

Monitoring - Structural Movement



LandScope Engineering offers an integrated position monitoring service which enables the engineering community to monitor and model our dynamic natural and man-made world.

From the settlement of buildings, through the deformation of civil structures to the movement of natural features, the highest order of accuracy survey instruments enables an understanding of this dynamism.

Each monitoring campaign is custom designed for duration, measurement frequency, accuracy and reporting format to ensure an appropriate solution. Best survey practice with a strong understanding of measurement (and associated error) analysis are invariably the critical success factors in any monitoring campaign.

LandScope utilises the latest equipment and system technology from both Trimble and Leica in the design of its monitoring programmes

Applications include:

- Dam Deformation
- Subsidence measurement
- Bridge and suspended structure movement
- Landslide modelling
- Chimney and flue deformation
- Industrial structure measurement
- Landfill settlement
- Structure installation



Periodic Monitoring

As our built environment becomes ever more dense and complex additional responsibility is being placed on the construction community to ensure the welfare of existing structures adjacent to construction activity. A new tunnel development may impact subsidence rates of structures above whereas a deep piling operation may affect an adjacent embankment – complex dynamics and interdependencies can now be measured and modelled with the latest advanced survey instrumentation.

A structure dynamic will be influenced by diurnal movements (solar, precipitation) as well as longer term movements such as settlement. The design of a position monitoring campaign must consider these natural phenomena and be able to isolate movement generated by other external factors – e.g. tunnelling beneath. Typically a subject structure would be monitored for a period before the proposed change (eg. proposed new building); during the process of change (eg. during construction process) and for a period after the change. This approach allows the engineering surveyor to discern ambient movement from change generated movement. To manage, monitor and model these structures the engineering surveyor relies on sub-millimetre and sub-second of arc measurements augmented with detailed analysis software.



Structural Installation Modelling

Real time positioning, visualisation and guidance of structure placement may be provided as an extension of monitoring solutions. Traditional survey sensors such as robotic total stations and GNSS systems may be augmented with accelerometers and inclinometers to enable full 3D position and attitude modelling in real time. Such a configuration allows an online visualisation and guidance tool in addition to providing an accurate record of a structure emplacement. Applications include bridge structure installation, mast section placement and oil platform module extensions.

Related Inserts Available

3D Scanning and Modelling



Land Survey/ Geomatics



Measured Building Survey



Real-Time Modelling

When a structure requires constant monitoring over a period of time the survey systems may be configured and pre-programmed to acquire continual sequential movements on a real-time and full-time basis.

Sophisticated data logging and analysis software is capable of interfacing to multiple sensors including total stations, GNSS receivers and inclinometers allowing constant data flow. Tolerance thresholds may be established which when exceeded would automatically generate alert messages on screen, over remote communication links or via text/email messages.

With the ability to manage large networks of sensors from a single control centre Trimble 4D Control software provides:

- Real time monitoring, analysis and alerts
- Robust communication options providing flexibility for a range of applications
- Sophisticated controls and data analysis tools providing the capabilities and tolerances that best serve project requirements.

