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MATURITY METHOD: Speeds project, saves lives, money

In 1978, 51 construction workers died in the worst construction disaster in U.S. history when the Willow Island, W. Va. cooling tower collapsed on them. Just five years earlier, in Fairfax County Va., a progressive collapse during the construction of the 24th floor of the Skyline Plaza Apartments killed 14 workers and injured 34 more.

Both of these disasters occurred because the in-place concrete had not gained sufficient strength to support the loads, even though lab cylinders were meeting the strength requirements in the specifications. Both of these disasters also shed light on the concept of maturity and spurred a new interest in utilizing the maturity method to determine the in-place strength of concrete at early ages.

While the concept of maturity had been understood since the 1950s, it was not regularly implemented outside the laboratory due to expensive equipment that was cumbersome and difficult to operate in field conditions. The concept is simple, as concrete maturity is just the extent of the cement's hydration.

As the cement hydrates, the concrete gains strength and gives off heat. By tracking time and temperature, the maturity and strength of the concrete can be calculated. In 1987, ASTM first approved a standard procedure for developing a strength-maturity relationship (ASTM C 1074), and since then, the maturity method has steadily grown in popularity and viability. Today, maturity systems are more affordable, practical, and are being implemented on more and more projects across the world.

Southern Star Concrete (southernstarconcrete.com), with headquarters in Irving, Texas, is one of the largest ready-mix concrete suppliers in the United States. They have been using The Transtec Group's COMMAND Center Maturity System for several years, and report they have seen excellent results and benefits.

Tim Kaiser, manager of quality services, prefers COMMAND Center to the other maturity systems he has used because of its simplicity, flexibility, and price, as well as the fact that it is backed by an experienced and world-renowned team of concrete experts.

The Transtec Group, which introduced COMMAND Center in 2003, is a specialty engineering firm with recognized expertise in pavements and materials. In the last two years, Southern Star's commercial sales manager has used COMMAND Center to monitor in-place strength gain for nine high-rise jobs in downtown Dallas.

Last winter, Southern Star was able to save Austin Commercial Construction several days per pour during the construction of a six story building and two-level parking garage when maturity tests showed necessary strength to stress posttensioned cables in 33 hours, much earlier than lab cured cylinders. This type of performance breeds client loyalty. Southern Star is now beginning its sixth job with Austin Commercial.

"As word spreads within their offices about early strengths for stripping and stressing, they are quick to acknowledge this service we provide them," Kaiser said.

Another advantage Kaiser notes is that even though maturity isn't always in project specifications, contractors and structural engineers are requesting maturity data due to the fact that some testing labs do not provide it, and they've experienced the benefits on previous projects.

Southern Star recently worked its third job with Hunt Construction Group, building a 19-story office building in downtown Dallas. The contractor's superintendent had been on a previous job that successfully implemented maturity.

"At the first sign of trouble, Hunt immediately asked for us to use our maturity to provide better strength information than the owner's testing lab was providing," Kaiser said. Although the structural engineer was very familiar with a competitor's maturity system, he was so impressed by COMMAND Center that he worked with Hunt Construction to purchase the system, allowing the testing laboratory to monitor early column strengths and all slab placements.

These are only a couple of the many proven examples of how maturity testing has helped build a job faster, save money and win future projects. The benefits of maturity doesn't stop there. Not only can maturity allow a contractor to posttension and strip forms sooner, but in pavement applications it can allow contractors to saw joints and open to traffic earlier. It reduces the number of test cylinders and beams required, and has even lowered workers compensation claims and insurance premiums in some cases.

For more information about The Transtec Group, call 512-451-6233, e-mail info@maturitycentral.com or see maturitycentral.com. For more information about Southern Star Concrete, call 972-621-0999 or see www.southernstarconcrete.com. CM

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