Reliable partner for efficient offshore solutions

The technology innovator.
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IHC Merwede’s offshore division strives to deliver the best value to its customers. It is a partner of choice for innovative, sustainable and integrated offshore vessels and equipment. IHC Merwede’s offshore solutions are reliable, efficient and flexible to the demands of challenging seabed-to-surface oil and gas projects, and the renewable energy market. With its extensive knowledge and in-house design capabilities, IHC Merwede ensures compliance with the latest technological developments, strictest safety regulations and most stringent environmental standards.

Reliable
IHC Merwede excels at managing the complexity inherent within the development of vessels. Each project is approached with care, creativity and adaptability, so that customers can depend on delivery within the terms of the agreement.

It has an impressive track record of delivering innovative solutions to major subsea construction companies, ship owners and oil companies. IHC Merwede is one of the leading global players in its field. Besides its production locations in The Netherlands, it can accommodate the construction of vessels and equipment in other locations worldwide.

Partnership
Specific demands result in bespoke designs. IHC Merwede provides cost-effective products, not only when newly acquired, but also throughout their working lives. The IHC Merwede team works closely with the customer and becomes an extension of their organisation, so that they complement each other’s expertise.

It can, for example, advise on the design, regulations and structure of the project. This reduces risk and cost to create a smoother process, which leads to better results. Support can also be provided throughout the working life of the vessel.

Efficient solutions
IHC Merwede constructs custom-built vessels and equipment – to meet customers’ requirements – or more standard vessels with a ready-to-build design, the IHC Supporter™ class. Conducting business in an offshore environment is often turbulent. Technical and financial risks are significant, and margins are fluctuating. World oil prices are sensitive to political and monetary events.

The difference between profit and loss for an owner or operator of offshore support ships is greatly influenced by the productivity of these long-term investments. Efficiency, reliability and durability are key factors to success. IHC Merwede understands its customers’ needs and has the ability to provide innovative and efficient solutions for a variety of projects, such as pipe- and cablelaying, diving support and pile-driving.
Due to global economic and political developments, and natural disasters, the prices of oil and gas have increased significantly. Energy companies have set up major investment programmes in the search for new reserves. Easily accessible sources are already in production and so this search is focused on less accessible areas, such as the polar regions and deep oceans.

IHC Merwede has been responding to these developments with a major expansion of its offshore activities. It has built up a respected position in the market as a supplier of advanced equipment and complex integrated offshore vessels.

Research and development

The IHC Offshore Technology Institute (OTI) carries out an offshore-focused research programme for IHC Merwede. It provides innovative solutions, concept development, high-level multi-disciplinary simulations and in-depth market research. Its main areas of expertise are pipelay, cablelay, trenching, diving support, offshore construction, well intervention and renewables.

IHC OTI also specialises in Arctic and deep-water environments, and feasibility studies. It can be consulted on a wide range of services, from technology to process, and from product to market.

Keeping in close contact with IHC Merwede’s customers allows IHC OTI to observe trends and discover potential requirements at the earliest opportunity. It explores new areas, such as design consequences for working in Arctic conditions and at extreme water depths, and new developments in oil and gas field development and IRM (inspection, repair and maintenance).

Safety and regulations

After major oil spills in recent years, regulations have become even more stringent than before. This has consequences for all parties involved in the oil and gas industry. As a reliable supplier of offshore solutions, IHC Merwede is well aware of how its customers have to comply with legislation. Due to its vast experience in this field, IHC Merwede has become an authority on this area of the business, and can advise on the best and safest solutions to meet specific regulations.

Positive outlook

The offshore market is picking up. In this positive trend, the Brazil pre-salt oil fields development is playing a significant role. Over the last year, the market has provided a total of $548 billion in 2011, compared to $458 billion in 2010. Exploratory drilling for the year has provided a total of 131 discoveries – an increase of ten compared to the previous year. These factors have ensured solid growth for the offshore construction market.

For example, more than 250 offshore construction and decommissioning projects were completed worldwide in 2011. Global E&P capex budgets of $548 billion increased by 16% in 2011, compared to $458 billion in 2010. Exploratory drilling for the year has provided a total of 131 discoveries – an increase of ten compared to the previous year. These factors have ensured solid growth for the offshore construction market.

Wind energy

Offshore sites are particularly suitable for wind farms due to the stronger and more constant winds of recent times. However, construction costs are considerably higher, and with a growing demand for wind energy, the offshore wind farms are increasing in size. This presents several challenges for the installation and maintenance of the wind turbines. IHC Merwede develops and supplies advanced equipment and innovative vessels as reliable solutions to meet these challenges.

