offshore holland 09

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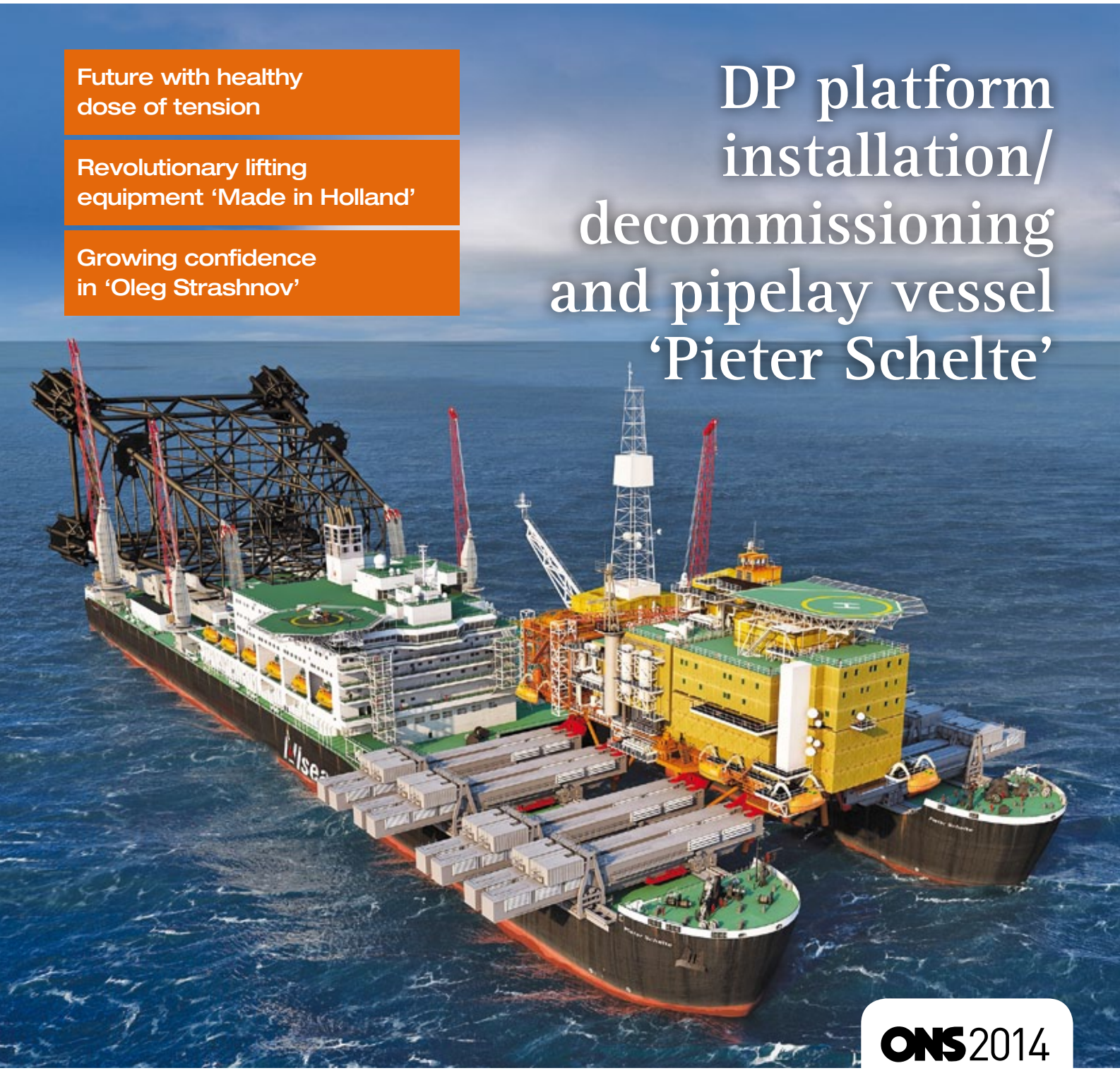
Future with healthy dose of tension

Revolutionary lifting equipment 'Made in Holland'

Growing confidence in 'Oleg Strashnov'

DP platform installation/ decommissioning and pipelay vessel 'Pieter Schelte'

