

## CASE STUDY

# Handle with care!

At almost 200 years old, the Mythe Bridge near Tewkesbury has provided Scan to Plan owner Bill Stebbing with the opportunity to combine skills in two of his specialist survey areas, historic buildings and civil engineering. It's also enabled Bill to make use of one of the Trimble X7 3D Laser Scanner's most underrated features – the handle!

Established in Taunton in 2014, Scan to Plan was set up by Bill Stebbing following a long career with the Environment Agency. Scan to Plan specialises in delivering digital surveys through laser scanning and aerial data mapping with a 50/50 mix of work across the historic buildings and landscapes and civil engineering sectors. Occasionally, the two sectors cross as in Bill's latest project surveying the Mythe Bridge over the River Severn.

As its 200th birthday approaches, the Thomas Telford designed Mythe bridge is undergoing a series of checks to better understand how it is standing up to traffic that often exceeds its weight limit of 17 tonnes. The results of this survey will provide an accurate assessment of its structural integrity in a pre-emptive move to establish whether the design requires further strengthening.

## Site Challenges

The survey was carried out on behalf of Gloucestershire County Council with work contracted to Scan to Plan through XEAD, a civil engineering consultancy specialising in difficult access. In this case, the XEAD team was responsible for both Bill's safety and that of any survey equipment used.

Mythe Bridge contains a single arch spanning 170 ft (52 m) constructed from cast iron. The arch is supported by six ribs with small X-bracing carrying the diagonal crossed bracing to the spandrels beneath the beam to the roadway and balustrade. In short, the structure is extremely detailed.

Whilst the bridge's complex iron work dictated that a 3D laser scan was the obvious choice for a survey of this detail, a land ownership dispute meant that there was no access to the bridge on the west bank. Therefore the laser scan pointcloud would need to be supplemented by an aerial survey which would fill in any gaps. These gaps were estimated to be around 5% of the steel work and also include some of the elevations on the left side.

## Getting a handle on demanding projects

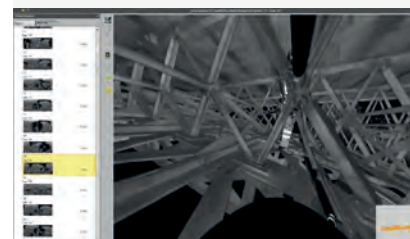
Over the years, Bill has used many KOREC supplied 3D Laser Scanners including the Trimble TX6 and the TX8. However, since the launch of the Trimble X7 in 2019, this has been his preferred choice for a number of reasons often dictated by the demands of much of his work.



