

DICLAS : Continuous distance measurement by laser

The LMS has developed a new device for continuous distance measurement by laser called DICLAS (D**I**stanc**E** en C**O**ntinu par L**A**Ser). The system includes a Data Disto™ RS232, a reflecting prism, a portable micro-computer and a power supply system which may be self-contained (Fig. 1).

This device aims at the automatic logging of the evolution of the displacement of a mobile point with time, which is located for instance in an unstable zone (Fig. 2), or on an excavation wall (Fig. 3). These DICLAS are available at a reduced price.

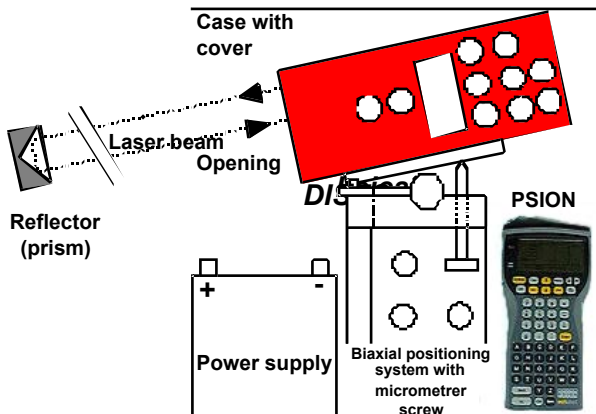


Fig. 1: Outline of measurement system DICLAS
 Obtained precisions:
 ±1 mm at 10 m
 ±3 mm at 140 m
 ±5 mm at 400 m

The Disto™ emits a modulated laser beam and calculates the distance to the reflector prism by the measurement of the dephasing between the emitted and reflected beam. This distance, which can be averaged on several readings, is recorded in a file of the micro-computer which also provides the piloting of the device. The measurement is done according to the direction of the movements, with a possible lateral offset of the prism of some 40 cm at 400 m.

The nominal range of the Disto™ of 140 m can be extended to more than 400 m by the use of an adequate reflector, considering that the information sought after is a distance variation. In order to obtain a good precision, the installation of the device must be optimal (concrete base for the DICLAS, and prism tightly fixed to the observed point).

The system can operate day and night, even in extreme climatic conditions, but not in case of fog or intense rainfall. The autonomy, limited by the size of the data file, exceeds one month with readings every 15 minutes.

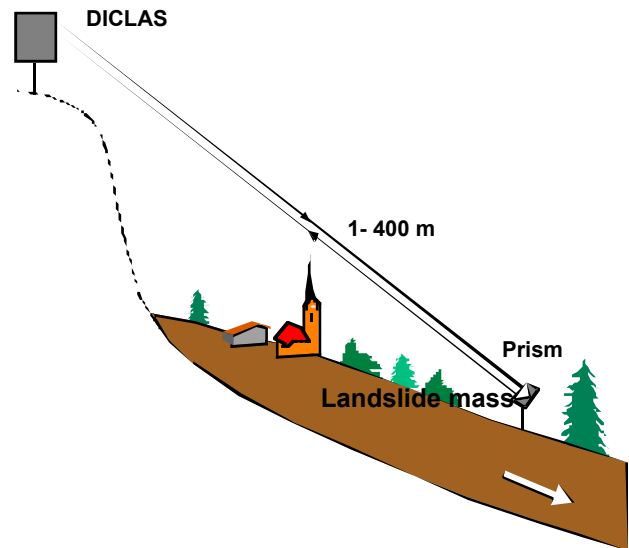


Fig. 2: Setting of the DICLAS device on a landslide.

The advantage of this device in comparison with the Invar wire classical system lies in a larger measuring range, in the lack of sensitivity to the wind and rime and to a reduced impact on the environment.

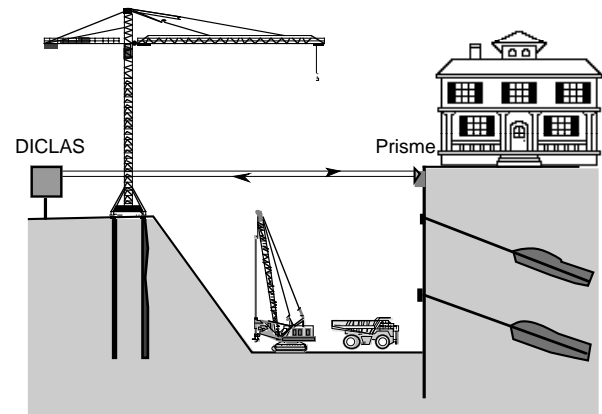


Fig. 3: Application to an urban working site.

Publications

- Ch. Bonnard, G. Steinmann, 1996. A new distancemeter for continuous measurement of landslide displacements. *Revista Italiana di Geotecnica* N° 2/97, pp. 8-14.
- G. Steinmann. 1996, DICLAS: Un appareil de mesure des distances en continu par laser. Rapport interne LMS, EPFL, Lausanne.