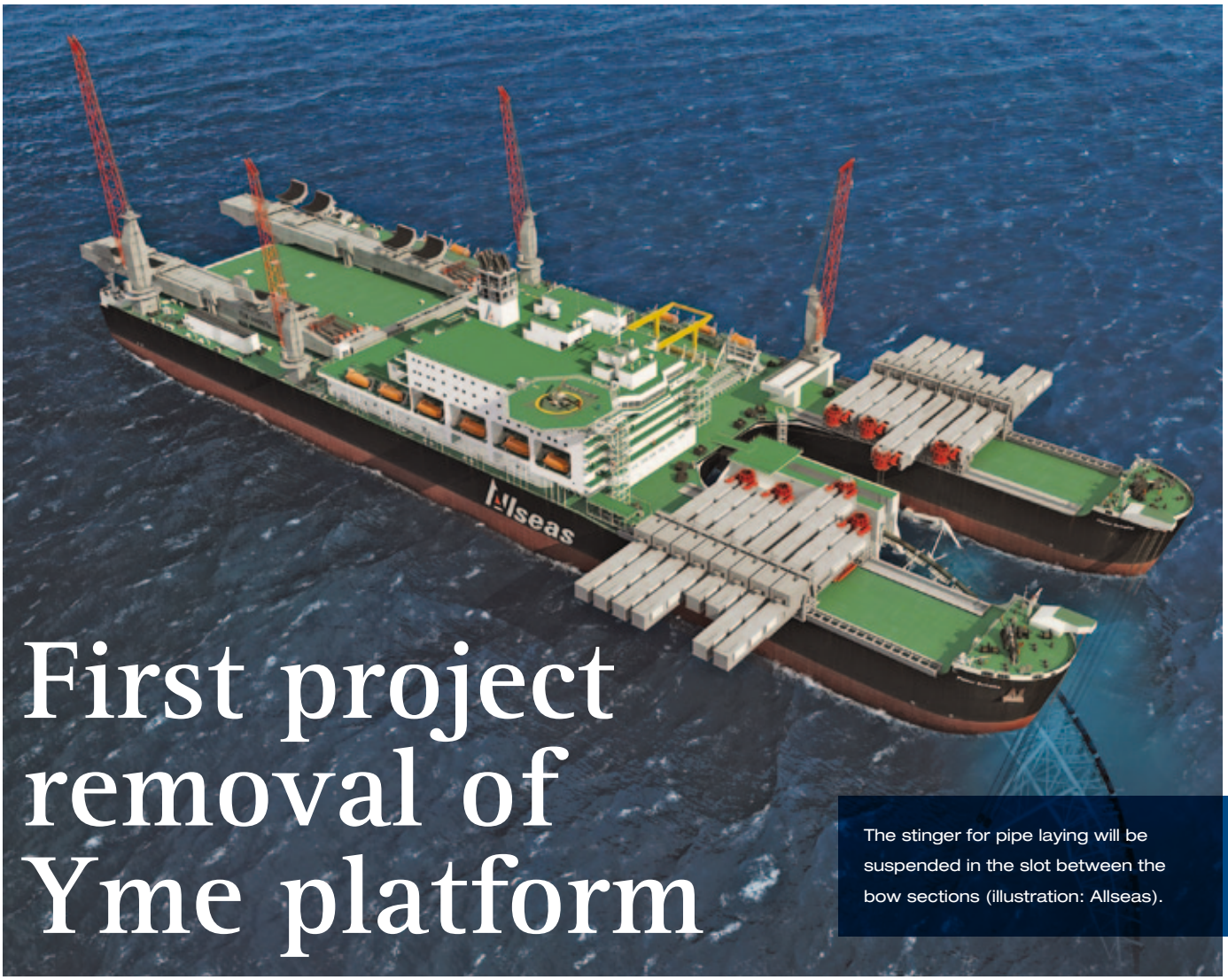


ONS 2014

Dutch knowledge is called in when the going gets tough

OFFSHORE ENERGY 14
EXHIBITION & CONFERENCE

DP platform installation/decommissioning and pipelay vessel 'Pieter Schelte'



