STAYING AHEAD OF THE GAME

OFFSHORE WIND’S CONTINUAL COMPLIANCE EVOLUTION
This is a relatively young industry, both in terms of industrial development and regulation.
When the Offshore Wind energy sector started to develop back in the early 1990’s, there was little demand for specialist vessels. Projects were small in scale, close to shore and any vessel requirement could be met by the existing fleet. Since then, the scale of projects has grown exponentially in terms of number of turbines, their weight and power capacity, plus the projects have moved much further offshore. As a result, several niche vessel markets have emerged where the utilisation of specialist vessels offers project developers greater capability and efficiency.

Specialist heavy lift installation vessels are now an established market as are Crew Transfer Vessel (CTV) which has been a major success for a number of European shipyards, including Damen delivering 33 Twin Ave Design FCS 2610 vessels to the market. More recently there is growing demand for specialist cable vessels, especially for array cable installation.

What is different about the Offshore Wind market?
Cable laying requirements are not dictated by the market but by the cable and the seabed conditions at the installation location. The main necessity for a cable installation vessel is the capacity to deploy the equipment required to install the cable at the site, plus the ability to carry sufficient supply of the cable to be installed. While there are many vessels available with the right capabilities, there is an added constraint that the vessels need to be able to manoeuvre within the confines of the offshore wind farm.

Many of the smaller cable vessels and barges work using four-point mooring rather than Dynamic Positioning (DP). This method works well in areas of shallow water and has been used on a number of projects including the installation of array cables on 630MW London Array in the UK. The Pantra Maris was one of the vessels used to install some of the 200km of cable on site. However, anchoring in the field is not always possible especially in deeper water so DP2 is preferred. Where there is a variation in water depth, several vessels may be used such as on London Array where Cable Innovator and CS Sovereign were used in the deep water areas and Pantra Maris and Sterntat 83 in the shallow areas.

Problems on site
Research shows that there are frequently delays to the installation of cables on offshore wind farms. These are often caused by unexpected seabed conditions such as hard soil or boulders obstructing the route, with the result that the correct equipment is not available to overcome the situation. It is essential for efficient operations that the seabed surveys are thorough along with route engineering. This ensures that the installation method is correctly specified and the right tools are available with the right vessel.

Having cable installation vessels with high levels of specification should be very attractive to developers as they would provide more options on site, enabling them to deal with unforeseen situations. Finding both specialist equipment and an available vessel to deploy is not easy – especially at short notice. Building highly adaptable, multi-purpose vessels has been called the ‘Swiss Army Knife’ approach i.e. a tool for every problem. The drawback is that the build cost of such vessels can be higher and subsequently leads to a higher day rate for charters. Research by 4C Offshore has shown that vessel scheduling is the most common cause of delays to project development during the construction phase. Therefore should a different vessel be required part way through installation, significant delays are almost inevitable.

Demand in the market
Even if the utilization of a specialist vessel is attractive to offshore wind developers, building such vessels is not without risk for investors as ensuring maximum utilization is dependent on market demand. The Offshore Wind sector is particularly challenging as it is perhaps more sensitive to changes in government policy than other offshore energy sectors.

The last three years have seen the two major European markets, UK and Germany, experience periods of uncertainty. Changes to the UK Government’s energy policy on financial support has delayed a number of projects and resulted in some developers deciding not to invest (e.g. RWE’s decision to not invest in Galloper OWF). Even now that the changes to legislation have come into force, the UK market still faces a level of uncertainty as developers bid to obtain financial support under the new Contracts for Difference (CfD) regime. In Germany, major delays to the construction of the offshore grid led some developments in a hiatus as developers stopped plans due to lack of available grid connection.

But it is not all bad news. The German market is now moving forward with a more robust and realistic plan for the offshore grid development and changes to government policy to provide the certainty needed regarding tariffs to allow developers to make investment decisions. Even more positively, the Netherlands market is again moving forward after a period of stagnation.

The capacity of the projects which will go forward is still significant, despite reduced targets. For example, 10-15GW of capacity is expected in the UK and 6.5GW in Germany by 2020 respectively. The Dutch Government has issued a road map setting targets of 700MW of tenders per year until 2019 and new legislation is due in 2015 to support this.

As a result, 4C Offshore’s latest cable demand forecast suggest that under a medium case scenario, demand for array cable installation will be over 900km per annum for the years 2016 and 2017 and over 1,000km in 2018 with most of the installation taking place in the UK and Germany.

The demand is forecast to be lower during some of the later years but there are indications that demand could peak at 1,800km in 2023. This high point would be driven by the construction of Dogger Bank Creyke Beck A (Tranche A) and Hornea Project Two – Breesba, if these projects go ahead. There is quite a larger variation between the low, medium and high case capacity forecasts for the UK whereas the German market remains more consistent under all scenarios.

All of the projects that are forecast to be built over the next 10 years, apart from a few test sites, are large commercial operations which need to be constructed efficiently if project schedules are to be met. Developers must maximise their construction window by making sure that vessels are not only fit for purpose, but the use of specialist vessels will provide extra scope if needed. Short term cost cutting on day rates for less able vessels may be very short-sighted. Cable lay equipment is not readily available in the market at short notice, so having a vessel with more than the minimum specification gives greater flexibility should it be required, reducing the risk of project overruns while other options are mobilized.