Tidal energy

The market for tidal energy is relatively young, but developing extremely quickly. Several major companies are investing valuable time and financial resources into the development of new products and systems. Although the current benefits of tidal energy are not yet comparable to those of wind energy, it is expected to prove its value in the next few years.

The major advantage over wind energy is the constant and predictable factor of the tides. As the technology innovator, IHC Merwede is also working on various key components and suitable production methods for this new and dynamic market.

Combining our strength

Within IHC Merwede, IHC Offshore Wind combines the strength of various business units to provide innovative vessels, advanced equipment and consultancy services for the construction, operation and maintenance of offshore wind farms and – among others – tidal energy projects. Along with the supply of special advanced installation equipment, new concepts are being developed for the next generation of floating offshore wind installation vessels.

IHC Merwede’s ultimate goal is to deliver added value to customers by promoting and linking the specialist skills and vast experience at its disposal with the specialist skills and vast experience at its disposal within the group to create innovative tools for challenging projects.

OWTIS

In collaboration with W3G Marine, IHC Merwede is designing a new offshore wind turbine installation ship (OWTIS). The OWTIS concept has the ability to improve offshore safety by enabling fewer tasks to be performed offshore. The purpose-designed OWTIS will be able to install fully assembled wind turbines in one lift onto pre-installed foundations.
The installation of pipelines for oil and gas transport is an important part of the construction of offshore infrastructure. These interconnect oil and gas wells to production centres, which are in turn linked to clusters of population and industry.

The increasing demand for oil and gas has driven the industry to deeper waters, which makes the installation of the pipelines and infrastructure even more challenging. The totally integrated solutions offered by IHC Merwede ensure the delivery of reliable equipment.

With a track record of multiple innovative pipelaying vessels, the company has already demonstrated its expertise in this field. IHC Merwede is renowned for delivering pipelaying vessels within the agreed schedule.

IHC Merwede’s innovative pipelaying vessels are custom-built for pipelaying and field development work. They are powerful and reliable, as well as multi-functional, due to the capacity for deep water offshore construction, rigid-reeled pipelaying, flexlay, J-Lay and ROV work for the infrastructure of oilfields.

All IHC Merwede pipelaying equipment is fully integrated into the structure of each vessel. The pipelay installation is planned into the design, so that a significant load of flexible pipe and umbilical can be accommodated.

IHC Merwede is responsible for the design, build and commissioning of two identical fully integrated 550t pipelaying vessels and their mission equipment for TL Offshore, a subsidiary of SapuraCrest.

IHC Merwede designs, engineers, builds and commissions complete pipelaying spreads. Its specialist business unit, IHC Engineering Business, delivers advanced equipment that provides a commercial and technical advantage, working in partnership with customers on projects ranging from fully integrated vessel systems to the rapid supply of subsystems.

It is a leading supplier of innovative, high performance equipment, and has delivered efficient solutions to several major companies in the offshore industry.

The pipelaying spread is supplied by IHC Engineering Business for the TL Offshore pipelaying vessels. It is designed to maximise operational efficiency as a result of complete integration with the vessel. In addition, IHC Drivers & Automation will deliver the integrated automation system, full electrical installation and complete electrical machinery package.
Despite its compact design, the SEVEN OCEANS has a high payload and good seakeeping characteristics. All equipment is fully integrated into the design of the vessel, in the sense that it has been designed according to its functionality. At the same time, the seakeeping characteristics of the vessel have been used as an input for the design of the reel and the pipelay ramp.

The redundancy required by the customer was substantially higher than the usual DP2, resulting in IHC Offshore & Marine basing the design on DP3 philosophy.

A full width ROV hangar is located aft of the accommodation block. Recessed ROV deployment rails are fitted on both sides of the ship. A 400MT deepwater offshore crane and two additional large deck cranes are provided on the working deck. Furthermore the vessel’s pipelaying equipment (delivered by Huisman) has a top tension capability of 400 tonnes and a storage capacity of 3,500 tonnes of rigid steel pipe on the main reel.

The vessel is a stable platform with a large payload due to the hull form. The stability of the vessel can be controlled and adapted according to different loading conditions by means of upper and lower ballast tanks in the sides. The ship’s motions can be further reduced by two independent anti-rolling tanks.

