



**THE FIRST
MONITORING
CHANNEL**



LANSLIDE
MONITORING
INSTRUMENTATION



San Leo, Italy

__ ROTATIONAL LANDSLIDE



Piezometer (pore pressure)



Piezometer (water table level)



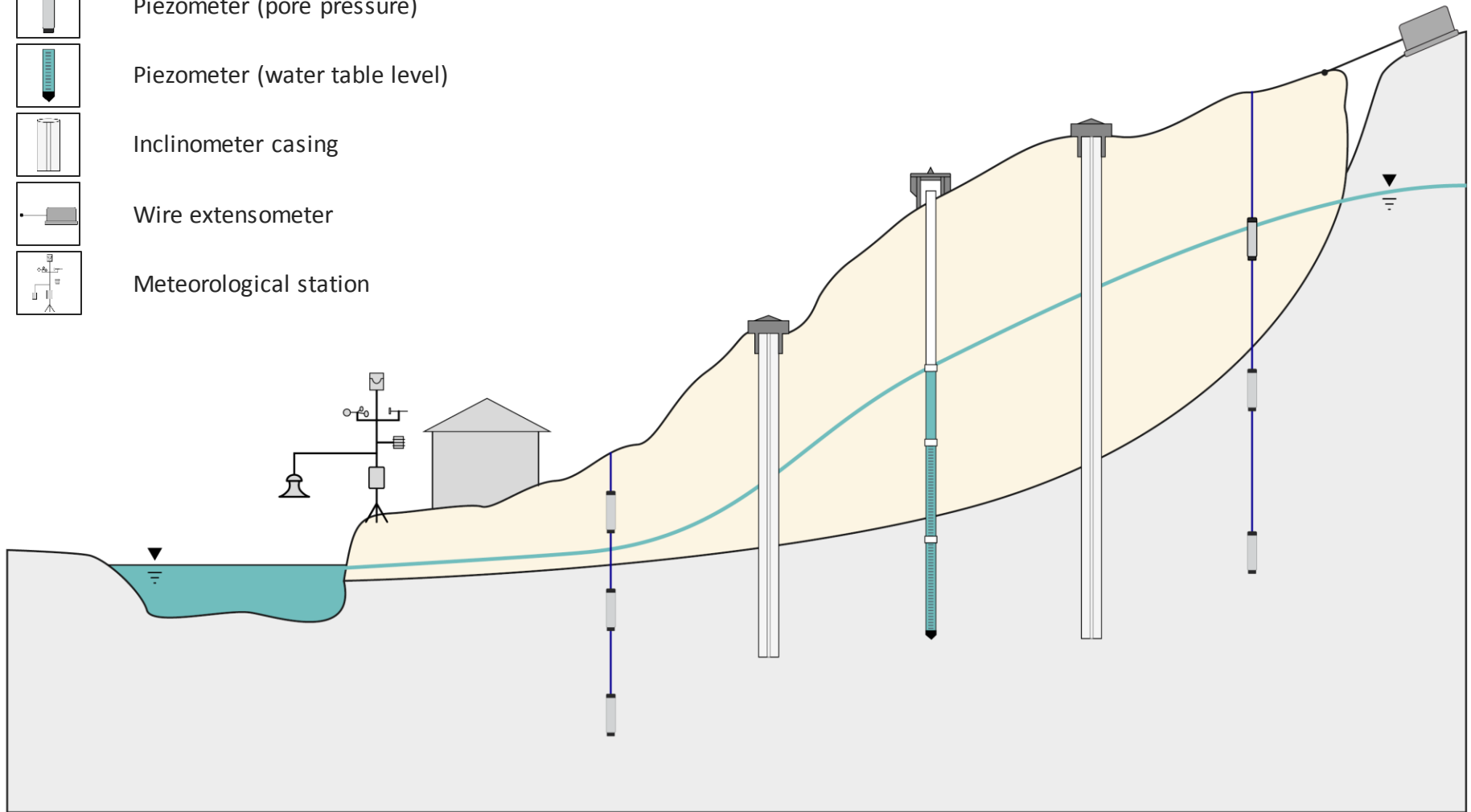
Inclinometer casing



Wire extensometer



Meteorological station



__ PIEZOMETERS FOR PORE PRESSURE



Piezometer (pore pressure)



Piezometer (water table level)