Sue Crothers
Market Analyst, 4C Offshore
A group of offshore companies has come together to realise a first-of-its-kind floating tidal energy platform installation. Bluewater Energy Services has developed BlueTEC, a tidal solution that will use a Damen modular barge, permanently moored offshore. Installation does not require a complex or heavy-lift vessel and technicians have easy access without the need to go below the water. The pilot project will be installed by Van Oord off the Dutch island of Texel and will aim to prove the capabilities of this new technology.

Allard van Hoeken, Head of New Energy at Bluewater Energy Services, was responsible for developing Bluewater’s tidal energy strategy back in the early 2000s. He says that the company’s experience with FPSOs in the oil & gas sector made a floating approach logical from the outset, and not only because it matches Bluewater’s area of expertise.

“In 10 years it may be good, at some locations, to go below the water with this technology. However, for now a lot of the equipment, which would become inaccessible, is unproven. First you’ve got to get everything to a stage where it’s proven maintenance free for 5 years – that’s challenging enough – and then you can think about putting it below the water. With a floating, modular system you have no need to go below the surface,” says Mr Van Hoeken.

This fact alone, he says, offers a considerable reduction in terms of cost, time and risk. Besides, there are other benefits to be had too. “Nearer the surface the current velocity is higher, most of the energy is at the top of the column – 75 percent in the top 50 percent of water. So, whilst reducing the amount of Euros spent on maintenance, you’re increasing the amount of Euros gained in kWh.”

During the development process, Mr Van Hoeken realised that the best approach involved housing all the system’s electrics in modular containers located on board the platform. Other options were considered: “For example, our CALM buoys, but they require special transport. To get them to the other side of the world, from fabrication site to client, is very expensive. With the modular approach we have cost-efficient transportation, that can also be moved easily on shore if required.”

He approached Damen to see if this was something within their scope and was pleased to find that they already supplied a range of modular barges, well suited to the concept. “This was a real game changer,” he says. The challenge was that modular barges are, by nature, typically used for mobile applications – no one has ever tried to moor one permanently before. In fact, moored platforms for tidal energy were initially not believed to be feasible.

“Some people were nervous about this,” Mr Van Hoeken states. “But floating platforms are our core business. We were confident – we knew it could be done and we knew it would solve all the major issues you would otherwise face when placing new equipment out of reach on the seabed.”

The platform that the project partnership is using for the Texel installation is the smaller of two that Bluewater is taking to market. The 200kW platform is designed for remote locations with high current, but lacking sufficient demand or resources to develop coal or nuclear powered infrastructure. Bluewater has identified countries such as Fiji, Indonesia and the Philippines as likely candidates.

“Currently these countries are reliant on diesel energy generation. With this platform we are under the cost of diesel generation from day one – plus this is non-polluting,” Mr Van Hoeken says.

The currents around Texel, at 2 metres per second, are not as strong as those typically found in the target areas. However, the project aims to demonstrate the feasibility of the system. “This is the chance to prove the technology – the turbines, the barge, the mooring system, installation, connecting the system and the power cable to shore and the reduced environmental impact. We want to invite visitors that will benefit from this and present them with a proven system and not one that only exists on a drawing board.” Bluewater has developed a second, larger platform with a 2MW capacity for more populated, energy-demanding areas such as Western Europe.

Mr Van Hoeken says that the Texel project is extremely collaborative and he is very pleased with the relationship between Damen and Bluewater. “This is a very exciting time, enhanced by the cooperation we have with the partners. Everyone is very proactive and results oriented. We are really working well together.”
With safety as top priority, Mr Wigmans is clear on what the goal is. “At the same time we work very closely with our customers during the planning phase in order to achieve high levels of availability and energy output from their wind turbines.”

Hernan Vargas is part of operator Vattenfall’s Operational Rediness Unit – Renewables – Generation, which is responsible for planning O&M throughout the life-cycle of a wind farm. He expresses agreement with Mr Wigmans. “The main driver is safety. With this in mind as a priority we need to address the correlation between operational needs and their associated costs. Personnel transfer is obviously key to ensuring turbine availability through accessibility and we continuously look at improvements in this area.”

Growing importance

One of the biggest considerations in the field of personnel transfer is passenger comfort – which goes hand-in-hand with safety. Comfort is actually growing in importance for a number of reasons. Mr Vargas offers one example. “Given the increased need of personnel required for the Offshore Wind market we cannot always expect to have sailors amongst our technicians and seasickness is an important issue to address.”

Mr Wigmans offers further explanation: “Today more and more wind farms are being built farther from shore. This provides a new set of logistical challenges as the typical setup, where service technicians start out from the harbour in the morning and return in the evening, simply won’t work for some projects any longer. Transits can take too much time.”

For this reason Siemens has been studying new approaches and is in the process of pioneering efficiency-improved O&M concepts. One of these is their Service Operations Vessel (SOV). Early next year, Siemens will be the first to deploy SOVs that are purpose built for offshore wind service. The state-of-the-art vessels will accommodate up to 40 service technicians on a vessel that can remain offshore for up to a month.

As may be expected, comfort is a strong feature of the vessels, as Mr Wigmans points out. “Comfort is one of the key elements we looked at when designing our SOVs. They will have individual accommodation rooms for each technician, an exercise room, meeting rooms, hospitality areas and even a theatre. We want to make sure our technicians are not only safe, but comfortable.”

When it comes to operations and maintenance (O&M) at offshore wind farms it seems there is broad consensus between operators and technical service providers about what is important. René Cornelis Wigmans, Head of the Maritime and Aviation Solutions department of the Siemens Wind Power service business says, “In developing or planning any offshore logistics concept the most important criteria is safety. Making sure our service technicians have the proper training is vital. Siemens prides itself in having all four of our global training centres certified by the Global Wind Organisation.”