IHC Engineering Business specialises in the design and construction of tailored pipelaying equipment. It works directly with customers to deliver innovative systems that provide both technical and commercial advantages.

The core technology includes:
- J-Lay
- S-La
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- reella
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- flexl
ay
- car
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- trenches
- ploughs.

Versatile J-Lay tower
IHC Engineering Business is a leading supplier of tailor-made, high-specification J-Lay systems. Its approach to engineering and in-house mechanical, structural and control system design expertise enable it to deliver: lay systems that offer maximum availability and functionality; and tower structures optimised for low system weight, while ensuring safe and reliable operations at all times.

One of the world's most versatile J-Lay systems, the Saipem J-Lay tower, is capable of deploying quad joints at line tensions of up to 1,500 tonnes and is able to hold the pipe string in the hang-off clamp at catenary tensions of up to 2,000 tonnes.

The system can work in shallow and deep water, with the tower angle adjustable from 45 to 96 degrees. Multiple travelling tower clamps, an adjustable stinger and a dedicated bulky item handler also contribute to the high functionality and low cycle time of the system.

Fully integrated pipelaying spread
The pipelaying spreads for the TL Offshore pipelaying vessels comprise a twin-tensioner tilting lay tower, flexible product storage in two below-deck baskets, and support equipment for the spooling and routing of products. The tower orientation allows for maximum deck space, while utilising a high-capacity 610-tonne abandonment and recovery (A&R) system. A custom-designed control system integrates each aspect of the pipelaying spread to ensure excellent performance, safety and reliability.

Pipeline ploughing systems for all conditions
IHC Engineering Business has developed a wide range of pipeline and backfill ploughs to install pipelines in a variety of seabed conditions. The designs of the Saipem Plough (PL3) and Backfill Plough (BPL3), for example, follow a trend of ploughs being specified for increasingly large pipe diameters as projects develop ever more challenging requirements.
Integrated offshore solutions

Communication networks and offshore wind farms require constant innovations in installation and maintenance. Innovative solutions for transportation, installation of cables and protection by trenching are a necessity in harsh subsea conditions. IHC Merwede’s cablelaying vessels and equipment are designed to meet the increasing demands of cablelaying projects, such as those for power and fibre optic cables.

Innovative vessels

The IHC Supporter™ class offers a modular platform for cablelaying activities. An optimised cablelaying solution is developed through the integration of the vessel, cablelaying system and other necessary equipment.

To deploy various types of subsea cable, a wide range of cablelaying modules are available, each specifically developed to suit the IHC Supporter™ class. Each of these transform the IHC Supporter™ class into a high-performance cablelaying vessel, while maintaining a competitive price and delivery time.

In addition, IHC Merwede offers complete custom-built integrated cablelaying vessels to meet specific demands. Typical examples include the ATLANTIC GUARDIAN, BOLD ENDEAVOUR (now named DEEP ENDEAVOUR) and C.S. SOVEREIGN.

Advanced equipment

The cablelaying equipment delivered by IHC Engineering Business offers maximum availability and functionality, while ensuring safe and reliable operations at all times. Combined experience in vessel integration and technically advanced equipment means that IHC Merwede is able to offer a cost-effective, fully integrated cablelaying solution.

For optimal offshore and cablelaying performance, IHC Drives & Automation engineers highly integrated solutions tailored to the vessel’s design. Within the innovative platform automation, the Dynamic Positioning (DP) system ensures the accurate positioning of cabling. This intuitively controlled DP system, based on extensive experience gained in global dredging operations, will take cablelaying to the next level.
IHC Offshore & Marine has designed a compact version of the C.S. SOVEREIGN, to be utilised for rapid-response cable maintenance and repair works, ROV operations, buoy deployment and cable retrieval. The C.S. ATLANTIC GUARDIAN has a transit speed of approximately 15 knots and a maximum range of 15,000 nautical miles. Despite her compact design, the ATLANTIC GUARDIAN carries the technical equipment to perform all maintenance and repair services: double rotary cable machines, A-frames and special winches for ROV and plough deployment, as well as a centralised control and monitoring system. The special hull form, dynamic positioning system and stabilising tank provide a stable and comfortable platform for cable repair operations.

The engineers at IHC Engineering Business have years of experience in designing cablelaying equipment. With this knowledge, the company creates solutions for all types of cable installation in the hardest seabed conditions.