First project removal of Yme platform

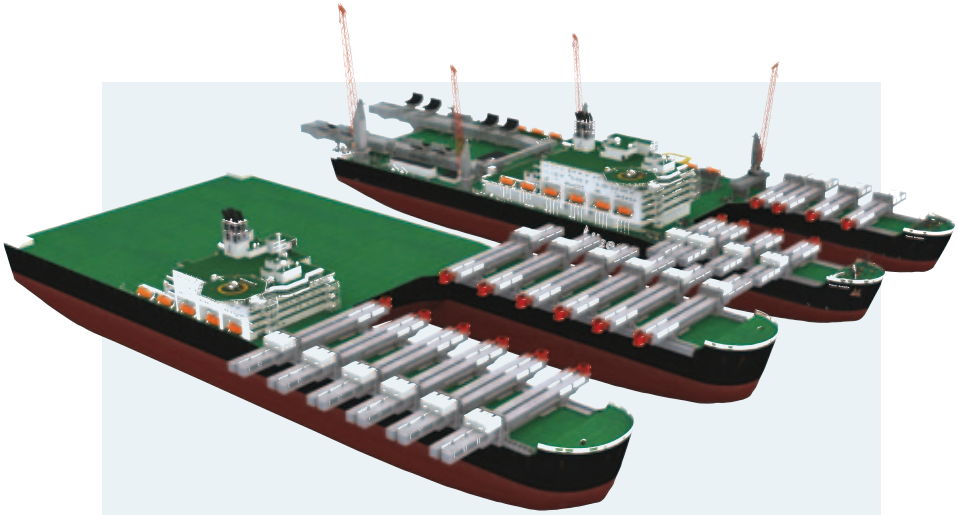
The stinger for pipe laying will be suspended in the slot between the bow sections (illustration: Allseas).

In 1978, with the introduction of the semi-submersible crane vessels 'Balder' and 'Hermod', his father Pieter Schelte Heerema succeeded in a single action in considerably pushing the boundaries of the offshore installation market. History will repeat itself when his son Edward P. Heerema puts a supersized, highly-innovative, single-lift vessel into operation, which just like the Balder and Hermod of their day, is unique in the world. And if it is up to the founder and CEO of Allseas, there is more to follow.

This father and son can certainly be described as offshore pioneers. With the monohull crane vessels 'Challenger' (1969), 'Champion' (1972), 'Thor' (1974) and 'Odin' (1976), Pieter Schelte Heerema had already succeeded in pushing the boundaries of the offshore installation market ever further. Lifting record after lifting record was established by these vessels, in particular in the North Sea region, where oil and gas fields were put into production in a never ending series. Subsequently, he was the first to make the daring move of operating semi-submersible crane vessels. To make this possible, the 'Balder' and 'Hermod' were fabricated between 1977 and 1979 at the Japanese Mitsui yard.

Each ship was equipped with two large cranes which in tandem could lift loads up of to 5,000 tonnes. Later, that lifting capacity was increased to 8,000 tonnes. Such character traits as daring, an urge to innovate and excellent entrepreneurial spirit are undeniably deeply ingrained in the genes of his son Edward, who with his company Allseas has now demonstrated in the pipelaying market that a pioneering approach also pays. Here, with his fleet of advanced monohull pipeplayers, he too is constantly breaking new ground. Furthermore, from just one year following the company's foundation in 1985, he has been hard at work thinking about the design

of a single-lift vessel capable of installing topsides and jackets of platforms offshore, with weights that far exceed the capacity of the semi-submersible crane vessels. In honour of his father, Edward has named this vessel 'Pieter Schelte'.



Artist's impression of the 'Pieter Schelte' (right) with on the left-hand side the enlarged version due to be launched in 2020 (illustration: Allseas).

Initial concept

During a press conference held in London on 3 June 1987, Edward Heerema presented his plan for massively pushing the boundaries of the offshore installation market, with the 'Pieter Schelte', by linking together two super tankers (VLCCs) and installing a lifting system between the bow sections capable of the offshore installation of topsides weighing up to 55,000 tonnes. This news spread like wildfire throughout the offshore sector, and the response was both amazed and sceptical. Looking back on that period, the originator of the concept commented: "They were very exciting times for us all. We were all young, enthusiastic people, and having just established Allseas, we were keen to realise what we all thought was a super idea. At the time, however, in every possible respect we were still too small for the task, also in terms of financing. The concept at the time was also not good enough to build the installation vessel in that form. We still had a long way to go before we could perfect the design, and raise our organisation to a level at which we could tackle such a challenge. In other words, we had misjudged our abilities, although we were convinced that our plans could be put into practice. That fact was a huge stimulus to carry on."

