

Geotechnical & Mining

Benefits of Our Systems

1. Systems measure most commercially available sensors—analogue, resistive bridge, vibrating wire, 4-20 mA, SDI-12, etc.
2. Systems used in geotechnical and various mining applications including: roof control, slope stability, methane monitoring, air and water quality, and equipment monitoring/performance.
3. Wireless and hardwire communication options provide real-time reporting of site conditions.
4. Systems not only measure, but control external devices, based on time or measured conditions
5. Low costs and networking capability allows placement wherever measurements are needed.
6. PC software supports data retrieval, data display, datalogger programming, and override control capability.
7. Low current drain allows operation from batteries and solar panels.

www.campbellsci.com/geotechnical



Cracks in the walls of Castillo de San Marcos, Florida were instrumented to determine their genesis and the best course for corrective action.

Campbell Scientific stand-alone data acquisition systems are versatile, rugged, and powerful—factors that make them ideal for geotechnical and mining applications. Their versatility begins with sensor compatibility—they can measure virtually every commercially available sensor—allowing them to be used in a variety of ways for a variety of measurements. For example, a CR10X can be used in slope stability, water quality, or equipment performance applications. Data from a number of stations and from a number of applications can be monitored from a single laptop or desktop computer. Their versatility extends to control as well—our systems can monitor and control external devices based on time or measured conditions—allowing savings in time and equipment, and possibly preventing, or warning, of dangerous conditions. They are rugged enough to be in use in geotechnical studies and mines worldwide.

Our systems have powerful on-board instruction sets—simply choose sensor type, scan rate, measurement channel, etc. On-board mathematical and statistical processing allows data reduction in the field and allows measurements to be viewed in the desired units, whether that be microstrain, centimeters per second, revolutions per minute, meters, Amperes, or inches.

Our systems are stand-alone. Their internal programming allows them to make measurements on scheduled intervals—and even changing that interval if conditions dictate. Once programmed and powered, no human or computer interaction is required, although data are typically downloaded to a PC for further analysis. A hardwire or telecommunications link allows data to be monitored and graphed

*The CR10X & CS616
Reflectometer are
used to assess soil
water content.*



in your office rather than in the field. The low power drain typically allows our data acquisition systems to be powered by solar panels and batteries. If 110/220 ac power, vehicle power, or external 12 vdc batteries are available, you can use those as well. Non-volatile data storage and battery-backed clock ensure data capture and integrity.

Geotechnical Applications

In geotechnical applications our systems typically monitor tilt, convergence, displacement, geographic position (GPS receivers), strain, load, vibration, overburden, level, flow, creep, and force—to name a few. As such, our systems are used in a variety of geotechnical applications including slope stability, subsidence, seismicity studies, structural restoration or mitigation, and site assessment. Our systems can measure a variety of sensor types used in geotechnical applications including voltage output, vibrating wires, pulse output, SDI-12, resistive bridge, etc. It is also common to measure meteorological and hydrological parameters in the same system to determine cause-and-effect relationships.

Mining Applications

Campbell Scientific has provided instrumentation to surface and underground mining operations worldwide.

Coal and soft rock mining—We have one of the few stand-alone measurement systems approved by MSHA (Mine Safety and Health Administration) for use in methane environments.

Equipment performance—temperature, pressure, RPM, velocity, power, acceleration, position, torque, strain.

Slope stability—displacement, water level, tilt, soil moisture, precipitation.

Convergence—distance, strain, load, in-situ or hydraulic pressure.

Mine weather and air quality—wind speed and direction, air temperature, precipitation, snowfall, barometric pressure, relative humidity, solar, gases, particulates, atmospheric stability class.

Water resources—level, flow, discharge, pH, conductivity, temperature, turbidity, dissolved oxygen.

Mine ventilation—barometric pressure, air temperature, relative humidity, air velocity.



A variety of methods are available for monitoring the performance of acid rock drainage caps.



Air and water quality measurement stations can be networked, simplifying the overview of monitoring program(s).



The versatility of our systems allows them to be used for monitoring performance of a wide range of equipment, vehicles, and processes.