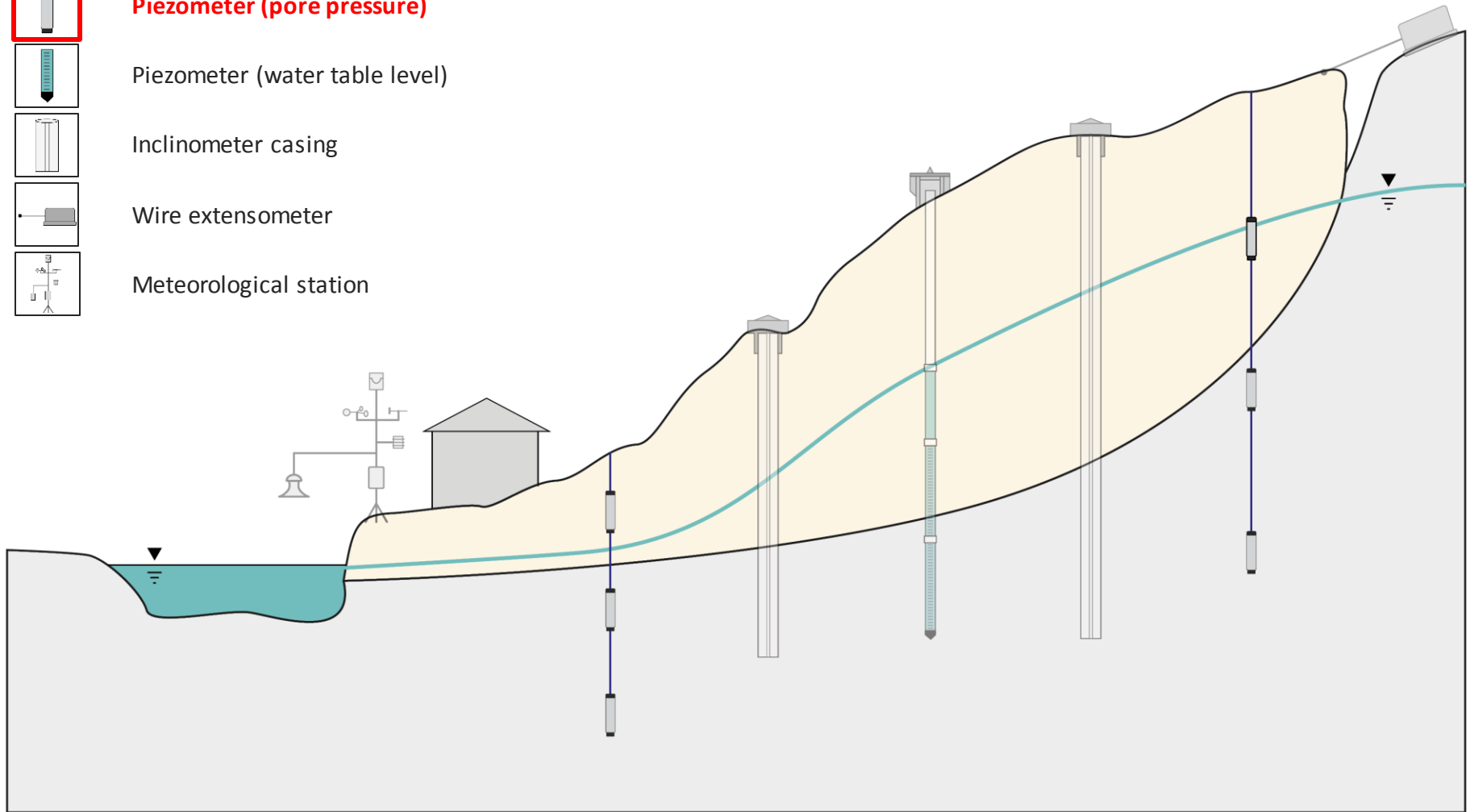
Inclinometer casing



Wire extensometer



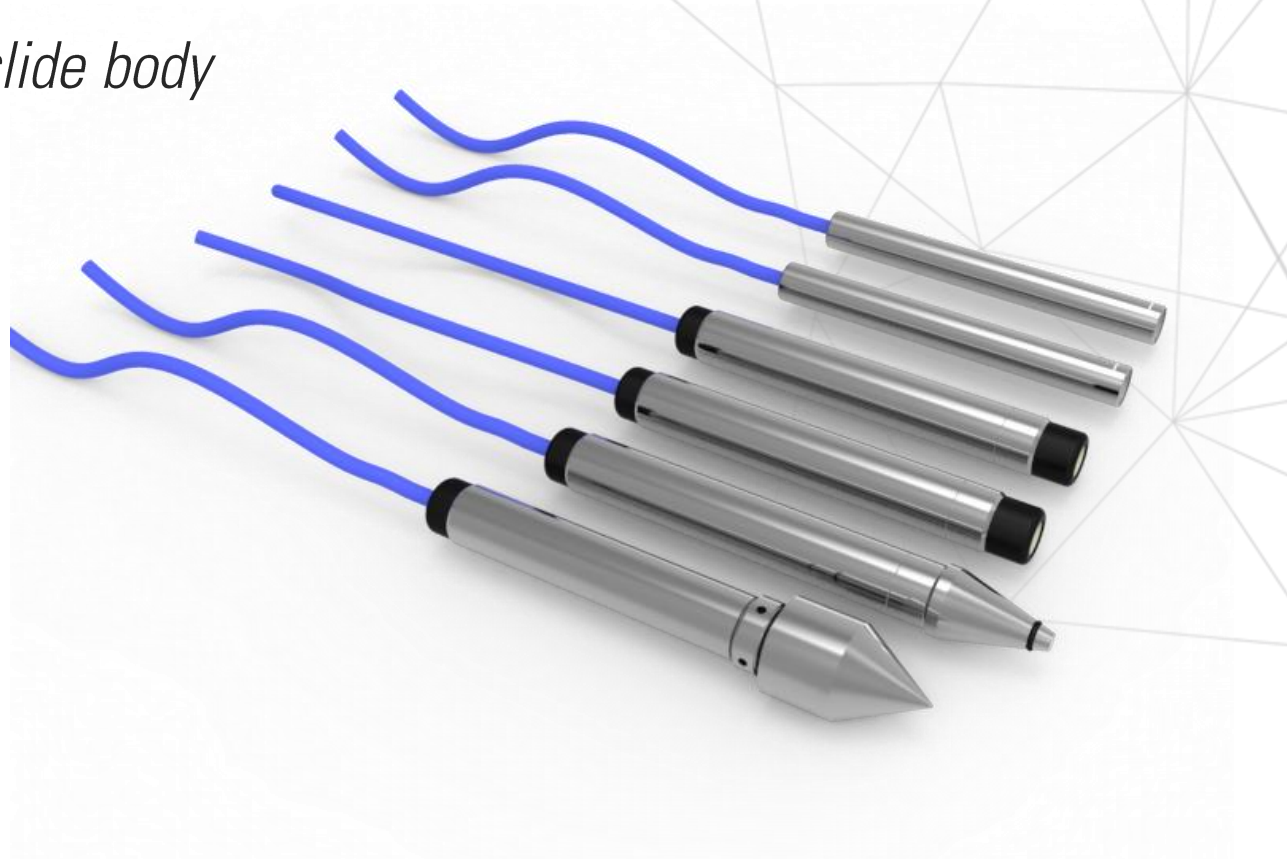
Meteorological station



— PIEZOMETERS FOR PORE PRESSURE

Aims:

- *Pore pressure monitoring in landslide body*
- *Pore pressure under landslide body*



__ PIEZOMETERS FOR PORE PRESSURE



__ PIEZOMETERS FOR WATER TABLE LEVEL (STAND PIPES)



Piezometer (pore pressure)



Piezometer (water table level)



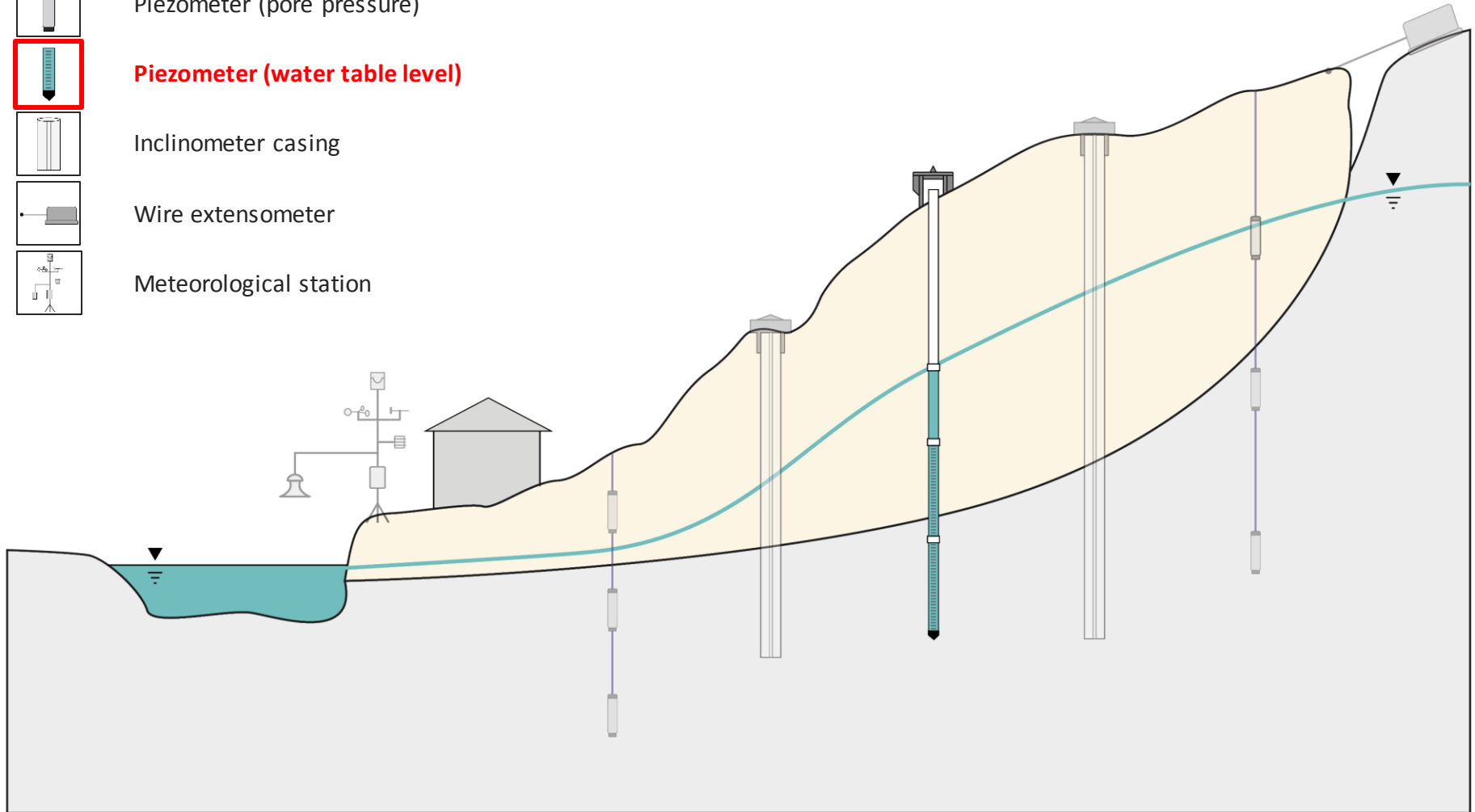
Inclinometer casing



Wire extensometer



Meteorological station



__ STAND PIPE PIEZOMETERS FOR WATER TABLE LEVEL



Sakhalin Island II project

__ STAND PIPE PIEZOMETERS FOR WATER TABLE LEVEL



***Stand pipe piezometer head:
detail of slotted tube with geotextile filter***

__ INCLINOMETER CASING FOR HORIZONTAL DISPLACEMENTS



Piezometer (pore pressure)



Piezometer (water table level)



