Leica Geosystems Deformation Monitoring Trusted solutions for monitoring structures



- when it has to be **right** 



# **Risk and Cost Reduction – Proven Solutions**



#### Facing new challenges

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

#### 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 15 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 in over 30 countries, Leica Geosystems has unparalleled experience in geodetic monitoring of structures.

#### Reduce your costs

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

#### **Reduce your risks**

With a structural monitoring system, risks are reduced as data analysis can be used to more fully understand the current and future implications of structural movements. Both 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 spotted early on and steps taken to rectify the situation 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 and are, by design, dynamic structures that move due to loads imposed by traffic, wind, heating and cooling, corrosion and other environmental conditions. Owing to the advantages of high accuracy, high-speed measurement, allweather conditions and no requirements of inter-visibility between measuring points, Leica Geosystems' high performance GPS receivers and advanced processing algorithms and software are ideal tools for high precision structural health monitoring both during and after construction.



Monitoring systems from Leica Geosystems are an essential part of risk management by providing early detection of instability and have prevented many slope failures in mines and other areas from causing injury, death and financial loss.



## 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. In mining geotechnical engineers are under increasing pressure to increase slope angles, and hence risk of a slope failure, in order to improve productivity.

## 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.

#### Dam monitoring





Large earth fill and concrete dams are a critical infrastructure for water supply and power generation. Loading and unloading of the dams due to fluctuations in the water level, settlement of the structure and seismic activity must be monitored. Monitoring is the basis for disaster preparedness and early detection of signs of a breach is critical to effective dam safety. Early detection of a weakness in the structure allows for remedial measures to be taken to repair it and prevent a disaster from occurring. Even if repair is not possible, with early warning of a problem action may be taken to mitigate its effects.



toring 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.



#### **Tunnel monitoring**





Leica Geosystems has a long history not only for steering tunnel excavations, but also for precise determination of tunnel displacements, be it during or after excavation. Permanent and semi-permanent tunnel monitoring systems from Leica Geosystems provide an excellent foundation to quickly discover unfavorable stress conditions in the rock mass. A moni-

# Geotechnical

# Support and Service



Leica Geosystems inclination sensors provide ultra-precise, high-speed, drift free dual axis inclination measurements for detecting the smallest movements in structures and are perfect for water dams and other applications requiring the highest precision.

# ACTIVE customer care

Leica Geosystems' customers benefit from service and support that spans time zones and geography. Our Active Customer Care program has packages to suit your needs, whether you use our simplest distance measuring device or the most sophisticated integrated solution. Active Customer Care is a true partner-



ship – it's our commitment to continue to provide the level of support and collabora-

tion you have come to expect when you put your trust in Leica Geosystems.

# Living in a dynamic world

Nothing is static. Buildings and dams settle, bridges flex and vibrate, rock masses shift, mud slides, glaciers flow, volcanoes erupt. Whether by human activity such as mining or construction 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, restrict commerce and cause loss of life. A landslide can cause huge financial and human loss, stop mining operations and even impact world mineral prices.







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

For the systems to provide the data necessary to manage 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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Software: Leica GeoMoS Leica GPS Spider Leica GNSS QC



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



GPS/GNSS:

Leica GMX902

Leica GRX1200 Series

Leica GPS1200 Series



Other: Leica Nivel210/220 Leica GPR112 Monitoring Prism



Total Quality Management – our commitment to total customer satisfaction.

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



