



PIPEWORK 3D SCANNER

Client
National Grid / Cadent / M4

Team
Specialist Welding Services

Sector
Natural Resources

Project start
09/18

Project end
12/18

Value
£5k

Date
23/07/19

Author
Chris Rodway

Innovation Reference
SI-00050

PROJECT OUTLINE

- Specialist Welding Services (SWS);
- An independent specialist business that forms part of the Murphy Group of companies
 - SWS manage all welding centrally from our Leeds head office and offsite fabrication facility
 - Technical Engineering support for welding and fabrication activities
 - Utilises strategic independently qualified subcontractors to provide Inspection and Non Destructive Testing services

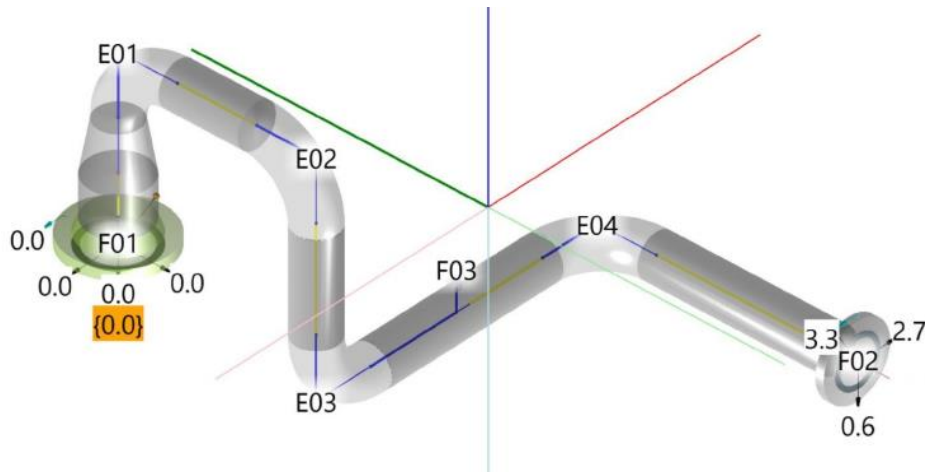
TESTIMONY

“This have given us a consistency of quality, Welding Services can guarantee fit first time”

**- Lee George, Group Welding Services Mgr
J Murphy & Sons Ltd**

KEY CHALLENGES

- When fabricating complex and big diameter pipework it can be hard to maintain tolerances for fitting onsite.
- It is sometimes impossible to measure complex pipework using conventional measuring techniques tapes and levels.
- An average example is complex 300mm diameter pipework, over 8m in length, that must be built within a 3mm tolerance to fit on site.
- With 3D scanning it is possible to fabricate more efficiently, more accurately and guarantee onsite fit.



SOLUTION / INNOVATION

Invest in customised 3D software to aid with the measurement of fabrications

The software chosen was Automet FAB developed by MLtech. It is a scanning software that is quick and accurate, providing early detection of none conformity. Welding Services saw the benefits of this software on the first project it was used on.

Use of Leica robotic total stations allows single person operation of the software. With visual cues and intelligent software, removing the need for hand controllers, the operator has the freedom to perform measurements with speed and accuracy.

KEY BENEFITS

- Increased spool dimension checking
- Checks all dimensions of spool, not merely length but also flange rotation, flange deflection, elbow angle, elbow roll angle - this is not practical using tapes and levels etc.
- One person operation
- Very fast; most spools would be checked within 5 minutes
- The ability to guarantee our clients that the pipework will fit, which in turn quashes any issues about payment
- Far less site welding, bringing more potential work to Leeds Fabrication
- Produces a report to confirm the spool will fit – eliminating time consuming paperwork
- Anyone can be trained to use the system – for spool checking it doesn't have to be an expensive tradesman
- An industry first
- Pipefitters can use the system to set up awkward spools – checking pre and post welding if required

