Taking the Maturity Method to the Next Level

Wireless Concrete Temperature Sensors Reduce Time and Costs on a Major Building Project – Leading to a New Corporate-Wide Best Practice

All in the Family

Flood Testing Laboratories (FTL) Inc. is a family run business with deep history and experience with construction materials testing. Susanne Flood, President, helms the company with her husband and son – Walter and Walt, often called the "two Walters" and affectionately, "Walt III" and "Walt IV".

"My grandfather established our testing company in 1913," says Walt III, Secretary and Treasurer. Today, FTL leverages over 100 years of family experience to provide specialized, accredited testing services to high-rise buildings, roadway and bridge projects. The company's expertise is in-demand across the U.S. and around the world.

The Evolution of Maturity Testing

The maturity method for predicting concrete strength is a core capability and area of specialization for FTL. Essentially the method accounts for the effects of time and temperature to predict in-place concrete strength during construction. FTL was one of the first test labs in the Chicago area – if not the U.S. to adopt the maturity method.

In addition, FTL prides itself on being an innovator and early adopter of advanced technology to improve operational effectiveness. It was one of the first labs to start using early versions of sensor technology when it became available in the 1980s to support in-field data capture to verify concrete strength. Sensors were embedded in concrete and connected to specialized readers to download temperature data.

About

Based in Chicago, IL, Flood Testing Laboratories Inc. provides specialized construction material testing services to clients across the U.S.A. and around the world.
Visit: www.floodlabs.com

Challenge

- Wired sensor technology requiring expensive readers
- Complications resulting from wire-management to ensure plug-in and data access
- Extruding wires vulnerable to damage
- In ability to access data remotely or share with project team members

Solution

- SmartRock2™ with wireless sensors and the ability to remotely access and share data in real-time on any mobile device
- ASTM C1074 standard
- Sensors embedded in concrete with no vulnerability from construction activity

Results

- Virtually all projects benefit from smart monitoring technology
- Optimized project scheduling for curing, formwork removal, and post tensioning
- Improved job site efficiency and utilization
- More competitive bidding

Although innovative in its day, the solution was somewhat clunky – with wires extruding vulnerably from formwork – and expensive. "The equipment that we used was over a thousand dollars for each location," says Walt III. Batteries would also run out, wires would break, or FTL would have to shuttle equipment around to various job sites to get the maturity data needed. "Sometimes it was challenging to get a reader to the right place at the right time," admits Walt IV. Despite these limitations, FTL used wired sensor technology successfully from the 80s, right up to the early 2000s – when the next evolution in maturity testing arrived.

Game Changer

In 2015, Giatec introduced innovative, smart monitoring solutions that revolutionized how concrete strength could be tested by the construction industry. Attracted by the promise of greater cost efficiency, time savings, and the opportunity to be part of the "next wave in concrete maturity technology", FTL became an early adopter of Giatec's technology, helping to beta test early products. "They've been very, very good to us as far as reacting to our feedback and incorporating that into the product," say Walt III. He adds, "They're really responsive; really willing to listen to comments and criticism and use that to improve the product. It's one of the reasons we've worked so well with them and for so long and plan to continue doing so."

The innovative product that attracted FTL's attention was SmartRock (now SmartRock2). By taking advantage of wireless technology, SmartRock2 enables field personnel to quickly and easily get real-time information from any mobile device using an App. The solution eliminates the need for expensive readers and wired sensors. Instead, a small wireless "tag sensor" that fits easily in the palm of one's hand is labeled on the sensor and on the mobile App – and then attached to the rebar using a simple twist tie.

Once the sensor is installed on the formwork, concrete is placed. The solution uses the ASTM C1074 standard to accurately determine maturity and strength. Real-time temperature and strength is monitored effortlessly from any location using a mobile device equipped with an App supplied by Giatec.

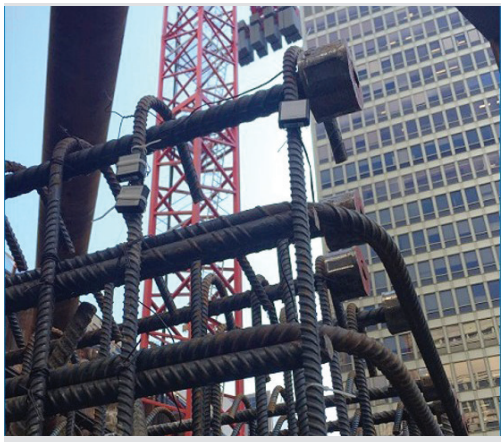
Out of Harm's Way

"Giatec's wireless technology is awesome," says Walt III. The fact that sensors are completely buried in the formwork is an important benefit. "It's like the previous, wired sensors had a bulls-eye on them," he explains. "Sometimes these are left in place for weeks at a time and often, someone disturbs and damages them during normal construction activity." With SmartRock2, once a sensor is buried, "nobody knows it's there."

