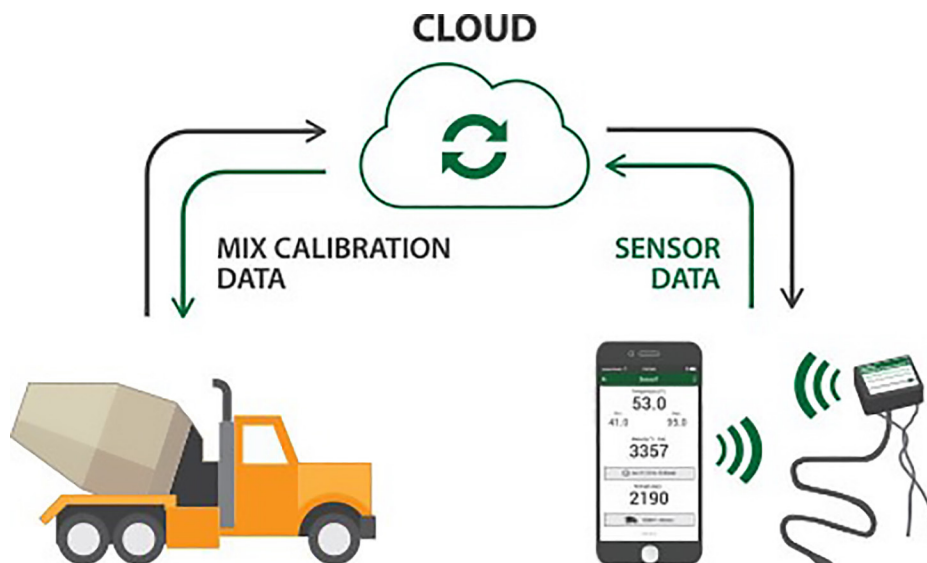




Smart Concrete™

Learn How This Novel Technology is Revolutionizing the Concrete Industry



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Foreword

Dear Producer,

Smart Concrete™ is a branded concrete mix technology solution designed to help ready mix producers differentiate and improve market share, customer loyalty, and profitability. Smart Concrete™ is both a value-added product, and a powerful tool for solving challenging technical problems.

Licensed only to qualified ready mix concrete producers, the Smart Concrete™ brand proves to your customers that you have the highest quality product. The license would give you the rights to sell branded Smart™ concrete mixes in your area. Our world-class service will delight you. From technical support to marketing strategy, we work hard to make our Smart Concrete™ partners successful.

This booklet provides detailed information about the implementation of this game changing technology and presents several case studies on how producers and contractors benefit from the Smart Concrete™ solution.

Sincerely,

Giatec

What is Smart Concrete™?

Smart Concrete™ is the new, branded, concrete mix solution designed to help concrete producers improve their bottom line by offering a value-added solution to the contractors who want to obtain real-time strength results on their jobsites. Contractors value Smart Concrete™ because it helps them maintain control of the project scheduling, utilize labor efficiently, save money on heating costs, and move at the pace of the concrete. For Ready Mix producers, Smart Concrete helps them differentiate, commoditize, and deliver profits. In addition to the upsell revenue, Smart Concrete™ makes it possible for Ready Mix producers to have access to jobsite data on the web-based cloud dashboard.

Beyond that, Smart Concrete™ is built by people who are passionate about helping our customers succeed. We've built the most reliable wireless sensors for measuring concrete maturity. We've built a mobile app that is incredibly intuitive and easy-to-use. We've built a cloud for online data access with powerful tools. And, we've built an innovative business process to make our customers successful.