COSTS / SAVINGS / ROI

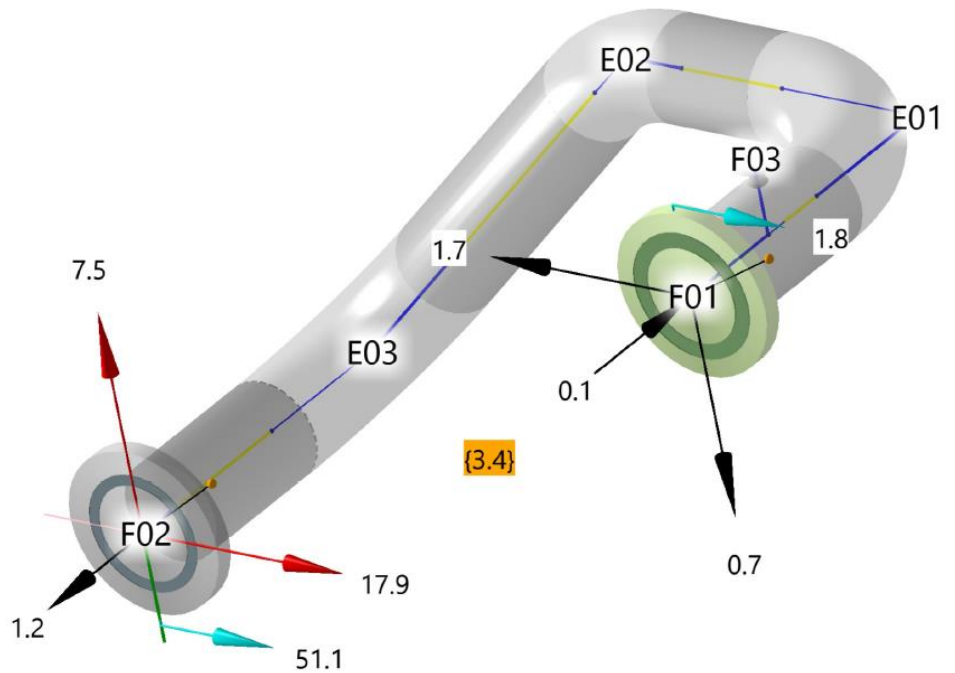
The first use of the scanner was on the Cadent – Forty Hill project. IT highlighted a flange bolthole alignment issue. This would traditionally be discovered on site during fitting.

Using the scan data SWS corrected the error before sending to site, reducing cost and risk by managing this internally.

Cost Vs Savings After 1 Month		
Item	Cost - Monthly	Saving - On Error
Total Station Scanner	£500.00	
Scanner Software	£400.00	
Transport To Leeds		£595.00
18" Re-Weld & Test		£800.00
Weld Inspection		£200.00
Blast & Re-Coat		£668.00
4HR Pressure Test		£2,000.00
Transport To Site		£595.00
Total	£900.00	£4,858.00
Saving On 18" Re-Weld		£3,958.00

Projected Savings		
Item	Cost - 6 Months	Saving - On Errors
Total Station Scanner	£3,000.00	
Scanner Software	£2,400.00	
Transport To Leeds		£2,975.00
Re-Weld & Test		£4,000.00
Weld Inspection		£1,000.00
Blast & Re-Coat		£3,340.00
4HR Pressure Test		£10,000.00
Transport To Site		£2,975.00
Total	£5,400.00	£24,290.00
Total Saving		£18,890.00

*Based On 6 Month Period With 5 Fabrication Errors (18" Pipe)



Bolt Hole Error Detected

IDEA ORIGINATOR

This idea was proposed by [Mark Thompson](#) (Welding Specialist) and [Chris Rodway](#) (Design Engineer).

CHAMPIONS

This proposal has been led and championed by numerous staff from the SWS team, including:

- [Mark Thompson](#) (Welding Specialist)
- [Chris Hawksworth](#) (Operations Manager – Fabrication)
- [Chris Rodway](#) (Design Engineer)
- [Adam Walton](#) (Welding Supervisor)
- [Richard Tacey](#) (Works Superintendent)

INNOVATION JOURNEY



5/9/18
Chris Rodway
Improve
Fabrication
Accuracy

Chris Hawksworth
Mark Thompson
Lee George

Chris Hawksworth
Lee George

Mark Thompson
Chris Hawksworth
Chris Rodway
Adam Walton
Richard Tacey

Lee George

SWS

10/12/18

FEEDBACK

Integrity is very important to all businesses and demonstrating this can sometimes be difficult. The use of the Automet software assists us in achieving our dimensional integrity targets but, further to this, the system has an effective audit trail so our clients can review the survey data in simple, effective reports.

The team made Automet an integral part of our lean system, in terms of cost effectiveness and process efficiency.

Automet alerts us at the very beginning stage and help us reduce waste, as well as operational issues. The introduction of the Automet software into our current working practices has improved our pipe spool surveying and fabrication efficiency and therefore our dimensional integrity.

FUTURE OPPORTUNITY

This is now standard practice on all welding services project. All fabrications are now 3D scanned which creates an overall more professional service which includes;

- Dimensional checking accuracy
- The ability to guarantee our clients that the pipework will fit
- Far less site welding, bringing more potential work to Leeds Fabrication
- Less or no site welding also eliminating need for hot works on live gas sites

If you are interested in finding out more or working with the Murphy Specialist Welding Services Team, [please get in touch](#).

