

E-town prof invents 'meat thermometer' for cement

Device designed to save time, reduce accidents

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Watching cement dry is never boring for Elizabethtown College professor Nat Hager III.

Last week, Hager and his business partner, chemist Roman C. Domszy, received a patent for a sensor that tells construction workers when their cement has dried into concrete.

They call it a "Time-Domain-Reflectometry Concrete Cure Monitoring System."

Simply put, Hager said, his new invention is similar to a thermometer inserted in a Thanksgiving turkey.

"The thermometer indicates if the

turkey is done by measuring its internal temperature," he said. "The embedded sensor does the same thing in concrete by monitoring how quickly water involved in the curing process is chemically combining with (cement)."

A contractor would place a disposable sensor where cement is about to be poured. The sensor is connected to a laptop computer and a data-recording device that displays information.

After the cement has cured, the wires are disconnected, and the sensor remains inside the hardened concrete.

Hager did not include the turkey analogy in a scholarly article on his new system, published this month in the *Journal of Applied Physics*.



Nat Hager III, an Elizabeth College professor, has received a patent for a new system, including a disposable sensor and computer software, that tracks the cement curing process.

In addition to teaching part time at Elizabethtown, Hager runs Material Sensing & Instrumentation Inc., a Lancaster-based research company that has landed several contracts with the U.S. Army and

Commerce Department.

The National Science Foundation partially funded Hager's reflectometry

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research through the foundation's Small Business Innovation Research program.

Elizabethtown engineering and physics students helped Hager and Domszy with their research.

Now that Hager has a patent, he

plans to market the sensor system to contracting firms. He believes it could save companies time — and maybe even lives.

Four construction workers were killed and 19 were injured last month when a parking garage collapsed in Atlantic City, N.J.

Preliminary reports indicated that a section of the deck collapsed while workers were pouring cement.

Hager said his device could have prevented the tragedy.

"It's time," he said. "The issue is critical when you pour a first floor and have to wait to pour a second."

The sensor also measures the amount of residual moisture in drying cement floors.

"When the thermometer indicates that the turkey is getting done too quickly or too slowly, you take corrective action, like turning the oven temperature up or back," Hager said.

"This monitoring system allows those in construction to do the same thing with concrete."