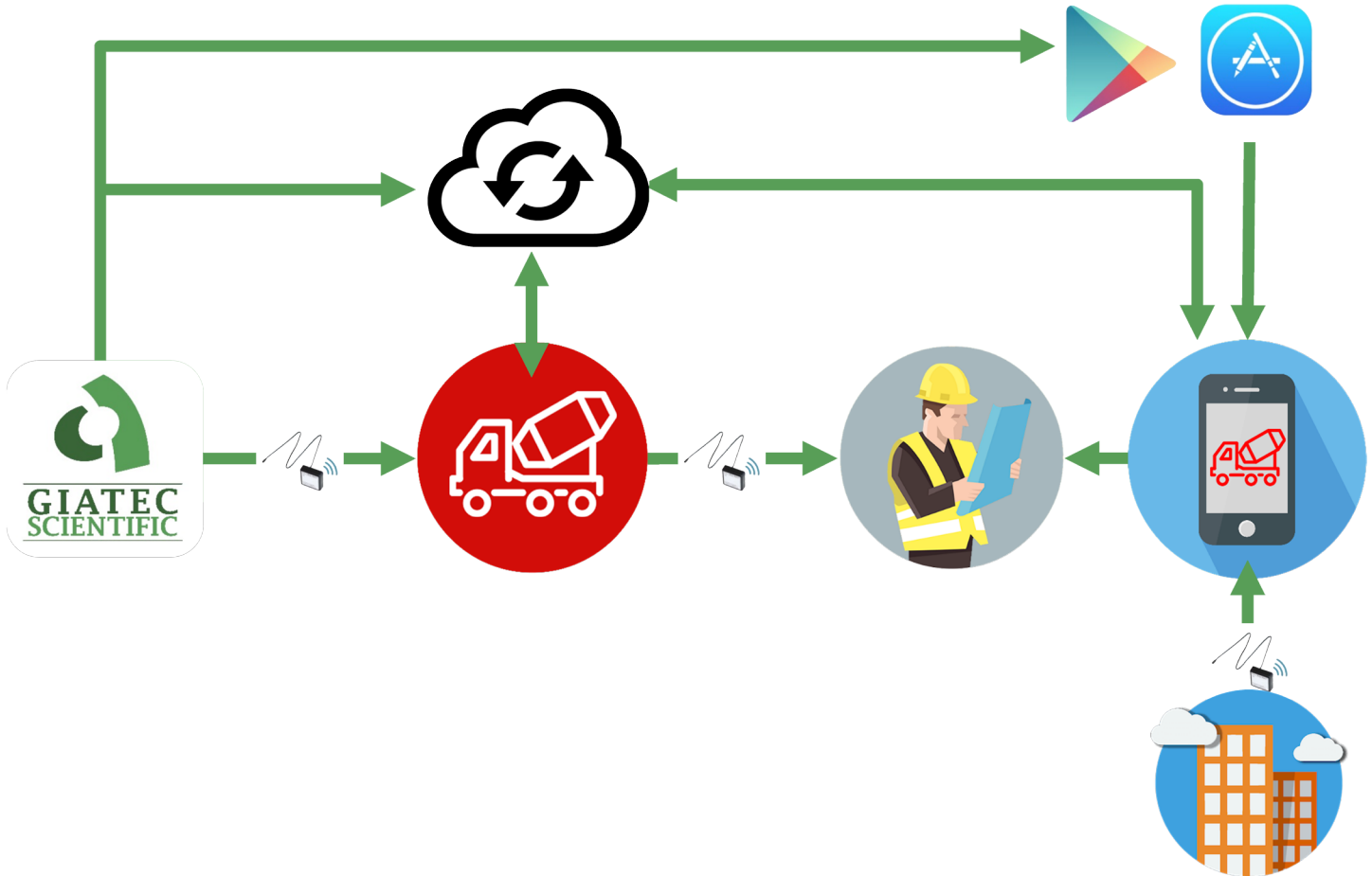
Why is it important?

The strength monitoring of concrete in the job site is a critical step in the optimization of important operations such as formwork removal, post-tensioning, concrete curing, opening traffic on concrete pavement, and application of load of concrete elements during construction. Currently, field-cured cylindrical specimens or CIPPOC samples are cast on the job site and are tested in laboratory at various times to monitor strength. This is time-consuming, inaccurate, and inefficient.

There must be a better way!

Among various non-destructive methods to evaluate concrete strength, the only widely accepted method is based on the maturity concept. According to the ASTM C1074 standard specification, this method requires continuous concrete temperature monitoring after pouring, and subsequently strength estimation using a pre-developed calibration curve. Furthermore, this method is also accepted by DOTs and ACI (ACI 318 and ACI 423.3) in the US, and CSA in Canada (CSA A23.1 clauses 4.4.6.4.5.1, 9.3.4 and A.3.2.6). Currently, construction companies and contractors install wired temperature sensors and loggers and use specific data readers to collect information and analyze it to estimate real-time strength.

