VW Liquid Settlement System

The Geosense® VWLSS-200 Vibrating Wire Liquid Settlement System is used to monitor settlement or heave in soils and other structures such as embankments, earth and rockfill dams.

Working principle

The main components are a reservoir (single or multiple), liquid-filled tubing and a vibrating wire pressure transducer cell mounted on a plate or, for borehole application, attached to an anchor. The vibrating wire sensor is attached to a settlement plate at the point of estimated settlement. The sensor is connected via two liquid-filled tubes which are connected to a reservoir located on stable ground. As the transducer settles with the surrounding ground the height of the column is increased and the corresponding higher pressure is measured by the transducer. Settlements are calculated by converting the pressure to millimetres of liquid head. The pressure sensor transducer uses a pressure sensitive diaphragm with a vibrating wire element attached to it which is mounted inside an evacuated and hermetically sealed housing. Various housings are available to suit application. The transducer operates on the principle that a tensioned wire, when plucked, vibrates at its resonant frequency. The square of this frequency is proportional to the strain in the wire. Fluid pressures acting on the diaphragm causes a deflection of the diaphragm which then changes the tension in the vibrating wire thus altering the resonant frequency of the wire.

Vented System: The pressure sensor is vented so that it is automatically compensated for changes in atmospheric pressure.

Sealed System: The pressure sensor is sealed and therefore independent atmospheric readings should be taken and compensations made accordingly.

VWLSS-200 vibrating wire settlement sensors may be read by the VW2106 or any vibrating wire readout device and may be readily data logged using Campbell Scientific or any other data loggers with vibrating wire interface modules. Vibrating wire transducers output a frequency signal, and are therefore insensitive to resistance changes in connecting cables caused by contact resistance or leakage to ground. Cable may be readily and simply extended on site without special precautions. Gauges may be read up to 1000 metres away from their installed location without change in calibration.

Features

- Not affected by barometric pressure
- In-situ checks available
- Air can be easily removed
- Manual or automated readout
- Reservoir can be sited away from construction area

Applications

Subsurface point settlements/heave beneath:

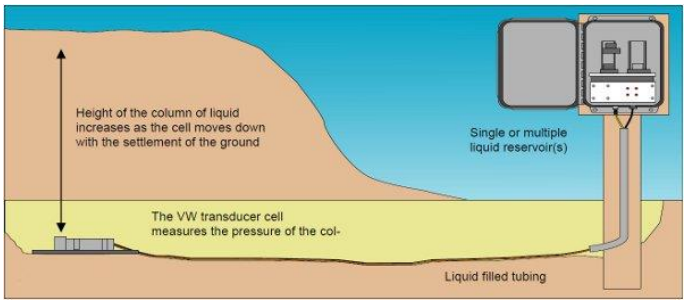
- Embankments
- Surcharges
- Fills
- Dams
- Landfills

Technical Specifications

Standard Range	7, 17 metres
Sensor Accuracy	0.1% full scale
System Accuracy	Site Dependent
Resolution	0.025% full scale
Temperature Range	-20°C to +80°C

VW Liquid Settlement System

Diagram of Installation



Model Description

- VWPS-201V – VW vented pressure sensor 70 kPa
- VWPS-202V – VW vented pressure sensor 140 kPa
- VWPS-203V – VW vented pressure sensor 175 kPa
- VWPS-204V – VW vented pressure sensor 345 kPa
- VWPS-201S – VW sealed pressure sensor 70 kPa
- VWPS-202S – VW sealed pressure sensor 140 kPa
- VWPS-203S – VW sealed pressure sensor 175 kPa
- VWPS-204S – VW sealed pressure sensor 354 kPa
- VWSR211R – 1 cell reservoir
- VWSR212R – 2 cell reservoir
- VWSR213R – 3 cell reservoir
- VWSR214R – 4 cell reservoir
- VWSR215R – 5 cell reservoir
- VWSR216R – 6 cell reservoir
- VWSR217R – 7 cell reservoir
- VWSR218R – 8 cell reservoir
- VWSR219R – 9 cell reservoir
- VWSR220R – 10 cell reservoir
- VWSP230 – 450 x 450 mm plate
- VWSP231 – 500 x 500 mm plate
- K10-045 – 6mm OD x 4mm ID twin nylon tubing with PVC outer sheath – per metre
- Q10-020 – type 900-1 cable – per metre

Ordering Information

- Sensor Type
- Sensor range
- Plate size
- Number of reservoirs
- Tube length
- Cable length

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