

3D SCANNING WITH ARTEC EVA FOR QUALITY CONTROL



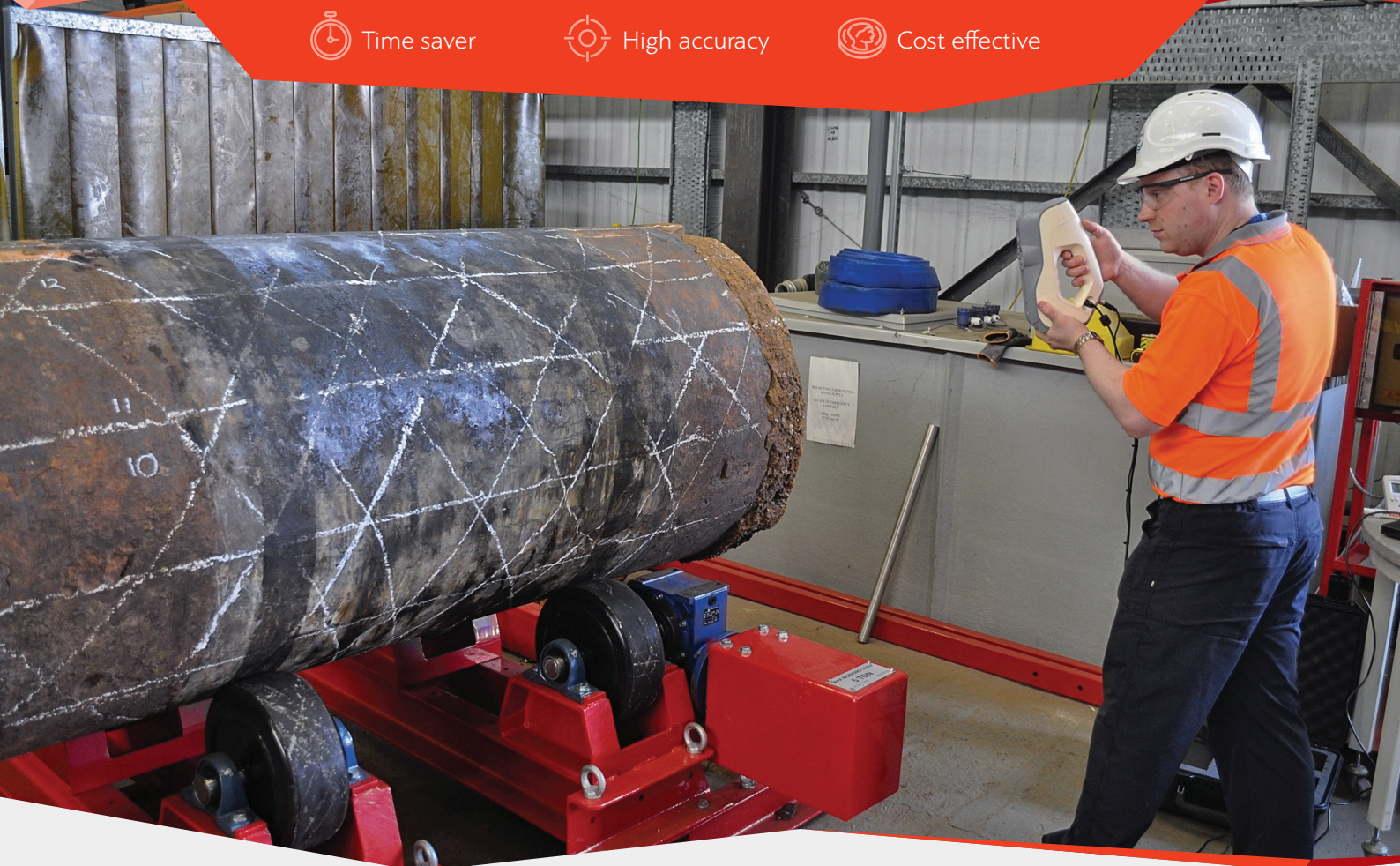
Time saver



High accuracy



Cost effective



FITNESS TEST FOR LONDON'S PIPES

Thames Water use Artec Eva to secure stable water supply to British households.

Thames Water (www.thameswater.co.uk) is the UK's largest water and wastewater services providers with over 15 million customers and as part of their business they deliver an average of 2,600m litres of drinking water every day. Thames Water's cast iron water mains in many

areas of London and the Thames Valley are among the oldest in the UK, and many of them are wearing out. Their staff have been working hard to replace the smaller distribution mains over the past 15 years, but now the larger trunk mains are of growing concern. A burst in just one of our trunk mains can leave thousands of customers without water, cause major flooding and disrupt transport routes.