Smart Concrete™ Business Model



In the Smart Concrete™ business model, the ready-mix producer purchases Smart Concrete™ sensors from Giatec. The producer selects the mixes they are interested to market as Smart Concrete™ brand, and will then calibrate them for maturity-strength relationship based on the ASTM C1074 procedure. The calibration process requires a compression machine for testing strength if the ready-mix producer decide to calibrate the Smart™ mixes in-house. The calibration can also be conducted by a third-party concrete lab. Once calibrated, the mix data will be uploaded to the online cloud system by the producer. The commercial names of the Smart™ mixes will be then available on the Smart Concrete™ app to the contractors though the cloud connectivity. The contractors will not see the proprietary calibration data. The Smart Concrete™ app will also be customized to the brand of the producer once the contractor selects the name of the producer in the mobile app.

In this business model, contractors who buy Smart™ concrete do not need to do any mix calibration as this information will be available in the producer's customized mobile app. The contractor only needs to install the wireless sensors (Smart Concrete™ sensor offered by the producer to them) in the formwork, pour the Smart™ mix they have purchased, and download the free Smart Concrete™ app. They can then connect to the embedded sensor wirelessly using their mobile phone to obtain real-time information

on concrete temperature and strength. The data collected through this app will be automatically uploaded to the producer's cloud where the producer can monitor the performance of their mixes on the jobsite. The contractor can also easily share the data and full PDF reports generated in the app with others coworker on the project to facilitate decision making processes regarding construction operations. (Please watch the tutorial video here: <https://youtu.be/iSHiJOcVis4>)

The recommended upsell potential for Smart Concrete™ is \$3 to \$8 per cubic yard of concrete depending on the economics of the market and the cost savings that the contractor finds using this solution. The average gross cost of the Smart Concrete™ solution including the cost of sensors and annual license fee is \$2/yd³. So the producer makes \$1 to \$6 additional profit per cubic yard of concrete through selling this value-added product. Once a customer purchases Smart™ concrete, the ready-mix producer calculates the number of sensors needed and supplies them free of charge to the customer. The cost of the sensors is included in the upsell price of concrete.

Components of Smart Concrete™



While the Smart Concrete system is a full business solution for improving ready mix producer market share, customer loyalty, and profitability, at the heart are three primary components: sensors, the mobile application, and the cloud.

Sensors

The sensors are revolutionary in that they incorporate the most powerful commercially available Bluetooth chip to be able to penetrate up to two inches of concrete cover. This small 2 inch square black box includes a tail to a thermocouple that measures the temperature of the concrete at any desired location. The tail can be short, 16 inches, or long, 10 feet. The longer tail allows you to reach into the depths of a mass concrete element for measuring core temperature.

Mobile App

An easy-to-use mobile phone app is important for contractors in the field. The nice interface and simple navigation make it user-friendly on the job site. Through the app, contractors can activate sensors, read sensors, review concrete performance, and generate reports in PDF format that can be emailed directly from their mobile devices. The power in the app comes in the data sharing capabilities. Users with either an Android or iOS device can see, in real-time, all of the sensors on the job site from any other

user that is connected to a project. This data it is also automatically uploaded to the cloud through he mobile app.

Cloud

Through a website interface, ready mix producers can access all of the Smart Concrete™ data that is on the cloud. Again, all of the data on the cloud is produced by the contractors in the field, on the job site, and automatically uploaded to the cloud. In the website interface, the concrete producer can see a map of every smart concrete project they have supplied, and through that map can then see all the sensors on a project. The cloud interface is also used for inputting and managing mixture calibrations and managing the mobile app appearance for their users.

Traditional maturity systems are good at reporting a simple maturity number; however, the Smart Concrete™ system is a powerful tool for managing a mass of maturity data across projects and across a large market area.

10 Days to Smart Concrete™



What if there was a new technology to help you quickly, easily improve the profitability of your ready mix business? What would this “ideal” new technology look like to a concrete producer?

