CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

GEOTECHNICAL MONITORING

Slope Stability, Dam Safety, Roadway, Railway, Tunnel, Excavation Stability

Campbell Scientific provides turn-key systems and components for Geotechnical Monitoring systems worldwide. Our clients include industry leaders like Geokon, RST, DGSI, URS, Fugro, the Tennessee Valley Authority, State and National government agencies, international energy and mining firms, and others. Our vibrating wire measurement systems are rapidly becoming a standard worldwide due to their robust and unique diagnostics, their accuracy, and their ruggedness. Systems are configurable for applications requiring any combination and quantity of vibrating wire, analog, digital, serial, and combined sensors in networks.

APPLICATIONS

	Measurements	*Sensor Types*	*Sensors*	*Dataloggers*	*Peripherals*	*Description*
Dam Safety 	Pore water pressure, tilt, acceleration, settlement, temperature, weather, crack monitoring, corrosion, hydrology, water level and flow, soil moisture	Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial	Piezometers, pressure sensors, tiltmeters, inclinometers, bridge measurements, strain gages, crack meters, flow meters, corrosion, PRT, ShapeAccelArray, thermistor, thermocouple, Time Domain Reflectometry	CR6, CR3000	AVW200, AM16/32B, AM25T, CDM-VW300, RF401A, MD485, TDR100, satellite and cellular modems	Our systems monitor dams worldwide storing data on site or transmitting it back to a central location. We will work with you to develop a robust measurement and data management system
Slope Stability 	Pore water pressure, tilt, acceleration, settlement, temperature, weather, crack monitoring, soil moisture	Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial	Piezometers, tiltmeters, inclinometers, strain gages, crack meters, robotic total station, Time Domain Reflectometry, ShapeAccelArrays	CR6, CR3000	AVW200, AM16/32B, AM25T, CDM-VW300, RF401A, MD485, TDR100, satellite and cellular modems	Our systems monitor slope movement in safety and mission critical applications to protect water and oil pipelines, mines, and roadways. Systems can be configured with alarms to provide early warning to managers.
Roadway and Railway Monitoring 	Soil moisture, crack monitoring, settlement, load, vibration	Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial	inclinometers, strain gages, crack meters, Time Domain Reflectometry	CR6, CR3000, CR9000X	AVW200, AM16/32B, AM25T, CDM-VW300, RF401A, MD485, TDR100, satellite and cellular modems	Our systems are used to monitor pavement performance, rockfall, subsidence, road weather, and other parameters worldwide.

	Measurements	Sensor Types	Sensors	Dataloggers	Peripherals	Description
Mining 	Tailings dam stability, excavation stability, soft rock (coal) mining, machinery, temperature, weather, lightning, safety, pore water pressure, tilt, acceleration, settlement, temperature, weather, crack monitoring, corrosion, hydrology, water level and flow, water quality, soil moisture, gas, LEL	Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial	Piezometers, pressure sensors, tiltmeters, inclinometers, bridge measurements, strain gauges, crack meters, flow meters, corrosion, ShapeAccelArrays, PRT, Thermistor, Thermocouple, Time Domain Reflectometry	CR6, CR3000, CR9000X	AVW200, AM16/32B, AM25T, CDM-VW300, RF401A, MD485, TDR100, satellite and cellular modems	Our systems monitor mines worldwide storing data on site or transmitting it back to a central location. We will work with you to develop a robust measurement and data management system
Excavation and Tunneling 	Tilt, movement, temperature, train, crack monitoring, pressure, soil moisture, corrosion	Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial	Inclinometers, strain gauges, crack meters, Time Domain Reflectometry, ShapeAccelArrays	CR6, CR1000, CR3000	AVW200, AM16/32B, AM25T, CDM-VW300, RF401A, MD485, TDR100, satellite and cellular modems	Tunneling monitoring systems fit in limited enclosure space. Onboard vibrating wire and analog data can be transmitted back to data collection points via wired or wireless communications

Geotechnical Case Studies

Campbell Scientific systems have helped a variety of organizations reach their goals. The following are some geotechnical case studies:

Seepage at the Wolf Creek Dam is monitored by 81 vibrating-wire transducers, our CR1000 dataloggers, and AVW206 vibrating-wire interfaces. All data is transmitted over a spread-spectrum IP radio network. The dam consists of a concrete hydroelectric dam and an earthfilled embankment structure.
www.campbellsci.com/wolf-creek

In South Korea, Campbell Scientific gear measured water content in a road bed to test anti-freezing methods that prevent road damage. Our monitoring system enabled Korea Expressway Corporation (KEC) to continuously monitor 45 test sites; and to assess, over time, the effectiveness of an antifreezing layer in preventing winter damage to KEC's expressways.
www.campbellsci.com/korea-road

Campbell Scientific equipment was used to monitor the construction of London's Heathrow Express Rail Link. Reliable and accurate structural monitoring is especially critical since 12 km of the tunnel runs close to historical sites such as Big Ben, Westminster Bridge, and Canary Wharf.
www.campbellsci.com/london-excavation

For the Susie Mine cleanup in Montana, Campbell Scientific equipment was used to monitor drainage before it flowed into the water sources for Helena, Montana. This data-acquisition system has stood up through grueling Rocky Mountain weather, and has never lost data.
www.campbellsci.com/susie-mine

In Del Mar, California, our TDR system is used to monitor dangerous slope movement at three segments of railway track above coastal bluffs. The TDR system includes our dataloggers, SDMX50 TDR multiplexers, TDR100 reflectometers, and horizontal coaxial cable sensors installed along high-concern segments of the track.
www.campbellsci.com/slope-monitor

In Del Mar, California, a tractor-mounted trencher installed coaxial cable for monitoring slope stability using our TDR system.