

Trelleborg's involvement in Prelude

Trelleborg's marine systems operation has supplied a suite of products to Shell's *Prelude* FLNG facility, the largest offshore facility ever constructed. Trelleborg supplied its gas transfer technology and SafePilot navigational and piloting systems for *Prelude*.

Richard Hepworth, President of Trelleborg's marine systems operation, says, "We're delighted that our SafePilot solution, SSL, ESL and radio ESD for tandem condensate offload have been used on Shell's *Prelude* FLNG. A project of this size and prestige is one we're extremely proud to be a part of. The products supplied fall under our SmartPort product range - they represent industry leading technology that enables real time communications and information sharing during vessel approach and the LNG, LPG and Natural Gas Condensate transfer operations."

In support of *Prelude*'s process operations, Trelleborg supplied its industry-leading Ship Shore Link (SSL) system for the transfer of LNG from the platform to visiting LNG tankers.

To achieve this, a full shore SSL system was supplied. In addition, Trelleborg also provided their Electrical Shutdown Link (ESL), known more commonly as the SIGTTO link, for LPG transfer and a new radio ESD link developed with Shell used in conjunction with floating hoses for the tandem transfer of natural gas condensate produced as part of the LNG production process.

In support of *Prelude*'s marine operations, Trelleborg supplied the navigational system for *Prelude*. The system is designed to closely monitor the relative motion of the FLNG and the carrier during approach, and the sideways berthing/mooring phase, as well as a tandem berthing/mooring phase. The motion and position data of the carrier are measured by the Differential Global Positioning System (DGPS) Globalnaya Navigazionnaya Sputnikovaya Sistema (GLONASS) RTK based Portable Pilot Units (PPU) installed on the bridge wing of the gas LNGC.

The PPU is an 'all in one' unit with built in roll and pitch sensors. The CAT III unit is quick and easy to set up, as it only contains two GPS antennas and the PPU switches on automatically the moment the antennas are pulled apart.

Position and motion data of the FLNG is

measured by the Motion Reference Unit (MRU) and the DGPS / GLONASS RTK based base station on the FLNG. The base and up to five PPU's are linked via a dedicated UHF frequency.

The offshore operation requires a precision approach, monitoring and mooring software for the offshore oil and gas industry. Through the SafePilot system, the pilot, master, tug operator and control room all have access to a real-time, accurate and independent picture of the relative positions and movement between the different objects and tankers in the operation.

Trelleborg's offshore software allows the ability to view all objects and shuttle tankers together, on a single display.

BW Catcher on her way to the North Sea

Norway's BW Offshore has announced the sail away of the FPSO *BW Catcher*. The vessel has left Singapore's Keppel Shipyard and is currently in transit to the *Catcher* field in the central North Sea.

The *BW Catcher* is expected to reach UK waters early in the fourth quarter, depending on prevailing weather conditions. Upon its arrival, *BW Catcher* will commence a seven-year fixed term contract, with extension options of up to 18 years, with Premier Oil. Based on a field life of 10 years, the contract value is US\$2.3bn including FPSO charter rate and opex.

"The *BW Catcher* has been completed on time and within budget, and we are especially pleased with the good HSE performance during the construction project. We have worked over 11m man hours without a lost time injury and in total around 19m man hours. The FPSO is now underway to the North Sea for hook-up at the *Catcher* field, and with first oil scheduled later this year," said Carl K. Arnet, the CEO of BW Offshore.



The *BW Catcher* under conversion in Keppel Shipyard

The *BW Catcher* has an oil storage capacity of 650,000 bbls and a processing capacity of 60,000 bbls/day. The FPSO has a design life of 20 years of uninterrupted operations, and will be moored using a Submerged Turret Production system.

New technology from TSG Marine/IE

A radical new technology for the in situ repair of pipes was launched at Offshore Europe in Aberdeen during September.

TSG Marine, a UK-based engineering and maintenance support company, has collaborated with Intelligent Engineering (IE), the owners of the composite technology SPS, for its use in a new permanent class-approved pipe and tubular product renewal process.

The clever new technology, based on 'no hot-work' repairs, has a range of advantages over conventional 'crop and replace' pipe repairs, the most important of which is that the pipe can remain in service while the repair is carried out.

TSG/Pipe Repair with SPS, as the new repair service is to be known, opens up a wide new market for SPS, the elastomer-based composite material which is already widely used in deck and bulkhead ship repairs, and in the strengthening of helipads, impact protection and pipe deck reinforcement on offshore structures. The product has also been used to reinforce the hulls of FPSOs above and below the waterline, to effect underwater steel repairs for such units, and to create anti-piracy blast-proof citadels on-board ships. The product is also widely used in civil engineering.

There are thousands of fixed and floating structures in the offshore energy sector which remain on station either for very long periods, or indefinitely, and this is the sector that TSG and the SPS technology owners are now targeting. The owners and operators of rigs of all types - FPSOs, FSOs, FSRUs and FLNG units - all stand to benefit from the new technology, class-approved by DNV GL, which minimises disruption because there is no requirement to break the containment of the plant.

The repair system works by bolting an outer shell to the existing pipe. This produces a cavity which is injected with elastomer. Together this creates an SPS structural composite which is bonded to the existing corroded or worn pipework to form a new outer pipe with an