It would probably encompass:

- Innovative technology that has proven value to contractors
- Low risk for the concrete producer
- Minimal R&D time and investment
- A novel solution with ready marketing
- Fast and easy implementation: no plant equipment to install, nothing to mount on trucks
- Sounds pretty good, doesn't it? That's what we've built in Smart Concrete™

Regarding 'Fast and easy implementation', you might be wondering how fast and how easy it is to implement Smart Concrete in your business. You can be up and running on Smart Concrete in 10 days or less. Smart Concrete licenses come with live training to help new producers learn the system and how to bring it to market, including a marketing strategy session. Also in that training session, mix calibrations and validations are reviewed in detail, as are procedures for training contractors and troubleshooting.

For people on the launch team, during the training, you'll want to identify who will be responsible for the roles of technical manager, sales manager, and marketing product manager. The technical manager

will be responsible for mixture calibration and validation, training contractors, and troubleshooting. Executing the marketing strategy will be the responsibility of the marketing product manager. And, most important, generating revenue is the responsibility of the sales manager.

Once the training is complete, calibrations can begin in the lab, and, for some mixes, in 7 days or less be ready to go live to start projects. Add it all up: one day for training, two days to plan and prepare, seven days for calibration. Fast and easy – 10 Days to Smart Concrete.

With most new technologies, investing and implementing is a costly and cumbersome process. With Smart Concrete, investing is low risk (typically on the order of \$0.02/cy on total production in the first year), and implementation is quick and simple.

Smart Concrete™ for Mix Optimization



In the concrete industry, "mix optimization" is an often abused term that vendors to the ready mix producers use when trying to justify their "value proposition" and sell their products. However, when used proactively, from the ready mix producer standpoint, mix optimization can be a powerful tool to save money in mix costs and provide the contractor with a better product. Mix optimization, however, isn't easy. It takes days in the concrete lab weighing up, mixing, and testing a range of concrete mixtures, then more time to properly prepare and analyze the data.

With respect to Smart Concrete™, how can a ready mix producer, then, use maturity to help themselves proactively in mix optimization? First, a brief explanation of how the Smart Concrete system works. Smart Concrete is built off of the concept of maturity – an idea that has been around for more than 60 years. Maturity says that if the time and temperature history of a concrete element is known, and that can be tied back to a calibration curve, then the properties of that concrete can be estimated. Maturity can be used to estimate the evolution of concrete properties that are dependent on the chemical reactions that occur in a cementitious mixture. These properties may include permeability, modulus of elasticity, and strength. By specification, maturity measurements are taken every 30 minutes or less. So, when using maturity for strength evaluation, rather than breaking cylinders at maybe 3 data points (say 3, 7, and 28 days) to evaluate a concrete mixture, with maturity, data points are automatically collected every half hour to create a very well defined history of the concrete strength from set through the first weeks of hardening. This allows one to look back and see what the performance of the concrete mixture was at an exact time (say 48 hours), with little effort.

Smart Concrete takes maturity, removes all of the friction points in the process, and makes data processing, handling, and sharing very easy. All of the data is moved automatically in the background and handled by online systems, so getting the data from the field to the office happens in a click. By generating field test results so easily, that data can be used for mix optimization of performance mixtures rather than going through a cumbersome lab process.

Two of our Smart Concrete producers have shared success stories of using maturity in their mix optimization efforts. Both producers have been able to provide their contractors with more workable, more finisher-friendly mixes at a lower mix cost, lower carbon footprint, and with reduced potential for long-term problems.

In the first application of maturity for mixture optimization, the project was a high-rise concrete structure. The contractor elected to buy value-added Smart™ concrete mixes instead of ordinary concrete mixes for the project. The producer provided the contractor several options of different mixtures to hit different early strength targets so that the contractor could select the optimal mix based on the weather and performance. The contractor found out early on in the project that the mix he had budgeted to use was significantly outperforming the construction schedule – he was spending more money on a mix than he needed to be. So, the contractor was able to use a mixture with reduced cementitious material content that did not gain strength as fast, and did not cost as much, but still met the performance requirements for the construction schedule. While the contractor wisely made an upfront investment in Smart Concrete for the project, his savings were three times his investment in the Smart™ concrete mixes. Additionally, the contractor was able to save more money because he could use a smaller finishing crew to finish the concrete without having to worry about it getting away from him, while giving his customer a flatter, more level floor.