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PRACTICAL SOLUTION

In recognition of such requirements Damen has designed a dedicated SOV and these vessels will also be equipped with a range of practical solutions, such as an on board spare parts warehouse and a hydraulic Walk 2 Work gangway system and a strong focus on comfort, performance and fuel efficiency.

Since the ‘E3’ are becoming more and more important these days, Damen started about a year ago with the search for a way to create and design a vessel which is Environmentally-friendly, Economic viable, and Efficient in operation. The key design criteria for the vessel were the result of extensive discussions Damen held with the industry. Staff retention was a growing issue in the offshore market. Therefore a fourth requirement was given: comfort for crew and its passengers.
“We will always be aiming for the perfect fender system for the Fast Crew Supplier (FCS) 2610,” comments Damen Project Engineer Kees van Oosten. With 40 FCS 2610s built since June 2011, the model is undoubtedly one of Damen’s recent success stories. Damen, however, is always striving to push the boundaries of quality and for the last 3 years, the company’s R&D team has been working to reach this goal. “We knew that the crew transfer system of the FCS 2610 would be the bottleneck,” explains Mr Van Oosten. “We needed a fender system to improve that aspect. One that dissipates a high amount of kinetic energy and then enables the vessel to hold its position. The fender must also give feedback to the captain about his actions to maintain safety and avoid damage. All this while maintaining onboard comfort.”

Damen has carried out research, collecting data concerning a wealth of variables at the BARD Offshore 1 wind farm in German North Sea waters. BARD 1 is renowned for its harsh conditions including high waves with short wavelengths. “This is real life testing,” says Damen Design and Proposal Engineer Brian Mewis. “We are testing fenders because the market cannot deliver what we are asking. The whole market is in a trial-and-error phase and our aim is to narrow down the options to the optimum end result.”

The team continues scaled-down testing under controlled conditions at Damen’s yard in Gorinchem, the Netherlands. By being able to control all the variables they can gain valuable insight into various fender dimensions and foam densities. “We have the knowledge and we listen to the feedback from customers,” continues Mr Mewis. “Our customers need to have a higher operability in rougher seas with less downtime.”

By working together with customers and fender manufacturers, Damen is making progressive steps in fender development. “We are on the road to the perfect fender system,” concludes Damen Business Development Manager Offshore Wind Peter Robert. “A system that further improves the already high performance of the FCS 2610.”

**Absorbing Forces**

When a FCS 2610 makes contact with an offshore wind turbine there are both horizontal and vertical forces involved. “Energy absorption is just one of the purposes of a FCS 2610 fender,” explains Damen Design Engineer Brian Mewis. “These are the horizontal forces.”

Absorbing these forces prevents structural damage to turbine and vessel. “The fender also has to keep the vessel in place against the wind turbine so that the bow of the vessel ‘sticks’ to the structure, preventing vertical movement of the bow so that the maintenance engineer can transfer safely.” This is achieved by the vessel maintaining forward propulsion – the stern, meanwhile, moves up and down with wave action. The energy from the horizontal impact is absorbed by a foam core and vertical movement is prevented by a polyurethane outer layer that provides friction. “The challenge is to combine the two demands of vertical and horizontal forces.”
Damen is bringing a new approach to vessels intended for operations in the offshore, wind power and associated sectors. The company believes that its expertise in designing and building a wide range of working vessels around the world, combined with a long-term outlook that derives from being a family-owned and run business, gives it an advantage over more specialist yards. The result is its new Offshore Series, the product of extensive industry consultation and exhaustive technical development.

This portfolio offers specialist vessels for a wide range of applications, from Platform Support Vessels from 1,600 DWT up to 5,000 DWT to Well Stimulation and Anchor Handling Vessels. Its extensive portfolio of Fast Crew Suppliers sets the standard for fuel economy and passenger comfort in even adverse weather conditions and models are available to suit every need. Built to the highest standards, all Damen vessels ensure fast and efficient operations, minimum downtime and low overall cost of ownership.

However Damen also offers a wide range of models that exhibit maximum flexibility and which can be outfitted and deployed across a broad spectrum of roles. Oil & gas E&P, wind farm construction and maintenance, cable laying, civil engineering and more - Damen has the product range to support and supply operations. The Damen Offshore Carrier can be equipped for everything from cable-laying and transportation to RoRo, bunkering and even dredging. Damen Multi-Cats are compact, manoeuvrable workhorses invaluable for diverse support operations while Shoalbusters are powerful, multipurpose platforms ideal for towing and anchor handling, and can be fitted with ancillary equipment such as cranes.

Industry-driven design

"The starting point for all the vessels in the new Offshore Series has been designing the hull forms from the keel up" says Mark Couwenberg, Damen Design and Proposal Engineer Offshore & Transport. "Considerable time is spent on computational fluid dynamics (CFD) studies to investigate and simulate ship behaviour and optimise the hull shapes. Models of the resulting hulls are tested at Maritime Research Institute Netherlands (MARIN) to verify the results. A slender hull reduces fuel consumption, in calm water but also especially in rough seas. Smooth surfaces and a distinct lack of angles, lines and recesses also have a positive effect on minimising drag and extending the durability of coatings."

Damen also takes seriously the E3 ethos: that is, to be Environmentally friendly, Efficient in operation and Economically viable. For that its designers look afresh at everything from coatings, the location of oil tanks and types of refrigerants to the recovery of waste heat and minimising engine emissions. All these and more are assessed and appropriate solutions implemented.