Strong trenching equipment

Extensive experience in the design and build of subsea trenching equipment has enabled IHC Engineering Business to develop the world-leading Sea Stallion cable plough range, which has set new standards in submarine cable installation and protection. The Sea Stallion has a proven ability to allow effective cable burial of up to three metres in a wide range of seabed conditions, while minimising residual tension in the installed cable.

The Sea Stallion 4 is a simple, but strong and aggressive plough specifically adapted and designed to achieve efficient and effective burial of power cables to large trench depths. Its robust chassis can withstand tow forces in excess of 180 tonnes. IHC Engineering Business is able to tailor its Sea Stallion plough systems to specific project ground conditions.

I-trencher

The Canyon I-trencher is a highly manoeuvrable self-propelled tracked machine that has been designed with three main modes of operation: cutting using digger chains, open v-cut trenching and backfilling. In addition to the trenching vehicle, IHC Engineering Business supplies a dedicated launch and recovery system for high sea state operations with lift and umbilical winches and passive heave compensation.

Carousels with minimum downtime

IHC Engineering Business designs and builds offshore carousels for the spooling and storage of power cables, umbilicals, rigid and flexible products. The carousels are designed to ensure maximum productivity and minimum downtime. Innovative features ensure the carousels can operate in difficult weather conditions, when vessels experience significant accelerations. Each carousel is designed to suit the customer’s individual requirements and can incorporate a number of features such as compliant roller mountings, changeable core diameters, hydraulically adjustable roof positions and modular design to ensure that mobilisation time is minimised. These handling solutions have an excellent track record of safe, reliable and rapid installation of products.
Well intervention

With a growing number of ageing oil wells and shrinking oil reserves, it becomes increasingly viable and important to maintain wells and extract the maximum amount of resources. Subsea well interventions pose many challenges and require much advanced planning. Our solutions provide a high level of reliability and flexibility.

Well intervention vessels maintain wells and carry out the required technical services in deep water. IHC Merwede designs and builds these ships to offer a favourable return on investment through high-performance levels and superior quality standards.

The WELL ENHANCER is based on the IHC Merwede Type-22 design, which makes it a cost-effective vessel of high performance and quality. IHC Offshore & Marine adapted the design to accommodate a multi-purpose tower (delivered by Huisman), an 18-person twin bell saturated diving system and a twin work class ROV system. She is fitted with coiled tubing and has potential for upgrading with a flare boom.

The DP3 dynamic positioning system, three engine rooms (totalling 15,862 kW), an innovative multi-purpose ROV system and propulsion systems provide triple redundancy and make the vessel extremely reliable. An innovative multi-purpose tower next to the work moon pool offers flexible hoisting capacity while maintaining efficient use of deck space. The safety and security during intervention work is guaranteed by a gas closure system using overpressure to protect the vessel’s accommodation. The twin ROV system is integrated into the ship’s design.

Advanced equipment

The handling of subsea modules or heavyweight structures (e.g. Christmas trees, process modules, jacket foundations and PLEM) on open deck demands a high level of safety for both equipment and personnel.

Safe deck skidding systems

IHC Offshore Systems’ deck skidding arrangements are designed for safe storage and horizontal transportation onboard well intervention, pipelaying and wind turbine installation vessels during operations and transit.

IHC Offshore Systems provides integrated and on-deck solutions in any desired configuration. Particular attention is paid to robust design and flexible configurations to ensure low installation costs and extended lifetime of the equipment. The main objective is to ensure maximum safety during severe offshore weather conditions.

The main features of the deck skidding systems include:

- skidding of loads weighing maximum 1,100 tonnes
- integrated or on-deck skid rails
- flexible ‘drop-in’ rail design
- longitudinal and transverse rail combinations
- stackable skidding caricages for storage
- sea-fastened skidding caricages
- push-pull, rack and pinion or winch-driven caricages
- manual or full remote operation
- optimised layout and integration/interface with other systems for efficient deck logistics.

Multi-functional AHCS

The innovative AHCS (Active Heave Compensation System) assorts the safe landing and recovery of valuable equipment, thanks to the Quick and Power lift boost functions. The AHCS requires minimum installed hoisting power and does not compromise on safety and reliability.

Custom-made module handling towers

Excellent system design and vessel integration is the key to the safe, reliable and efficient launch and recovery of subsea modules, coiled tubing, risers and subsea lubricating systems through a moon pool.

