

# Leica Monitoring Solutions Certainty builds confidence.

Leica Monitoring  
Solutions



- when it has to be **right**

**Leica**  
Geosystems

# Risk and Cost Reduction – Proven Solutions

## Facing new challenges

Engineering companies and contractors are facing challenges never experienced before. They are being charged with – and being held liable for – the health of the structures they create and maintain. To surmount these challenges, engineers need to be able to measure structural movements to millimetre level accuracy. Accurate and timely information on the status of a structure is highly valuable to engineers. It enables them to compare the real-world behaviour of a structure against the design and theoretical models. When empowered by such data, engineers can effectively and cost efficiently measure and maintain the health of vital infrastructure.

## Trust a partner with experience

No other company can provide the depth of experience in the acquisition, management and analysis of spatial data for structural monitoring.

Leica Geosystems has nearly 200 years of experience in precise measurement and over 20 years experience with automatic deformation monitoring systems. With a diverse range of monitoring applications including bridges, high rise buildings, tunnels, nuclear power plants, landslides, mines, volcanoes, ski lifts and more.

## Reduce your costs

The ability to detect and react to potential problems before they develop helps in the reduction of insurance costs and the prevention of catastrophic failures that may result in injury, death or significant financial loss. A structural monitoring system will help reduce both your current and long term maintenance cost associated with structural movement.

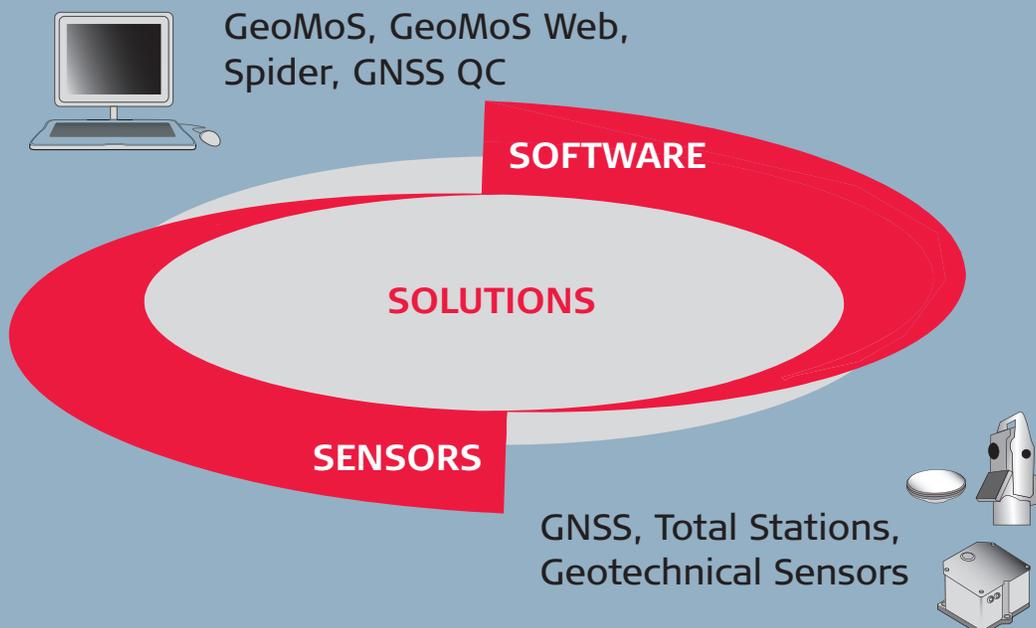
## Reduce your risks

A structural monitoring system reduces risks, as data analysis can be used to aid the understanding of

current and future implications of structural movements. Safety and structural integrity concerns can be minimized. Contractors can reduce their risk exposure before, during and after a construction project by continuously monitoring the project as it progresses through its lifecycle. Potential problems can be detected and rectified before a critical situation develops.

## Single source software and hardware

At Leica Geosystems we're experts in the development and integration of monitoring instruments and software. Leica Geosystems manufactures a wide range of high-precision instruments for structural monitoring. These and third party instruments may be configured and managed via customizable Leica Geosystems software to provide you with 24/7 monitoring capabilities. Advanced data processing algorithms, together with powerful event management systems ensure that maximum benefit is derived from the measurement information provided by the instruments.



