AT&T Business

IoT connectivity creates concrete success

- **Business needs** - A way to ensure perfect concrete for each job.

- **Networking solution** - AT&T IoT connectivity enables GCP truck-mounted sensors to monitor concrete in transport, make any necessary adjustments, and communicate the information to a web portal.

- **Business value** - The ability to ensure consistency and optimal quality of delivered concrete, increase productivity, and reduce the carbon footprint of the ready-mix industry.

- **Industry focus** - Construction industry solutions

- **Size** - 5,000 Verifi® trucks deliver 20 million cubic yards of concrete per year.

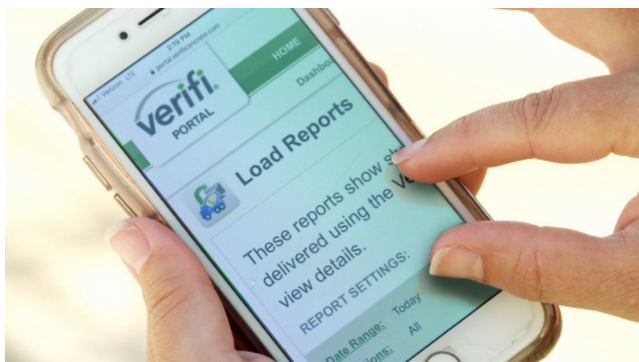## About GCP Applied Technologies

GCP Applied Technologies has over 50 years of industry expertise. They also have decades of success in creating new product categories and markets. Its portfolio of construction products includes concrete and cement additives, building materials, and technologies that ensure specified quality and enhance business productivity.

The situation

GCP Technologies developed a revolutionary system to ensure concrete quality. The Verifi® In-transit Concrete Management System automatically adds water and admixture within pre-set limits. This achieves and maintains the necessary slump. If you're not a concrete aficionado, the slump is a measure of the wet concrete's consistency and fluidity. The higher the slump rating, the more workable the concrete. Each type of project requires different ratings. GCP needed a way for its system to communicate information from sensors on the concrete mixer to the operators at the batch plant. This data also needed to go to quality control engineers and dispatchers, the contractors waiting for the concrete, and the contractors' customers.

Solution

AT&T IoT connectivity gives Verifi customers immediate visibility to the location, status, and concrete properties on all trucks. This allows dispatch and quality control personnel the ability to monitor and adjust when necessary to meet project specifications.

"With the help of AT&T Business, Verifi has made the truck and the characteristics of its contents visible to everyone."

Jason Straka
Verifi Product Manager, GCP Applied Technologies

Solving complex construction challenges

GCP Applied Technologies was formed in 2016 when specialty chemicals leader W. R. Grace separated into two independent public companies: Grace and GCP Applied Technologies. GCP Applied Technologies has a legacy of more than half a century of industry expertise and decades of success in creating new product categories and markets.

GCP today is focused on the steadily growing global construction industry. The world's most successful architects, producers, builders, and contractors trust GCP brands and solutions for their construction projects. GCP has helped its customers build residential homes, commercial buildings, highways, municipal plants, bridges, and skyscrapers.

Jason Straka, Verifi Product Manager, said the company has developed a global customer base. "We have customers from New York to California and everywhere in between. We also have customers in the United Kingdom, Singapore, and Australia, so we really are worldwide."

The company helps solve some of the most complex construction challenges in residential and commercial building infrastructure and underground construction. For example, one pressing problem has been the inability to track quality and consistency after the concrete is batched. GCP created the breakthrough Verifi In-transit Concrete Management System to address this challenge.

Chemistry expertise and technology

"GCP was able to develop the Verifi technology by combining the company's chemistry expertise with technology," Straka said. "It's helped us reach our goal of producing high-quality concrete. It requires a complex balance of hardware, software, and industry knowledge."