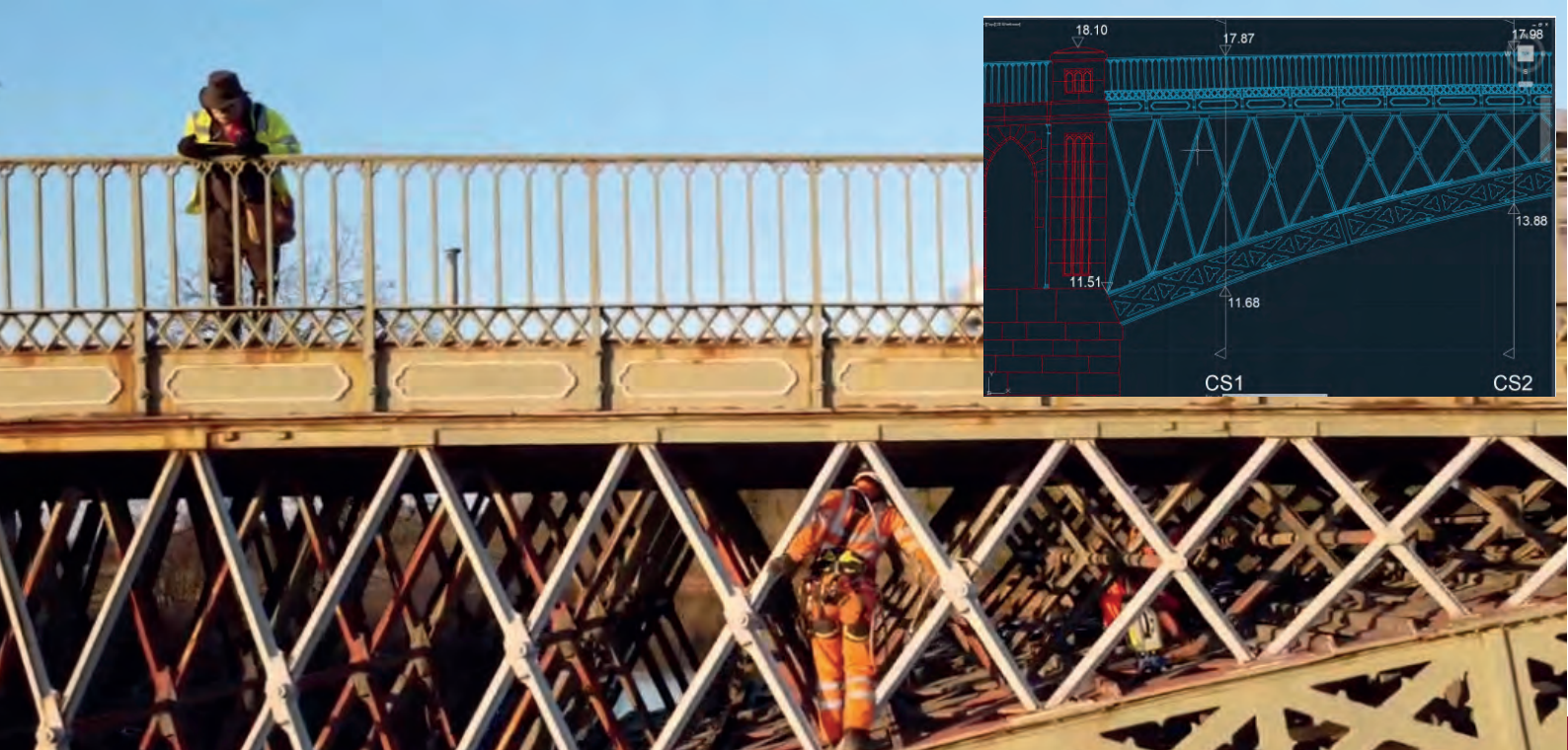
Scanning iron work on Mythe Bridge

### X7 key benefits

- The X7 has a handle!
- Weighs just 5.8kg for easy manoeuvrability
- On site registration for confidence in full data capture
- Easy drag and drop of pointcloud into Trimble RealWorks
- Fast and easy workflow - short time from scan to deliverable



A member of the rope access team just visible behind the ironwork



Bill Stebbing used the tablet to control the Trimble X7 remotely from the road above the bridge. Above, right, the upstream and downstream elevations were drawn from the ortho mosaics as well as additional tiffs generated from the terrestrial pointcloud

Specialising in historic building and landscape work, Bill regularly partners with XEIAD. He therefore understands well the amount of organisation required to have both himself and a specialist access team on a site, and that it's vital he takes a 'right first time' approach. One of the key benefits of the X7 is its ability to register the scan in real-time which means that Bill can ensure that he has captured everything whilst still on site viewing all the scan data on his tablet.

However, for Bill, he says that one of the most obvious but overlooked features of the X7 is its handle! Having previously used an X7, positioned by XEIAD on a bridge pillar 12 ft above a fast flowing river, Bill knew that easy manoeuvrability of the scanner would be vital to the success of the project and the safety of the instrument.

### On the day

Working with an XEIAD team of two, over 40 set ups were carried out over a single day with each set up and scan taking around 5-7 minutes to capture a 3mm pointcloud, well within the specification for the job.

The XEIAD rope access team was able to safely and easily move the X7, using its handle, and position it with tripod legs splayed to straddle the lattice ironwork. Scans were undertaken on every other row of the bridge with the team working across the 6 girders on each of the five bays.

An aerial survey was then carried out to fill in any gaps in the pointcloud, especially those on the left side of the bridge where there was no access.

In each case, Bill operated the scanner remotely, safely positioned on the road

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Bill Stebbing,  
Scan to Plan

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Bill Stebbing,  
Owner, Scan to Plan



above, where he could manage the survey using Trimble Perspectives software running on a tablet.

## Deliverable

The requested deliverable was a 3D point cloud of the combined 3D laser scan and drone data along with RCS files which were easily processed in Trimble RealWorks in preparation for use in AutoCAD the creation of 2D line drawings. A selection of Tiff picture files were also created.

Bill concludes that with the assistance of XEIAD the job went well and in particular, the handle of the X7 again proved it's worth. "It's such a basic feature, but you wouldn't believe how many scanners simply don't have one. On jobs such as this, it's vital that we can move the instrument easily and secure it safely for each scan. Overall, the workflow couldn't be easier or smoother and in the office this is assisted by the Trimble RealWorks point cloud processing and analysis software, it really is excellent."

### Sam Jones, Senior Engineer, XEIAD explains why the X7 was so easy to handle

"The scanner with the built-in handle made it extremely easy for our team to secure it via ropes and handle it safely over the water. The tripod attached was easy and quick to set up, plus sturdy enough to provide a solid and steady platform for the scanner, on every set up. This made carrying out each scan quick and easy. The weight of the whole system made it easy to transport around the lattice work of the structure, even when the team had to crawl around the narrow sections of the bridge.

Overall the scanner was light and robust enough to handle the roped access laser scan of Mythe Bridge. With the added ability to see in real-time the scan of the bridge via the connected tablet, our team was happy that we were obtaining all the information the client would need."

## CONTACT US

Please do get in touch for further information on any of the products or services mentioned in this case study, a demonstration, support or just a chat about your requirements.

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The client required as much detail as possible of the structural ironwork so a systematic approach was required. A total of 80 scans were taken of the ironwork alone.