The Offshore & Offshore Wind Portfolio continues to develop as customer needs evolve in response to changing economic and regulatory environments, but it always remains dedicated to flexibility, efficiency and cost effectiveness.
Platform Supply Vessels: Highly efficient, large-capacity ships, especially suited for transport of crew and supplies to and from offshore structures. The vessels may be optionally fitted with: Fire Fighting, Oil Recovery and/or high class Dynamic Positioning installations. The vessel design provides a safe and comfortable working environment.

Fast Inspection Repair & Maintenance Vessel: This concept design was developed with a focus on delivering substantial improvements in transit and mobilisation times. The initial design speed is considerably higher than that of most equivalent vessels available on the market today, and the FIRM combines high speeds with high DP performance. The concept features the successful Damen Axe Bow designs.

Well Stimulation Vessel: Increasing the production performance of deteriorated oil wells is often performed by old PSVs which have been retrofitted with the required pumping and mixing equipment. Damen has designed a versatile well-stimulation vessel in recognition of the fact that purpose-built vessels are increasingly coming to be seen as safer and more economical.

Offshore Pontoons & Crane Barges: Offers a full range of offshore, Heavy Lift and/or semi-submersible pontoons, from simple, but seagoing platforms to crane and pipeline barges. Fast delivery from stock due to standardised design and build techniques and predesigned options. High quality components and accommodation for 12 crew members to European standards.

Anchor Handling Tug & Supply Vessels Part of the Anchor Handling Tug and Supply vessel category, offered from 70k bollard pull upwards, the 200 t bhp AHTS200 has been designed for water depths up to 3,000m. The vessel features a 670m² working deck, extensive winch lay-out, ROV functionality and can be used for subsea construction. The Damen AHTS 200 design was based on the Petrobras AHTS 18,000 requirements.

Construction Support Vessel: Offshore oil, gas and wind fields need specialised vessels to install and maintain subsea equipment. The Damen CSV 8019 is designed with a large clear deck, a large accommodation area and can be fitted with ROVs, a 100 ton subsea crane, moonpool, heli-deck, etc. A larger vessel of this type is under development. The CSV 8019 complies with Petrobras’ requirements for ROV Support Vessels.

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Damen Offshore Carrier: A 7,500 – 10,000 dwt range multi-purpose vessel with heavy lift, ro-ro and offshore installation capabilities. It features 65 days endurance, 2,300m² of deck area, and deck strength of 20t/m². The vessel can be fitted with the Damen Deep Dredge system, for mining and dredging.

Multi Purpose Vessels: Designed to execute a great extent of specific tasks which may include coast guard duties, fishery control, fire fighting, rescue, oil recovery, salvage, wind farm maintenance. The Damen AHTS 200 design was based on the Petrobras AHTS 18,000 requirements.

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Fast Crew Suppliers: More than 70 vessels featuring the unique Damen Sea Axe vessels bow ranging from 19m-67m have been supplied. These vessels cut through waves maintaining speeds of up to 20 knots, reducing slamming and vertical acceleration by up to 75%. The latest variant, a Twin Axe Bow version, the FCS 2610, is making an impact in the windfarm construction sector, handling crew transfer in wave heights of up to 2.5m and operating at speeds up to 25kn.

Accommodation Barge: Very comfortable accommodation for workers and crew, in compliance with IMO and MLC 2006 regulations, including spacious cabins and a high quality fit-out. Assisted propulsion and equipped with a fully integrated DP2 system. Adding optional equipment such as FFi-2, tenders, boarding systems and a helicopter platform will make the barge fit for any purpose.

Infield Cable Layer Vessel 5000: Dedicated design fitted with integrated carousel is ideal for infield cable laying. The vessel is able to lay array cable as well as export cable. The deck layout for each vessel will be established in close consultation with the end user. A bollard pull in excess of 120 tonnes can be achieved, facilitating eventual ploughing operations via the stern mounted A-frame.

Multicats: Damen Multi Cats are invaluable workhorses for a wide and multi-purpose range of tasks. The vessels are tough, compact, stable and manoeuvrable for tight situations. The design includes an ergonomic wheelhouse providing 360 degrees visibility. All communication and navigation equipment is within direct reach of the operator. Our Multi Cats are reliable, offer you trouble-free services and are thoroughly tested already for years by our loyal customers.

Shoalbusters: Damen Shoalbusters have been designed for different kind of jobs on different kind of working places. The vessel has a shallow draft to work in shallow water as well as in deeper water, often with an unrestricted sailing area. Equipped with enough power for heavy duties it is one of the most functional vessel type there is.

Walk 2 Work Vessel: Designed to provide motion compensated transfers for personnel and equipment, while facilitating optimum logistic flows for carrying out maintenance and repairs for the Offshore Wind industry, as well as for unmanned offshore installations. With well-appointed accommodation for 45 maintenance personnel plus 15 crew, the W2W vessel features an efficient work and storage space, a number of sheltered workshops and a helideck.

Oil Spill Response Vessel: An increasing demand for vessels which are able to respond to environmental disasters is expected, especially after the Macondo disaster. Having built a number of dedicated Oil Spill Response Vessels, Damen is working on a new type for this market. Like the CSV and the AHTS, this vessel is fit for the Brazilian market and incorporates Petrobras’ OSRV-requirements.
Theo de Lange says that despite some delayed projects, Europe’s Offshore Wind cable laying demand is expected to grow rapidly. “UK Round 3 projects, but also German and probably also Dutch projects, are moving farther away from shore, into deeper waters. That means those vessels doing the cable laying need to be suitable for rougher conditions.”