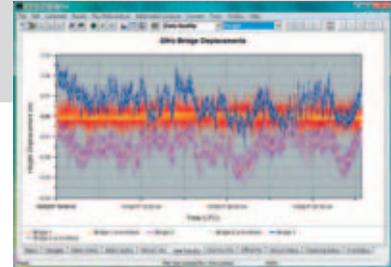


## Bridge monitoring

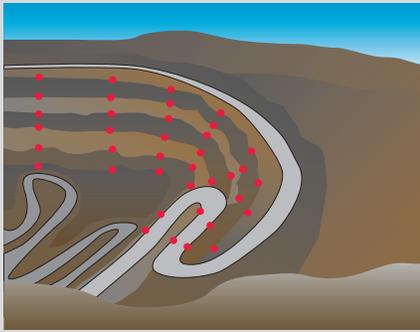


Modern cable-supported bridges carry enormous loads across great distances. By design they are dynamic structures that move due to the loads imposed by traffic, wind, heating and cooling, corrosion and other environmental conditions.

Leica Geosystems' high performance GPS/GNSS receivers, advanced processing algorithms and software are ideal tools for precise structural health monitoring. Our monitoring solutions can be used both during and after construction.



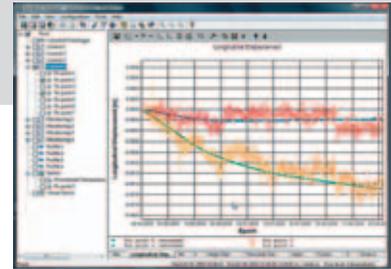
## Landslide monitoring



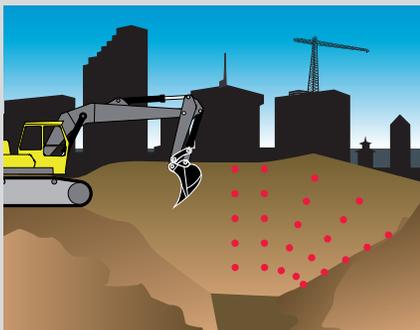
Each year landslides cause millions of dollars of damage and loss of revenue to mines, residential and commercial properties, motorways and railway lines.

Monitoring systems from Leica Geosystems are an essential part of risk management. By providing the early detection of instability they have prevented slope failures from causing injury, death and financial loss.

In mining, geotechnical engineers are under increasing pressure to increase slope angles in order to improve productivity. This increases the risk of slope failure.

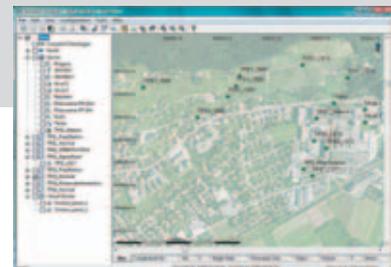


## Construction monitoring



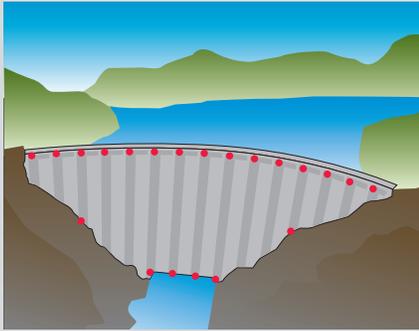
Cities throughout the world are becoming denser and higher than ever before. The costs of base materials are rising, driving engineers to develop novel construction techniques. Monitoring systems can provide timely information on any departures from design during the critical stages of construction, such

as concrete jetting, deep excavation and support walls. This ensures the integrity of the construction site and the safety of people. Monitoring provides ongoing verification and documentation of the compliance to construction and design tolerances.



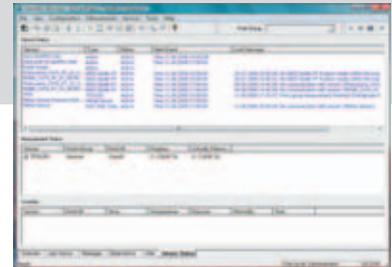


### Dam monitoring

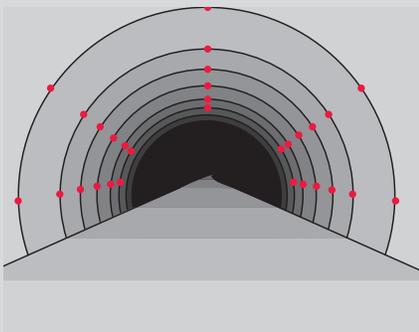


Large earth fill and concrete dams are a critical infrastructure for continuous water supply and power generation. Loading and unloading forces on a dam cause stress on the structure and must be monitored. The stress can be due to fluctuations in the water level, settlement of the structure, nearby landslides or

seismic activity. Early detection of a potential problem allows repairs or remedial measures to be taken before a disaster occurs. Even if repair is not possible, with the early warning of a problem action may be taken to mitigate its effects.

