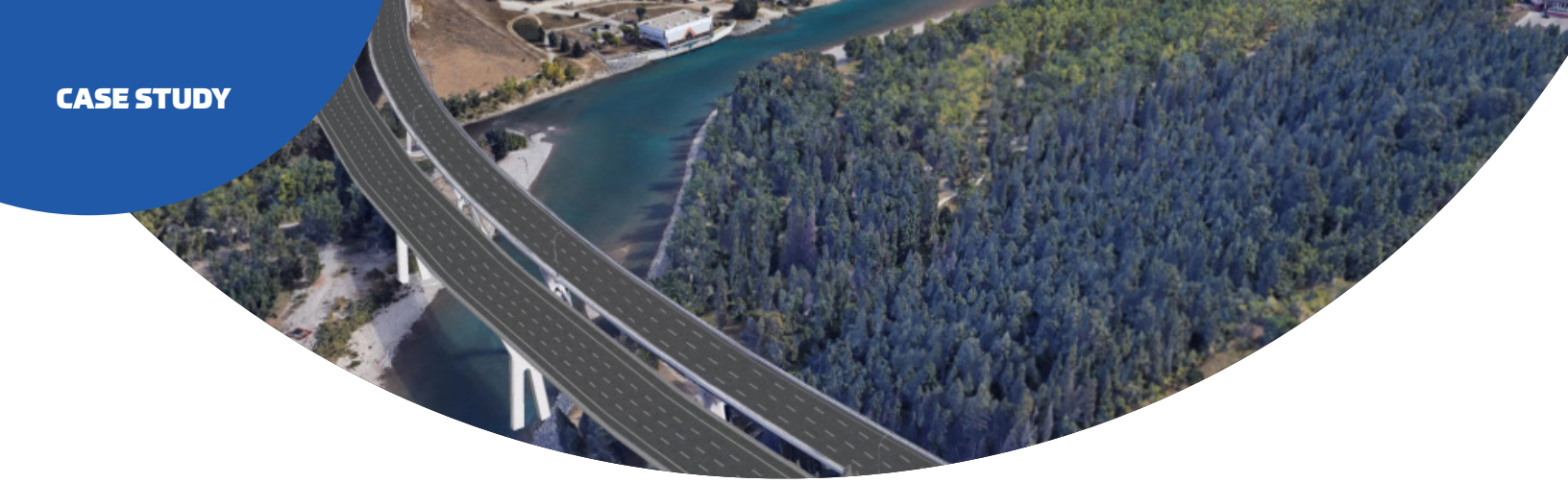
CASE STUDY



REMOTE CONCRETE MONITORING SUPPORTS BRIDGE CONSTRUCTION PROJECT

Monitoring temperatures and adjusting heaters from a smartphone cuts costs and boosts safety

Keeping concrete at the proper temperature for curing in the middle of a Canadian winter is no easy task. When you're building a five-span, 500-meter-long bridge and need to pour 1.7 million cubic meters of concrete, the cost of heaters and fuel can add up fast, not to mention the cost of manually monitoring each pour in keeping with strict government regulations.

Two of the largest civil construction companies in North America faced these obstacles during a 4½-year bridge construction project in Alberta, Canada. By law, they were required to monitor every 50 cubic meters of concrete every four hours in the first 24 hours after each pour, then every eight hours for the next 28 days, recording both the surface temperature and the core concrete temperature.

Under normal circumstances, this would have meant dispatching field engineers armed with heat guns to climb as many as 16 floors of scaffolding at all hours of day or night, in all weather conditions. Given that every pour overlapped with three other cures, the prospect of manual monitoring was even more daunting.

It's little wonder that when United Rentals proposed the use of a remote concrete monitoring system coupled with remotely adjustable rental heaters, the project team was receptive.

WEDGE for remote temperature monitoring

WEDGE, the remote monitoring system from United Rentals, uses wireless sensors to monitor the air temperature and wireless sensors with thermocouple adapters to monitor the temperature of the concrete. The data is sent via a gateway to the cloud. Users can access it from the WEDGE dashboard on their computer, tablet or smartphone.

Because WEDGE monitors both the air temperature and the temperature of the concrete, it can serve as an early warning system. If a tarp blows open, for example, WEDGE will send an alert that the ambient temperature is dropping. That gives workers time to react before the concrete gets too cold.

"By the time your concrete is cold, it's too late," said Kristen Hallberg, manager of products and solutions for WEDGE Environmental Monitoring at United Rentals.

Smart Heaters for remote temperature adjustment

The temperature data can also be sent to a WEDGE

"WEDGE has a very simple, user-friendly dashboard, and it's easy to update. Green means you're good to go. Red means you have a problem."
- Emma Seymour, product development manager

Smart Heater, a piece of hardware attached to a rental heater that allows users to monitor and adjust the heater from a mobile device. If the temperature drops below preset thresholds, the Smart Heater will send out an alert via text or email.

Smart Heaters can also cycle automatically to maintain a set air temperature. The device will tell the heater to engage if the air gets too cold or disengage if it gets too warm, preventing overheating and driving significant fuel savings.

Managing by exception

With WEDGE, engineers can monitor concrete pours and heaters from the comfort and safety of a job shack. What's more, they can rest easy knowing the system will flag any anomalies. For example, if a heater has shut down because it ran out of fuel, WEDGE will tell them.

"You get an alert if something is wrong, so you don't have to be constantly staring at your phone. You can manage by exception," said Emma Seymour, United Rentals product development manager. WEDGE makes it a snap.

"These guys are used to looking at Excel sheets full of raw data," said Seymour. "It's not easy to see what's going on. WEDGE has a very simple, user-friendly dashboard, and it's easy to update. Green means you're good to go. Red means you have a problem."

Reducing costs, and worry

United Rentals was on site to set up and test the WEDGE system and configure the dashboard. Over the next four years, the company became an integral part of the construction team. Representatives arrived every week for the new pours and brought in additional sensors as needed.

As a result of WEDGE, the project realized a 40% fuel savings for the primary heaters and a 61% savings for the backup heaters. Between fuel and labor, the contractors saved hundreds of thousands of dollars.

Thanks in part to the success of the WEDGE program, United Rentals became the go-to vendor for additional project equipment, providing everything from pumps to telehandlers.

"WEDGE created a level of trust," said Hallberg. Eventually, United Rentals became the only equipment vendor on the site.

As individual managers left the bridge project, they began to request WEDGE on other jobs, including a large bridge project in Vancouver. Said Hallberg, "WEDGE just makes their lives so much easier."

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