

Toeing the Line

In this issue, we take a look at some of the most important items of any subsea project...cables, connectors and umbilicals. They may not be the most glamorous piece of kit you take when going on a job but they can mean the difference between life and death or success and failure. So, what is available and where do you get them? Rachel Bass has delved deep and come up with the answers to these questions and more...

The umbilical is the connection between the wellhead control system & the conventional processing platform or for divers; their lifeline and link to the surface. This vital link requires a highly reliable system & there has been an increased need for improved technology over the past few years due to the increase in use of subsea wells and time spent in the water for divers.

Due to the water depth that Subsea offshore excursions can now reach, it is all the more important that the tubing, cables & connectors can meet the rigorous demands expected of it. Steel tube umbilical cords were discovered to have favourable characteristics over the original thermoplastic hoses as they had higher yield strengths, even with reduced thickness, whilst operating under high pressure. Stainless steel also offered the added benefit of a longer, more reliable life-time due to its high resistance to localised corrosion.

Subsea operations companies realise how critical the umbilical tubes, cables & connectors are, as they are only too aware that any malfunction can halt production altogether, resulting in the loss of millions of pounds.

Of even more importance are the divers' umbilicals as these are literally their lifelines, providing breathing gas and other services from a surface supply to a diver and any failure could mean loss of life.

So, who are the companies supplying these important apparatus?

Umbilicals International

Umbilicals International (UI), a division of HL Technologies provides hose, cable, diving umbilicals, electro-hydraulic umbilicals, ROV tethers and cable assemblies for harsh environment use. The company operates a strict Quality Assurance programme to ISO9001:2000 and was re-certified by DNV in August 2007.

During 2007, UI supplied a saturation diving Main Bell Umbilical (MBU) to a Norwegian diving contractor, which was built to the latest DNV-OS-E402-2004 standards for MBU's. This was extensively tested during manufacture to ensure full compliance with the latest standards, and an additional series of tests were conducted to verify that the levels of volatile organic compounds (VOCs) were within acceptable limits. UI has since received a repeat order from this



customer for this design, along with additional orders for other DNV-OS-E402-2004 approved designs from other operators and dive system manufacturers.

Saturation excursion umbilicals and Surface excursion umbilicals are built using the same high standards; therefore the user can have full confidence in the quality of the product supplied by UI.

UI offers a full range of diving hoses, including Aquaflex for surface demand umbilicals, Flexflow for higher pressure applications such as those found within a Main Bell Umbilical, and Texflow for the ultimate performance required for saturation excursion diving. All hoses are built on a high performance thermoplastic tube which is particularly clean and free from odours often associated with conventional rubber hoses.

While there are a number of typical constructions of 3-, 4-, 5- and 8-part umbilicals held in stock, the hoses may be custom cabled together with any of UI's extensive range of communication, light, and video cables to make the best diver umbilicals available on the market.

Local support throughout the world is available from a network of dealers ready to respond to the needs of the smallest contractor to multi-national diving corporations.

As an innovative forward looking company, UI has introduced the latest in protection for surface diving umbilicals. The common 3-part umbilical (UDA0103), comprising the 1/4" Pneumo, 3/8" Gas Hose and Communication Cable, is now available with a

protective outer jacket made from Polyurethane. This new product known as the UDA10334 (SW Umbilical) offers additional protection and also simplifies the cleaning of the umbilical when it has been used in contaminated waters.

Aker Kvaerner

Aker Kvaerner has more than 45 years of experience of design, manufacturing & installation of subsea systems worldwide. Their subsea umbilical plant in Mobile, AL, is the largest umbilical bundling facility in the world & in 2005 they were awarded a \$110 million contract to supply subsea umbilicals for the Independence development of Anadarko Petroleum and Dominion Oil and Gas.

Aker Kvaerner's innovative team realised the need to strengthen the early umbilical models to enable them to perform at great depths. They knew that to increase the thickness of the internal steel tubes would mean they would be too heavy so they enhanced axial stiffness with carbon fibre rods, which meant an almost equal strength to stainless steel whilst being 80% lighter.

Turid Storhaug, department manager with Deepwater Composites, a department within Aker Kvaerner Subsea says "This is an elegant, cost-effective design that has the benefit of eliminating bulky added buoyancy elements, which greatly complicate installation and add considerable project cost."

SEAFLEX

SeaFlex AS is a specialist company within offshore riser technology. The company was established in 1990 & its clients include the major oil companies and offshore contractors.

They have detailed knowledge & understanding of the structural design of umbilicals, which is the key to safe and efficient use of these products. SeaFlex is working with umbilicals from all the major manufacturers in Europe, Far-East, US and Brazil, gaining in-depth knowledge of the designs and their behaviour. SeaFlex provides high-end engineering services for all types of umbilical designs in static or dynamic applications. Over the years SeaFlex has established several umbilical qualification programs, including full-scale tests, umbilical component tests and advanced analysis, to provide the required level