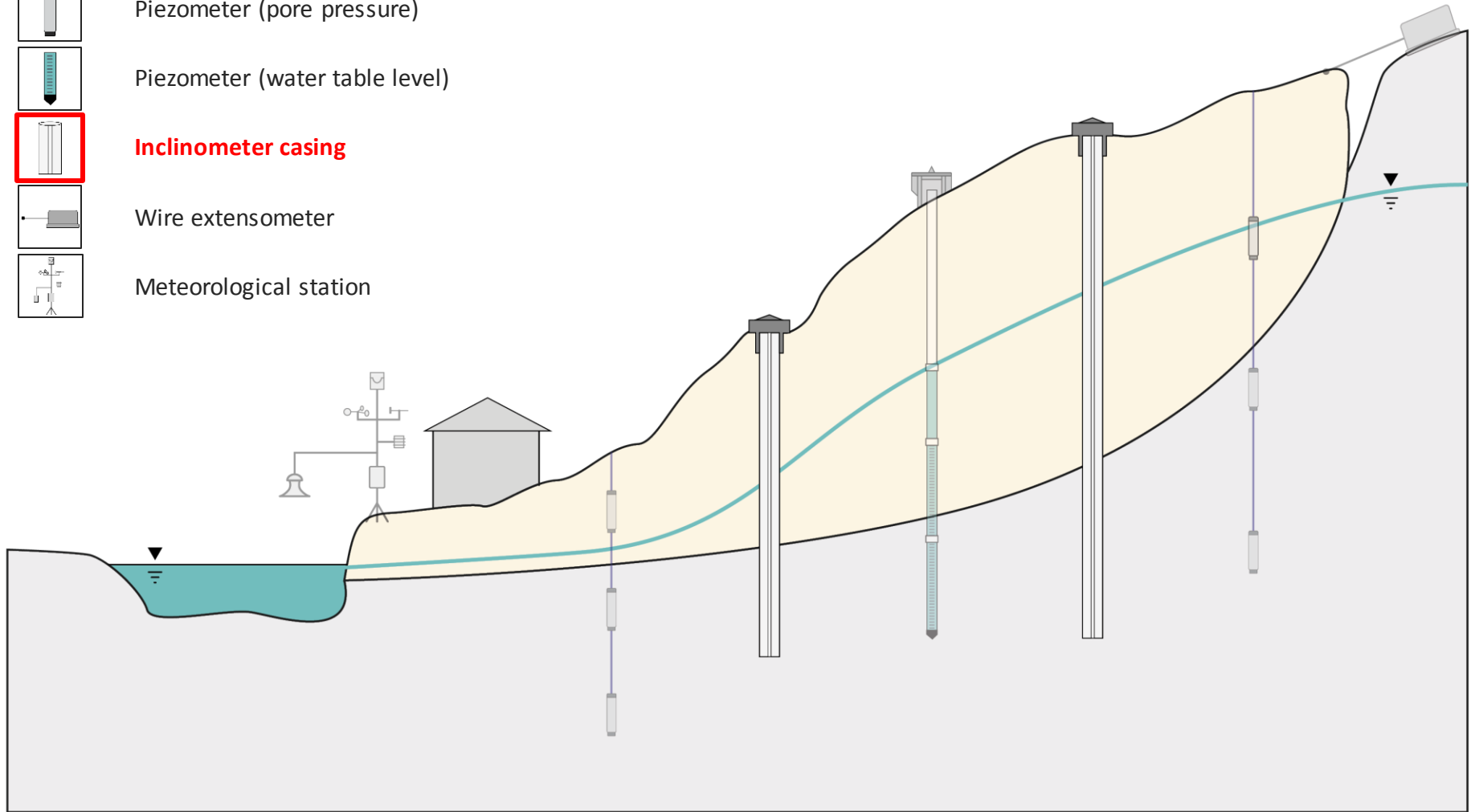
Inclinometer casing



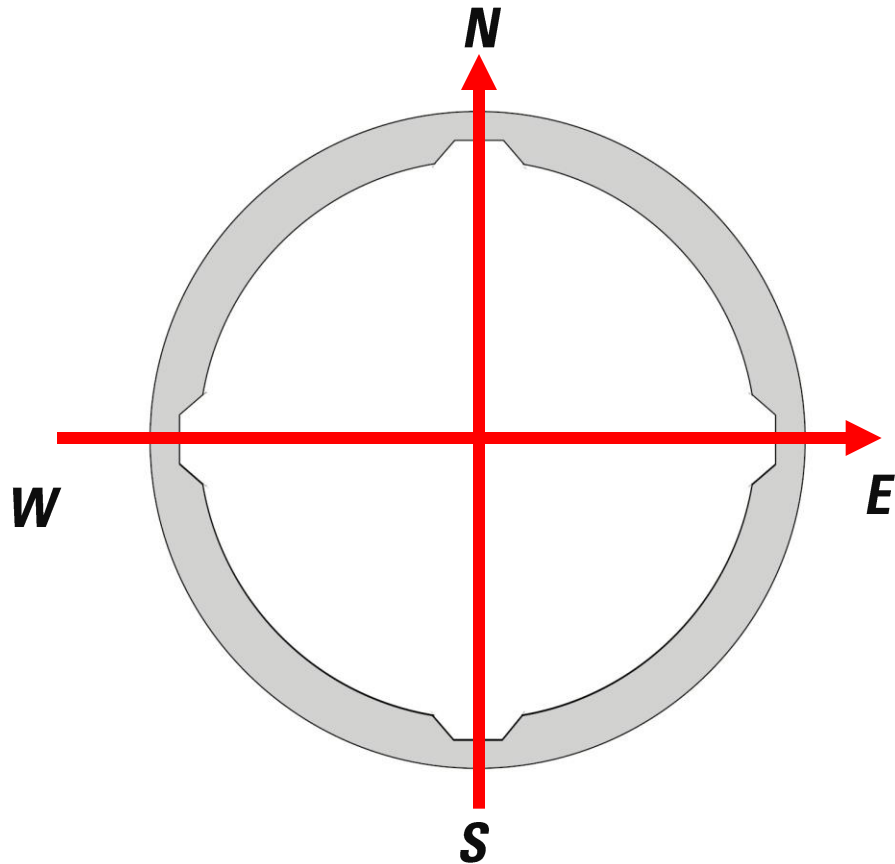
Wire extensometer



Meteorological station

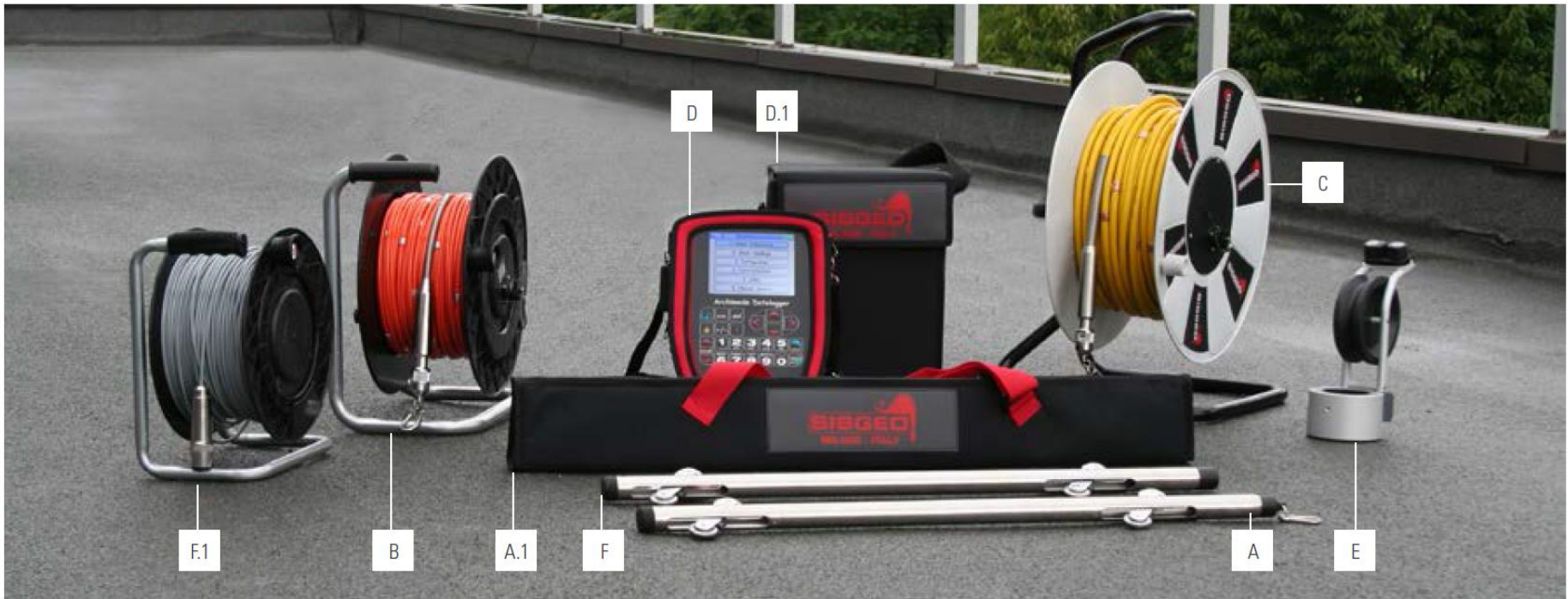


__ INCLINOMETER CASING FOR HORIZONTAL DISPLACEMENTS



***Inclinometer casing section:
4 grooves to guide the probe
in the tube without twisting***

REMOVABLE INCLINOMETER SYSTEM FOR INCLINOMETER CASING SURVEYING



A Digital inclinometer probe

A.1 Travel bag for both inclinometer and dummy probes

B Light inclinometer cable reel

C Heavy-Duty cable

D Archimede readout

D.1 Archimede carrying case

E Pulley assembly

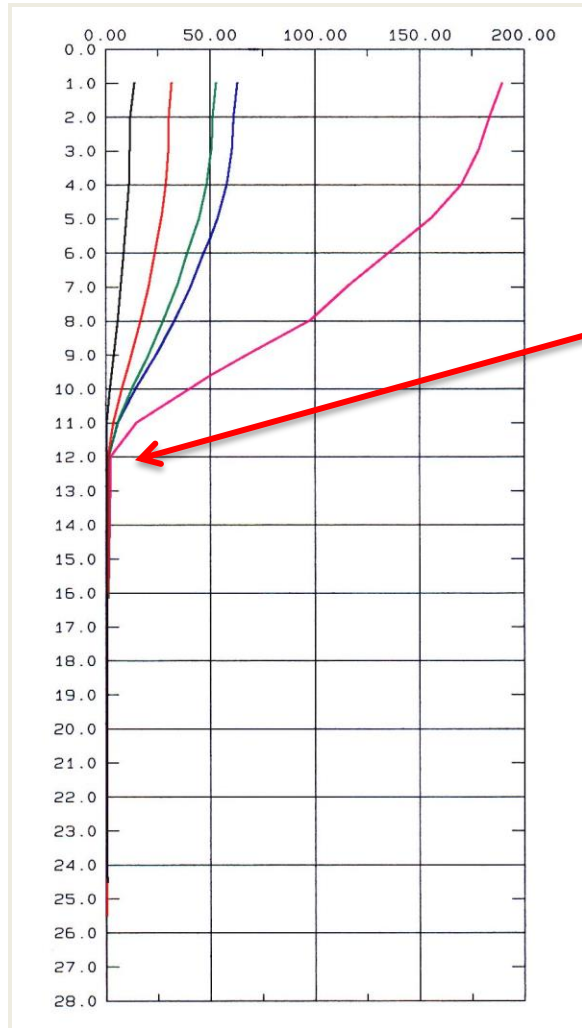
F Dummy probe

F.1 Cable for dummy probe

