



Applications

The hydrostatic level system is used for monitoring settlement or heave in structures. Typical applications include:

- Monitoring differential settlements in structures affected by nearby excavation and tunneling.
- Controlling critical activities such as compensation grouting

Installation

System components include a reservoir, hydrostatic level cells, tubing, deaired liquid, and a datalogger.

One of the cells is deployed as the reference cell and is placed outside the zone of influence. The other cells are placed on the structure.

The reservoir is usually located near the reference cell. It must be placed at a higher elevation than any of the cells in the system to create the hydrostatic head.

Tubing for liquid and atmosphere is connected to each cell and signal cable is routed to the data logger. Then the hydraulic circuits are filled with deaired liquid.

Operation

The difference in elevation between the reservoir and each cell creates hydrostatic pressure, and the sensor within each cell measures this pressure.

Settlement of the structure increases the difference in elevation between the reservoir, which is on stable ground, and the cell, which is sinking with the structure. The cell then reports increased pressure. If the structure heaves, the elevation difference decreases and the cell reports decreased pressure.

Systems that use the reservoir as the reference elevation require careful maintenance of the water level, which can be affected by evaporation and temperature changes.

In the GEO-Instruments system, the reservoir supplies hydrostatic pressure, but is not used as the reference elevation. Instead, pressure readings from each cell are compared to the pressure reading from the reference cell. By monitoring difference readings, the system eliminates reservoir issues and provides higher accuracy.

As with other level systems, pressure readings are converted to inches or mm of settlement or heave during processing.

Advantages

High Resolution: The system detects settlement or heave as small 0.0008 inch (0.024 mm).

Reliable: The hydrostatic level system eliminates error due to reservoir maintenance.

Compatible: The hydrostatic level system is fully compatible with GEO's automated monitoring platform (AMP), which processes the measurements, checks for alarms, and posts plots and planviews on the project website.

System Specifications

Sensor: Capacitive sensor, 4-20mA output.

Range: 8 to 20 inches (200 to 500 mm).

Resolution: 0.0008 inch (0.024 mm).

Linearity: 0.008 inch (0.2 mm).

Stability: 0.008 inch/a (0.2 mm/a).

Temp Rating: -20 to +80 °C.

Cell Size, H x W x D: 6.7 x 2.6 x 2.2 inch (170 x 65 x 55 mm).