A second Smart Concrete producer reports significant cost savings in their “high-early” mixtures typically used for industrial work or pavement repairs. Demand in their market is most common for a 4,000 psi mix at 48 hours. Using cylinders to evaluate the performance of such a mix can be cumbersome as breaks need to be completed at exactly 48 hours. Generating sufficient performance data can be problematic for companies with lean QC departments or when 48 hour breaks fall at off times like in the middle of the night or on weekends. Due to these complexities of testing, they used a “bulletproof” mix – a mix that they didn’t know exactly how well it performed at 48 hours, but knew it never came up short on early strength. As this producer started implementing Smart Concrete practices in their business, their “high-early” mix was one of the first to be evaluated. They quickly realized that the mix was over-performing their technical targets based on field data. Through additional mix optimization efforts they realized that they could save over \$4 per cubic yard by reducing cementitious content and still meet their customer’s expectations. For this producer, the cost savings found in optimizing just this one concrete mix more than paid for their annual investment in Smart Concrete.

These two examples show not only the power of Smart Concrete for concrete mixture optimization, but also the ease with which it allows cost saving decisions to be made that can quickly impact profitability for both the contractor and ready mix producer.

Smart Concrete™ for Pavement Applications



Optimizing Project Scheduling for Concrete Pavement

The Smart Concrete™ technology offers an accurate and simple solution for real-time monitoring of concrete strength during construction. Through this technology, the Smart Concrete wireless sensor is first embedded in the concrete during the placement. Then, the Smart Concrete™ mobile app is used to connect to the sensor wirelessly and view the concrete temperature and strength data on the jobsite, which is instantly shared between the team members.

Smart Concrete™ offers great advantages for pavement application where the strength data is required to optimize opening road to traffic. Tomlinson, a Smart Concrete™ producer, has

successfully used the Smart Concrete™ technology in one of their recent pavement projects. In a portion of the Highway 417 where panel replacement was required, Smart Concrete™ was used to determine when the lanes can be opened.

How Smart Concrete™ Helped Improve Project Scheduling

The access to real-time strength results on the jobsite significantly improved the project scheduling. Engineers were able to determine quickly (within an hour) when they can open traffic on the concrete pavement. Previously, concrete cylinders were used to determine the concrete strength. The cylinders had to be sent to a lab 100 km away for the break test.

The Smart Concrete™ technology is based on the well-established concept of concrete maturity according to the ASTM C1074 standard. This test method is also specified by the CSA A23.1,2 as a means and method of measuring the in-place strength of concrete.

Easy Implementation

STEP 1: TECHNICAL TRAINING

We will provide training to your technical services team on mixture calibration, sensor installation, troubleshooting, and contractor training. Additionally, we'll provide resources for civil engineers.

STEP 2: SALES TRAINING

We will provide training to your sales staff on value-added sales skills to help them be successful at getting the contractor to see the value in Smart Concrete™.

STEP 3: MARKETING STRATEGY

As part of the sales training, we'll introduce you to our full portfolio of marketing resources including logo-ready brochures, videos and banners, and conduct a marketing strategy session to develop plans for launching Smart Concrete™ in your territory.

STEP 4: MIXTURE SELECTION

Starting with existing mixes and projects, we'll help you figure out which mixtures to calibrate first and bring to market as Smart™ concrete.

STEP 5: MIXTURE CALIBRATION

Building off of step 4, you'll calibrate a small library of mixes to have them ready to sell as Smart™ concrete. As you grow the sales of Smart Concrete™, you can add more mixes to the online list on the cloud.

Implementation Timeline

Implementation is fast and easy. A typical schedule is shown below.

| Task | Time |
|---|----------------|
| On-site Technical Training | 1 Day |
| On-site Sales Training/Marketing Strategy | 1 Day |
| Initial Mixture Calibration | 14 Days |
| Total Implementation Time | 16 Days |

