

Case Study

Customer:
Taylor Woodrow Construction

Project:
South Hook LNG Terminal

Solution:
Trimble S6 Robotic Total Station



How Robotic Total Station Technology found its niche on a landmark gas project

On the coast of West Wales, strategically located for shipping from the Arabian Gulf, a landmark project is underway which could provide 20% of the UK's gas demand after completion in 2007/08.

Thanks to the development of the South Hook LNG Terminal in West Wales, liquefied natural gas (LNG) is set to make a return to our shores after an absence of over 20 years. The end result will be the largest liquefied natural gas receiving terminal in Europe and potentially the world.

The terminal is a state of the art facility and has been designed to process 7.8 million tonnes per annum of LNG. When cooled to -160°C , natural gas becomes liquefied and 600 cubic metres can be condensed to approximately 1 cubic metre of LNG. The LNG will arrive by tanker at Milford Haven's newly refurbished jetty and be

discharged into five insulated tanks onshore. It is then sent to vapourisers for re-gasification by warming the cold liquid until it reverts to a gas.

Tank Construction

Undertaking the tank's construction is Taylor Woodrow Construction (TWC) operating as a subcontractor to Chicago Bridge and Iron (CBI). Each tank has a capacity of 155,000 cubic metres, a concrete wall 27.5m high and 0.7m thick and an interior diameter of 94m. Easily able to house an A380 Airbus, these tanks will be some of the largest structures of their type ever to be slipformed.

▲ The tanks in the early days
(Aerial photographs courtesy of Partryck Kilvington (TWC))

In early 2005 Taylor Woodrow established their construction site at the South Hook LNG Terminal and began work.

Conventional survey methods using EDMs

and levels were used to construct the tank bases whilst vertical lasers were used to monitor the construction of the first Tank.

“Obviously cost was an important factor and hire rates were higher, nearly double, than that of the instruments already in use”

As slipforming began on this first Tank, a Technical Representative from **KOREC** was on site demonstrating a Trimble S6 Robotic Total Station to CBI. The TWC survey team attended the demonstration and although impressed, felt that at that time they had an insufficient volume of suitable work to justify the hire or purchase of a robotic instrument.

However as the first tank was slipformed, several points emerged. John Rainnie, Project Quality Manager for Taylor

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Woodrow Construction explained, “The vertical lasers that we were using to monitor the slipform were not sufficient on their own and although the conventional survey equipment we used to supplement them produced useful information, the process was slow. As work on the

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increased demand for surveying, we decided to revisit using a robotic instrument.”

Selecting Robotic Technology

With the future in mind, Taylor Woodrow Construction’s surveyor Jim Garside, took a more detailed look at the specification of the Trimble S6 along with alternative

remaining tanks progressed, lines of sight would be restricted by both the tanks and follow on work (materials and equipment) needed to finish them. On top of this, we were also bidding to construct the process areas and buildings to control the receipt and distribution of gas. This work was spread over a large area although the individual structures would be much smaller than an LNG tank. Reflecting on our experiences with the first tank and the potential of new work bringing an



▲ Jim Garside & KOREC, centre of tank 5, 3 days into slipforming

robotic solutions from other manufacturers. After the initial research stage, the choice was narrowed down to Trimble and one other manufacturer and site demonstrations were arranged. John Rainnie continues, “Technically the instruments had similar capabilities and offered significant improvements over the conventional techniques and instruments that we were using. The ability of a surveyor to work on his own without the traditional chainman was a significant advantage and we planned to have at least two people trained to use it for optimum benefit.”

“Obviously cost was an important factor and hire rates were higher, nearly double, than that of the instruments already in use. We prepared a range of comparisons and

projections and although there was a big ‘guesstimate’ element because we had no direct experience of using a robotic instrument, even taking a pessimistic view, a robotic instrument appeared to offer worthwhile savings.”

Following a site evaluation of both manufacturers’ instruments, surveyor Jim Garside selected the Trimble S6 for its technical ability, robust construction and powerful software running in a Windows environment with a colour screen. This decision was further backed up by the fact that CBI had been using an earlier model of the instrument and was pleased with its performance and capabilities. One major benefit was how quickly a detailed report could be created in the field using the flexible xml reporting. This allowed any deviation from the design to be rapidly assessed, providing further confidence to everyone on site.

On Site

Following extensive use of the Trimble S6 on site, John Rainnie can reflect on what the instrument has brought to the Milford Haven job. “The S6 has performed well and allowed our surveyor to work quickly with or without assistance on a full range of projects from setting-out to preparing ‘as built’ of complete structures. KOREC has provided us with useful support and advice in the crucial early days and overall our experience has been a very positive one. Our surveyor’s only grumble is that he always has a backlog of work as his services are in almost constant demand!”

All information kindly supplied by John Rainnie (Project Quality Manager) of Taylor Woodrow Construction

Aerial Photographs courtesy of Partryck Kilvington (TWC)



▲ TWC Surveyor Jim Garside with the Trimble S6 in the centre of Tank 5 with Tank 1 in the background

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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