TIME FOR CHANGE

CONSTRUCTION FACES AN UNCERTAIN FUTURE, WITH THE LACK OF ADOPTION OF NEW TECHNOLOGIES AND RESISTANCE TO CHANGES TO BUSINESS PROCESSES SEEMING TO UNDERPIN MANY OF ITS ISSUES. **CHRIS EMERY** EXPLORES THE CHANGES NEEDED TO MEET ITS CURRENT AND FUTURE NEEDS

The Falcon 8+ UAV Topcon edition carries both GNSS technology and a video camera

In Europe, aging post war assets are reaching the end of their intended design life, meaning the pressure is on to quickly develop new and update existing infrastructure in the most effective way possible. Globally, the increasing levels of high-density construction needs, especially in cities, are bringing a number of challenges for engineers. In order to build and maintain the required infrastructure, advanced levels of technology and automation are needed to gather and interpret rich data, to shape and monitor projects.

In the UK, a new report by the Infrastructure Client Group, From Transactions to Enterprises, highlights the readiness of the infrastructure industry for digital transformation and automation. The report found that despite a range of readiness levels, there was an agreed recognition of the benefits of becoming more digitally appropriated. The report was in favour of the UK developing a national digital transformation strategy. However, this approach is something that could potentially be applied throughout Europe.

Deteriorating infrastructure in Europe and the rest of the world needs more sophisticated approaches to monitoring

Old school ways of working

The processes implemented by construction companies over the past century were devised in an analogue world, creating a lack of automation and siloed working. By relying on these tried and tested methods, using the systems we are comfortable with, we remain in an unprogressive space.

For example, traditional monitoring and data capture methods are incredibly time consuming as the team physically needs to be on-site for days to collect measurements. The data then needs to be taken back to the office to analyse and compare. On top of this, there are also health and safety considerations, particularly when working in environments such as mines and tunnels.

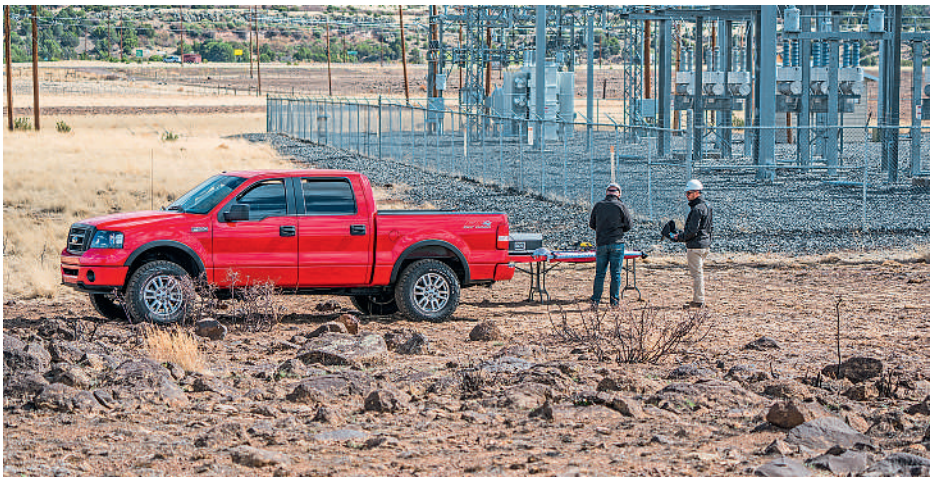
As an industry, it's common knowledge that we are lagging behind others, and by continuing to use outdated procedures, we are struggling to meet huge infrastructure demands. The adoption of new technologies pre-, during and post-construction can help to manage complex data and reduce the number of workers on-site.

Pre-construction and inspection

When it comes to pre-construction and inspection methods, a reliable, safe and accurate system with high precision measurement technology is required to capture the data needed to plan the workflow process. UAV technology can capture a high level of data in real time. Using a combination of a UAV and GNSS technology (such as Intel Falcon 8+ Topcon Edition, Topcon's Sirius Pro and GNSS RTK) for aerial image capture provides instant accurate real-time data of inspected construction assets or the entire project. A live video camera can be used on the Falcon 8+ so a live feed can be received at ground station showing an instant display of what the technology is looking at. Therefore, an engineer could be inspecting the underside of a bridge in real-time via the live video and capturing images. Once the data is captured, post-processing can be made simpler, with wireless export of images and position data to processing software for design, modification and creation of DTMs and orthomosaics.

Keeping the project flowing

Assessing all the inspection data a UAV has provided is useful for helping to manage a construction workflow. However, when faults or potential structural issues are found, a central management system is often then



UAVs allow sites to be monitored without risking the health and safety of surveyors

also required. A central management suite makes it possible to create detailed, reliable and accurate datasets that can be analysed quickly and remotely. Therefore, inspection is a great pre cursor for identifying whether that investment is needed.

A deformation monitoring system then becomes an integral part of the central survey, inspection and structural stability management system. Topcon's Delta Watch software provides a modular solution to monitor, manage and evaluate automatic and/or manual monitoring data. In addition to providing visualisation, the Delta Watch technology also offers alarm functions to quickly highlight any potential issues to personnel and site environment as they arise during the monitoring process. The alarm function works by identifying certain trigger values allocated to sensitive buildings or censors that will be triggered if breached.

As we build more and more in high density areas, monitoring the impact construction is having on the nearby buildings and surroundings is going to be become more critical to more projects. Software like Delta Watch can be used to create an unlimited number of coordinate transformations, or 'local grids', for any project. By creating these grids, it's possible to monitor and display movement of any potentially affected nearby buildings in direct relation to the work on site in real-time. That way, the data is more relevant as the building is being rotated in line with the buildings' directions. The data then becomes more obvious, relevant and quantifiable to the specific structures that are involved.

Lifetime extension

The need for monitoring projects spans much further than the pre- and during phases of construction. Typically, 0.5% of a project's entire budget is invested in monitoring solutions. For many European countries, aging infrastructure is an ongoing concern, and growing populations place extra strain on the demand to maintain and regenerate. Vertical and horizontal construction alike carry tremendous risks such as structurally unsound buildings and failing roads. Technology that embeds sensors within assets from the construction phase makes the asset 'smart', offering continued monitoring of structures after construction completes. These can extend an asset's operational life by identifying health and structural issues before they escalate.

Off-site connections

In order to help meet growing infrastructure needs across the whole of Europe, we need to be open to the adoption of new technologies and industry partnerships. Siloed ways of working are counterproductive to long-term infrastructure aims. By collaborating and sharing ways of working, firms can take note of the wider industry strategies and proactively begin to tailor their approaches. Through individual strategies, organisations can seamlessly connect, share data and pool expertise, ensuring progress towards collectively meeting future demands.

The evidence is increasingly clear that moving away from what we already know can provide so many different benefits. In essence, automated technologies and workflows can achieve greater results by helping us to do what we already do, better.

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