Dr Tim Evans, water network innovation manager, explains how new technology is paving the way for a more sustainable replacement approach. "It's costly to replace pipes, so we need to prioritise the riskiest ones," he said. "A big challenge with cast iron is that it corrodes unevenly and the corrosion is very hard to detect. Traditionally we've assessed the condition of a water main by cutting out a short length of pipe, sand-blasting it to remove the corrosion, then measuring the resulting craters by hand. But taking pipe cut-outs is disruptive for customers and road users, and expensive for Thames Water. "To remove the need for pipe cut-outs we've started to use non-destructive testing (NDT) technology, such as ultrasound; it's similar to pregnancy scans, except we're looking for corrosion instead of babies!" Looking to the future "The aim is to be able to send a device into a water main that will gather NDT condition data all along it, not just in short excavations."

Surface scanners help Thames Water understand what different NDT tools can measure and a Konica-Minolta Vivid system had been used to map corrosion in small diameter (4-8") pipes. However, such a system is inappropriate for pipes over 18" diameter. For large pipes a handheld scanner is needed and Thames Water appraised market offerings inviting various suppliers to demonstrate their equipment. Following up on a first demonstration **Patrick Thorn & Co.** (www.patrick-thorn.co.uk), Thames Water's local Artec specialist, worked with the company to scan a large pipe section so they could confirm that the Artec Eva™ delivered the essential performance

they required. They concluded the Eva would offer the most cost effective option to meet their requirements. Following the purchase of an Eva™ Patrick also assisted the staff working with the scanner with comprehensive training in the use of the system and acquiring additional software through which they can perform more detailed analysis of data from the Eva™.

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Since delivery of our Eva™, Alex Rainer, working on a research project between Thames Water and the University of Surrey, has been developing an appropriate methodology, combining the Eva™ and its software, visual texture added to the pipe and a motorised pipe rotator, so reliable 3D models of the pipes can be built. Artec Studio 10.1, the recently updated system software, has increased the robustness of making the mesh by improved texture tracking whilst recording data. It also uses more of the multi-core capability of our PC workstation so the raw data processing is completed in a significantly shorter time. Comparing the models from before and after corrosion is removed from the pipe enables corrosion levels to be mapped to a good level of accuracy. The corrosion mapping provided by the Eva™ will be used as a baseline against which the effectiveness of different non-destructive approaches can be gauged.

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*Eva is easy to operate
when scanning a casting*

EVA CAST IN STARRING ROLE AT LEADING FOUNDRY

Using Eva as a QA tool makes light work of metal casting jobs.

It's always great to get testimonials from industry pros who have enhanced their performance thanks to Artec scanners. One such company is **Willman Industries Inc.**, a Wisconsin-based full-service jobbing foundry offering design, pattern making, heat-treating and machining. Willman have purchased an Artec Eva from one of our U.S. partners, Exact Metrology.

Willman were already familiar with the benefits of 3D scanners as they were looking to upgrade from an older laser scanner and Faro arm. Efficiency working with large castings up to 30,000 pounds was the benefit that sold them on the Eva, says Steve Young, the owner of **Exact Metrology**.

"With the larger castings, the scanner can be taken to the casting rather than having to move the casting to where the scanning arm is," explains Dana Green, an account manager at Exact

Metrology. "That along with the large field of view allows for faster capture rates compared to that of the arm and scanner. Additionally the accuracy tolerances are well within the Eva's capabilities."

Since its purchase, says Randy Parker, Willman's quality manager, the Eva has been in use practically every single day in some capacity or another. Parker estimates the Eva has been instrumental in QA on approximately 50 jobs so far, "working out well beyond expectations."

"We've made numerous improvements to our process with it. Our dimensional control has improved not just from measuring the castings but from checking multiple process inputs with the Eva," Parker says.

Dimensional control is carried out to determine if the quality of castings meets expected values by comparing the data captured with the scanner against known CAD files. This also helps with issues that can come up during the casting process such as core shift. The Eva captures data at an accuracy level well within the confines of the needs for the castings, demonstrating a higher speed of capturing the larger castings, along with a higher speed of data processing.

"The Artec Eva is crazy efficient. The rate at which you can capture data is fantastic."

"Using an arm and laser scanner could take hours to scan a large casting, add to that the processing of the large data sets and it may take a day to get results," says Green. "With the Eva, the casting can be captured in less time and provide processed results faster, thus allowing faster feedback on the production process to maintain quality."

According to Parker, Willman Industries have greatly expanded the primary use they bought the Eva for to include tooling analysis, pattern and mold scanning, reverse engineering and problem solving.

"Without a doubt the Eva has saved our company money," says Parker. "We definitely promote it to customers as a valuable tool that will enable us to meet their castings' requirements."

Problems such as uneven cooling can be encountered within casting scenarios, leading to production errors. With the faster data capture and measurement results, Parker can see errors in portions of a casting that can only be attributed to uneven cooling. This helps adjust production methods, resulting in lower production losses in time and materials.

Parker says he knew the Eva would help supply layout castings more rapidly but is amazed at the actual pace. Some tasks are accomplished in 75 percent less time and he cited some castings that historically would have stretched over a period of seven to 10 days now being finished in six to 10 hours.

He refers to the Eva as "crazy efficient," adding, "The rate at which you can capture data is fantastic."

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