— REMOVABLE INCLINOMETER SYSTEM FOR INCLINOMETER CASING SURVEYING



REMOVABLE INCLINOMETER SYSTEM FOR INCLINOMETER CASING SURVEYING

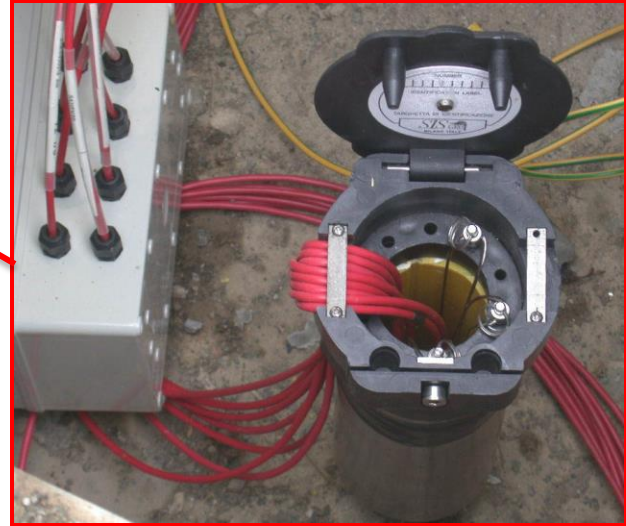
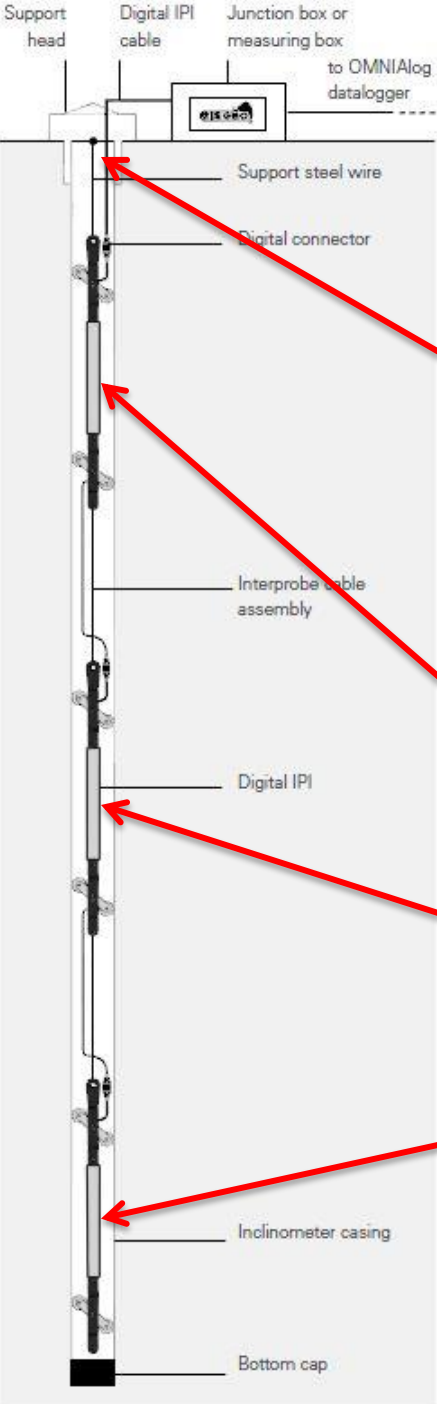


In this landslide example is clear that at depth -12.0m there is a slipping surface

IN-PLACE INCLINOMETERS (IPI) FOR AUTOMATIC INCLINOMETER MONITORING

Support top cap after installation

IPI probes

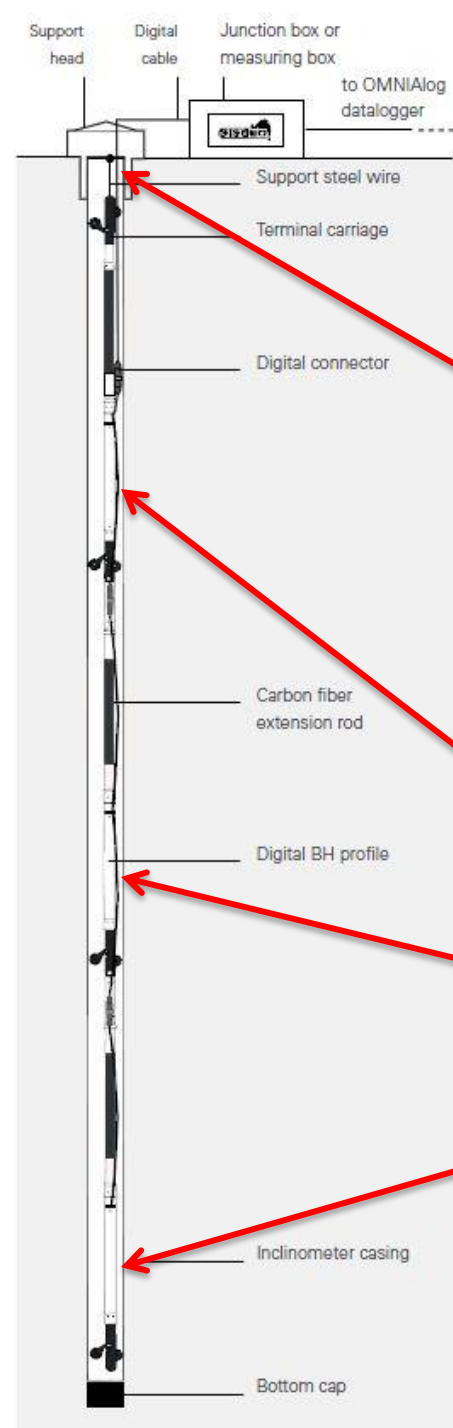


BH PROFILE INCLINOMETERS FOR CONTINUOUS BOREHOLE PROFILING

Support top cap after installation



Digital BH profile inclinometers with carbon fiber extension rod



— WIRE EXTENSOMETER



Piezometer (pore pressure)



Piezometer (water table level)