ROI Calculation for Contractor

| | | | |
|--|---------------|--------------------|--|
| No. of Floors | 20 | floors | |
| Concrete Volume per Floor | 300 | yd ³ | |
| No. of Sensors per Floor | 3 | sensors | |
| Additional cost for Smart™ Concrete | 4 | \$/yd ³ | Upsell cost to the contractor in the commercial market |
| Additional concrete cost per floor | 1,200 | \$ | |
| Total number of sensors provided for the project | 60 | sensors | |
| Cost of sensors and mobile app | 0 | \$ | offered for free with the purchase of Smart Concrete |
| Total additional concrete cost | 24,000 | \$ | |

| | | | |
|---|----------------|-----------|---|
| Conventional field-cured break test: cost per floor | 600 | \$ | for sampling, picking up, delivery, testing and reporting. (\$600-\$1200) |
| Delays in formwork removal | 1 | day | |
| Cost of delays | 7,500 | \$ | half a day cost to be on site. (One day is worth \$15K for a contractor.) |
| Cost of coring | 0 | \$ | (conservatively) |
| Cost of unnecessary heating | 0 | \$ | (conservatively) |
| Financing cost savings in project completion time | 40,000 | \$ | |
| Improvement in efficiencies | 0 | \$ | for collaboration, reporting, documentation |
| Total cost saving | 202,000 | \$ | |

ROI for Contractor **842%**



Concrete Results

A Leading Ready-Mix Producer Uses Smart Concrete™ to Drive Customer Value and New Revenues

Competing on Value and Customer Service

Founded in 1928 Stoneway is widely recognized as one of the most innovative concrete companies in the Seattle market. “We look for opportunities to separate ourselves from other companies through technology innovation, the quality of our product, and level of service we offer,” says Greg Mckinnon, Operations Manager.

While this strategy has proven effective, it often makes Stoneway a price leader. “We’re far from the low-price producer in a very competitive market,” confirms McKinnon. Instead of competing on price, Stoneway constantly looks for new ways to add-value through technology options that also make it easier for contractors to do business with them he says.

A drive to maintain technology leadership while bringing new innovative products to customers quickly led Stoneway to Smart Concrete™ from Giatec. A value-added solution for ready-mix producers, Smart Concrete is sold to contractors who want to know the strength of poured concrete in real-time. Wireless sensors placed in the formwork relay temperature and strength results directly from the job site using a ready-mix producer’s app that’s supplied by Giatec. By leveraging wireless connectivity and mobile-based data collection, contractors get accurate, instantaneous information on concrete maturity. This enables contractors to make faster decisions, streamline their construction practices, complete projects faster, and often significantly reduce project costs.

About

Based out of Seattle, Washington USA, Stoneway Concrete is one of the state’s largest privately held ready-mix producers primarily serving contractors in King County.

Challenge

- Need to differentiate low-price bidders in a competitive market
- New and younger generation of contractors looking for technology-enabled methods

Solution

- Smart Concrete, with real-time concrete strength monitoring
- Wireless connectivity providing mix calibration data from job site
- Responsive customer support and professional sales materials from Giatec

Results

- Competitive differentiator based on technology leadership and innovation
- Ability to deepen relationships with contractors
- Attractive new high margin revenues with upselling opportunities

A New Generation of Tech Smart Contractors

According to McKinnon, the Smart Concrete solution is particularly appealing to a younger generation of contractors who are already comfortable with apps. "Increasingly, we recognized that we were selling to a new cohort of users who were not going to be happy with the old, traditional method of running wires, pushing buttons on a box, and computing the maturity index," he says.

While Stoneway explored many different technology and innovation options, they quickly settled on Giatec. Smart Concrete was an ideal solution for this emerging app-savvy, technology enabled user group that expect faster results – in the palm of their hands. "Today, young engineers and their project managers want everything on their phone or iPad – not their desktop," he says.

Another reason Stoneway chose Giatec was customer service. "Everything about their business model appealed to us because it seemed to fit with our own philosophy," says McKinnon. The two key things Stoneway looks for in a supplier is their level of customer service and quality of product. He says that to date, [Giatec] has done more than any of his other vendors. "My phone is on 24 hours-a-day, 7 days-a-week. That's how we operate our business. That's exactly what we have found in Giatec – there's always someone who is going to answer a phone or an email. And that level of customer service has tremendous value."

In addition to responsive customer service, Giatec provides ready-to-use professional marketing and sales materials. "It makes it really simple to send an email to a customer or if we're submitting a bid for a project, to include their marketing material to position this clearly from the first contact," says McKinnon.

