



Dams

TRIMBLE MONITORING SOLUTIONS

SOLUTIONS FOR SAFE DAMS

The Role of Monitoring

The importance of a well planned monitoring installation as an essential component of the maintenance and operation of a dam, particularly in an aging structure where early warning signs of failure may be detected, is widely accepted and in many countries, enforced by legislation.

Wall deflection, settlement, water seepage, the diurnal and seasonal changes in reservoir levels, seismic activity and the aging of the structure all affect the health of the dam. Changes in the behavioral characteristics of the structure may be indicative of impending dam failure and it is the primary goal of the monitoring system to detect such changes.

Catastrophic dam failure through the uncontrolled release of the impoundment will threaten life and property downstream. The safe functioning of a dam is an important matter of economic benefit and public safety.

The Focus of Monitoring

Water seepage, structural deflections and tilt, hydrostatic pressure, crack changes within the structure, can be monitored by the system.

Seismic or micro seismic vibrations from operation, maintenance and construction activity may cause damage such as cracking of the structure or liquefaction of the dam foundation.

The early detection of potential failure of reservoirs and tailings dams which may dramatically impact the lives and economic activity of downstream communities is yet another monitoring objective.

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 data is processed using state of the art algorithms, and presented in a powerful, yet user friendly Web Interface. It provides a variety of 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 or lateral displacements to detect common failure indicators.

Significant events such as overtopping, rapid water level changes, maintenance and construction activities may be logged and referenced on the charts.

Boolean comparators are used to integrate data from GNSS, optical, geotechnical, seismic, and atmospheric sensors to create complex alarm conditions.

Alarm notifications are issued by email and SMS to selected recipients and the system may also activate audible and visual alarms which may form part of the mandatory emergency response procedures.

Designed for Demanding Environments

The Trimble Dam Monitoring Solution is designed specifically for the dam engineer and 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 accommodates a smooth transition from periodic monitoring surveys using the Trimble Access™ software and Trimble 4D Lite software into complex automated systems using the Trimble 4D Control software.

Key Features

- ▶ Automated, real-time monitoring system
- ▶ Dam safety monitoring
- ▶ Periodic deformation surveys
- ▶ Stability assessment in seismic areas
- ▶ Long and short term analysis of structural behaviour



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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 - MC

Offers a singular solution for multiple applications with built-in communication facilities to allow for real-time and on-demand data collection. The 130-MC is available in a 12 or 18 channel recording scheme with advanced telemetry built-in for real-time data collection for every channel.

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 REF TEK147A

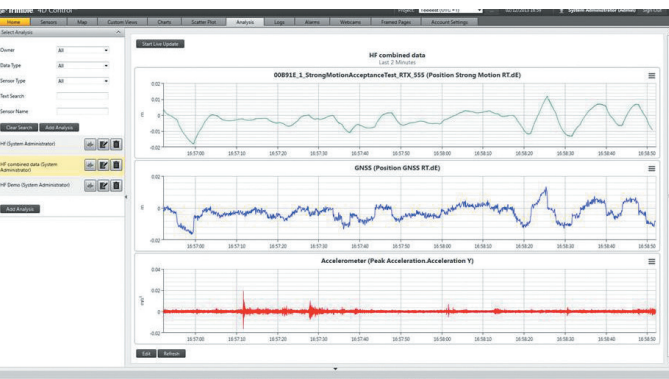
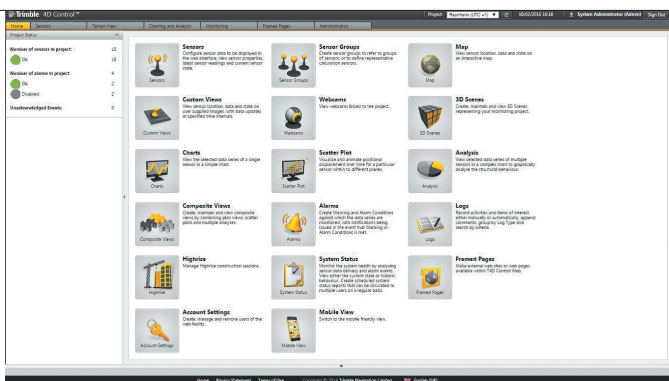
A triaxial force balance accelerometer that converts acceleration signals into voltage signals to measure various low frequency and ultra-low frequency motion.

TRIMBLE 4D LITE SOFTWARE

A cloud-based web application designed with the same advanced web interface and back-end stability as Trimble 4D Control, with the advantage that this is available for the analysis of any form of data time series.

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

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