IHC Offshore Systems’ module handling towers are custom made and adapted to comply with the customer’s needs:

- maximum operational speed
- well intervention equipment or modules parked in tower
- movable service platforms for easy tool and tower access
- maximum moon pool accessibility (four sides)
- cursors for safe equipment guidance through moon pool
- optimal integration with vessel and other equipment
- minimum use of deck space
- low centre of gravity (COG)
- hoist winches located outside tower
- deep-sea lowering capabilities
- hoist system with multi-functional AHCS
- integrated umbilical, guide wire and auxiliary systems
- cladding options for operations in Arctic environments
- full remote control systems.

Innovative vessels

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For hurricane remedial work in the Gulf of Mexico and deep-sea operations worldwide, the customer required a versatile offshore support vessel – a ship suited to inspection, repair, maintenance, diving and construction activities. The vessel was based on the IHC Merwede Type-22 design to create a competitive vessel for the market.

This concept has been adapted to suit the vessel’s specific tasks, such as an A&R winch, ROV and cranes. Furthermore, the ship – built by IHC Offshore & Marine – is capable of accepting two 12-man modular saturated diving spreads – allowing the vessel to change functions rapidly – and a modular pipelaying unit, which can be placed on the aft deck. One dive bell of the modular twin-bell diving system is operated through the moon pool. A second can be operated through the large working moon pool. Two engine rooms provide ample power for manoeuvring and positioning this DP3 vessel. A third dedicated engine room – providing power for deck appliances – guarantees additional power to enhance safety and flexibility.

A 160-tonne heave-compensated crane and a 400-tonne heave-compensated A&R winch are suited to subsea work. The two additional cranes are suited to deck work. A twin work-class ROV system is integrated into the vessel’s design.

IHC Merwede supplies offshore support vessels and equipment for various applications, including inspection, repair, maintenance, decommissioning and deep-sea operations. They can be used to support pipelaying and offshore construction vessels, and adapted for specific charter tasks.

Equipment on board these versatile platforms is varied. The IHC Supporter™ class, with a modular design and integrated equipment, is adaptable throughout its working life as an offshore support vessel.

Combined expertise
IHC Merwede can deliver all equipment for the purpose of pipelaying, cablelaying, diving support and well intervention. It combines the expertise and experience of several experts within the company, which results in safe and efficient offshore support solutions.

High system availability
For system integration, IHC Merwede relies on the knowledge and electrical systems of IHC Drives & Automation. It can deliver the integrated automation system, the full electrical installation and the complete machinery package. From generators via transformers and switchboards, to thruster drives with DP2 control, IHC Drives & Automation engineers, builds and commissions the ship’s complete platform management system according to the latest technological developments.

This fully integrated approach warrants high system availability, sustainability and maintainability. It applies to the design, construction and operation of IHC Merwede’s versatile offshore support vessels.

Customised winch systems
The delivery of customised winch systems for use in the offshore oil and gas industry is one of the specialities of IHC Winches. It uses in-house resources for engineering, procurement, construction and on-site commissioning activities to deliver complete large-scale hydraulic or electric motor-driven winch systems.

A&R winches
An A&R winch is designed especially for the abandonment or recovery of a pipe or cable on the seabed. Greater water depths have led to an increase in top tension requirements and resulted in increased A&R winch systems. Working at greater water depths also calls for longer cable lengths.

IHC Merwede’s A&R winches are available as single drum winches or as a trawl with storage winch combination, depending on customer preferences. Furthermore, they are built in compliance with rules from DNV, ABS, Lloyds etc.
Business concepts of diving operations have changed significantly. What may once have been considered a record-breaking dive has become a daily routine exercise. Therefore, new technologies are required to reach new depths, and to perform safer and more efficient operations.

The current developments in the exploration and production sector require a new generation of diving support vessels. The key factors to be considered in the development of these vessels are multi-functionality, optimal efficiency and worldwide usability.

Innovative vessels
IHC Merwede delivers custom-built diving support vessels, such as the SEVEN ATLANTIC, as well as the pre-designed modular IHC Supporter™ class series with saturation diving equipment.

Diving support vessels operate as a floating dive base. Onboard, divers remain under high pressures in saturation dive chambers. The divers are transported to the work site by means of a diving bell, where they are involved in maintenance, repair and inspection activities.

IHC Merwede diving support vessels are designed to support: professional diving projects; global installation, maintenance and repair work; and other tasks such as subsea and offshore construction.

The SEVEN ATLANTIC has been specifically designed for saturation and air diving support activities up to 350 metres below sea level and features an integrated saturation diving system with a total capacity of 24 divers. The vessel is suitable for worldwide operation and is the highest class DP vessel capable of operations in severe weather conditions. In order to enhance the FMEA safety case, the vessel is designed with full triplication of all DP, propulsion and manoeuvring related systems and subsystems.