Showing Greater Value at Bid Opportunities

Above all, McKinnon says that "Smart Concrete gives Stoneway one more opportunity to distinguish ourselves from our competitors at bid time." For McKinnon, the ability to fundamentally differentiate through technical innovation is one of the most important benefits. Smart Concrete helps him answer a client's most challenging question: "What value do we bring to the table that nobody else can?"

Smart Concrete also enables ready-mix suppliers like Stoneway to deepen the relationship they have with clients. In effect, they become an information hub with all calibration information coming from the ready-mix producer. "ASTM has a method to determine your maturity curve," confirms McKinnon. "We run mixes in our labs, break cylinders, record the time-temperature factor to plot a



Test cylinders being cured in laboratory

"Today, young engineers and their project managers want everything on their phone or iPad – not their desktop."



Construction worker installing Smart Concrete sensor on rebar

curve where you can estimate the concrete strength,” he adds. That calibration information is provided by the ready-mix producer to the contractor via the cloud using a mobile app that is supplied by Giatec. “Our clients learn how a mix performs which enables them to make better decisions more quickly,” says McKinnon.

Dramatic Example

To illustrate the value of Smart Concrete – and the relative ease of selling this to a knowledgeable contractor – McKinnon describes the recent experience of a major high-rise building developer. The initial job schedule called for post tensioning every three days – where a deck is poured and sits for two-days before tensioning. After their first pour, and using Smart Concrete – with sensors providing real-time information – the developer found that the mix they were planning to use made strength after one day. “So instead of tensioning at three days, they adjusted their schedule to a two-day pour schedule,” confirms McKinnon. “Effectively, the developer took a day-off every floor they were going to pour,” he adds.

Shaving a day-off every floor results in huge savings for the contractor. In addition to accelerating their schedule, they enable the building owner to have occupancy much sooner. If the project is a hotel building, that’s “tremendously important,” says McKinnon.

While McKinnon has many of these types of success stories to prove the ROI and “sell ability” of Smart Concrete he cautions: “some people still struggle” with the idea that they don’t have to break cylinders to test compressive strength of concrete. Again, part of it appears to be a generational mindset – because that’s been the established industry practice.

“A Gamechanger”

However, McKinnon believes that a major generational shift is underway – and while traditional habits and methods of working ‘die hard’, Smart Concrete is a gamechanger for those contractors who adopt it.

Wrapping up, McKinnon says that with Giatec’s Smart Concrete solution, ready-mix suppliers have an innovative way of differentiating themselves in a competitive market while generating important new, high-margin revenue AND creating breakthrough value for contractors. “It’s a win-win situation,” concludes McKinnon.

“There’s always someone [at Giatec] who is going to answer a phone or an email. And that level of customer service has tremendous value.”



Obtain and share temperature and strength results in real-time with the Smart Concrete™ mobile app.

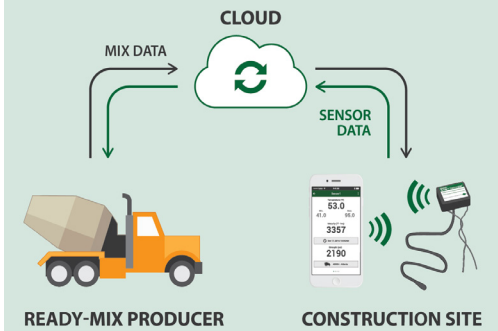
About Giatec

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.

Our 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.