Van Oord had a clear set of requirements for its new cable laying vessel, including accommodation, dynamic positioning capabilities and the ship’s dimensions, but also faced a relatively short timeframe before mobilizing her for Gemini. The team looked at vessel conversion options and existing Offshore Support Vessel designs, but found these too limiting. When presented with the Damen Offshore Carrier 8500 concept, Van Oord quickly decided to order Nexus, the first in class for Damen’s new multipurpose design.

To meet these challenges, contractors are placing orders for new cable laying vessels or ship conversion projects. Van Oord, which has relied on its own adapted side-stone dumpers or on chartered vessels, decided to invest in its own purpose-built cable laying vessel – part of Van Oord’s business model as offshore wind EPC contractor – “building the complete balance of plant of wind farms, and at the same time doing that with our own equipment.”
“Damen’s concept was probably originally made for transportation and installation purposes,” Mr De Lange says. “So the start was different from, for example, a dedicated offshore vessel with all kinds of capabilities that probably we don’t need for cable laying. The Damen concept was kind of a basic design with flat deck, enough accommodation and enough deck space. That was the perfect basis for making it a cable laying vessel.”

Van Oord ordered the vessel in Q3 2013 and it was recently delivered in December 2014. Because the engineering for the basic design was close to completion, it was possible for Damen to build the vessel in what Mr De Lange says is a very short timeframe. “They also offered a reasonable price/performance balance. And of course Damen has a good track record. That gave us enough confidence that this project would also be delivered in time.”

Despite the demanding deadline, Damen undertook additional engineering to fit Van Oord’s specifications. The main challenge was extending the accommodation without losing too much deck space, while maintaining low noise and vibrations and certified comfort class for up to 90 persons.

“A high accommodation standard is very important,” says Mr De Lange. “Not only for Van Oord personnel, but there will be suppliers on board like cable companies and testing teams. So you have all kind of requirements from clients and suppliers that we also had to comply with.

I think this vessel at the moment is perfectly suitable for the majority of Round 3 projects. It’s definitely capable of installing the export cables, but without any problems we could also do the infield cables. Most probably it will also do some infield cable laying for Gemini.”
“Seazip has the same owners as JR Shipping,” begins Managing Owner Jan Reier Arends, explaining his move into the offshore industry in 2010. JR Shipping covers all-round shipping – container vessels, multi-purpose dry-cargo vessels and the management of a tall ship. Seazip, on the other hand, is focused on the offshore industry. “A couple of years ago we decided that we wanted to diversify. Offshore wind was booming, as it still is, and we decided that this was the next logical step for us. This is not a 1 day adventure, this is a well organised step forwards in our development.”

Mr Arends does acknowledge that it’s not all plain sailing in Offshore Wind, and that the industry presents a unique set of challenges. However, he is convinced of the sector’s future and puts a lot of the difficulties seen so far down to teething troubles. “It’s normal for a new business and already a lot of lessons have been learned. There is especially a learning curve when it comes to operating farther out to sea – it’s only just over a year since such developments have got underway, with projects such as the Bard and Global Tech 1 Offshore Wind farms. There’s still a shortage of larger vessels needed for these projects and of people who can build and operate them.”

Early in his new venture, Mr Arends ordered two Damen Fast Crew Supply (FCS) 2610 vessels, which first saw action on the Bard project. The vessels, he says, enabled the company to meet the rising expectations of their customers in the Offshore Wind arena. “We saw the standards of our clients and we invested in a vessel capable of meeting them. We built the vessels under Dutch flag and we have a Dutch crew aboard. “We chose Damen as they have a lot of experience in vessels such as this. We saw the development of the twin axe bow vessel and were very interested in it.”

Mr Arends has not been disappointed. “The vessels are really very versatile,” he says. “We’ve done crew transfer as you would expect, not just from the shore, but from hotel vessel to turbine. Additionally we’ve also used the two anchors for diving work on a 3-point mooring spread and the moonpool for survey operations during the last charter. The large deck space also allows us to transport cargo. “This is what we are trying to communicate to our clients – that these vessels can do much more than simply transport twelve people. The FCS 2610 is so much more than just a water taxi.”

Mr Arends says that the advantages the vessels present go beyond versatility, however. “It’s a combination of speed and comfort for passengers and crew – which has a lot to do with the Twin Axe Bow design. One of the biggest advantages for us though, is the large tank capacity. This means we are able to stay offshore for 5-6 days before refuelling.”

Mr Arends says that Seazip ordered a further two FCS 2610s from Damen, scheduled for delivery March 2015. The vessels would take advantage of Damen’s flexible approach to building their standard range. Seazip would modify the vessels with features they require to further their Offshore Wind activity, entering into the O&M market.
Seacontractors deploys its Shoalbuster vessels around the world, with a focus on north-west Europe, the Middle East and Africa. Seacontractors Managing Owner Xander Schanssema says for him the Shoalbuster is all about versatility. “These are multi-purpose vessels. We use them for anchor-handling, supply work and support on pipe and cable-laying projects, for example.”

Seacontractors’ workboat section is involved in a diverse array of projects, so such versatility is a must. The company offers tug supply and Multicat vessels in two ranges: Class A with between 55 and 110 tonnes bollard pull and Class B with up to 55 tonnes bollard pull. The Shoalbuster 3209, with a bollard pull of 45 tonnes, sits within the latter. The vessels’ workload includes towage and salvage, work on maritime infrastructure construction, dredging support and service to the offshore energy sectors.