Multifunctional deployment

In the years that followed, no stone was left unturned in improving the initial concept, and further expanding the organisation. Market developments were also closely monitored. Heerema continued: "The installation market was certainly a factor that gave us sufficient confidence in the late nineteen eighties and early nineteen nineties to believe that a large vessel of this kind would be necessary. In the first instance, the ship was only intended to be used for installation work. It was only some six years later that we also started thinking about what became known as removals. Given the reversal of the same principle (in other words reversed installation), a vessel of this kind would be relatively easily capable of removing large platform parts from the sea. After a number of years, we also realised that if we wanted to keep a vessel like the 'Pieter Schelte' operational for say nine months a year, the ship would also have to be capable of pipelay operations, as well as the installation and removal of platform parts. The ship had a number of specific characteristics that made it suitable for all of these tasks, including the vessel's considerable length, the dynamic positioning system that we had introduced by that time, and the deck space available for the storage of pipes, and the possibility of suspending the stinger in the slot between the bow sections. This led us to decide that we would also make the vessel a very heavy pipelayer. In the MARIN institute, extensive model tests were carried out in order to better understand the movement behaviour of the ship, and to determine her sailing speed. We also wanted to determine whether it was possible to further perfect the concept."

Start of construction

In June 2010, Allseas announced that the construction of the 'Pieter Schelte', the largest platform installation/decommissioning and pipelay vessel in the world, was actually going ahead. The outcome would be a super-large catamaran with a length of 382 metres and a width of 124 metres. "We had decided to award the contract for building the 'Pieter Schelte' to the Daewoo yard in South Korea," continued Edward Heerema. "At that moment, the concept for the 'Pieter Schelte' had been determined for quite some time. In deciding on the width of the slot between the bow sections, at the time we had to make do with fairly generic information

With clamps mounted on the lifting beams, a topside is lifted from a jacket (illustration: Allseas).

provided by the oil companies about the dimensions of their existing platforms. We decided to make the slot 52 metres wide. However, when we undertook a series of detail studies for the oil companies about four years later, the actual figure emerged, and we repeatedly came up against the fact that the slot would probably be too narrow. This was very frustrating for us, because by then we had designed a vessel that with the exception of the opening between the bow sections was fabulous, in every respect. We therefore asked the yard to make the slot seven metres wider. Initially they refused, but when it turned out that they needed more time to complete the construction process anyway, and asked us permission, we were able to arrive at a settlement on the widening of the slot, too." The eventual outcome was that the 'Pieter Schelte' would be completed six months later than planned. The slot is now 122 metres long and 59 metres wide.

Lifting beams

For the installation and decommissioning of topsides weighing up to a maximum of 48,000 tonnes, eight sets of two horizontal lifting beams will be deployed, all of them equipped with hydraulic clamps or grabs. The lifting beams are being fabricated in Italy. "The clamps will be suspended in a system of arms that are able to move up and down thanks to the active motion compensation system, in addition to which the beams can move both sideways and be rolled in and out. As a result, active control means that movements can be compensated for in three directions. If you wish to employ the so-called fast-lift method, the system of arms is extended using a number of very large cylinders, whereby the entire topsides is lifted several metres." If it is necessary to lift highly-positioned topsides from a gravity-based structure (GBS), the draft of the vessel is reduced, and special yokes are installed in the clamps, which can be forced against the underside of the topside unit, to raise it. This same method is to be employed for the Brent contract for Shell, the first contract Allseas was awarded for the deployment of the 'Pieter Schelte'. "Three of the four topsides of the Brent complex are in fact the superstructure section of a GBS. For this project, it will indeed be necessary to cover considerable heights. Studies have also been undertaken regarding the removal of the topsides from a high concrete substructure in the Norwegian sector of the North Sea." Also as part of the Brent contract, a large steel jacket will

have to be removed. “The lifting system for jackets on the stern of the ‘Pieter Schelte’ is only to be installed on board in two years time. The winches required for the system have already been built into the ship, and the necessary high-quality steel has been purchased. The final details for the engineering are currently being concluded, so that a start can be made on the fabrication of the system in the near future. The Brent jacket is not due to be removed until 2019, so we still have sufficient time available.” When a jacket is raised from the seabed, it is drawn up against the lifting or tilting yoke. The yoke and jacket are subsequently tilted backwards, and the jacket is placed horizontally on the deck of the ‘Pieter Schelte’, for further transport. The maximum lifting capacity for jacket removal is 25,000 tonnes.

First project

Edward Heerema recognised the special nature of the fact that oil company Shell had contracted the ‘Pieter Schelte’ for the Brent decommissioning project, even before the vessel had sailed a single metre. The Brent field is in the British sector of the North Sea, 186 kilometres northeast of Lerwick in Scotland. The local water depth is 140 metres. The field comprises four large production platforms. Of these, the Brent Alpha consists of a steel jacket and a steel superstructure, while the Brent Bravo, Brent Charlie and Brent Delta consist of a concrete GBS with a steel superstructure. The weights of the topsides are between 16,000 and 30,000 tonnes.