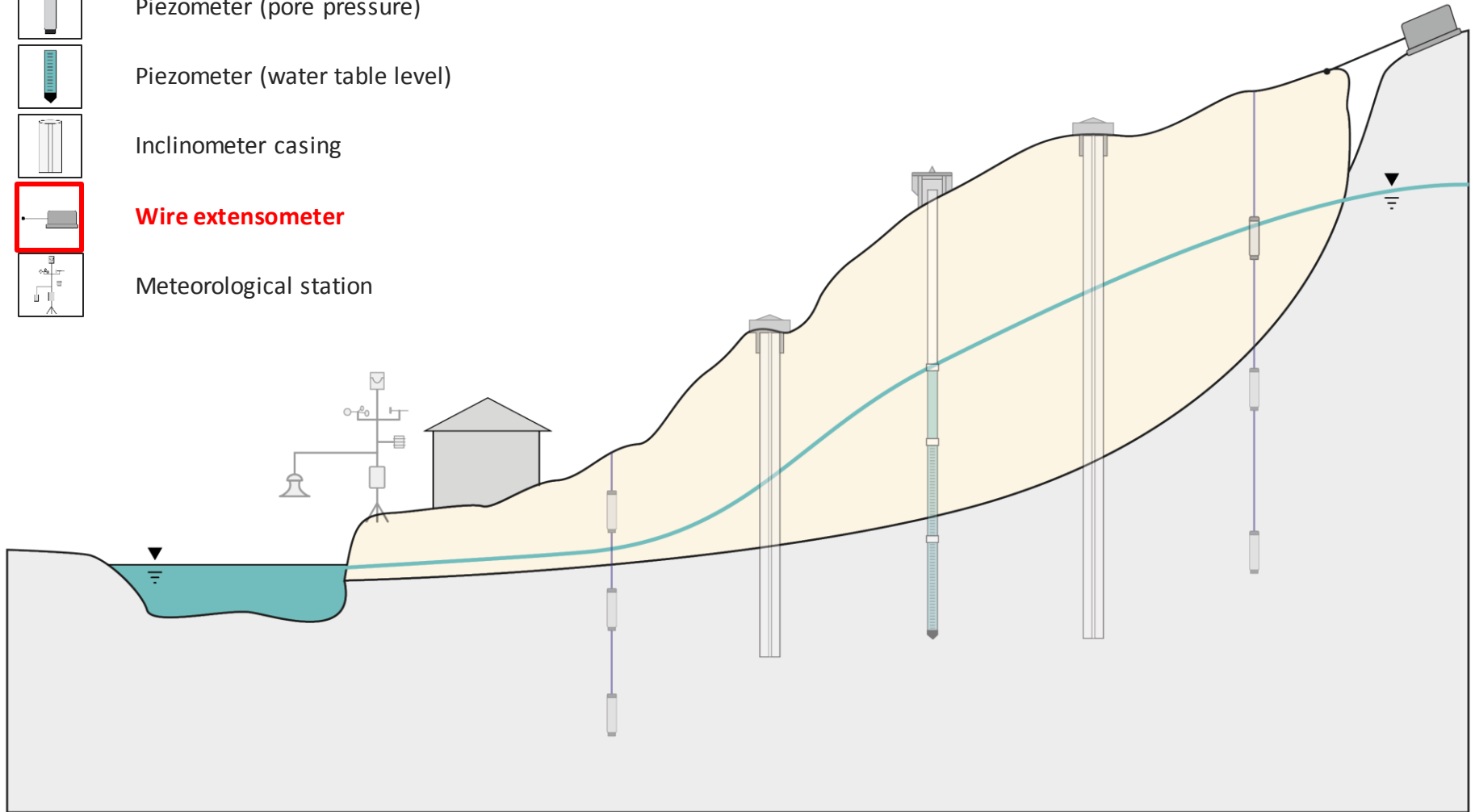
Inclinometer casing



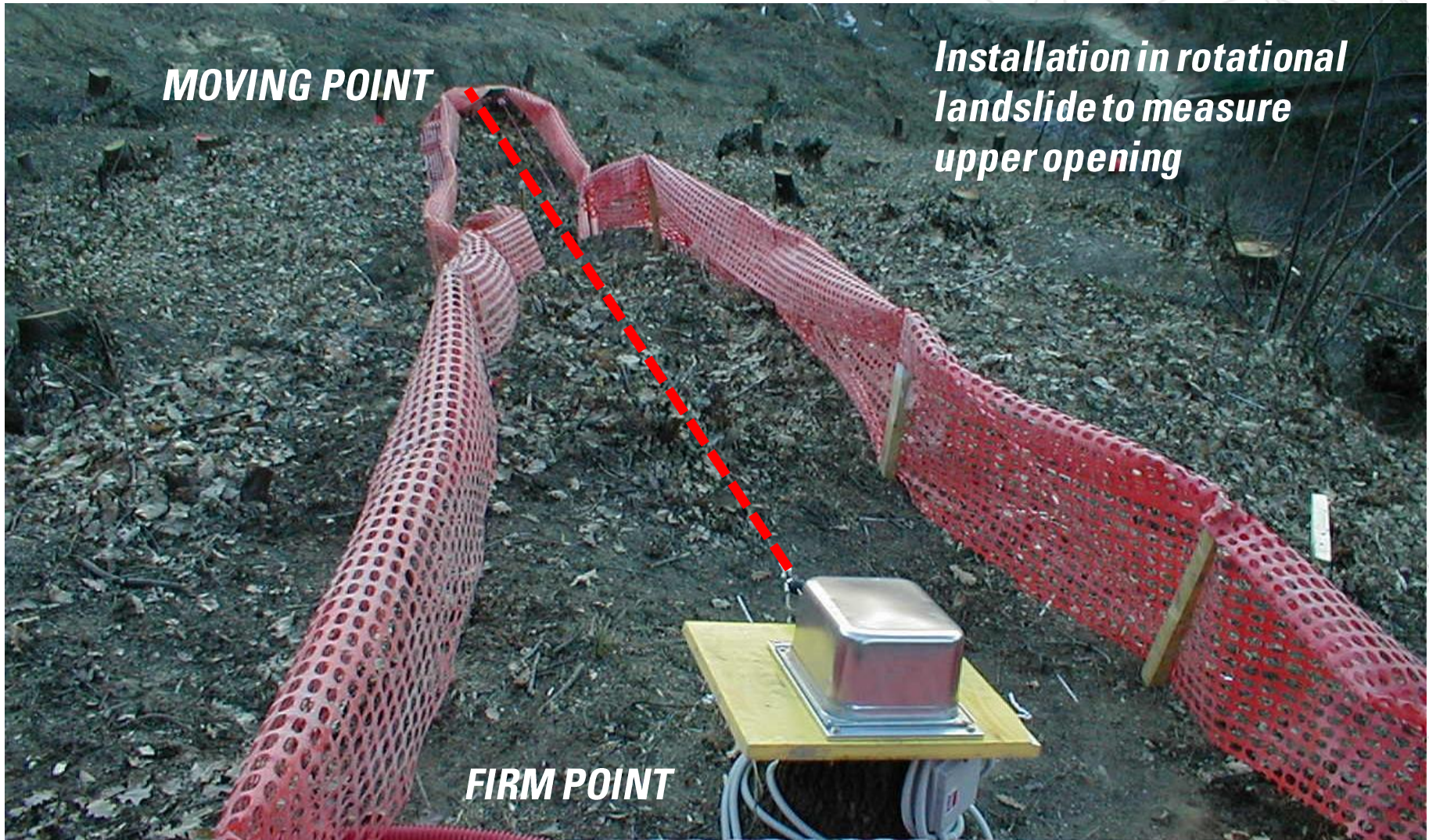
Wire extensometer



Meteorological station



— WIRE EXTENSOMETER



__ METEOROLOGICAL STATION



Piezometer (pore pressure)



Piezometer (water table level)



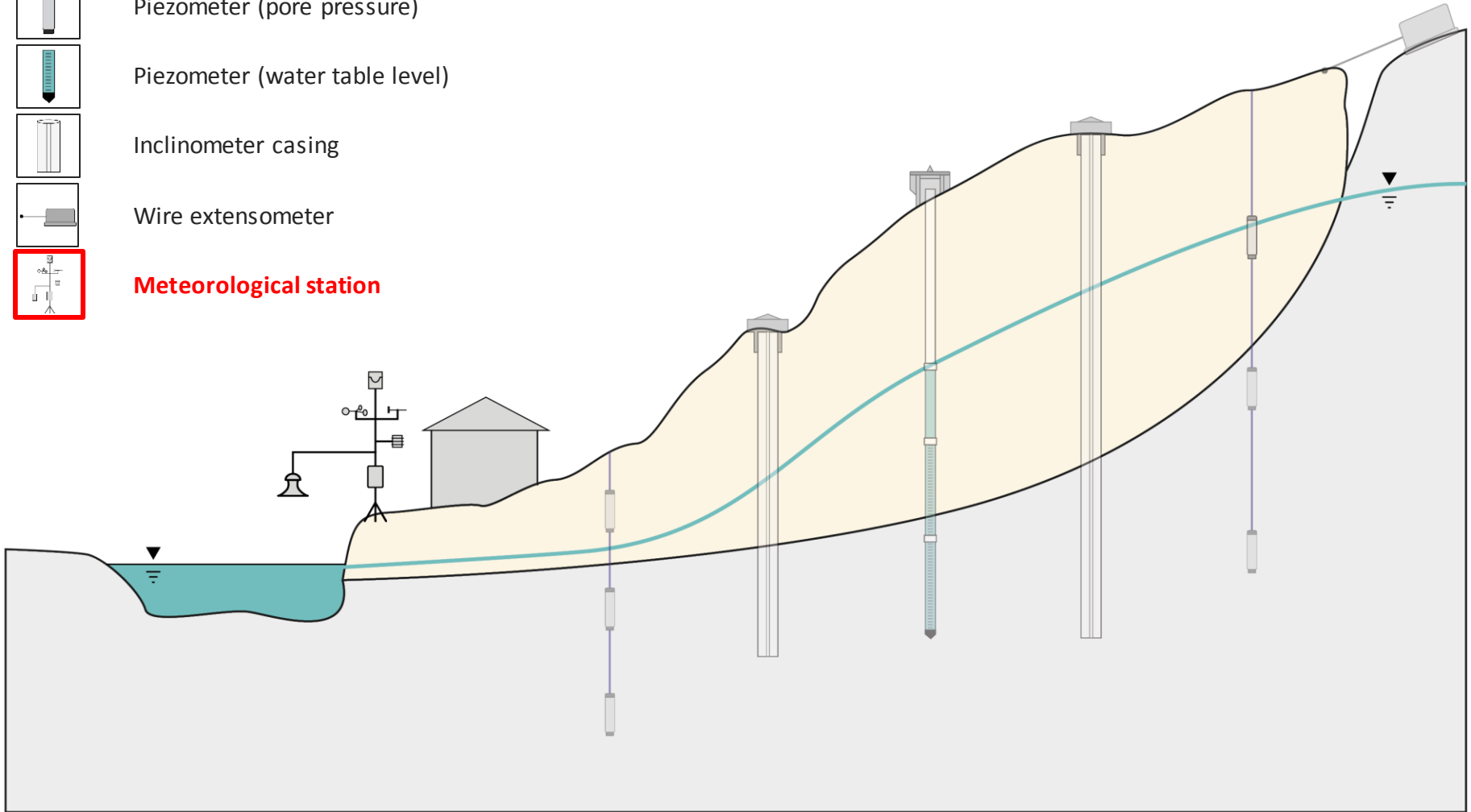
Inclinometer casing



Wire extensometer



Meteorological station



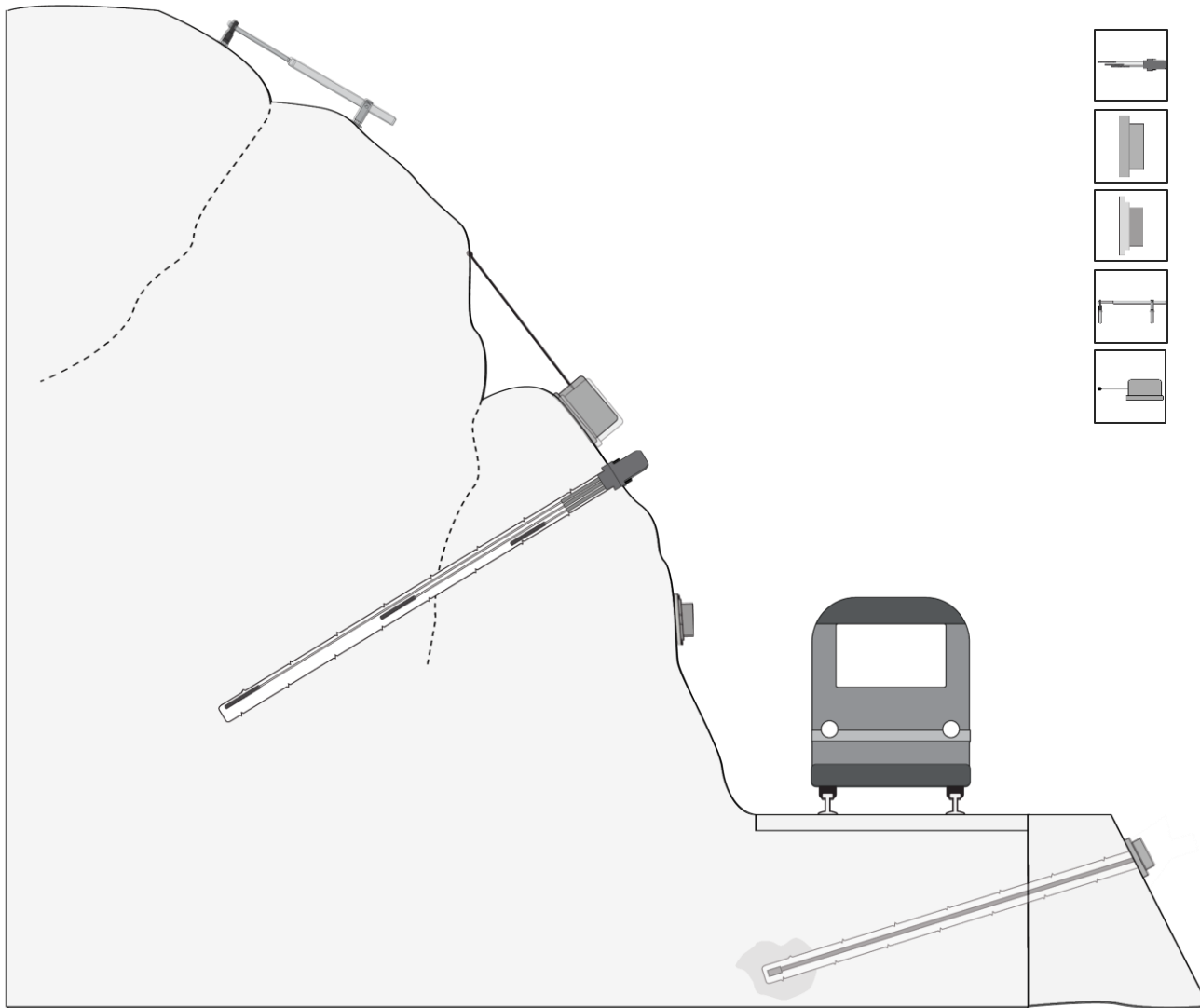
— METEOROLOGICAL STATION

Usually composed by:

- *Rain gauge*
- *Wind speed gauge*
- *Wind direction gauge*
- *Air temperature gauge*
- *Air humidity gauge*
- *Barometer*
- *Datalogger powered by solar panel*



__ ROCKFALL OR TOPPLE LANDSLIDES



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter

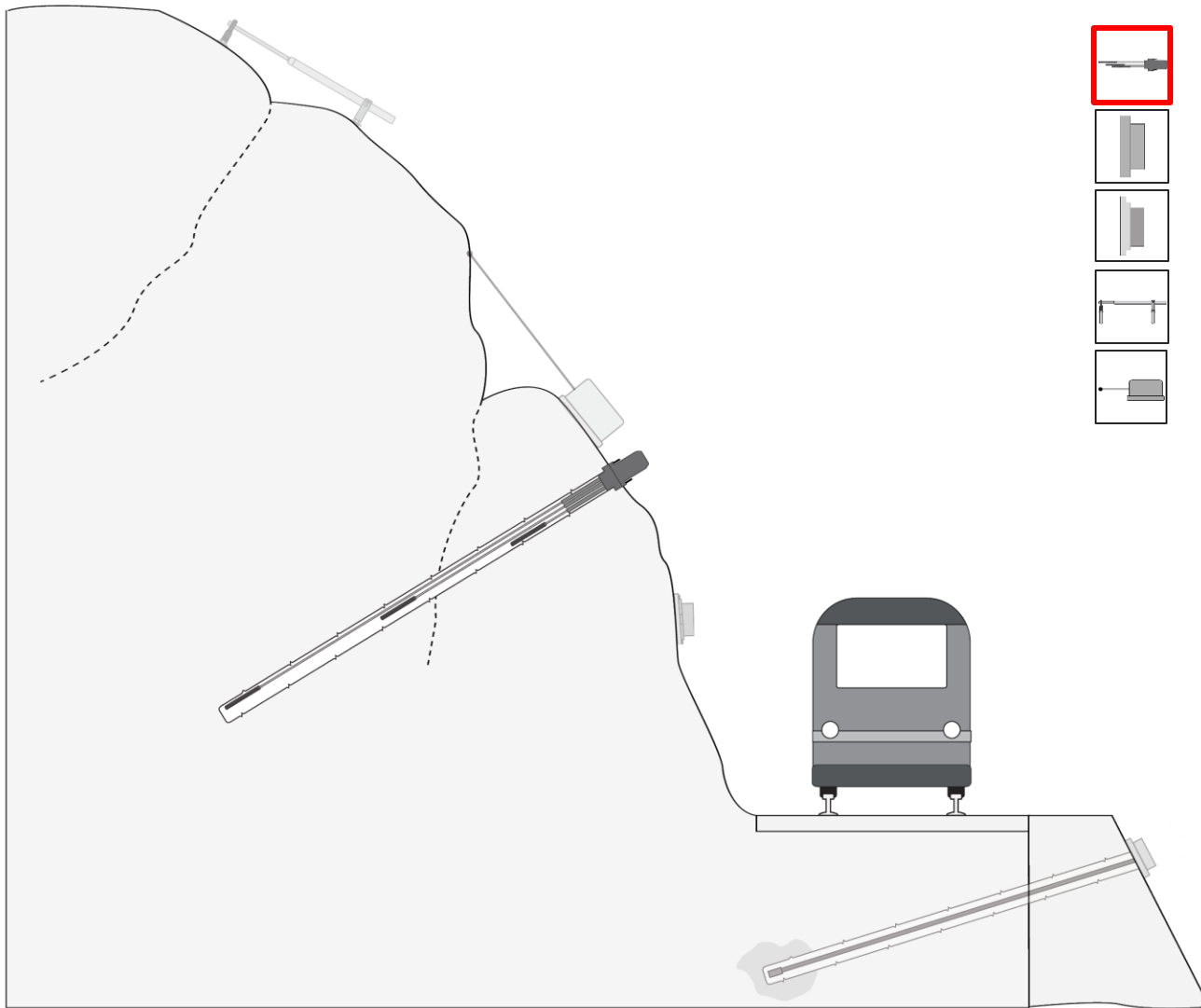


Crack meter



Wire extensometer

MPBX MULTIPOINT BOREHOLE EXTENSOMETER



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter



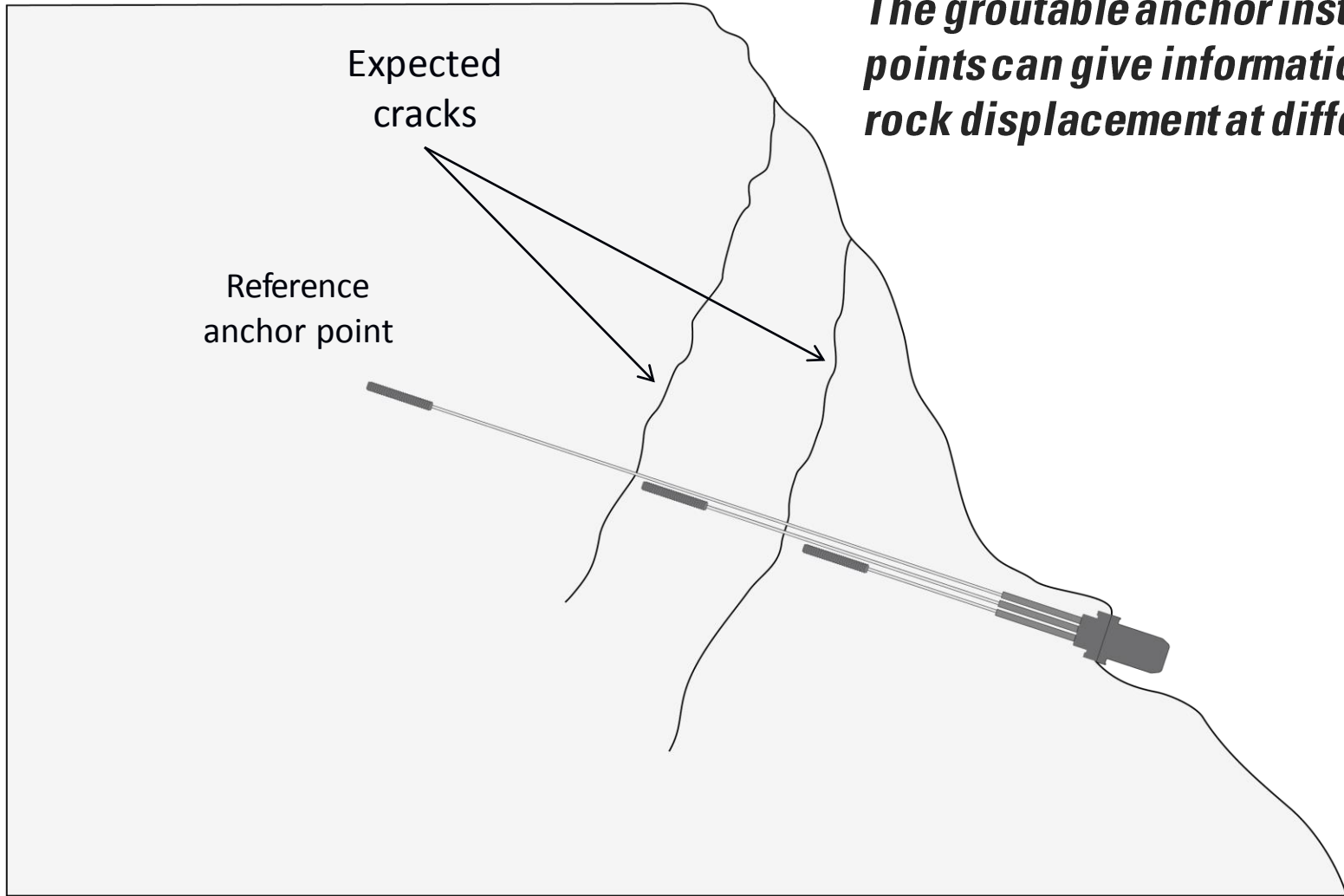
Crack meter



Wire extensometer

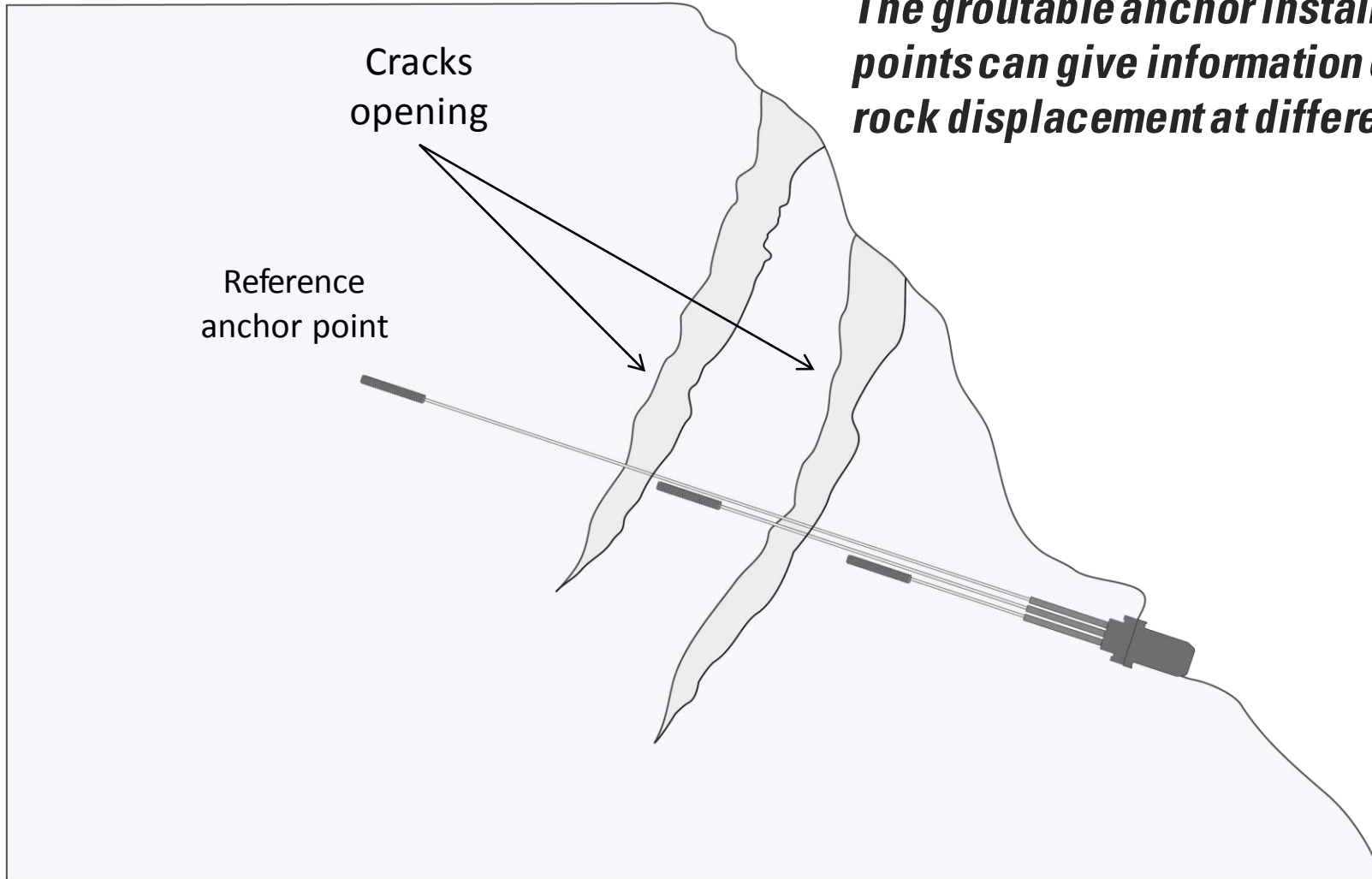
__ MPBX MULTIPOINT BOREHOLE EXTENSOMETER

The groutable anchor installation points can give information of internal rock displacement at different depth



__ MPBX MULTIPOINT BOREHOLE EXTENSOMETER

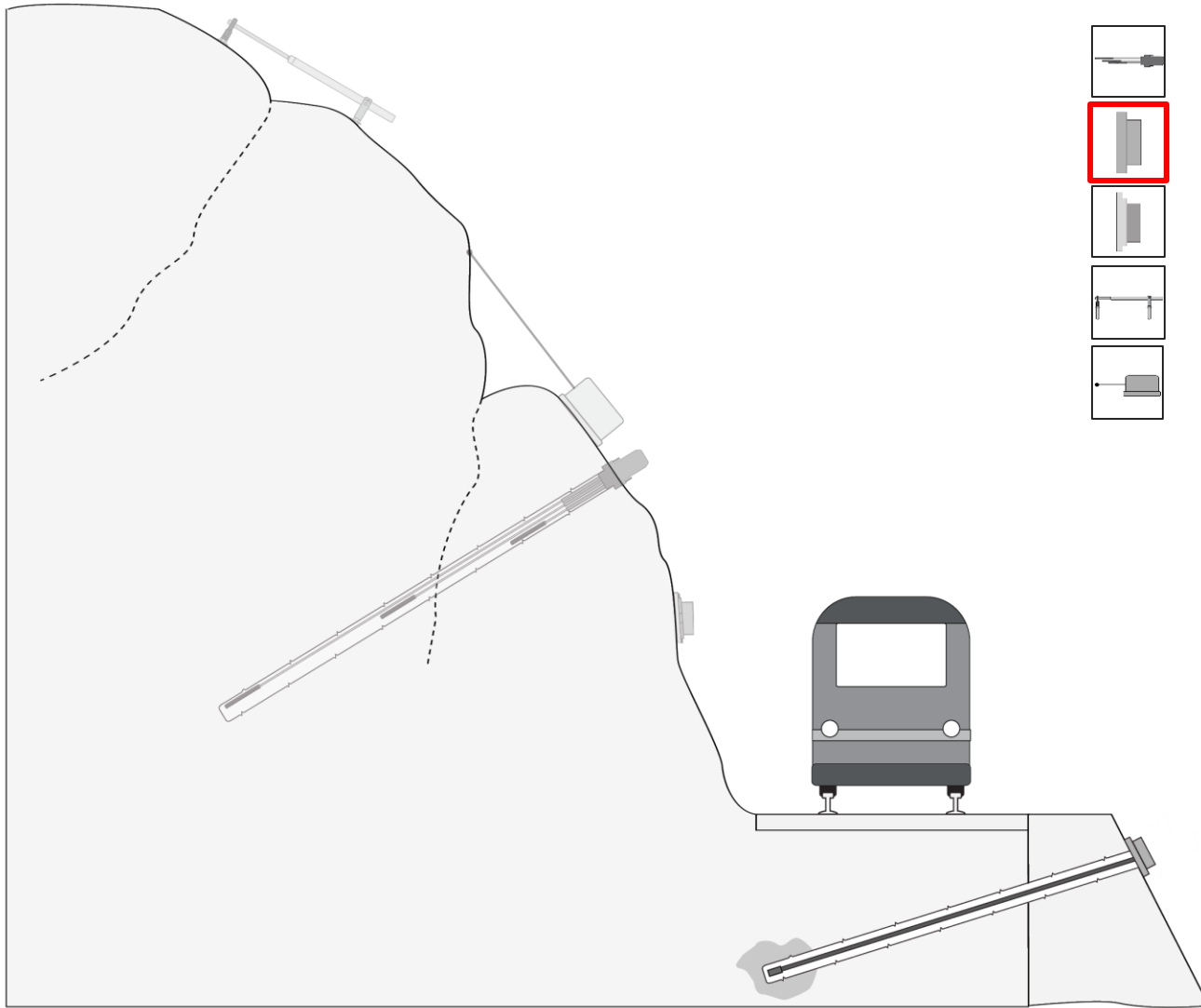
The groutable anchor installation points can give information of internal rock displacement at different depth