Mr Schanssema says that it is in the field of Offshore Wind that the Shoalbuster design really comes into its own. “We do a lot of jack-up support on offshore wind farm construction projects with these vessels. The thing with offshore wind projects is, mainly, they are taking place in shallow waters. Therefore, you need a vessel with shallow draught capabilities. We find the Shoalbuster, with its flat bottom, is perfect for this work.”

He goes on to say that the standard design – which Seacontractors has had Damen customise to meet its exact needs – is also an advantage, from maintenance, spare parts and manoeuvrability perspectives.

Seacontractors has built its fleet over the past 10 years, over which time, Mr Schanssema says, he has seen the Shoalbuster vessels evolve. “As well as the adaptability of the vessel, there has been a process of continual improvement. If you consider the design of these vessels over the years, you can see there have been several updates. If something new is discovered that will improve performance, Damen has taken care of it in the next design – the vessels get better and better. It’s not a highly complex vessel, but it works well and that’s what we like.”

For this reason, Mr Schanssema explains, Seacontractors will be looking at introducing further Shoalbuster vessels to its fleet in the future. “We have a leading position, not only in this niche, but with the whole fleet – and we want to maintain this.”
For Offshore Wind, like all maritime industries, regulations are a constantly evolving challenge, says Gijsbert de Jong of international classification society Bureau Veritas. “The interesting thing is that this is a relatively young industry, both in terms of industrial development and regulation. Because of this it relies a lot on lessons learned over the years in the oil and gas industry.”

Bureau Veritas has a dual role to play in the classification of offshore renewables vessels. On the one hand it develops its own standards and, on the other, carries out certification on behalf of flag states, encompassing every aspect of vessel development and operation.

“We review the design drawings, carry out construction inspections, and accompany the vessel on sea trials,” explains Mr De Jong. “It doesn’t end there, however; we carry out annual inspections and 5-yearly Class Renewal Inspections in dry-dock.”

According to Mr De Jong, the regulations affecting offshore wind vessels are many and varied. “You could conduct a study on it,” he says. Broadly speaking, however, there are two areas that are of utmost importance – safety, covered by SOLAS, and environmental protection, the domain of MARPOL.

“In the IMO currently, the biggest question is what we should do with the people who are brought from shore to work on turbines,” Mr de Jong states. The challenge begins as a result of the number of personnel involved. “If you transport up to 12 industrial personnel, then cargo vessel regulations apply. Any more and, technically speaking, you’re operating a passenger ship. The problem is, if you want to build offshore wind vessels fully compliant with SOLAS passenger regulations it’s going to be very difficult – practically and financially speaking.”

The solution, he says, is to train the technicians – many of whom have an onshore wind background – to be fully competent offshore. “We need to enforce standards of training and certification that see technicians recognised as ‘special personnel’. This category sits somewhere between cargo and passenger transportation. We already have a regulatory framework in place for this classification, thanks to the oil and gas industry.”

Training of personnel really is key, Mr De Jong says, as vessel designers are already preparing vessels for tomorrow’s regulations.

“We’ve already been working with a lot of designers on anticipated changes so, basically, today’s vessels – including Damen’s Walk 2 Work design – are already designed in accordance with what we think those changes will be. European designers are not taking any risks; they set out with the SPS Code in mind. Nobody wants to operate substandard ships.”

As an example of the kind of issues facing the Offshore Wind sector, Mr De Jong offers the lack of offshore access system regulations.

“Transfer of people is a very delicate operation, but one which, at the moment, is very poorly regulated. Take Walk 2 Work systems as an example. There is international legislation in place that suggests turning off motion compensation before an operation in case it fails. This is despite the fact that that its whole point is to makes the operation safer and the technology is already up to standard – manufacturers simply don’t have a way of demonstrating this currently. However, we are working with them on this.”

The other great consideration, that of environmental impact, is one that has become increasingly tight over the last decade, across all maritime sectors. Since January 2015, this includes the implementation of a maximum sulphur content of 0.1 percent in marine fuel inside ECAs, including the North Sea. A number of options are being explored to cope with this.

“To begin with at least, vessels running on residual fuels may switch to distillate fuel, though this will increase operating costs. Some of the larger vessels running on distillate fuels are likely to fit exhaust cleaning systems, such as scrubbers, but there is a third option – LNG. I think this will become increasingly popular – especially as availability is rapidly improving in the North Sea basin right now. I think this is a really interesting opportunity.”
On the surface, the Offshore Wind industry has a good safety track record. “So far on wind farm crew vessels industry-wide, there have been zero fatalities,” says Workships’ Philip Woodcock. “Statistically this will not continue. We have to improve, learn lessons and share information. Together we can move the eventuality further and further back and mitigate the consequences of major incidents.”

Workships have over 25 years’ experience in the management of platforms, vessels, crew and offshore logistics, amongst other things. They currently operate a fleet of 13 vessels, recently expanded by the addition of two Damen vessels, a Fast Crew Supplier (FCS) 2610 and an FCS 2008. Mr Woodcock is the company’s Operations Director and QHSE Manager. Safety, therefore, is a matter close to his heart. Here, he gives the benefit of his experience to suggest how the industry can get safely up to speed.

In what ways does Offshore Wind QHSE differ from oil and gas?

“That begin with, a lot of contracts were awarded very much on the basis of tendered prices. It was logical it should be this way; renewables do not experience the same peaks in production and associated boom times as oil and gas. However, this means less money to finance QHSE initiatives.

