

## ELECTROLEVEL GEOTECHNICAL APPLICATIONS

The **ELECTROLEVEL** is a very sensitive remote reading electronic tilt transducer. When suitably mounted and supported it can measure minute movements in rock, soil or civil engineering structures. Its unique construction gives an output of infinite resolution, free of hysteresis with long term stability and long operational life.

In contrast with conventional surveying techniques which tie up skilled personnel in routine data collection, the **ELECTROLEVEL** can offer remote continuous monitoring of potentially dangerous structures.

Equipment is available for automatic data collection, logging and analysis and with facilities for triggering alarms when movement occurs.

The **ELECTROLEVEL** manufactured by Tilt Measurement Limited is the **ORIGINAL** transducer of that name, which has now become a generic name for transducers from different sources.

These transducers, although similar at first sight to the original **ELECTROLEVEL** actually use a different and inferior physical principle to sense tilt angles.

The results, which are documented in a number of Geotechnical reports, can be inferior performance, instability and large temperature drifts which have led to embarrassing false alarms (false positives), and worse, to false negatives resulting in catastrophic failure.

Our original **ELECTROLEVEL** sensors have been used in the field for over 30 years without any of these problems and are the sensor of choice for many users with critical reliability and failsafe issues to address.

(E.g Nuclear Industry, Power Generation Industry etc.).

Talk to our application engineers for the full facts about the superior technical performance of our **ELECTROLEVEL** sensors.

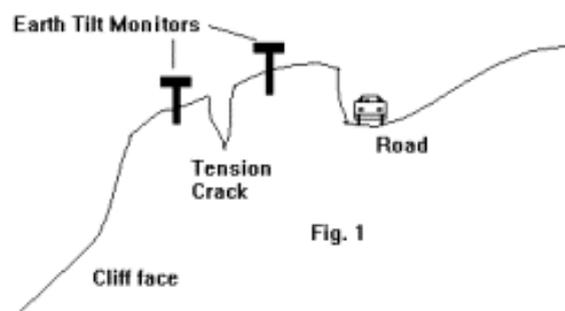
### Some typical applications.

The following descriptions of applications show various uses of **ELECTROLEVEL** systems but are by no means an exhaustive list. Our application engineers are always pleased to discuss a particular site or installation and to prepare proposals for suitable equipment.

#### Rock Stability

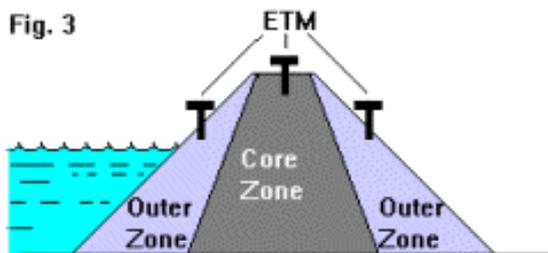
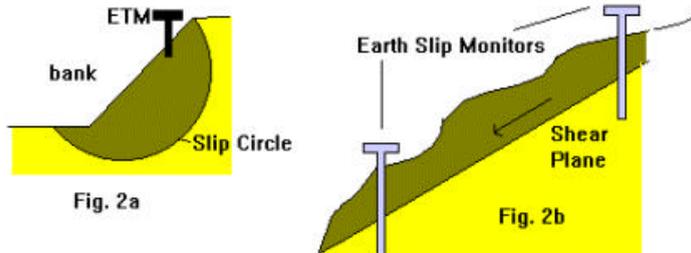
Tension cracks in the rock supporting a cliffside road are monitored at several locations carefully chosen with reference to visible signs of the cracks. Movements in the rock which could lead to slab failure are compared with preset danger levels which, if exceeded, illuminate warning signs and activate a telephone alarm link.

The sensor used is the **ELECTROLEVEL** Earth Tilt Monitor secured in the rock with grout. see Fig 1.



## Soil Slopes

When monitoring the stability of soil slopes, the soil structure of the site must be evaluated to identify the probable cause of failure before the locations to be monitored can be chosen. When a circular failure is expected, Earth Tilt Monitors are placed to detect the bulk rotation of the soil as in Fig 2a . In the case of planar shear, slab-slide or flow failure over a static substratum, - Earth Slip Monitors are used to detect the relative motion at the failure interface Fig 2b . Small rates of soil creep can thus be measured and with an intelligent data collection system the increase in creep rate just prior to large scale failure can be identified and used to raise alarms.



## Earth Rock Fill Dam

Earth or rock fill dams are subject to a variety of potential failure modes including settlement, slope failure, spreading and degradation due to piping, overtopping or seismic activity. The first three mechanisms are monitored by judicious placing of ELECTROLEVEL tilt monitors and slip monitors in the outer zones. Earth Tilt Monitors embedded in the core zone are used to measure the bulk movements caused by the latter mechanisms. (Fig 3).

## Mining Works

Both deep and open cast workings may cause subsidence in overlying or adjacent areas. The resulting movements may damage civil engineering structures, water mains, etc., **ELECTROLEVELS** are extensively used to measure and record the effect of such movements.

## Civil Engineering Structures

Bridges, power stations and other foundations can be checked for settlement. Commonly a granite plate is grouted at a suitable monitoring position and a portable **ELECTROLEVEL** system used to check movements. Alternatively installations with permanently mounted sensors can read distortions and differential movements between various parts of the structure.

Tilt Measurement's Engineers are available for discussion of any possible applications and have many years experience in the design of systems for customers from a diverse range of industries.

All information herein is believed to be correct but no liability is accepted by Tilt Measurement Limited for any application in respect of fitness of purpose, infringement of intellectual property rights, or consequential loss or damage howsoever caused.

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