IntelliRock Concrete Maturity Loggers

The concrete maturity method is a proven strength estimation technique (ASTM C 1074) that accounts for the effects of time and temperature on the strength development of in-place concrete. This method gives a continuous estimate of concrete strength gain during the curing period

Details

Engius developed the IntelliRock Concrete Maturity logger in 2002. It won the 2003 World of Concrete award for innovation and has seen rapid growth and adoption on many major US projects in a short time. The reason? It is a simple and extremely cost effective device. PCTE, known for their introduction of leading edge concrete technology has been appointed as the exclusive distributor.

Maturity monitoring gives insitu strength, that strength can be used to determine if the structure is “cooked” from either a load or durability perspective.

The key difference is that for load the strength of the bulk concrete is required and for durability the strength of the cover zone is required.

Generating The Strength/Maturity Calibration Curve

When the compressive strength will be achieved within 7 days develop the relationship curve at roughly 50%, 75%, 100%, 150%, 200% and 400% of the maturity value corresponding to the anticipated required strength.

At greater than 7 days use points at 25%, 50%, 75%, 100%, 150% and 200%. Finally, a graph of maturity versus strength is generated (this can be done using the spreadsheet that comes with the IntelliRock maturity reader).

The strength-maturity relationship is generated in the laboratory by first preparing cylindrical specimens made from the same mix-design that will be used in the field. Two specimens are instrumented, e.g. by IntelliRock maturity loggers, to record the time-temperature history and calculate the maturity while sets of 3 cylinders are crushed for strength.

Applications

- Accelerates construction & reduces form work costs by allowing early stripping & stressing
- Eliminate the need for expensive curing after form work removal
- Reduce the disruptive curing time on flat work by proving concrete has reached a self cure state (defined by strength)
- Improves safety by giving a simple means of accurately gauging strength of critical elements before support removal (eg tilt up, suspended slabs) assessment of insitu strength.

Specifications

- Temperature accuracy +/-1°C
- Nurse Saul or Arrhenius calculation
- Operating temperature -18°C to 85°C
- Battery last for 6-12mnths from turning logger on
- Logs for period specified but data retained while batteries last
- Weight 80gms

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Measuring Maturity and Strength in The Field

The time-temperature history of the concrete insitu is now recorded and integrated over time. Using IntelliRock maturity loggers this is extremely simple as the temperature gauge, temperature/time logger and the maturity integration are all undertaken in a 35mm long x 30mm diameter cell that is embedded in the concrete. A wire is taken to the surface where the maturity reader can be plugged in at any time to download all data or to simply read off the maturity and hence strength.

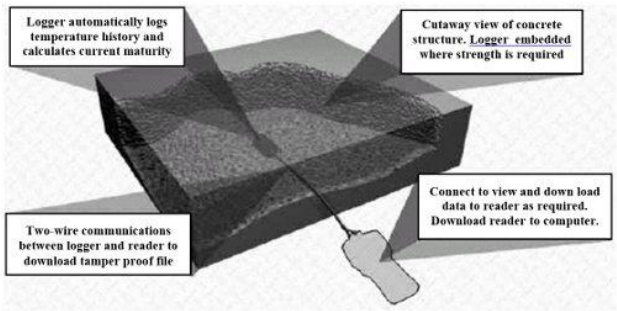
Applications Involved

- Development of Strength : Concrete maturity strength curve relationships
- Measuring Maturity of Insitu Concrete

Advantages over Concrete Thermocouples

IntelliRock concrete maturity loggers are more durable and simpler to operate than a thermocouple based system, benefits include:

- Automatic concrete maturity calculation, information is available onsite with no processing, site staff can read maturity of concrete and make a decision using only the handheld reader. There is no need to load data into excel or to send an engineer to site.
- Durability, second generation loggers encase all electronics in a durable plastic casing and have a redesigned stronger yellow cable selected to hold up to the rigours of concrete pouring and vibration
- No Data Loss, each logger is self contained, with its own thermistor, battery, circuity and memory. There is no permanent connection to the reader and even a damaged cable can be re-terminated easily
- No Programming, loggers are ready to run out of the box pre set with a logging period and duration
- Simple Installation, rather than working with finicky and expensive thermocouple wire and calibrating each sensor IntelliRock loggers only need to be tied into place within the reinforcing cage and the cable led to a point outside the form work
- No theft or damage to data logger, there is no data logger or other box on site to steal, break or even be run over by vehicles



About PCTE

PCTE have over 30 years' experience in the measurement and testing of construction materials. PCTE can provide more than just the equipment, they can provide expert training. PCTE have a service centre in Sydney in which they can provide calibration, repairs and warranty repairs.

Other Equipment

PCTE supply three main ranges: NDT, Lab and Geotech Instrumentation.

NDT includes: Rebound Hammers, Covermeters, Ultrasonics, GPR, Corrosion Testing, Coating Testing and Foundation Testing

Lab includes equipment for: Concrete, Cement, Aggregate, Soil, Asphalt and Metal

Geotech Instrumentation includes: Strain Gauges, Piezometers, Inclinometers, Extensometers, Tiltmeters, Load Cells and Dataloggers