“Then there’s the fact that it’s a new industry and the energy providers are utilities companies, not offshore specialists and, initially, were not familiar with the implications of working offshore. Thankfully, this is changing now.”

Oil and gas has taken several decades to reach the high QHSE standards we see today – will we have to wait until the next generation before the offshore renewables sector catches up? “The fact is that renewables offshore construction is still offshore construction. It requires the same techniques and the same assets and poses similar safety implications as oil and gas. The similarities between renewables and non-renewables mean that contractors already have the right equipment and techniques. What we need are industrial channels to facilitate safe practice. Within this are two necessary key features: Observation and transparent reporting.”

What should we observe to improve safety?

“Everything. The more knowledge we gather the better the chance of avoiding a tragedy. I often think of the way Henry Ford used to record workers to identify repeated, common, physical actions then position equipment accordingly for more efficient production. We can do the same for safety. We observe movement, for example, from a seat to a ladder and this tells us where the handrails should go. “And we need to constantly monitor – at Workships we have enlisted BMO Offshore to carry out monthly vessel performance monitoring on things such as body vibration, motion sickness and turbine impact.

“But we need to make sure we respond to the things we observe and this means constantly tweaking the design of a vessel. Vessel design should not stop at ‘best in class’, it needs to keep going, in a process of evolution, if safety is to improve. “The same is true for personnel. We put crew through a process of ongoing training and examination, with a strong QHSE focus. Anyone who fails to pass an examination relating to core competencies is simply not permitted to sail.”

Does the industry pay enough attention to crew satisfaction?

“Crew are not important – they’re vital! This goes for everything from safety to client relations.

“As projects get farther out and crew are expected to spend more time at sea, we really need to ensure the crew are comfortable and alert, so they can concentrate on doing their job safely. This is often straightforward, covering things such as the addition of vibration mounted suspension seats to a vessel that meet High Speed Craft Code standards. It’s getting expensive though – the need to stay at sea longer and the larger vessels and increased demands for comfort mean that a vessel today costs as much as a whole fleet did just a few years ago!”

How can the industry increase transparency?

“The first step is to encourage people to report incidents. Historically there was a tradition of ‘what happens on the boat stays on the boat.’ This is unhelpful. People need to feel that they can report without fear of recrimination – it’s non-reporting that should attract punishment.

“Secondly, information needs to be shared. That means creating channels where people can release data about their experiences anonymously, without fear that their reputation will be compromised. We are part of the IMCA renewables working group and send all internal safety notices to the association. If there is something they feel is of interest to other members, the information is shared – anonymously. We are also participating in an industrial safety forum with the National Workboat Association. Two developments have arisen from this: The sharing of information via IMCA safety flashes and the compilation of statistical data from members.

“Mistakes are made, everyone makes mistakes. You can hide them, but I’d rather learn from them to prevent repetition.”
NEW WALK 2 WORK VESSEL SET TO LAUNCH END 2016

The innovative new Damen Walk 2 Work Vessel will be available at the end of 2016. Given market demand, Damen took the decision to build the new vessel for stock to ensure vessels would be promptly available for customers.

Damen’s Walk 2 Work Vessel has been designed to provide motion compensated transfers for personnel and equipment, while facilitating optimum logistic flows for carrying out maintenance and repairs for the Offshore Wind industry, as well as for unmanned offshore installations.

**Extensive operating window**

With excellent seakeeping ability and low power consumption, the Walk 2 Work Vessel will be able to remain at sea for a month. The vessel’s robust seakeeping performance facilitates access to the Central North Sea, which is the most challenging area for operations, for up to 80% of the time. In other areas of the North Sea, accessibility increases to 95%. This results in greater turbine availability, less lost production time and lower Operations & Maintenance costs. It is estimated that the vessel contributes to a 25% reduction in O&M costs over the lifetime of a large wind farm.

The Offshore Support Vessel provides in field accommodation and a large work deck for engineers involved in all phases of wind farm projects. With well-appointed accommodation for 45 maintenance personnel plus 15 crew, the Walk 2 Work Vessel features an efficient work and storage space, a number of sheltered workshops and a helideck.

The vessel is a monohull with the bridge located amidships. With a 90m length overall and a beam of 20m, the vessel features a spacious, 500m² deck, as well as approximately 400m² of internal storage space.

**Safe turbine access**

A telescopic, motion and heave compensated crane and gangway and the DP system allow maintenance personnel to quickly and safely walk to and from the turbine in a range of weather conditions, including waves of up to 3m. The DP performances are tuned to the Baltic, Irish and North Sea areas. Standby, Emergency Rescue/Response and Recovery duties can also be performed.

Crews have comfortable accommodation, which includes a fitness and wellness centre and 60 single occupancy cabins.

**Optimal efficiency**

By extensively analysing the different tasks on board and spare parts usage, Damen was able to design the public spaces to provide the most efficient workflow and storage spaces. The optimised hull form results in an average of 25% less installed power to achieve the same speed as a conventional hull. When considering DP operations and power output, significantly less (20%) thruster output is required because of the position of the accommodation.

Damen has also developed a fuel consumption tool whereby total fuel consumption in various operational conditions in a specific area can be calculated. This tool gives a good indication of what can be expected on an annual basis given a certain operational profile.
Charles Chulwoo Ahn, Managing Director and CSO of LCI Industries Corporation, represents Damen in the country. He says there are three main obstacles for the industry to overcome. “First of all there is discontent about the idea of Offshore Wind amongst the local population – especially in regions where fishing is a major industry. There is often overlap with fishing areas and sites that are candidates to host wind farms. This has the potential to cause political conflicts between central and regional authorities.”

