Scanning down below

LS Transmission Consultancy Limited (LSTC) has conducted more than 50 underground manhole surveys using handheld laser scanning technology. The result: more accurate data and safer working conditions for all. Lucy Hamilton reports

With origins that can be traced back to 1954, LSTC based in Driffield, Yorkshire, (https://www.lstc.co.uk/) specialises in providing professional engineering services to the electricity and transportation sectors. Over six decades, the company (formerly Line Surveys) has seen technology progress from the days of dumpy levels, chains, and theodolites to the innovative and high-tech portfolio of equipment that it uses today. This includes high accuracy 3D laser scanners, with the most recent addition - using SLAM (Simultaneous Localisation and Mapping) technology- being a state-of-the-art KOREC-supplied ZEB-REVO RT handheld scanner from GeoSLAM.

Responsible for managing LSTC's survey teams is Kurt Slater, who looks after a range of tasks covering everything from providing quotations and project proposals for laser scanning and underground manhole/utility surveys to staff training, deployment and work instructions. Kurt is responsible for preparing safety critical-RAMS (Risk Assessment and Method Statements) and is therefore keen to establish safe systems of work for LSTC's surveyors who collect the data.

Safety First

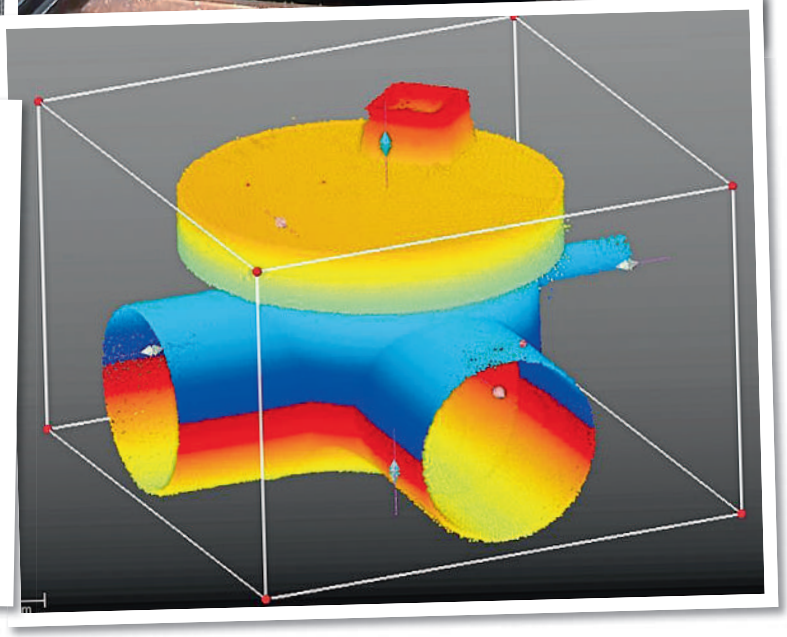
LSTC undertakes work on behalf of major house builders, including the provision of as-built S104 information. These as-builts provide the details that determine whether a sewer is suitable for adoption by the water utility company, with each survey requiring accurate invert information backed up by video footage.

LSTC's priority is keeping its surveyors safe whilst providing clients with the high-quality data they need. Manhole chambers present a significant health and safety risk and the only alternative to using a remote data collection sensor is working within the chamber. This requires staff to be trained in working in confined spaces with gas monitoring equipment.

The company therefore worked closely with GeoSLAM's UK distributor, KOREC, to trial a ZEB-REVO RT handheld scanner. The latter allows the user to quickly collect and process scan data on the move at a rate of 40,000 points per second and up to a range of 30m.

Monitoring scans in real-time

LSTC tested and calibrated the data gathered using the ZEB-REVO RT against



Pictured from top left clockwise: Underground cable-markings; Lowering the ZEB-REVO into the manhole – remote operation keeps surveyors safe above ground; Manhole data generated by the ZEB-REVO RT (scanner pictured lower left)

the company's Trimble TX8 Laser Scanner and was completely satisfied with both the unit's functionality and the quality of the outputs.

In the two months since purchase, LSTC reports that the ZEB-REVO RT is proving to be a reliable and accurate tool for the as-built S104 surveys. At each manhole, the ZEB-REVO is lowered on a detail pole into the chamber and a 15-20 second scan undertaken with the surveyor safely above ground. The RT functionality is used to check the quality of the collected data by watching the point cloud visibly build up on a connected web enabled tablet or even smartphone. This saves time and money by ensuring that the team can see exactly what has been captured before the survey is completed.

Survey times can also be cut by as much as half because the ZEB-REVO RT collects and processes the 3D scan data simultaneously, providing optimum value for LSTC's clients. The ZEB-REVO also provides video footage to back up the results.

Back at the office the manhole scan data is used to measure accurate invert levels and update as-build drawings.

"Using the ZEB-REVO RT for our invert surveys is by far the safest method of collecting the data and it has all but eliminated the need to send our surveyors underground." - Kurt Slater

Flexible instrument

LSTC reports that in the two months since purchase, it has been using the ZEB-REVO RT for both the manhole inverts and other jobs, such as measured building floor plans, and that it has proved to be reliable, accurate and easy to use. They've also found it easy to combine the ZEB-REVO RT data with that collected by the Trimble TX8 laser scanner by using simple cloud to cloud registration.

Kurt Slater concludes "Using the ZEB-REVO RT for our invert surveys is by far the safest method of collecting the data and it has all but eliminated the need to send our surveyors underground. KOREC has been there for us throughout, providing support and advice on laser scanning and in particular, any issues have been sorted quickly and efficiently."

Lucy Hamilton is with Huntingdon-based KOREC Group (https://www.korecgroup.com), the largest distributor for Trimble positioning solutions and surveying equipment in the UK and Ireland