Typically, concrete consists of roughly 10% cement, 20% water, 30% sand, and 40% gravel. The mix can vary depending on how the concrete will be used.
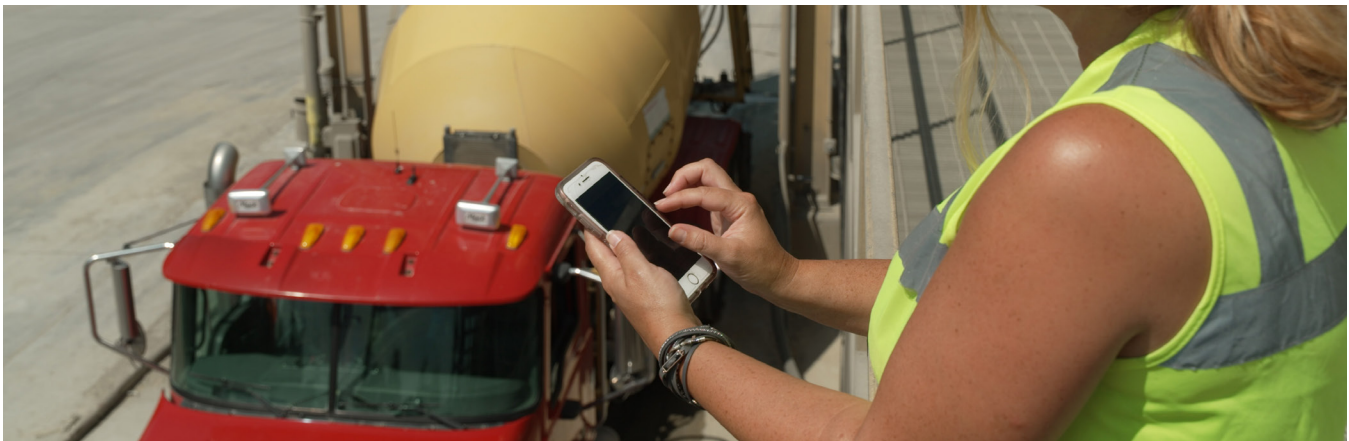
Heat and rain can affect the consistency, as can time—there's a short window during which the concrete must be batched, delivered, and placed.

GCP found that many contractors add water to the concrete to adjust its slump. "The concrete may be stiff, so they add water to make it easier to work with," Straka said. "This can have a number of negative effects. Adding water can reduce the compressive strength of the concrete and make the surface weaker. It can also create an inconsistent appearance in the finished concrete."

GCP's Verifi Division set out to create a process that gives contractors the confidence that the concrete that is delivered to the construction site is the exact consistency that was ordered for the job, with no jobsite adjustments needed.

Automatic adjustments

Verifi transformed the delivery of ready-mix concrete by turning its trucks into technologically sophisticated equipment. Smart trucks. Each truck continuously measures concrete consistency and makes adjustments whenever necessary.

With sensors to measure temperature, drum speed, and truck location, concrete arrives on the job site ready to pour. With no need for on-site changes, work crews can finish installing the concrete faster, with fewer defects.

The Verifi system enables the trucks to create the perfect concrete for each job. "Our sensors take the readings and communicate them back to our onboard truck computer, which will automatically make the adjustments as needed," Straka said. "The Verifi system can automatically add water or chemical admixture to adjust the load and create the correct consistency."