No Specialized Equipment Needed to Read Data

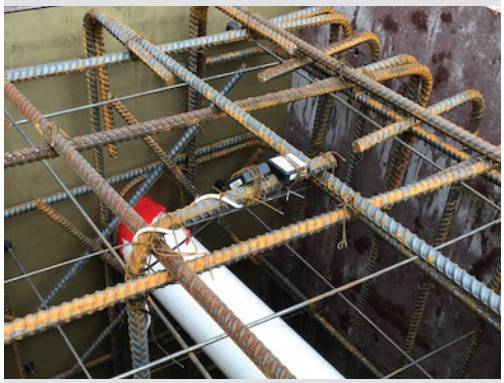
While FTL acknowledges there are other wireless devices now available for evaluating concrete strength, in their experience, these options still require specialized equipment with a connection to a hub to obtain data. "That's where Giatec is really leading the pack," says Walt III.

"SmartRock2 doesn't require expensive, specialized equipment like other wireless solutions, and our inspectors already have a smartphone to get sensor data". With SmartRock2, data is downloaded directly to an inspector's smart phone, who can then share the information directly with contractors. "That's also a big plus for our contractors," says Walt III adding, "the contractor can see their own information in case our inspector isn't on the project site – and they don't have to hunt down any specialized equipment to read the data."



SmartRock2™ sensors attached to rebar

"There's no doubt SmartRock2 saves an unbelievable amount of time and money for the contractor…and takes the maturity method to the next level."



SmartRock2™ sensors installed on rebar

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No Internet, No Problem

The other significant advantage of SmartRock2's completely wireless solution is that data can still be read even if Internet availability is lost. Bluetooth technology ensures individual sensor data can always be seen – and uploaded to the cloud for sharing later, when connectivity is restored. In contrast, if the internet connection is lost with wireless solutions requiring a "hub", users can't get the data.

Adding to this is the height of some projects which can be seventy or more stories high. "Nobody really thinks about it, but height limits the use of your cellular equipment," says Walt III. He adds, "It's still a big advantage [of SmartRock2] being able to get individual sensor data using Bluetooth if you don't have the Internet – and then upload the data later for sharing with the project team."

Contractor Value

Walt IV also comments on how SmartRock2 enables project efficiency, saying "you couldn't do the construction schedules that we have now without it." Walt III goes further and believes "there's no doubt that SmartRock2 saves an unbelievable amount of time and money for the contractor – and takes the maturity method to the next level."

Technology is Gaining Market Visibility

Twenty years ago, the use of any type of sensor technology to support the maturity system was far less common than it is today. FTL is seeing more end clients and contractors alike expecting a real-time monitoring solution. However, Walt III thinks the Chicago market is "a little unique" – and possibly ahead of overall market adoption for this technology. He believes there are a lot of markets that still haven't picked up on a maturity process enabled by new, wireless technology in the same way. In those markets, he says, "there's huge potential for contractors to speed-up their schedules and decrease their overall project costs – like we have."

About Giatec

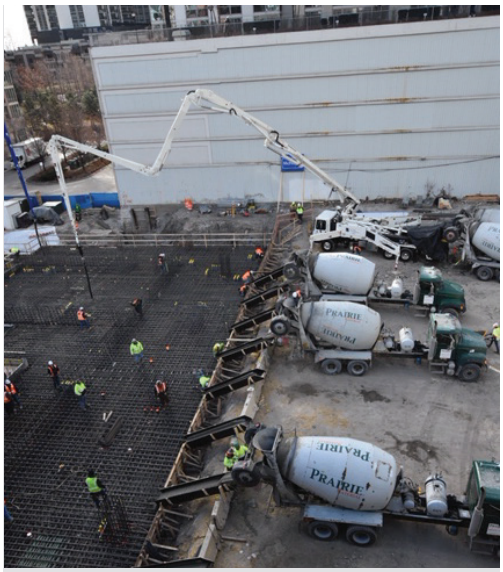
Giatec Scientific Inc. is a leading provider of advanced concrete testing solutions to the global construction industry. By combining wireless concrete sensors and mobile apps, Giatec's unique smart monitoring solutions provide invaluable real-time information on concrete properties.

Giatec's knowledge-based solutions include laboratory devices, Non-Destructive Testing equipment, and wireless sensors for the accurate assessment of various parameters including concrete electrical resistivity, permeability, rebar corrosion potential and corrosion rate, as well as wireless monitoring of concrete temperature, maturity and humidity.

Contractors, builders, and ready-mix producers in over 70 countries use Giatec's smart monitoring solutions to save time, reduce their labour investment, energy and material costs while measurably increasing the profitability of their building projects.

For more information on SmartRock2™, please visit:

www.giatecscientific.com/concrete-sensors/smartrock2/



Continuous mass concrete pour over SmartRock2™ wireless sesors installed on rebar

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