



Excavations

TRIMBLE MONITORING SOLUTIONS

SOLUTIONS FOR SAFE EXCAVATION OPERATIONS

The Role of Monitoring

Activities associated with deep excavations can cause ground movements, vibrations and shocks that affect buildings within the zone of influence of the excavation.

Pre existing conditions in buildings adjacent to deep excavations must be determined prior to excavation commencement by baseline monitoring and structural assessment. Piling operations employed within the excavation, particularly impact, explosion or vibration piling are further sources of potential structural damage.

It is important to detect movements, vibrations, structural changes and responses of buildings to these local conditions in order to identify potential failure scenarios. Managing the risk of infrastructure damage caused by the excavation operations in dense city environments is a major challenge for civil contractors, one that is directly addressed by the installation of a structural monitoring system.

The Focus of Monitoring

It is necessary to establish baseline measurements of the positions of buildings prior to the commencement of excavation operations, particularly if dewatering or vibration related piling is to form part of the excavation and construction operations.

Rotation of the adjacent buildings, when considered as rigid bodies of varying stiffness, is very important in assessing excavation induced damage. The monitoring system must measure rotation, translation and settlement parameters, as well as strain and vibration within the structure. These parameters must form the primary focus of the monitoring system.

This data is observed using total stations, levels, tilt and crack meters, inclinometers, strain gauges and accelerometers coupled to suitable data loggers and data communication equipment.

This information is recorded accurately and repeatedly at the start of the contract, during the course of the excavation operations and for a defined maintenance period after contract completion.

Trimble 4D Control

Trimble® 4D Control™ software is the key element of the Trimble Monitoring system. The modular design facilitates an industry specific solution, capturing data from GNSS, optical, geotechnical and seismic sensors.

The solution provides a variety of web based visualization and analysis tools to identify potential failure scenarios.

Information from different sensor types may be combined with displacement indicators like slope distance change, settlement, displacements or tilt to detect common failure indicators.

Significant events such as piling activities, downtime, dewatering or grouting activities, maintenance and construction related events, images and documentation may be logged and referenced on the charts.

Comprehensive alarm conditions may be set with notifications issued by email and SMS to selected recipients Audible and visual alarms may also be triggered

Designed for Demanding Environments

The Trimble Monitoring Solution is ideally suited for the monitoring of infrastructure above, below and within the tunnel operation by the geotechnical, seismic and survey monitoring analyst .

Intricate data from multiple sensor types is converted into meaningful information from which informed decisions can be made with confidence.

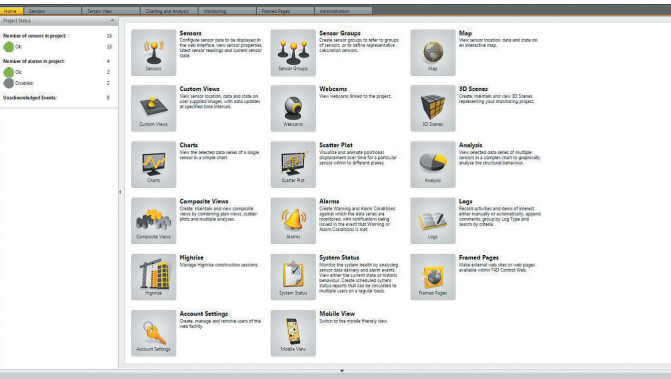
The solution can integrate manual surveying and data acquisition operations into a complex automated monitoring system using the Trimble 4D Control software.

Key Features

- ▶ Automated, real-time monitoring system
- ▶ Structural deformation monitoring
- ▶ Periodic deformation surveys
- ▶ Stability assessment next to construction activity
- ▶ Long and short term analysis of structural behavior
- ▶ Vibration related structural analysis



Excavations TRIMBLE MONITORING SOLUTIONS



TRIMBLE S7, S9 TOTAL STATIONS

Advanced total stations that combine Trimble FineLock™ technology with long-range, distance measurement to provide fast and precise monitoring measurements.

TRIMBLE NETR9® TI-M GNSS RECEIVER

A full-feature, top-of-the-line receiver with an industry-leading 440 channels for unrivaled GNSS multiple constellations tracking performance intended for monitoring applications.

TRIMBLE DINI® DIGITAL LEVEL

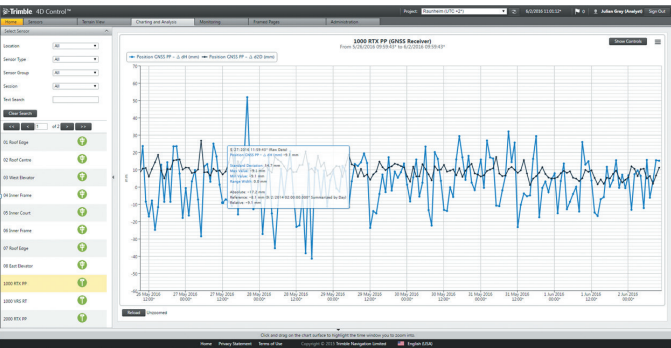
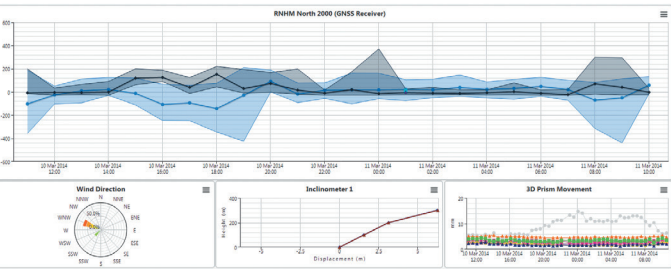
A digital height measurement sensor for any job site where fast and accurate height determination is required.

TRIMBLE REF TEK 130-SMHR

A strong motion 24-Bit Strong Motion Accelerograph that combines the third generation broadband seismic recorder and an advanced low-noise, force-feedback accelerometer.

TRIMBLE 4D CONTROL MONITORING SOFTWARE

A powerful monitoring software that integrates GNSS, optical and geotechnical sensors to collect and manage data, provide computation and analysis, visualization and mapping and alerts and alarms.



Contact your Trimble Dealer today

NORTH AMERICA
 Trimble Navigation Limited
 10368 Westmoor Drive
 Westminster CO 80021
 USA
 MonSol_Sales@Trimble.com