WE MONITOR THE PRESENT WITH THE INSTRUMENTS OF THE FUTURE

VERTICAL ARRAY

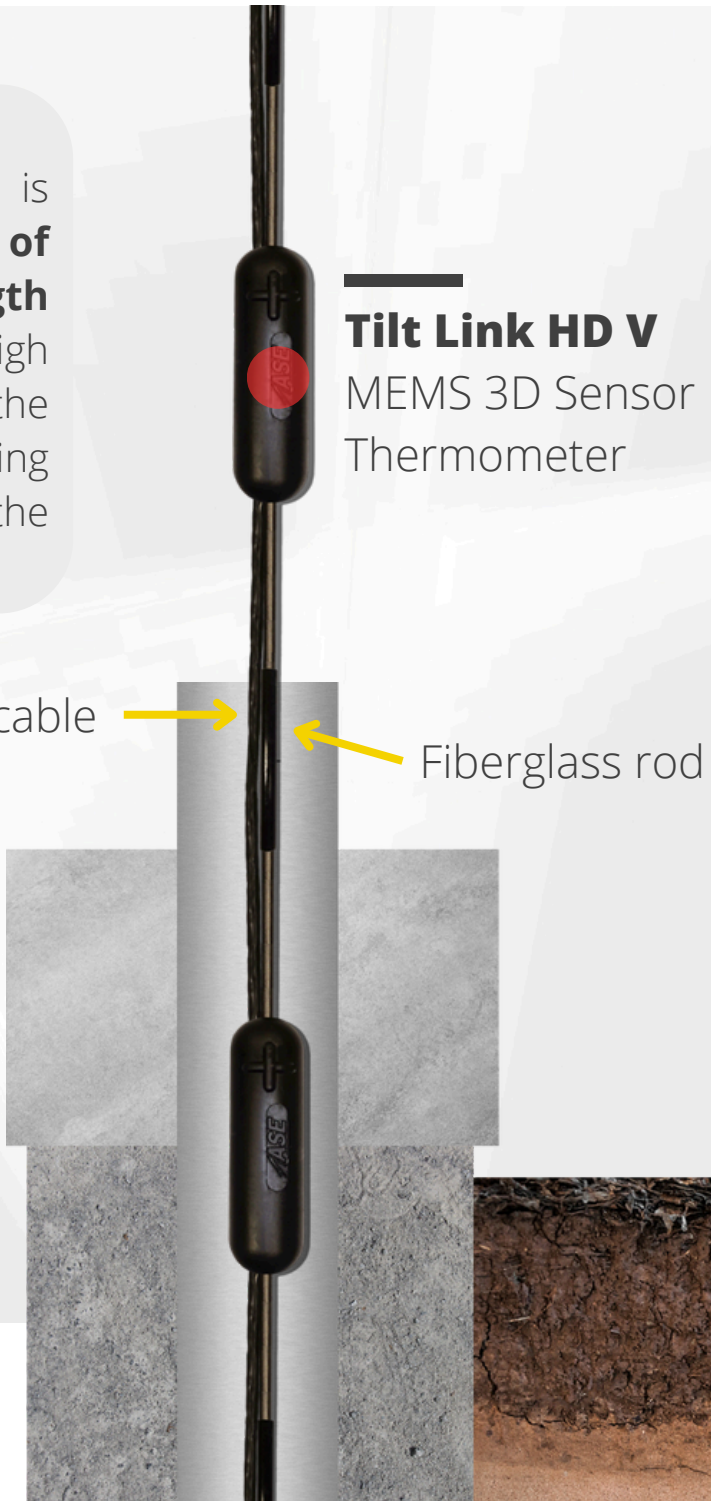
STRUCTURE

ase
ADVANCED SLOPE ENGINEERING

VERTICAL **ARRAY** *STRUCTURE*

The **Vertical Array STRUCTURE** is an **innovative automatic inclinometer** designed to monitor displacements at various depths in **geotechnical structures** such as **large-diameter piles**, **micropiles**, and **sheet piles**. It consists of a sequence of IP69-rated hermetic nodes connected by fiberglass rods and a four-wire signal cable. Each node (**Tilt Link HD V**) contains a high-resolution **3D MEMS** accelerometer and a thermometer.

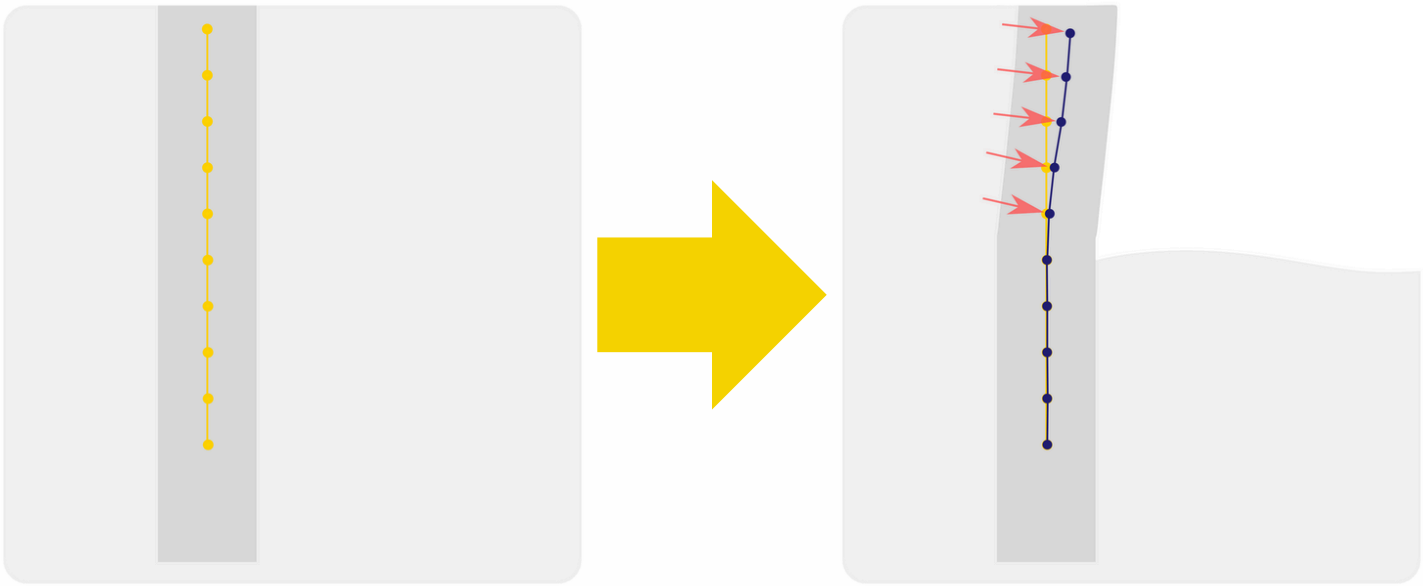
Based on project requirements, it is possible to customize the **number of sensors**, their **spacing**, and the **length of the instrument**. Thanks to the high precision of the sensors used, the instrument is capable of detecting submillimetric displacements of the monitored structure.



