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Fay Forges Ahead Over the Yough

The contract was awarded to Fay for \$15.4 million and construction is phased. Crews from the Pittsburgh company began work on this project in August 2020 and will finish in the summer of 2022.

By Brenda Ruggiero
CEG CORRESPONDENT

A bridge in McKeesport, Pa., is currently being revitalized for the Pennsylvania Department of Transportation.

The Jerome Street Bridge is an arch bridge

crossing the Youghiogheny River. It opened in the current design in 1937 and was previously rehabilitated in 1988. The bridge length is 755 ft. long with a main arch span of 455 ft. in length.

The contract was awarded to Fay for \$15.4 million and construction is phased. Crews from

the Pittsburgh company began work on this project in August 2020 and will finish in the summer of 2022.

According to Katie Spear, Fay spokesperson, the scope of work includes full blasting and painting, structural steel repairs, new concrete

see **FAY** page 42



Though people want to be able to access data from anywhere, in reality the fewer places data lives the safer it is.

Staying Ahead of Hackers

Though Construction Hasn't Been Hit, Yet, Potential for Damage Is There

By Lucy Perry
CEG CORRESPONDENT

Challenge-junkie cybercriminals have moved on from hacking personal information. Now corporate intelligence, infrastructure and even heavy equipment are targets. Though currently cybersecurity threats are incidental in the construction industry, the potential for widespread damage exists. What can contractors do to protect their company data and heavy machinery assets?

"We've crossed the rubicon," said Erol Ahmed;

director of communications of Built Robotics, San Francisco. Cybercrime is "now moving on to critical infrastructure, pipelines and potentially heavy equipment."

Ahmed believes these large-scale operations make more attractive targets because the software used to run them is easy and accessible to criminals.

"So, it's important to provide the right protection for users as much as possible."

The bottom line, said Ahmed is yes, "we're

see **HACKERS** page 40

Ensuring Quality, Speedy Projects With Instant Moisture Measurement

By Del Williams
SPECIAL TO CEG

In the construction industry, the quality of cast-in-place concrete foundations, superstructure, slabs, stairs and architectural features, along with the speed of project completion, can largely depend on getting moisture measurement right — and the same is true with the masonry mortar used to build brick, block or stone walls.

Water is an essential element of both concrete (i.e. water, aggregate, cement) and mortar (i.e. water, aggregate, binding material). However, at the job site, everything from seasonal temperature, rain, humidity and groundwater to circulating air can affect the moisture content in concrete and mortar greatly. This can impact setting and drying time — and incorporating the wrong moisture levels in concrete and mortar can be disastrous to quality, finish, longevity and even safety.

Although the construction industry has access to moisture meters, to some extent, these tools typically require calibration, sampling and time. In addition, they are not always portable or durable enough to be used on job sites.

Fortunately, hand-held, durable, instant moisture measurement devices are now available that allow anyone without special training to spot check concrete and mortar at the job site to assure that it is properly mixed, set and dry. In many cases, such pre-calibrated systems allow non-destructive, non-invasive testing on digital displays with no pin holes or discoloration. This approach facilitates construction work as soon as feasible, speeds project completion and improves quality.

How Seasonal Heat, Moisture Can Affect Concrete

Concrete-water ratios can make a big difference in the permeability of concrete, but air humidity and summer heat also can affect the rate at which moisture migrates through drying concrete.

“High humidity can increase the risk of fractures and other structural issues. Concrete can also gradually change from ductile to brittle when humidity decreases, which naturally occurs when summer heat affects concrete’s evaporation time,” said John Bogart, managing director of Kett US, a manufacturer of a full range of moisture and organic composition analyzers.

He noted that concrete cures best between 70-80 F, so if temperatures rise above that and climb toward 90 F, concrete can be affected and cause surface problems as well as reduced strength.

Hot weather, wind and dry conditions can increase a concrete slab’s rate of evaporation, which can threaten the integrity of the top layer of concrete. Water quickly evaporates from the surface layer, which can cause the mix to be drier and susceptible to surface cracking and shrinkage.

Reduced strength also can become an issue with hot, dry weather, which can shorten the hydration portion of the curing process (when water is absorbed and crystals form in the concrete). Then the concrete mixture has less time to hydrate



Hand-held, durable, instant moisture measurement devices are now available that allow anyone without special training to spot check concrete and mortar at the job site to assure that it is properly mixed, set and dry.

these forming crystals and create strong compressive strength. So, concrete curing in hot weather can suffer from limited strength and durability.