Political Play
Politics plays its part in all three of the issues it turns out. Another hurdle for offshore wind energy is the government’s predilection towards nuclear energy. “It was the former President, LEE Myung-Bak, who turned the focus on nuclear power and increased investment in that direction,” says Mr Ahn. “After Fukushima in Japan there was a turn towards solar and wind power as solutions for the future, but the low cost of nuclear energy soon saw most politicians turn back in that direction.”

Signalling Concern
The third issue, as might be expected, relates to the military situation in the country. “Technically the Korean peninsula is a war zone,” Mr Ahn explains. “Therefore, there are many radar bases and the military are concerned at the prospect of wind turbines jamming signals.”

The European Offshore Wind industry is not without its challenges – political uncertainty amongst them – but these are simple in comparison with the struggle facing the development of renewable energy in South Korea.

“There is discontent about the idea of Offshore Wind amongst the local population – especially in regions where fishing is a major industry.”

European Experience
Despite these issues and the fact that there are currently no commercial wind farms operating in the country, a number of test sites have been installed, with more planned for the future. The construction at these sites has been carried out using floating cranes and crane barges, as opposed to specialist Offshore Wind Vessels. Mr Ahn is hoping to make the case for Damen vessels for future projects.

“We have promoted Damen Offshore Wind Vessels to the Korean market during the past 4 years via seminars, conferences and exhibitions. There are virtually no companies or contractors here that have experience of the sector so this can be difficult. However, some of the major companies are interested in the idea of using the proven vessels of the European experience.”
Cornwall, UK-based Windwave Workboats has been providing offshore wind farm support and crew transfer services to the European Offshore Wind industry since 2008. Last year, the company’s fleet expanded with its first Damen-built vessel – a Fast Crew Supply (FCS) 2008 named Susie S. The vessel also represents a first for Damen as she is a first-of-class. As is the case for many a first-of-class vessel, Susie S’s first job was not without its teething problems – despite completing her first contract with 0% downtime.

“Our clients have had a lot of success in using Damen’s FCS 2610, but for certain operations, it is just too large. We understand that bigger is not always better,” says Windwave Workboats Commercial Director Peter Scriven. The ISM-certified company performs a lot of support work for jack-up vessels carrying out wind turbine operation and maintenance contracts – tasks that suit a short, manoeuvrable vessel. As well as smooth seakeeping behaviour and fast transit times, Windwave’s requirements included two cabins, to allow for overnight accommodation, and a foredeck crane to supplement the large stern and bow cargo storage areas. “Damen’s FCS 2008 was an obvious choice for our applications,” informs Mr Scriven. “And because of their reputation, going to Damen was natural progression for us – they are the Mercedes of boatbuilding.”

After delivery from Damen’s yard in Den Helder, the Netherlands, in the summer of 2014, Windwave took the Susie S north for her first job – to the Butendiek offshore wind farm in Danish waters. There, the 20 metre vessel provided support to the project’s inter-array cable layer. Susie S’s debut into the Offshore Wind sector was not without its problems. “We discovered some weak points – some real world issues,” says Mr Scriven. “We experienced a lot of pitching while sailing directly into waves, the vessel was very susceptible to weight and there was lots of spray which resulted in a very wet foredeck.”

Despite the problems, Windwave finished the contract successfully. “We completed this job with 0% downtime – something that is excellent for any new vessel, especially a first-of-class vessel,” continues Mr Scriven. “Our client was also very happy with the load-carrying capacity of the large foredeck and the great accommodation.”

On completion of the Butendiek project, Mr Scriven returned to Damen in the Netherlands with his findings from the first job. “On taking delivery of a first-of-class vessel, everybody expects to have a certain number of problems. It is ultimately a brand new design. However, we want to go on a job confident that the vessel is going to perform.”

Damen’s response to the feedback? “They carried out a number of modifications to solve our problems,” stresses Mr Scriven. To address the spray issues on the foredeck, Damen covered the grated foredeck with a reinforced lightweight composite material and welded tubing to the fore spray rails to achieve improved water run-off. Neither adaptation affected the impressive load-carrying capacity of the foredeck: “The sea spray issue has undoubtedly been resolved and, if anything, the Susie S now has a larger cargo carrying area than before,” explains Mr Scriven. “There are no manual handling issues and no trip hazards and it is easier to carry bags and equipment.”

Damen raised the load-line in order to solve the weight issues: “By raising the load-line, the weight issue has also completely disappeared,” he continues. In response to the third and final problem of pitching, Damen modified the fuel tanks by positioning two air-filled bladders in the front ends of the tanks – with the aim of making the vessel more stable when sailing into the weather. “Despite this modification, we will still have a 8,000 litre fuel capacity – enough for our needs.”

Mr Scriven is also happy with Damen’s after sales support concerning spare parts lists and maintenance. “We gain certification through a proactive maintenance schedule,” he explains. “Damen’s documentation allowed us to integrate the vessel into our Planned Maintenance System.”

“In the process of sorting out the snag-list, Damen has been fantastic. They have remedied all the points we raised,” informs Mr Scriven. “When we left the yard to go to the next job, we encountered 3-4 metre seas which the Susie S handled effortlessly. The vessel already had strong points – now it doesn’t have any weak points. I can now go to clients and honestly say: ‘You are not going to get a better boat.’”

“Damen was natural progression for us – they are the Mercedes of boatbuilding”