To ensure the quality its customers have come to expect, Verifi needed one final enabling technology. It needed reliable, consistent connectivity to deliver the valuable data to the customer, Verifi quality control engineers, and others who need the information. "We needed a connection that would tell us where every truck was at all times and whether it was mixing the concrete or discharging it," Straka said. "We also needed to know the temperature, the slump, and if the system made a water or admix addition."
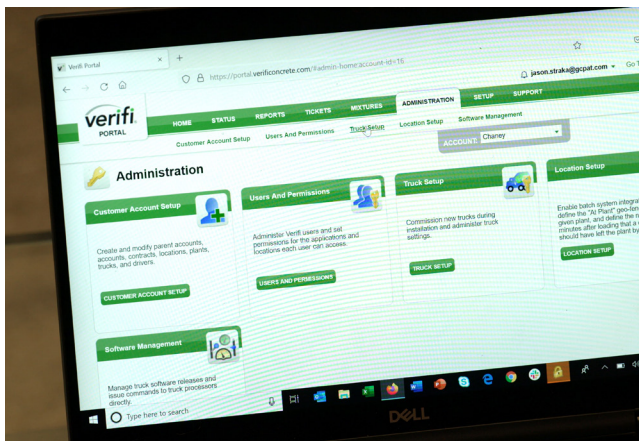
"AT&T is reliable and consistent. We can take the solution anywhere without worrying."

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Verifi Product Manager, GCP Applied Technologies

Reliable global connectivity

GCP installed control modules equipped with AT&T Global SIM cards in each of its trucks. These IoT cards deliver worldwide network connectivity, supporting multiple types of network technologies.

"We selected AT&T Business based on its ability to offer service in all of the countries we were looking at when we bid the contract," Straka said. "The web portal is easy to use, and our account manager is very responsive. The technical issues we've had have been few and far between. AT&T Business worked with us through COVID-19 and saved us quite a bit of money."

The solution gives GCP a streamlined means of deploying IoT devices around the globe. It's easy to provision its trucks thanks to the simple and cost-effective AT&T Control Center, a SIM management platform with integrated billing and reporting tools.

The Verifi team appreciates the portability of the solution. "AT&T is reliable and consistent," he said. "We can take the solution anywhere, without worrying about whether it will work at a particular location, or whether there are towers and reception."

Visibility and confidence

Drivers who have trucks with the Verifi system no longer have concerns about the quality of the concrete they deliver. "The Verifi system manages that for them," Straka said. "It automatically does all the work of maintaining the slump and workability for them."

During the delivery process, the Verifi system continuously sends data to the cloud, providing visibility into the delivery cycle, including slump and temperature measurements and fluid additions.

The truck sends sensor data to the Verifi portal where it can be seen by GCP, the concrete producer, and the producer's customers. "This lets dispatchers track the number and location of trucks at each job, so they can determine if and when they need to send out another truck," he said. "And end customers of the producers can even use an app to track the concrete delivery and its characteristics."

"With the help of AT&T Business, Verifi has made the truck and the characteristics of its contents visible to everyone," Straka said. As a result, producers and contractors can have confidence that their concrete will be exactly what they need for each job.

GCP has documented the enhanced concrete quality in case studies. "There is a strength increase in the concrete when Verifi is used," Straka noted. "By controlling the amount of water that the drivers

are able to add to their trucks, we are able to produce higher strength concrete with less variability."

Quality and sustainability

Sustainability is a key component of GCP Applied Technologies' operations. The company's Verifi In-transit Concrete Management System supports sustainability by improving the consistency of the concrete. "The customers are able to optimize their mixes and reduce some of the cement that they use and therefore lower their carbon impact," Straka said.

GCP further helps to maintain ecological balance by tracking the amount of concrete that is returned to its plants when customers ordered too much. When this occurs, the company tries to find another use for the concrete rather than wasting it.

GCP also works to stop the practice of dumping surplus concrete in landfills. "We work with customers to help them order better," Straka says. Simply double checking a project's measurements can often result in an order without much waste.

The Verifi In-transit Concrete Management System supports GCP's sustainability goals. "By giving the producer and the end user visibility into what's going on with the truck between the plant and their project, Verifi moves concrete beyond a shipping and construction solution to a quality and sustainability solution," he said.

GCP customers are pleased with the sustainability. "And we have a lot of customers say that Verifi has provided them multiple benefits on cost savings and quality improvements," Straka concluded.

"We liked the worldwide scope of AT&T Business. We didn't want to have to go to multiple vendors for the solution."

Jason Straka
Verifi Product Manager, GCP Applied Technologies