Monitor the real-time **3D displacements** and **deformations** of **geotechnical structures**

PRINCIPIO DI FUNZIONAMENTO

By knowing the **distance between the sensors** and the **spatial orientation** of the nodes calculated using data recorded by the MEMS through specific algorithms, it is possible to determine the relative position of the instrument in space and, consequently, the **displacements of the monitored structure**.



INSTALLATION

The **Vertical Array Structure** system is supplied in one-meter segments, which are joined using specialized connectors. After assembly, it can be installed in various ways, depending on project requirements:

- **Inside an inclinometer or smooth tube:** The system is inserted into a pre-installed tube within the monitored structure and then cemented.
- **Direct cementation:** The instrument is placed on the reinforcement of the structure and incorporated into the concrete pour of the structure.
- **Monitoring of existing berlin walls and retaining walls:** The system is attached to existing structures using specific connection devices to ensure optimal sensor adhesion to the wall.

The mix design for the bentonite grout used for cementation is provided by ASE.

RESULTS OF THE INSTRUMENT

- Displacements for each individual calculation point
- Resultant of 2D local displacements
- Resultant of 2D cumulative displacements
- Settlements at different depths calculated via the MEMS sensor
- Cumulative displacements (orientation A)
- Cumulative displacements (orientation B)
- Time trend of daily acceleration and velocity of displacements at individual calculation points
- Time trend of the inclination angle
- Time trend of temperature

DATASHEET

Sensors	3D Accelerometer, Thermometer
Measurement range	360°
Accelerometer range	± 1.2 g
Accelerometer sensitivity	105 LSB/° (0.0095°) 6000 LSB/g (0.167 mg) 0.166 mm/m
Accelerometer sensitivity error	±0.7%
Accelerometer sensitivity dependence on temperature	±0.3%
Accelerometer linearity error	±4 mg
Offset error evaluating absolute positions	±1.15° ±20 mg
Offset dependance on temperature	±0.57° for X & Y axes, ±0.86° for Z axis ±10 mg for X & Y axes, ±15 mg for Z axis
Drift of the offset error	±0.23° for X & Z axes, ±0.34° for Y axis ±4 mg for X & Z axes, ±6 mg for Y axis
Accelerometer amplitude response	40 Hz
Accelerometer temperature operating range	-40 °C ÷ +125 °C
Thermometer measuring range	-50 °C ÷ +150 °C
Thermometer sensitivity	18.9 LSB/°C (0.053°C)
Total accuracy	Depending on MUMS chain configuration and length
Node length and diameter	125 mm – 37 mm
Node weight	0.2 kg
Electrical cable	CEI 20-35

OUR MISSION

Develop and disseminate new technologies for monitoring natural phenomena and structures in order to deepen the knowledge of their dynamics, strengthen the theoretical basis for theoretical interpretation and make safer, cheaper and more functional design activities of civil and environmental works as well as Civil Protection procedures.

ABOUT US

ASE is an SME based in Parma, founded in 2013 and sponsored by the University of Parma. Our company, born as a Start-Up, has established itself over time as a leader in the development of innovative tools for geotechnical and structural monitoring, as well as in the creation of state-of-the-art software and hardware for managing monitoring data from automatic systems, topographic surveys, and manual instruments.
What sets us apart is the multidisciplinarity of skills within the company. Within ASE, a team composed of Civil, Environmental, and Electronic Engineers, along with highly qualified expert programmers, collaborates to internally develop both the instruments and software solutions, allowing us to maintain a high level of control over the quality and efficiency of our products.
The core of the company is driven by a profound passion for research and development. We recognize the importance of staying at the forefront of the latest technological and scientific innovations to provide our customers with solutions tailored to their needs.
In summary, ASE is much more than just a company: it is a center of excellence, a reference point for monitoring, and a reliable partner in ensuring the safety and reliability of infrastructures worldwide.

WE MONITOR THE PRESENT WITH THE INSTRUMENTS OF THE FUTURE

CONTACT US
TO REQUEST INFORMATION

www.aseltd.eu

info@aseltd.eu / sales@aseltd.eu

+39 0521 1404292

Via R.Koch 53/A, 43123 Fraz. Pilastrello, Parma - Italy
VAT IT 02687890349

ase
ADVANCED SLOPE ENGINEERING