First of all, during the period 2015-2016, the ‘Pieter Schelte’ is due to remove the topside from the Brent Delta. The other topsides will follow in subsequent years. According to current expectations, however, the ‘Pieter Schelte’ will first see service in the Norwegian sector of the North Sea. “Our first project will be the removal of the Yme platform operated by Talisman. Following installation in the Yme field, this platform proved unstable, and as a consequence has never actually worked. Because this instability represents a risk, the platform has to be removed. We expect to be able to complete this job during the course of next May.”

To bring the topsides removed from the sea ashore, Allseas has built a special transport barge, that can be manoeuvred between the bow sections. “The topside is then transferred in sheltered and sufficiently-deep water. Once at the yard, the topside can be

This aerial photograph of the ‘Pieter Schelte’ was taken at the Daewood yard in December 2013 (photograph: Allseas).

The ‘Pieter Schelte’ is the largest platform installation/decommissioning and pipelay vessel in the world (illustration: Allseas).

slid from the barge onto the quay-side. For a new-built topside, the process is repeated, but in reverse. The barge will be 200 metres long and 57 metres wide. For the Brent contract, we are also responsible for transporting the platform sections and the safe delivery of the topsides to the quayside at the Able yard in Hartlepool, where the dismantling process will be undertaken. For the dismantling itself, Shell has signed a separate contract with Able. There are however oil companies that wish to include the total onshore dismantling, in the overall contract. This makes it necessary for us to subcontract a dismantling yard.”

Pipelaying

The first pipelay contract for ‘Pieter Schelte’ will be South Stream; a 890 km long, 32-inchpipeline in water depths up to 2,200 m in the Black Sea. The stinger is currently under construction at Iemants in Belgium and being assembled in Vlissingen. Including the transition frame to be suspended between the hull and the stinger, the unit will be 210 metres long. The firing line with six welding stations for so-called double joints will run below deck, over the entire length of the vessel. The firing line will also include an NDT station for inspecting the weld seams, and six coating stations. The use of a transition frame of this kind means that the stinger is already positioned at the ideal angle for guiding the pipeline into the sea. To keep the pipeline taut, 2,000 tonnes of tensioning capacity is available.” As well as crew accommodation, the deck offers storage space for 27,000 tonnes of pipes. Double-joint stations will be installed below the accommodation unit. At each of these stations, two 12-metre pipe joints will be welded together simultaneously into double joints with a length of 24 metres, before being fed into the firing line. In the future, the ‘Pieter Schelte’ will be capable of laying pipes with a maximum diameter of 68 inches in water depths of up to 3,000 metres.

Edward Heerema expects the 'Pieter Schelte' to leave the Daewoo yard in October of this year, before making the crossing to Western Europe. In the meantime Allseas has decided to install the topsides lifting beams at the Maasvlakte 2 in Rotterdam. This work will have to be carried out during the coming winter period. "That will enable us to undertake the Yme project in May."

The 'Pieter Schelte' is expected to achieve a maximum speed of 14 knots. The beating heart of the vessel consists of eight MAN diesel generators, together delivering an output of 95 MW. They will also supply the power for the twelve thruster units each with an output of 6,050 kW, to be installed in the bottom of the vessel. These units are not only responsible for propulsion, but are also linked to a class 3 dynamic positioning system.

Even bigger

The fact that even the 'Pieter Schelte' has far from reached the maximum limits of the offshore installation and removal market is reflected by the fact that an even larger version of this already impressive vessel is in the pipeline. Allseas announced its plans for this larger vessel last November. "It may seem a little strange that even before the first ship has been launched we have come up with plans for an even larger version, but we have been aware for many years that the 'Pieter Schelte' is not large enough for the very largest platforms. When we realised just how much interest there was in the 'Pieter Schelte', last year, we were upset that we would be unable to handle the very largest platforms. We have now become convinced that single-lifting becomes financially even more attractive as topsides grow in size, as the relative advantages increase proportionally. With that in mind, some 2.5 years ago, we started designing a vessel with a lifting capacity for topsides with a weight of up to 72,000 tonnes, in other words fifty per cent more than the lifting capacity of the 'Pieter Schelte'. This vessel will be 400 metres long and 160 metres wide, with an even deeper and wider slot between the bow sections, and twelve sets of two lifting beams. We tested the design with a number of oil companies, including Norway's Statoil, last year. These companies responded very enthusiastically. The result was a decision that this vessel must also be built."

According to expectations, the bigger sister of the 'Pieter Schelte' should be operational by 2020. In other words, history continues to repeat itself.