GeoSIG
swiss made to measure

GeoSIG Solution Centre

Tunnel Monitoring

What can be monitored?

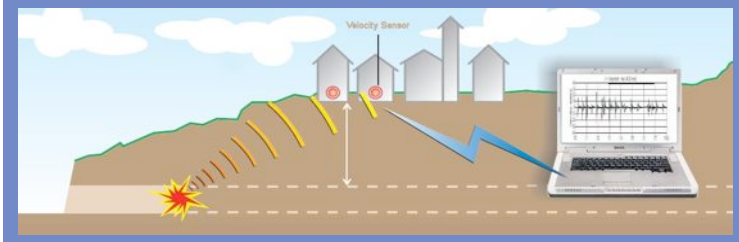
- ✓ Tunnels

What are the Features and Benefits?

- ✓ Reliable data about the tunnel's behaviour & status
- ✓ Reliable data on actual condition of the structure
- ✓ Detect early signs of failure
- ✓ Assist in taking specific decisions for safety measures
- ✓ Reduce maintenance and repair costs
- ✓ Ensure sustainability and safety of the structure
- ✓ Assess structure's safety following a major event
- ✓ Achieve compliance with local regulations

Professional Advice and Support from concept to deployment

Our professional and experienced consultants are ready to provide you with the best impartial advice and support from the outset. Our knowledge of tunnels, coupled with an in-depth understanding of our instruments will provide you with an unparalleled advantage to achieve the best results for your monitoring requirements on time and on budget.



Dynamic measurements beyond and above static ones are critical requirements in tunnel monitoring as earthquakes can cause permanent damage with serious consequences. Timely and precise measurements of pre-defined parameters will provide the data to understand the behaviour of the structure and monitor the rate of change. A combination of static monitoring options such as deformation, displacement and settlement can be used to further provide an indication of the performance of the tunnel.

As well as the local regulations outlining the requirements for the monitoring instruments; other factors such as the type of the tunnel, its construction method, age and length, and seismicity of the area are amongst important considerations when specifying a tunnel's instrumentation.

Contact us for a comprehensive consultation and discussion on your Tunnel Monitoring requirements.

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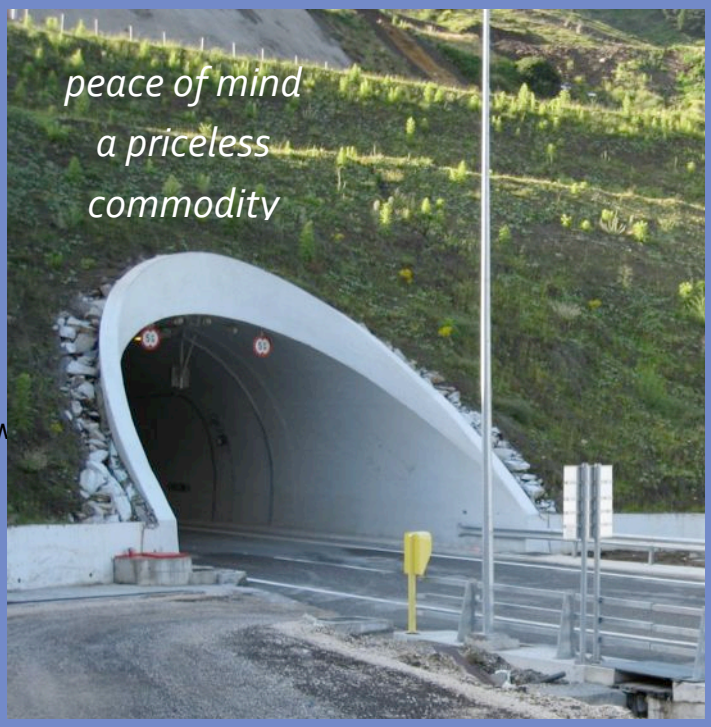
OUR SERVICES

- Advice
- Consulting
- Technical Proposal
- Financial Offer
- Planning
- Installation
- Training



What can be measured?

There are a multitude of options for monitoring the changes in a Tunnel. Each project will have its own unique requirements. The structural engineers will dictate such requirements for which our experts can then provide the appropriate package.

The most widely used packages for Tunnel Monitoring:

1. *Vibration:* — *Structural health and behaviour*
2. *Strain:* — *Fatigue and curing related effects*
3. *Displacement:* — *Joints, cracks and differential displacements of segments*
4. *Environment:* — *Humidity and temperature*

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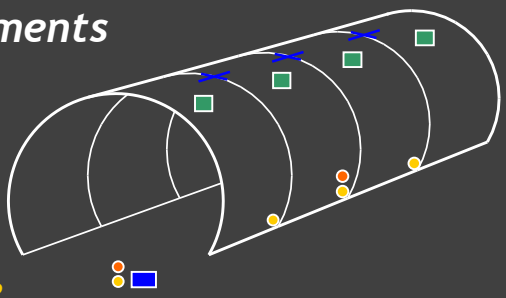
We provide useful advice and a unique integrated approach that can help you achieve your

Tunnel Monitoring Requirements



Kit Example

Typical Tunnel

For seismic monitoring of a typical segmented tunnel, a simple installation with the following equipment will be required:

- *1 off CR-6*
  Recorder with 27 channels including GPS
- *4 off AC-73*
  Triaxial Accelerometer
- *3x2 off GS-LVDT*
  Linear Variable Differential Transformer
- *4 off GSG-Cx*
  Straingage
- *2 off METEO-TT*
  Temperature Sensor
- *Cable and Software*

Analysis Capabilities

A typical setup as above will provide valuable information about the behaviour and status of the tunnel. Thresholds for acceptable changes in the structure's monitored values can be set to provide automatic notifications. After a natural disaster, at an instance valuable information about changes in the structure's behaviour can be provided. Safety decisions about the tunnel and its operation and alerts to the local population can be made based on credible data and analysis.