

***ELECTROLEVEL* APPLICATIONS IN CIVIL ENGINEERING**

The ***ELECTROLEVEL*** is a robust, stable, gravity referenced, tilt transducer. The system combines the dependable principle of the simple spirit level with modern, reliable solid state electronics. The sensing element is an hermetically sealed glass vial which is mounted in a variety of standard or custom designed metal housings. There are no delicate moving parts - only a self-repairing bubble - and the assembled transducer will withstand immersion in the North Sea and the level of shock and vibration experienced on mobile weapon launch systems.

During the twenty-five years that the ***ELECTROLEVEL*** has been commercially available a wide range of applications have been recorded and a few of those of Civil Engineering interest are noted below.

Control of Ro-Ro bridges.

The ***ELECTROLEVEL*** is used to monitor the twist of the free end of the cantilever bridge and the gradient of the roadway. The angles are continuously indicated and the output signals used to operate relays controlling the hydraulic actuators. Additional electronic monitors raise alarms in the event of loss of power at various critical points in the control circuits.

Stability monitor for overpass support pillars.

ELECTROLEVEL transducers are mounted on suitable reference platforms on the base of the support pillars. A portable, plug-in indicator is used to record the rotations of the pillars at regular intervals during the initial settling period and at longer intervals once permanent stability is indicated.

Control of tidal river sluice gates.

Submersible ***ELECTROLEVEL*** transducers attached to the gate allow the longitudinal angle to be continuously monitored. The output signal is used to proportionally control the hydraulic lifting rams to prevent jamming in the guide rails. Relays are operated in the event of preset limits of misalignment being exceeded.

Soil Slip Indication.

The area of possible land slip is planted with a series of "Tilt Rods", usually of steel and varying in length to suit the properties of the soil and the expected nature of the slip. a slip which is expected to take a rotational form requires only that the tilt rods are long enough to associate with this rotation. If no rotation can be expected the rods must pass through the slip into unaffected soil and may take the form of a "Tilt Tube" so that the slide is converted to a rotation of the rod. Weatherproof ***ELECTROLEVELS*** are attached to the top of each rod and screened cables lead to a central indicating and monitoring point.

Stability monitor for concrete dam.

At several locations across the dam reference platforms are constructed to which **ELECTROLEVELS** are attached. A central indicator shows the tilt angle at each location. As the impounded water level rises the rotation of the structure is recorded and compared with the theoretical values. Adjustable limit relays may be set to raise an alarm in the event of any unexpected tilt excursions.

Other Applications:

Borehole attitude angles are indicated during or after drilling depending on method.

Sway of tall structures. The accelerations are measured and used to give an indication of peak displacement.

ELECTROLEVELS permit the use of theodolites and inclinometers for floating structures.

The attitude of large loads during moving or installation operations is measured to allow safe and accurate handling.

Alignment or distortion of various parts of a building or structure.

Cross fall gradient control on paviers simplifies and speeds operation.

Volcano activity monitor, rise of pressure causes a change in the attitude of the crust which is monitored by a series of **ELECTROLEVELS** linked to a central computer.

ELECTROLEVELS form the sensing elements for a "Taut Wire Inclinometer" which allows accurate positioning of drill ships or piling rigs.

Television and radar aeriels are monitored and controlled by **ELECTROLEVEL** equipment, corrections can automatically be made for the sun's unequal heating of the mast structure.

Tilt Measurements' 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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