

# Ohio Tries Time-Saving Thermal Integrity Profiling

The Ohio Department of Transportation is using thermal integrity profiling to accelerate construction of the largest project in the agency's history, replacing the aging Innerbelt Bridge in Cleveland with a pair of new structures.

The new **George V. Voinovich Bridge**—one side opened in 2013 and the other beginning construction this year—is a vital link into downtown Cleveland, spanning the Cuyahoga River on I-90. A key connection between New York and Chicago, the bridge serves 140,000 motorists a day.

Thermal integrity profiling is a nondestructive testing method that uses the heat generated by curing cement to evaluate the integrity of cast-in-place concrete foundations, such as drilled shafts or bored piles. It uses a tool known as a Thermal Integrity Profiler to measure concrete temperatures during the curing process by a probe inserted into access tubes or cables embedded in the concrete.

Because test results can be evaluated just 24 to 48 hours after the concrete is poured, thermal integrity profiling can speed up a project's construction schedule. Other testing methods are typically used after the concrete has cured, about three to seven days after casting. Thermal integrity profiling also evaluates the entire foundation element, something other methods can't.

## Ohio uses method for first time

"Construction of the first new George V. Voinovich Bridge was the first ODOT project for which TIP was used," said Jocelynn Clemings, public information officer for the agency. "The TIP method was proposed by the design-build team alongside already-required testing methods for comparison and correlation."

Because thermal integrity profiling was used with other testing methods, it didn't save any time during construc-



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tion of the first structure. But the Ohio DOT required its use as part of the specifications for the sister span because of its potential to accelerate construction.

On the first span, thermal integrity profiling evaluated the foundation integrity, shape and reinforcement cage alignment from temperatures measured in the drilled shafts during the concrete curing process.

“Along with the potential for accelerated timelines, the technology also introduces the ability to evaluate the full cross section of the shaft, including the region outside of the reinforcing cage,” Clemings said.

The Voinovich Bridge project is replacing the original 1959 structure with two nearly identical spans, one to carry traffic in each direction. They have a combined price tag of more than \$500 million.

Traffic will travel in both directions on the first span while work proceeds on the second project, in which workers will demolish the old bridge and build another one in its place. When the project is finished in 2016, each new span will carry five lanes of traffic, one more than the old bridge.

## Florida researchers develop technology

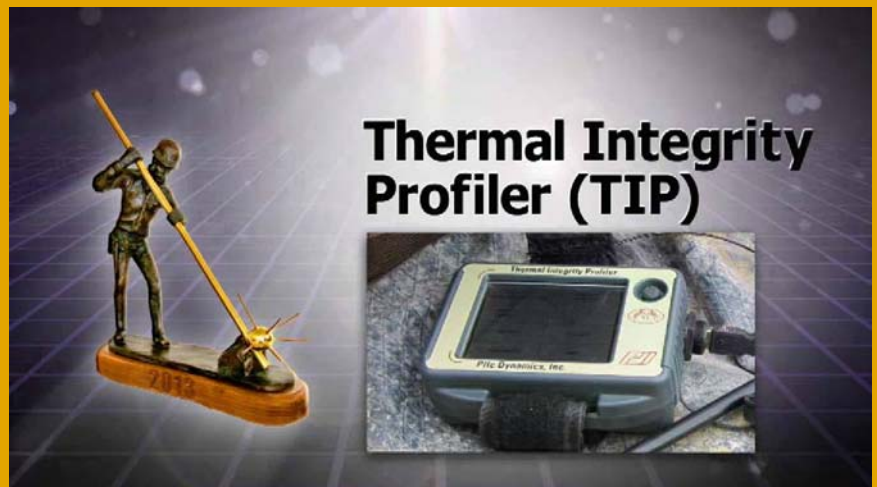
Thermal integrity profiling technology was developed by University of South Florida researchers. Foundation & Geotechnical Engineering of Plant City, Florida, and Pile Dynamics Inc. of Cleveland formed a joint venture to design the **Thermal Integrity Profiler** and take it to market. The engineers and researchers who developed the technology won a 2013 NOVA Award from the Construction Innovation Forum for their work.

In addition to the Ohio bridge, thermal integrity profiling has been used on a number of projects across the country. More than 100 shafts were tested by this method on the Crosstown Connector project, a mile-long elevated section of highway in Tampa, Florida.

It was also used on Governor Williams Highway over Black Creek in Darlington, South Carolina; an I-465 ramp over Big Eagle Creek in Indianapolis, Indiana; and the Milwaukee Zoo Interchange in Milwaukee, Wisconsin.

Comment?

Ohio DOT tried thermal integrity profiling when it built the first span of the George V. Voinovich Bridge, now open to traffic



How thermal integrity profiling works

Photo Credit: Ohio DOT