SoilCreate
Geotechnical Monitoring & Testing Solutions

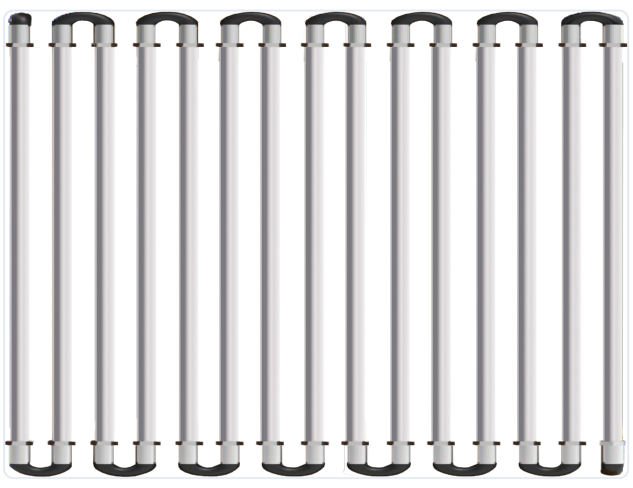
FLEXIBLE INCLINOMETER

SC-FLEXIBLE-INCLINOMETER

INTRODUCTION

The Flexible Inclinometer, also known as an Array Displacement Meter, is a multi-section, flexible three-dimensional measurement system for geotechnical deformation monitoring. Its modular sensing units can be connected in series and assembled on site according to borehole depth, making the system reusable, easy to transport, and convenient to maintain.

The system is designed for static deformation monitoring in rock and soil engineering, including deep horizontal displacement, settlement monitoring, tunnel convergence, foundation pit monitoring, embankment settlement, and underground structure convergence.



KEY FEATURES

1 TEMPERATURE COMPENSATION, DATA STABILITY

Integrated MEMS and advanced temperature compensation models eliminate axis errors and temperature drift, ensuring highly reliable data in any environment.

2 DUAL CALIBRATION, RELIABLE PRECISION

Guarantees accuracy through a strict two-step process: independent calibration for each node, followed by an overall system calibration to completely eliminate cumulative errors.

3 INTELLIGENT CORRECTION, TORSION RESISTANT

Initial Setup: Accurately compensates for existing casing twist using the alignment Mark line.
Dynamic Monitoring: Automatically calculates and corrects angular deviations caused by ongoing casing torsion, ensuring authentic deformation data.

4 PLUG-AND-PLAY, REAL-TIME CLOUD ANALYSIS

Features 4G and serial communication for fast deployment. Captures data up to 1Hz and transmits it to the cloud in real-time for remote visualization, analysis, and rapid export.

5 MODULAR DESIGN, COST EFFICIENCY

A segmented structure allows users to customize the total length based on borehole depth. It is highly adaptable and fully reusable across multiple projects, significantly lowering operational costs.

INSTALLATION AND CASES

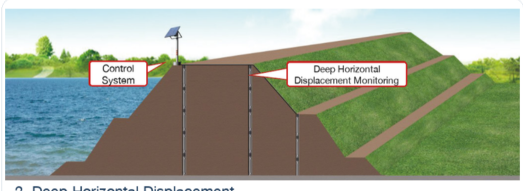
Flexible Inclinometer Application & Case Studies

Installation scenarios, deformation curves, and field comparison results

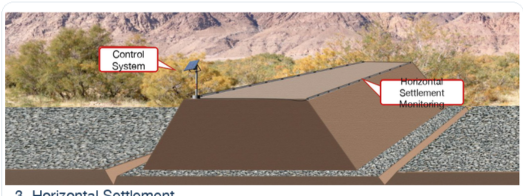
INSTALLATION

Typical Monitoring Layouts

1. Tunnel Convergence



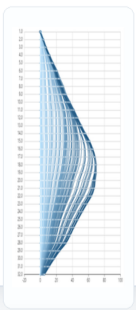
2. Deep Horizontal Displacement



3. Horizontal Settlement

CASE 1

Rail Transit Foundation Pit: Multi-Point Data



Monitoring period
Apr. 2024 to present

Depths
32 m, 34 m, 32 m

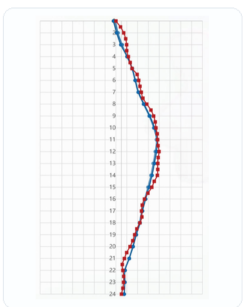
Sampling interval
1 hour

Power
220 V AC to 12 V

Result
Daily displacement changes align with field conditions; manual check data are broadly consistent.

CASE 2

Adjacent Borehole Comparison



Test Site
A metro foundation pit during rail transit construction. Two adjacent inclinometer boreholes were located 20 cm apart.

Comparison Method
A manual sliding inclinometer measured deep horizontal displacement in Borehole 1, while the flexible inclinometer measured Borehole 2.

Conclusion
Over a six-month displacement time-series comparison, both methods showed highly consistent monitoring results. The A-direction deformation trends were fully aligned.

APPLICATION

Slope

Railway track

Bridge

Subway

TECHNICAL SPECIFICATIONS

Parameter	Specification
Function type	Array displacement meter / Flexible inclinometer
Working method	Self-developed MEMS
Measurement direction	3D measurement (X, Y, Z axes)
Angle range	0-360°
Angle resolution	1"
Displacement resolution	0.005 mm
System stability	Better than 0.3 mm / 30 m
Measurement accuracy	0.001%FS; 0.01 mm / 500 mm
Radial compression resistance	Greater than 10^4 N
Diameter specification	18 mm body, 25 mm maximum; segmented joint diameter 29 mm whe n spliced
Connecting rod coaxiality	0.5 mm
Weight	≤0.6 kg/m
Material	Ultra-high-strength metal material
Temperature measurement accuracy	Better than 0.1°
Torsion correction accuracy	Less than 0.5°
Temperature recording	Real-time temperature recording for each section
Acquisition frequency	10 kHz (10 times per second)
Electrical power consumption	DC12V, 3.2 mA/node
Tensile guarantee	Greater than 10^4 N
Waterproof guarantee	300 m, 3 MPa
Working environment	Passed HAST test
Magnetic field interference	Passed EMC test
Electric field interference	Passed EMC test
Deformation trajectory	Real-time playback of deformation trajectory
Length options	Single section 0.3 m, 0.5 m, or 1 m optional
Maximum bending angle at section joint	180°
Assembly method	Free assembly to any length
Segment length	Customizable