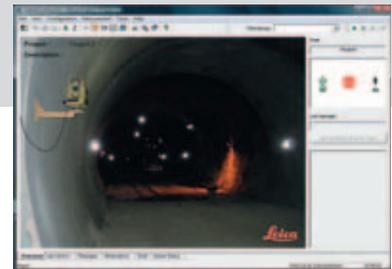


### Tunnel monitoring



Leica Geosystems has a long history of steering tunnel excavations and the precise determination of tunnel displacements, both during and after excavation. Permanent and semi-permanent tunnel monitoring systems from Leica Geosystems provide an excellent foundation to quickly discover unfavourable stress conditions in the rock mass. A monitoring system can save time and

money during construction by reducing the amount of reinforcing that must be installed in order to ensure safety. After construction the monitoring system provides assurance that the tunnel remains within the design tolerances.

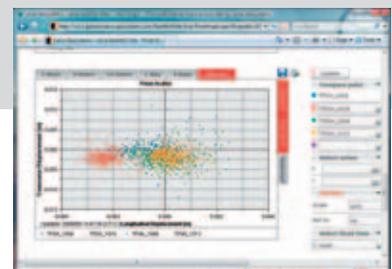


### Building monitoring



New and existing buildings can be affected by daily movements (solar effects, heavy rainfalls), long period movements (settlement) and dynamic movements (resonance, wind and loads). They may also be built in flood or earthquake zones and therefore at risk of being damaged by natural events. Many buildings are aging and their construction materials deteriora-

ting due to time and weathering. A monitoring system can insure the structural integrity of a building by providing continues deformation data over extended periods of time. Which allows appropriate and cost effective maintenance to be conducted.



## Total Stations



Leica Geosystems total stations set the standard for precision and reliability. Specifically designed for the demanding requirements of continuous monitoring, they are in a class of their own.

## GPS/GNSS



High precision GNSS (Global Navigation Satellite System) receivers, supporting both GPS and GLONASS, and advanced processing algorithms and software make Leica Geosystems a world leader in GNSS monitoring.

## Monitoring Software



Leica Geosystems monitoring software uses standard communication and data interfaces for flexibility and customization and has sophisticated multi-sensor measurement scheduling, data management and processing, analysis and messaging capabilities.

## Geotechnical Sensors



Leica GeoMoS can interface with dataloggers, which in turn support most commercially available geotechnical sensors. Leica Geosystems inclination sensors provide ultra-precise, high-speed, drift free dual axis inclination measurements for detecting the smallest movements. The additional meteorological and geotechnical data provided by these sensors improves the understanding of any detected deformation.

## Living in a dynamic world



Nothing is static. Buildings and dams settle, bridges flex and vibrate, rock masses shift, mud slides, glaciers flow and volcanoes erupt. Whether by human activity such as mining or by natural processes such as erosion, the world in which we live is continually changing.

Management of this change is essential for social and economic advancement. Failure of a bridge can isolate communities and restrict commerce. A landslide can cause financial and human loss, stop mining operations and even impact world

mineral prices. Economies and our daily lives are dependent upon the health of bridges, dams, tunnels, elevated road systems, mines and high-rise buildings. Engineers, geologists and other professional are trusted to prevent such disasters.

For the solutions to manage and monitor these structures, they rely on the proven solutions from Leica Geosystems.

Whether you monitor the movement of a volcanic slope, the structure of a long bridge or track the settlement of a dam; whether you measure, analyse and manage the structures of natural or man-made objects: the monitoring systems by Leica Geosystems provide you with the right solution for every application.

Our solutions provide reliable, precise data acquisition, advanced processing, sophisticated analysis and secure data transmission. Using standard interfaces, open architectures and scalable platforms, the solutions are customizable to meet individual requirements – for permanent and temporary installations, for single sites and monitoring networks.

**When it has to be right.**

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**Total Quality Management – our commitment to total customer satisfaction.**

Ask your local Leica Geosystems dealer for more information about our TQM program.

The Campbell Datalogger depicted in this brochure is a product of Campbell Scientific Ltd.



**Active Customer Care**



**Software:**  
Leica GeoMoS  
Leica GNSS Spider  
Leica GNSS QC  
Leica GeoMoS Web



**Total Stations:**  
Leica TCA1800/2003  
Leica TCA1201M  
Leica TPS1200 Series



**GPS/GNSS:**  
Leica GMX902 GG  
Leica GRX1200 Series  
Leica GPS1200 Series  
Leica GMX901



**Other:**  
Leica Nivel210/220  
Leica GPR112  
Monitoring Prisma