On the other hand, in wetter seasons, excess moisture can do a great deal of damage to concrete and its protective coatings, as well as affect concrete-water ratios. Because concrete is porous, issues arise when water is trapped within the concrete.

When it comes to structural concrete, including foundational slabs, construction contractors do not want to “guestimate” moisture levels, which can potentially jeopardize the whole project.

The Benefits of Simplified Moisture Measurement

Although traditional laboratory and online based moisture measurement techniques are useful in the right settings, they have lacked the simplicity and flexibility required for frequent spot checks on construction sites. Because such moisture tests are too slow, laborious, and alter or destroy the sample, they are not practical for the job site, where concrete or mortar must stay in place. Instead, what is needed is a fast, easy method to determine moisture content.

So, industry innovators have developed a simplified approach with testing equipment that allows anyone in the field to get laboratory-quality measurements in any environment.

As an example, using a hand-held device such as the HI520-2 concrete and mortar moisture meter by Kett, the worker would select the calibration (i.e. concrete or mortar), press it against the sample, and moisture is immediately displayed with accuracy of ± 0.5 percent (0-12 percent for concrete/0-15 percent for mortar). Automatic temperature compensation enhances measurement accuracy, and two “raw” modes allow the user to calibrate for deep or shallow



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Simple Hand-Held Devices Offer Instant Moisture Measurement

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samples. Up to 1,000 measurements can be stored in memory and downloaded to a PC for analysis.

The device utilizes high-frequency capacitance, comparing the di-electric constant of the solid with water. A direct relationship exists between this and moisture content.

According to Bogart, one construction contractor used the moisture meter to confirm that the concrete flooring on a 20-story building was ready for custom surface treatment. In fact, the contractor was able to test the entire project in one morning.

"With an instant moisture meter, flooring installers can test concrete humidity as water passes through the concrete's surface even after it hardens. This kind of testing is critical in indoor installations, where high levels of moisture and trapped water in concrete can create mold or lead to bubbling or degradation of its strength and integrity," said Bogart.

This approach can be particularly helpful to contractors responsible for concrete subflooring.

"If you are building on a slab, you know the importance of a concrete subfloor that is fully dried and accurately prepared for use. Knowing how the concrete will act when the concrete is coated, flooring is installed, or the slab is prepared for final use, is key to success," said Bogart.

For contractors who need more specialized applications of measuring moisture, such as for "wet" concrete, this also is available with other units. For instance, with such units, the sample moisture of slurry and aggregate can be instantly measured, allowing contractors to optimize batch mixing anytime, anywhere.

Whether summer, winter, spring or fall, the bottom line for contractors working with concrete or mortar is that using hand-held devices that provide instant moisture measurement helps to ensure that quality work is done as soon as it is feasible, without excess or insufficient moisture, setting, or drying times. In the end, this facilitates project profitability.

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Boomer M20 Reduces Unplanned Stops

BOOMER from page 105

Through teleremote capabilities, operators can drill from a safe distance away from hazardous areas at the tunnel face and keep production going over shift changes.

The multi-functional joysticks allow operators to keep their eyes on the task at all times. The unique cabin is designed to give optimum visibility and noise and vibration dampening materials keep the noise level as low as just 65 decibels. The safe bolting platforms are another advantage because this avoids any operation under an unsupported rock.

Battery Driveline Option

Epiroc continues the charge towards electrification in underground mining and the new Boomer M20 comes with a battery-electric driveline option. A battery-powered Boomer M20 brings additional savings on health, maintenance, ventilation and cooling.

With the on-board charger, the operator does not need to plan for charging, as it automatically takes place while connected to the grid for drilling. Due to the high-capacity bat-

tery, the Boomer M20 has an enhanced driving range and there is nothing to disturb the drift cycle, according to the manufacturer.

"In addition to cost savings, the Boomer M20 also contributes to a healthier and safer work environment for miners everywhere, thanks to the optional battery-electric driveline," said Travis Battley, underground business manager of North America.

Mining From New Perspective

To highlight the innovation, a campaign video has been produced, with a scenic backdrop showcasing the Boomer M20 balancing on a mountain top. Epiroc's President and CEO, Helena Hedblom, is fronting the new innovation in the campaign video.

"We are in this for the thrill of solving the real problem. For the adventure and energy found in new perspectives. The Boomer M20 is another great example of how we make a difference through innovation," said Hedblom.

For more information, visit www.epiroc.com/boomm20.

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