CSIC | sensing the future

Monitoring structures using terrestrial laser scanners

The technology

Terrestrial laser scanners gather 3D-depth and colour data of the nearby visible environment with millimetric accuracy. To date, the use of these scanners in structural monitoring has been limited. CSIC is currently working with Topcon using the GLS-2000 laser scanner to investigate the engineering information that can be gathered from the point cloud data for various infrastructure applications.

Applications

Change detection – construction of piles and tunnels threatens the serviceability and stability of structures nearby. We are improving and validating point cloud change detection software for identifying the hinging, cracking and delamination response of brick masonry in London Bridge Station Redevelopment project in response to these actions.

Structural reconnaissance – accurate 3D point cloud data of structures provides useful information on the precise structural geometry. We are investigating the deformed geometry of the segmental cast-iron Post-Office tunnels to deduce joint rotations and sliding experienced during construction and resulting from nearby tunnelling works.

Detailed documentation of construction and sensor deployment work – periodic laser scans of the work site during construction/sensor deployment can be used to compare as-built aspects with the design intention. For this purpose, CSIC is currently scanning the works at the new James Dyson Building at the Department of Engineering, University of Cambridge.

The benefits

Laser scanning provides the ability to create accurately geo-referenced 3D models while minimising the use of expensive targets for surveying.

These 3D models can be useful for:
- detecting local/global changes in the structural configuration
- informing structural modelling by providing precise information on the real geometry
- providing detailed 3D records to compare the as-built structure with the design intention

E: info@csic-sense.co.uk   **T: +44 1223 746976**   **W: www.csic-sense.co.uk**