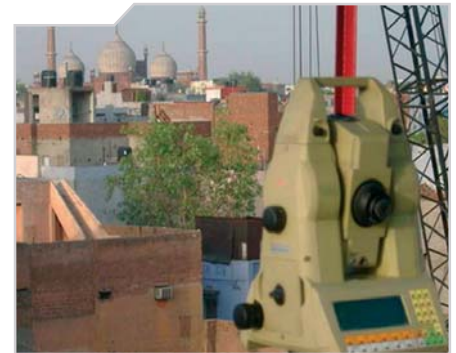


GeoRobot - Automatic 3D-Deformation Monitoring System

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HIGHLIGHTS

- Combination of multiple measuring stations for large survey areas
- Measuring stations and measuring points can be up to 1 km apart
- Simple extension of the observation plan by direct measurement of new points
- Automatic adjustments of the measuring cycles and the observation plan via the Internet
- Extensive alarm options



GeoRobot during construction of Metro Delhi

Field of Application

Automatic measurement of 3D displacements are required wherever objects and landscapes are under threat and need to be monitored, but where manual single measurements fall short of the required measuring frequency or in inaccessible locations. This is often the case in the inner city, e.g. when subways are built or where unstable slopes must be monitored.

In addition, there are many project-specific instances of applications not only in the construction sector, but also in industry and in testing and development, such as stability investigations during fire tests or during geotechnical tests.

System description

The measurements to the observation points are carried out at arbitrary intervals from mobile total stations at fixed positions. The measuring points are fitted with suitable targets (glass prisms). The survey is controlled via the EUPALINOS software system and is based on the automatic target recognition capability of modern total stations. Consoles or pillars are used to accommodate the instruments and, if necessary, they can be re-located and controlled by free stationing in the course of the measurements. Instability of observation points is strictly compensated via a balancing calculation, optionally also



Prisms for monitoring a power-generating machine

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taking into account the distance scale. In this way, given a suitable survey configuration, meteorological data need not be measured.

If required, multiple total stations can be combined in a network to monitor widely dispersed areas. In this case the data from the individual measuring stations are transmitted to a central server via (radio) LAN or ISDN and administered in a database. The data are also independently stored on the specific control computer of the individual measuring stations. Depending on the configuration, output of diagrams and the triggering of various alarm procedures are handled locally by the EUPALINOS software, or centrally by the KRONOS database system.



Measuring station for monitoring a sliding slope in a mine

Procedure

- Checking communication between total station and PC
- Initialisation of the instrument and measurement of the vertical axis inclination
- Reference measurement (determination of instrument position parameters, oriented and optionally coordinates and height)
- Measurement of monitoring points
- Evaluation by intermediary net adjustment and transfer of the results to the database
- Logging of all measurements and evaluation data
- Transfer of modified observation configurations and monitoring frequencies
- Checking of alarm criteria
- Alarming in case of exceeding values and general errors

System components

- Leica total stations TPS1000, TPS1100, TPS1200 or TPS2000
- Suitable targets (prisms) in respect of distance and accuracy
- Standard or industry PC (according to operating conditions)

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Deformation Monitoring System**

- Wireless modem, WLAN-adapter or data cable for connecting the total station to the control computer
- LAN, WLAN or UMTS for cross-linking the monitoring stations and remote control of the control computer
- Power supply unit for total station, PC and modems
- EUPALINOS Surveying Software

The following other data sheets are associated with this data sheet:

<u>Services:</u>	<i>Optical 3D-Deformation Monitoring Targets and Marking Material</i>
<u>Hardware:</u>	<i>Mobile Console</i>
<u>Software:</u>	<i>EUPALINOS Surveying Software KRONOS Tunnel Information System</i>
<u>Systems:</u>	<i>DAMOS - Automatic Data Acquisition System</i>