



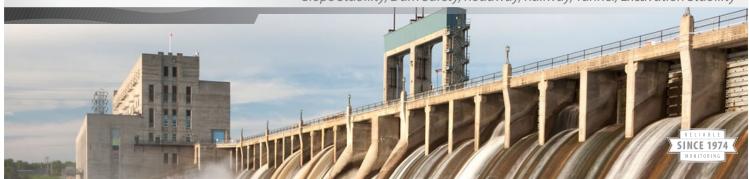






GEOTECHNICAL MONITORING

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.

Peripherals

AVW200,

AM25T,

RF401A,

MD485

TDR100,

satellite

modems

and cellular

AM16/32B,

CDM-VW300,

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Dam Safety

Slope Stability



Pore water pressure, tilt, acceleration, settlement, temperature, weather, crack monitoring, corrosion, hydrol- ogy, water level and flow, soil moisture	Vibrating w 4 to 20 mA analog volt digital volt pulse, seria
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Measurements

Pore water

pressure, tilt,

acceleration.

settlement,

moisture

temperature.

weather, crack

monitoring, soil

orating wire, o 20 mA, alog voltage, gital voltage, Ise, serial	

Sensor Types



Reflectometry,

inclinometers,

strain gages,

crack meters,

Time Domain

Reflectometry

ShapeAccelArrays

Sensors

Piezometers, pressure sensors,

tiltmeters, incli-

measurements,

strain gages, crack meters,

flow meters,

thermistor,

corrosion, PRT,

thermocouple,

Time Domain

Reflectometry

ShapeAccelArray,

nometers, bridge



Dataloggers

CR6,

CR3000

AVW200, AM16/32B, AM25T CDM-VW300, RF401A, MD485 TDR100. satellite and cellular alarms to provide modems early warning to

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

managers.

Description

Our systems

monitor dams

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

worldwide storing

Roadway and Railway Monitoring



Soil moisture, crack monitoring, settlement, load, vibration

Vibrating wire, 4 to 20 mA, analog voltage, digital voltage, pulse, serial

Vibrating wire,

analog voltage,

digital voltage,

4 to 20 mA,

pulse, serial

CR6, CR3000, CR9000X AM16/32B, AM25T, CDM-VW300, RF401A, MD485 TDR100. satellite and cellular modems

AVW200,

Our systems are used to monitor pavement performance, rockfall, subsidence, road weather and other parameters worldwide.



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

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.