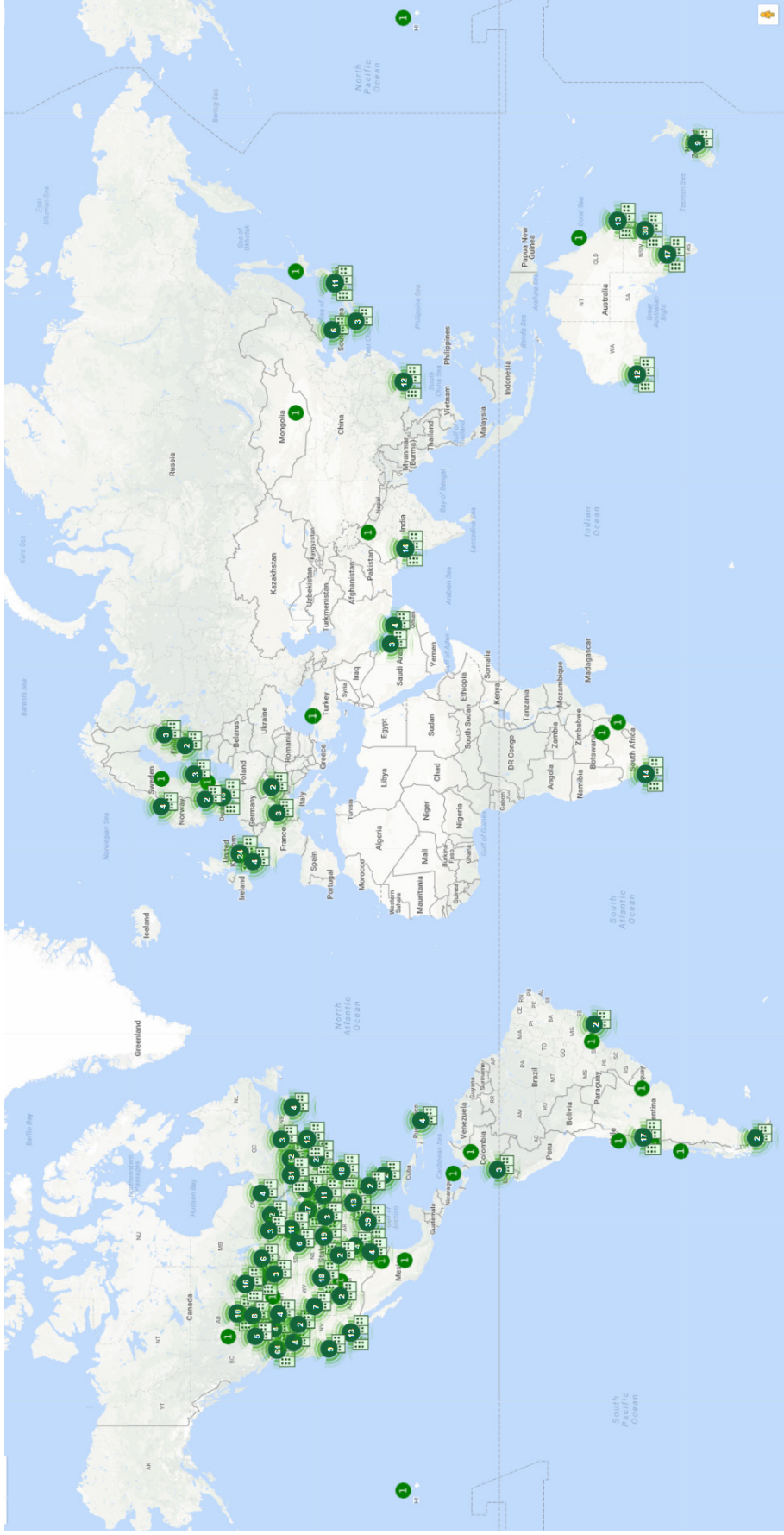
Contractors, builders, and ready-mix providers in over 70 countries use Giatec's smart monitoring solutions to save time, reduce their labour investment, energy and material costs while measurably increasing the profitability of their building projects.

"Effectively, the developer took a day-off every floor they were going to pour."



Smart Concrete™ is a value-added solution for ready-mix producers offered to the ready-mix customers who want to know the strength of concrete in real-time.

Smart Sensor Projects Around the World



3200 Smart™ projects as of December 2017

Smart Concrete™ Producers in the US and Canada



Why Producers Love Smart Concrete™



"Stoneway has successfully offered Smart Concrete to construction companies in Seattle working on high-rise structures and concrete pavements. Contractors immediately see the value as they can obtain real-time strength information on the jobsite through this novel mobile-based technology."

Greg McKinnon, Operations Manager
Stoneway Concrete

"The technology is what interested us in working with Smart Concrete™. The smartphone apps, wireless technology, and the cloud seemed easier to use than the older wired sensors with meters. The system took no time at all to set up and the response from contractors has been great."

Andrew Lester, Promotions and Project Development Manager
MMC Materials Inc.



Hands-on With Smart Concrete™ Producers



Training with Lafarge Canada in Richmond, BC



On-site training with MMC Materials in Ridgeland, MS



Hands-on Training with Geiger Ready-mix in Kansas City, KS



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