

Award winning application of a laser measurement tool in the offshore oil industry

OMC (Bishop's Stortford, UK) and Technip Offshore UK Limited have won the 2004 Subsea Pipeline Technology Award of the Pipeline Industries Guild. The award was presented at the Guild's annual dinner held at the Grosvenor House, London. It was given in recognition of the significant contribution to subsea technology provided by OMC's Laser Profiler applied to pipe measurement by Technip.

Technip Offshore UK Limited, are specialists in using the rigid reeled installation method for laying steel pipelines of up to 18 inches in diameter for off-shore oil and gas applications. The rigid reeled installation process is a fast and cost effective method for the installation of high quality pipelines since the welding and inspection process is conducted away from the vessel critical path at onshore fabrication facilities. The fabricated steel pipeline is then wound onto a large reel of approximately a 10m radius on the installation vessel. The vessel can then lay the pipeline in the desired location in a very short timescale with lay rates of up to 30 metres a minute.

The depth of water into which these pipelines are being installed is increasing (up to 2500 metres). A key parameter affecting the deepwater collapse resistance is the installed out-of-roundness, or ovality, of the pipe. The rigid reeled installation method affects the ovality of the pipe as the pipe is bent to relatively tight radii during the installation process.

To evaluate the affect on ovality of the reeling process Technip regularly carry out trials with short sections of pipe in order to gain a full understanding of the geometric changes that occur. Technip model the reeling process with sophisticated finite element analysis methods and compare these simulations with test measurements. In the past the pipes were measured during the simulated reeling process by a person with a large "C" shaped micrometer who would take up to eight diameter measurements of the pipe at regular intervals along the pipe.

Technip now use a Laser Measurement tool produced by the Optical Metrology Centre, UK. With it, Technip have been able to improve significantly their knowledge of the shape of the deformed pipe by development of advanced analysis techniques. This instrument has been used to obtain accurate geometrical maps of the shape of pipes and welded connections throughout the reeling process. The tool has played an invaluable part in the validation of the analysis techniques developed. It is this combination of tool and techniques that has appealed to the Pipeline Industries Guild judges in the 2004 Subsea Technology area.

The OMC Laser Profiler system uses a Laser Distance sensor and an optical encoder in order to measure the size and shape of pipes. The profiler can take many hundreds of measurements in a few seconds providing the end user with useful statistics such as optimum diameter, maximum and minimum deviation from a true circle. The accuracy of the device can be changed to suit differing needs with wide-range/medium-accuracy or high-accuracy/small-range options being available.

OMC specializes in the development of metrology products. Its work has been noted by the industry in the past being the recipient of five awards for various projects. As well as being useful for ovality measurements during bending trials the OMC Profiler is being used for a wide variety of tasks. For instance:

- Pipe-end sorting to minimize gaps between pipes when welded
- Estimating the optimum position of two pipes prior to welding
- Constructing maps of welds or other features such as corrosion or cavities
- Pipe straightness
- Coating thickness estimation
- Deformation analysis

Technip Offshore UK Limited is a UK entity of Technip, Europe's leading provider of project management, engineering, technologies and construction services to the oil and gas, petrochemical and other industries. With a workforce of 19,000 people, manufacturing plants and construction yards in every oil and gas region in the world and a fleet of 15 subsea construction and installation vessels, Technip is one of the most dynamic companies in the engineering industry.



CSO Deep Blue



Laser Measurement Tool

Contact OMC for further information and high-resolution images of the tool.

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