PAPWORTHS CONSTRUCTION TESTING EQUIPMENT

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Temperature Measurement

Introduction

IntelliRock Temperature Loggers can measure and document the temperature profiles and gradients of in-place concrete. Since a large number of sensors can be used with a single on-site reader, detailed temperature profiles can be easily and cost-effectively generated. IntelliRock's software tools also make temperature analysis and reporting a snap.

Applications

The ability to determine true, in-place concrete temperature in real-time can greatly enhance one's ability to manage critical path workflow:

- **Cold weather** - Determine & document temperature profiles and regulate thermal protection.
- **Large Element Pours /Mass Pours** – Thick pours generally require the maximum temperature and the surface to bulk difference to be monitored due to self insulation.
- **Cylinder Curing** - Measure and document concrete cylinder curing conditions including tanks and moist rooms

Why Monitor Temperature

Thermal cracks: Temperature rise (especially significant in mass concrete) results from the heat of hydration of cementations materials. As the interior concrete increases in temperature and expands, the surface concrete may be cooling and contracting. This causes tensile stresses that may result in thermal cracks at the surface if the temperature differential between the surface and centre is 20–30 degrees depending on mix. The width and depth of cracks depends upon the temperature differential, physical properties of the concrete, and the reinforcing steel.

Strength: Concretes mixed, placed, and cured at elevated temperatures normally develop higher early strengths than concrete produced and cured at lower temperatures, but strengths are generally lower at 28 days

Delayed Ettringite Formation (DEF): Maximum temperatures must be monitored to ensure that the formation of DEF is not assisted which occurs where temperatures are high. This can lead to cracking and durability issues with the resulting structure. Most specifications have maximum temperatures for this reason.

Standard Temprature Loggers

The IntelliRock probes contain a thermistor, a battery, and a microprocessor. They are a consumable sensor and data-logger in one. During installation the probe is tied to reinforcing, the wires are lead to the top of the pour and then the probes turned on using the reader. The Reader is plugged into the probe exactly like a speaker wire. Once the probe is running the Reader is unplugged and the probe works independently.

Probe

Reader

The loggers are pre-programmed to log at differing intervals and time lengths. The wires can be from 1.3m to 50m. The reader is capable of downloading up to 100 loggers for viewing on the reader on in the Rockware software. The data files are highly portable and very secure. The loggers come in single and re-usable configurations lending them to lab and site applications.

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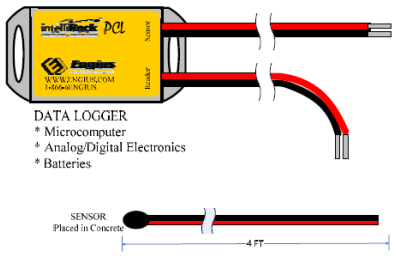
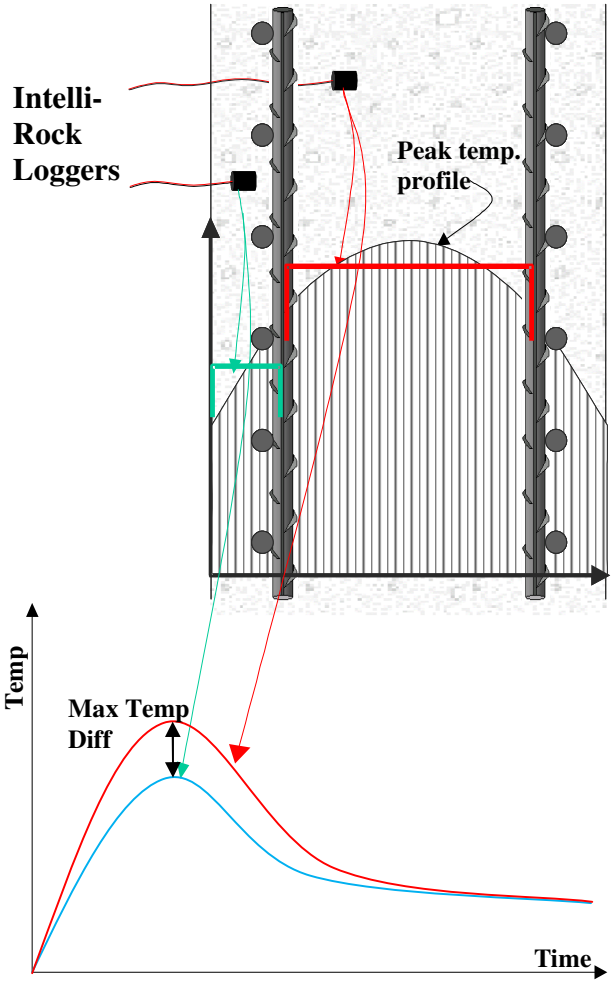
PCL Loggers

The precast version of Intellirock logger only embeds the temperature sensor inside the concrete, allowing the other components of the system to be reused. This means that only a low-cost temperature sensing wire is consumed at each measurement point. The result is the economics of a thermocouple meter, with the accuracy, power, and convenience of the industry leading IntelliRock system





Designed specifically for precast concrete operations

- Accurate and Economical
- Convenient Printed Reports
- Temperature graphs and MIN/MAX temperature events
- Rugged, Weather resistant

Advantages over Thermo Couples

- No long wires to run to data collection box
- Less chance of damaging exposed wires which have to be run to data collection box
- If wire is damaged, data is still collected in the sensor and can still be read.
- If thermocouple wire is damaged, data is not recorded until the problem is fixed.
- No more unreliable results due to thermocouple wires being exposed or shorting out.
- Quick and easy data collection using intellirock reader

About PCTE

PCTE have over 30years experience in the measurement and testing of concrete. With experience in research, consulting and construction they are able to assist you in reviewing the issues and developing solutions. PCTE can provide more than just the equipment. They can provide leading technical support for your business.

Other Equipment

The Olson Instrument range also includes the CTG, Freedom Data PC and DAS as well as the resonance tester.
The full Proceq range of equipment is available for insitu non destructive concrete measurement, including Schmidt Hammers, Covermeters, Half Potentials, Resistivity, Ultrasonic's and Permeability.
We also supply Intelli-Rock maturity, temp and humidity logging systems, corrosion rate monitoring equipment, Ground Penetrating Radar.
Our newest piece of equipment is the MIRA Ultrasonic Pulse Echo imaging system.

Papworths Construction Testing Equipment- Australia's leading Concrete NDT Equipment Supplier