__ MPBX MULTIPOINT BOREHOLE EXTENSOMETER



— ANCHOR LOAD CELL



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter



Crack meter



Wire extensometer

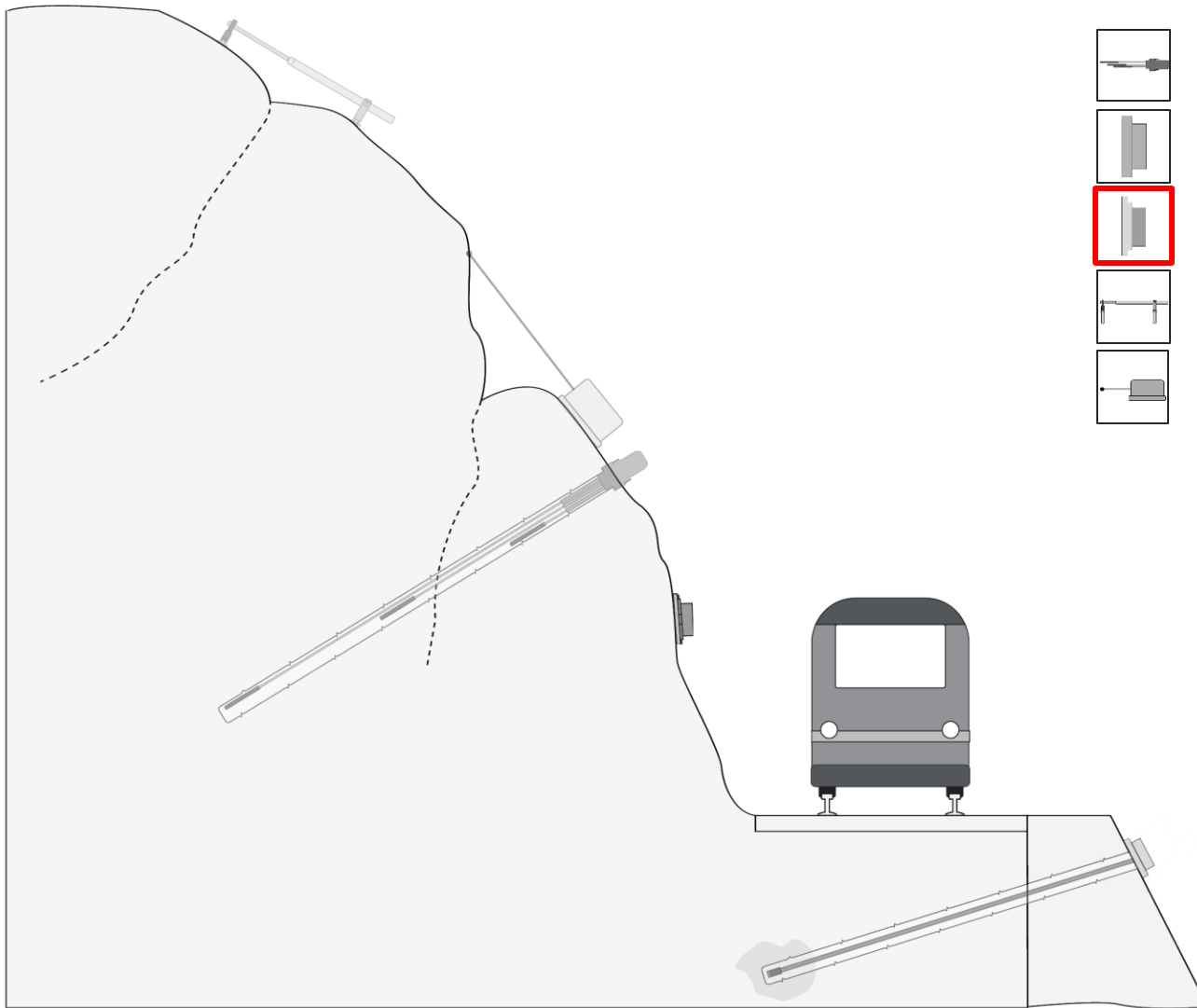
— ANCHOR LOAD CELLS ON RETAINING WALL



— ANCHOR LOAD CELLS ON RETAINING WALL



TILTMETER



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter



Crack meter



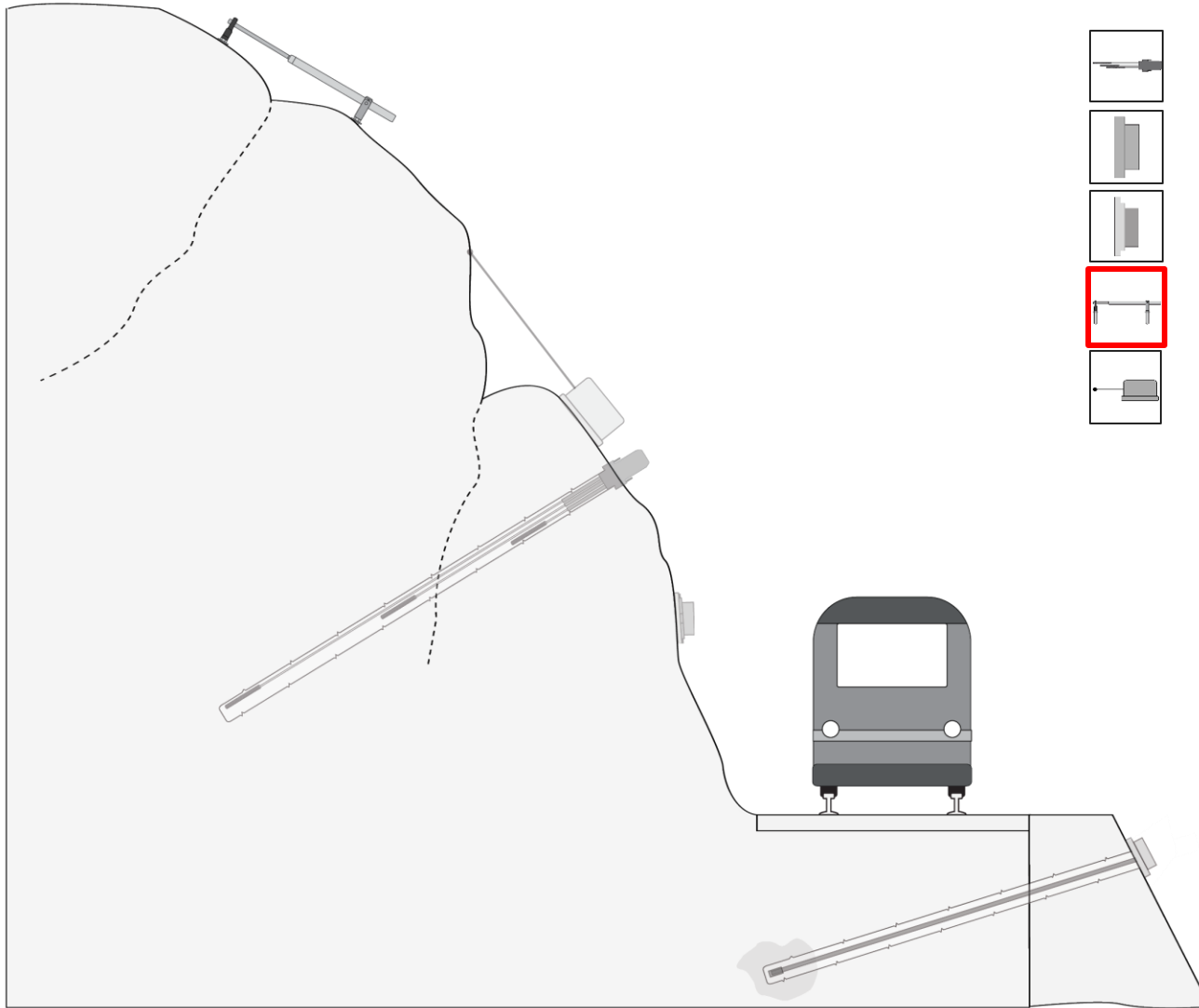
Wire extensometer

— TILTMETER

***IP68 waterproof tiltmeter installation
on rockfall landslide***



— CRACKMETER



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter



Crack meter

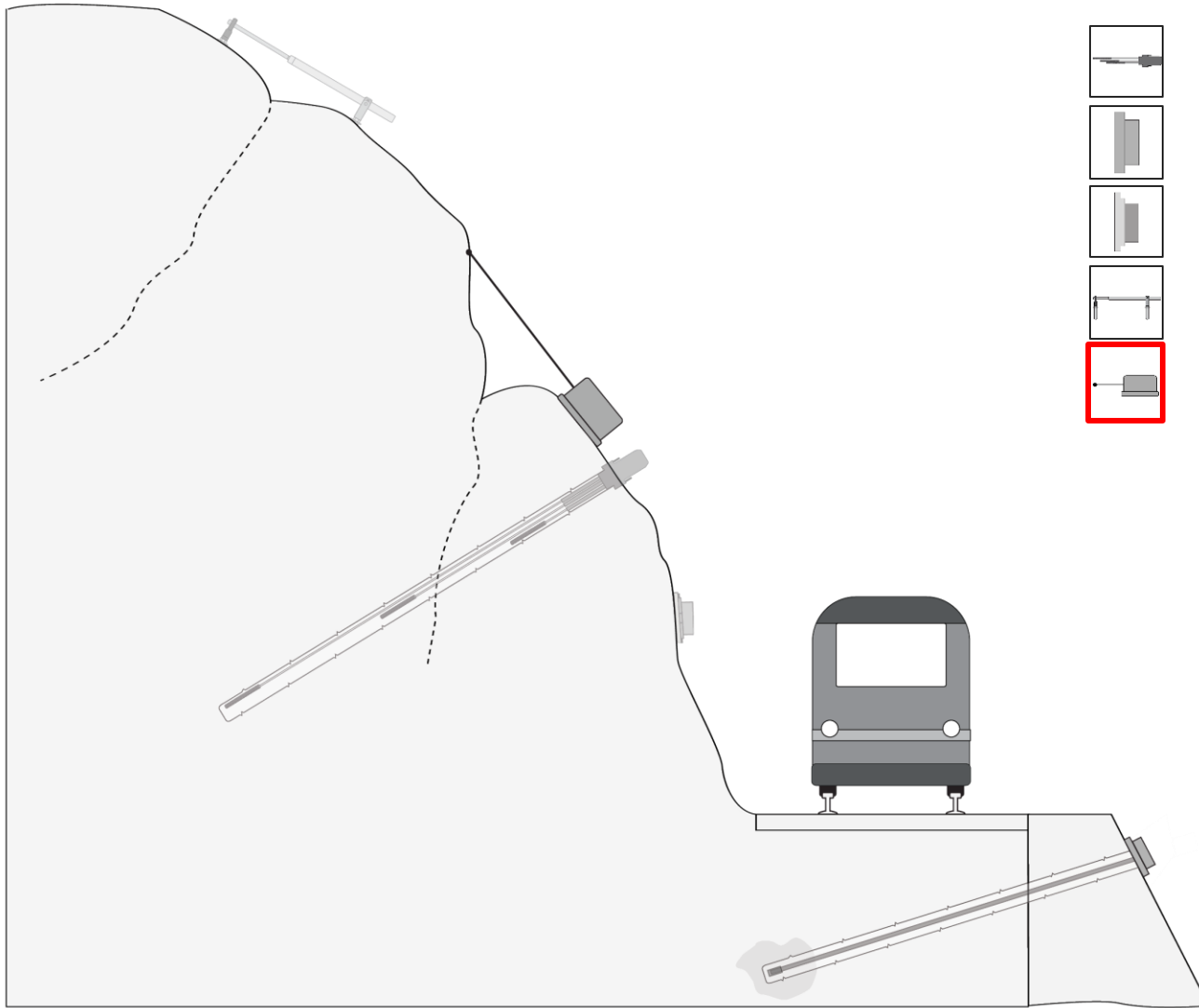


Wire extensometer

— CRACKMETER INSTALLED ON ROCK WALL / MASS



— WIRE CRACKMETER



MPBX Multi Point Borehole Extensometer



Anchor load cell



Tiltmeter



Crack meter



Wire extensometer

— WIRE CRACKMETER ON TOPPLE LANDSLIDE



— LANDSLIDE MONITORING: DATA ACQUISITION SYSTEM

Instruments installed for landslide monitoring provide automatic real-time monitoring by means of OMNIAlog datalogger.

Usually in landslide DAS are powered by solar panel package.

With an internet 3G router, OMNIAlog can provide remote system management, data pushing on a server and alarms.





THANKS FOR WATCHING

*For any further clarification
visit www.sisgeo.com
or email us: info@sisgeo.com*