Co., Inc., a Northern California business unit of U.S. Concrete, invests in products, people, and technology to drive ongoing success. The firm's investment in the VERIFI® in-transit concrete management system and associated concrete admixture has yielded considerable quality and operational improvements.

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Central Concrete Director of Quality Assurance Patrick Frawley, P.E.

Challenge

Central Concrete designs and delivers concrete with high early strength, low shrinkage, and superior permeability for diverse projects, from commercial enterprises to large public works projects. The firm has in-depth experience designing and delivering higher performing concrete while significantly lowering the carbon footprint of its mixes.

As part of its commitment to delivering the best possible products and production capabilities, the firm decided to implement the VERIFI[®] in-transit concrete management system to measure slump and temperature as concrete batches move from the plant to jobsite – and to gain insights for improvement throughout the concrete production process.

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Manager of Strategic Development and Sustainability Juan Gonzalez.

Solution

Each of Central Concrete's trucks is now equipped with the VERIFI[®] system, which combines sensor technology with predictive analytics to measure and manage concrete in transit. The sensors on the trucks monitor slump, temperature, load size, age, water, admixture, drum speed, and drum revolutions for optimum concrete consistency. Thanks to these automated capabilities, Central Concrete's batch men can now remotely confirm the appropriate slump for each batch. The system automatically adjusts the water and/or admixture on the truck as needed so that each batch arrives on spec.

GCP's VERIFI[®] team worked closely with Central Concrete to help them make the most of the new system. "Our local GCP rep is great," said Central Concrete Director of Quality Assurance Patrick Frawley, P.E. "He was a quality manager before he joined GCP, so he 'speaks concrete' and knows how to drive value from our investment."

The real power of the VERIFI[®] system is in the data it collects from ready-mix trucks, which is readily accessible through a dashboard. With this actionable data, Central Concrete can identify and resolve productivity issues. "The VERIFI[®] system helps us to be more efficient operationally and understand exactly how to properly design our mixes. It enables us to be more competitive on our projects," said Frawley.

For example, by integrating the VERIFI[®] system with Central Concrete's dispatch software, the company can benchmark data, identifying what factors influence leave plant time. "Everyone has their own set of KPIs, such as first ticket to first load, and can relay back to us how efficient they are throughout the day," explained Manager of Strategic Development and Sustainability Juan Gonzalez. "We've made great strides in our leave plant time, which is now just six minutes, compared to the national average of 10-11 minutes."

Central Concrete is also piloting the use of GCP's in-transit management (ITM) concrete admixture at seven of its plants. As part of this process, the plant batches concrete at two inches below the target slump and relies on the potent ITM admixture, added in micro-doses while the concrete is headed to the jobsite, to bring it to the optimum slump. "When you try to batch so that you arrive at a target slump, the variability of what arrives at the jobsite can be high," said Frawley. If we batch low and then use the VERIFI[®] system to adjust the concrete along the way, the consistency is vastly improved. That's very exciting for us. It represents a big step forward in the quality of our admixture usage."

Results

Enhancing concrete batch consistency. “The VERIFI®system helps on many fronts,” said Frawley. “We target the batch slump lower than the ordered slump and rely on the VERIFI®system to increase the slump along the way, so slumps arrive with more consistency. Having the ability to automatically add exactly the amount of water and admixture to the mix in transit means the concrete arrives on site and will pump and finish with more predictability.”

Slump management is the foundation of what’s useful, Frawley explained. “It’s what goes into the slump that is really key for us to manage.”

Optimizing mix designs and reducing rejected loads. “Early on, there was no way to measure the consistency and quality of concrete other than to wait for 28 days to pass,” said Christopher Schenone, Vice President of Concrete Operations. “The VERIFI®system was a real eye-opener. In the first year or two of having trucks enabled with the VERIFI®system, we reduced rejected loads by roughly 75 percent. It quickly allowed us to pull back and see if certain batches were water starved or had too much water. This enabled us to better design our mixes.”

Gaining quality metrics. “The data we get from the VERIFI®system is like keeping score at a baseball game for every batch of concrete,” said Frawley. “The traditional method of taking a single slump at the job is like the final score of the game; all we know is who won or lost. When keeping score, each player action is tracked for every inning. Similarly, with the VERIFI®system, we know the batch, leave plant, arrival, and dispatch slumps for every load of concrete we ship, in addition to all water adds. We can look at a year’s worth of data and optimize our mixes for cost and efficiency.”

Eliminating bottlenecks. Central Concrete can drill down into the data to uncover issues, such as batching out of tolerance or a driver in need of a refresher on protocols.

Improving customer satisfaction. “Our customers are happy because the hardened concrete properties are improved and the concrete arrives in a consistent way and will pump the same way, for each batch,” said Frawley. “That’s been a big positive for us.”

Enhancing safety. “One of the highest incidents of injuries is trips and falls,” explained Schenone. “With the VERIFI®system in place, we can perform load-checks and have wash systems without the drivers having to get out of the truck. That helps keep our drivers safe.”

Reducing waste. “We set a big goal of targeting zero waste,” said Gonzalez. “The VERIFI®system has been instrumental in documenting returned concrete volume. Now we can see how much concrete is left on board without getting the truck weighed. With this data, we can quickly dose the returned concrete and repurpose it for a new project.”

Driving sustainability. A leading ready-mix supplier of sustainable concrete, Central Concrete has deployed solutions that help reduce their carbon footprint. “Our ITM concrete admixtures have reduced our reliance on Portland cement, which consequently reduced embodied carbon,” said Frawley. “And by understanding our processes better and implementing process improvements such as reducing batch overdesign, we’re inherently becoming more sustainable.”

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Christopher Schenone, Vice President of Concrete Operations.

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