Advanced equipment
The integrated saturated diving system on the SEVEN ATLANTIC has a total capacity of 24 people: eight diving teams with three members each. The maximum diving capacity is six people based on two diving bells, for three people each. The diving system is designed for operations in depths of up to 350 metres. The vessel has a total of five moon pools, two for the dive bells, two for the observation class ROVs, and one for lowering instruments and tools to the seabed.
The modular approach of IHC Offshore & Marine for the IHC Supporter™ class product range offers a variety of functionalities that suit the customer’s mission requirements. Absolute synergy can be obtained by the integration of vessel particulars, diving system and other equipment into a complete diving support solution. As a result, various diving configurations will be available for the IHC Supporter™ class platform.

Several different types of diving systems are available and additional equipment can also be integrated into the same vessel. Alternatively, diving equipment can be integrated into vessels with other primary mission profiles, such as well intervention. The versatile IHC Supporter™ class platform, in conjunction with advanced modular diving equipment, offers a cost-effective offshore diving solution that suits a wide range of mission profiles.

Different diving support purposes require varying vessel lengths and the integration of different diving systems. Vessel lengths ranging from 94 to 132 metres allow for the integration of diving systems with a capacity of six, 12 or 18 divers. The systems have a depth rating of 100, 200 and 300 metres of seawater respectively, and can be equipped with a single- or twin-bell launch and recovery system each through a dedicated diving moon pool.

IHC Hytech is IHC Merwede’s in-house centre of competence for offshore diving technologies and integration of diving equipment. By combining experience in vessel integration and advanced equipment with knowledge of diving, IHC Merwede is able to offer integrated diving system solutions including DSV Class notation.

This leads to short delivery times and a cost-effective diving solution. The vessel itself will also become more efficient and safer, due to this integration.

Cutting-edge technology is readily available for condensing into IHC Merwede vessels. The automation of the modular design is integrated in the vessel’s system architecture by IHC Drives & Automation.

Air and mixed gas diving systems
A variety of innovative and modular air and mixed gas diving systems are available from IHC Hytech. These range from basic transportable decompression chambers via air basket dive units to fully integrated wet bell diving systems with all the necessary life support equipment. All of these systems are built around deck decompression chambers, which provide safe and controlled diver decompression.
IHC Merwede’s expertise includes the design, engineering and construction of vessels and equipment for the installation, operation and maintenance of wind turbines. The construction of these vessels – built in The Netherlands or overseas – meets customer expectations within the agreed timeframe and budget.

The self-elevating heavy-lift jack-up vessel, NEPTUNE, was delivered by IHC Offshore & Marine with an impressively short lead time of 18 months – from signing the contract to delivery. This complex, high-tech and unique vessel is 60 metres long and 38 metres wide, and comes equipped with a dedicated 600-tonne fully revolving crane that is integrated into the hull. The NEPTUNE, designed by Gusto MSC, is perfect for the transport and installation of offshore wind turbines and any other heavy marine offshore structures. To store the wind turbine components, it boasts a 1,600m² main deck with a capacity of 10t/m². The NEPTUNE has a MODU certificate, which enables the vessel to not only travel to and manoeuvre on her own in a mobilisation area, but also to sail overseas to new job sites.

IHC Merwede provides consultancy services in the fields of vessel and equipment design, offshore wind and marine operational engineering and assessments. These services range from load-out, seabed preparation, transport and installation activities, such as feeder solutions, to methods and equipment for the operation and maintenance of offshore wind farms.

IHC Offshore Wind provides services and expertise for the construction, operation and maintenance of offshore wind farms including:

- consultancy and design, incorporating operational engineering
- engineering and fabrication of equipment
- handling and installation tools
- construction of vessels and modifications to existing vessels.

Renowned hammers and handling equipment

The majority of European offshore wind farms using monopile foundations were installed with hammers supplied by IHC Hydrohammer®. IHC Merwede offers a wide range of unique and renowned equipment to install offshore wind turbine foundations thoroughly and efficiently. This includes the transportation and handling of various types of foundation structures with upending tools, monopile plugs, internal lifting tools, upending hooks combined with saddles, skidding arrangements, winches, hydraulic devices, buoyancy systems for jackets and piling templates.

The purpose of the noise mitigation system (NMS) is to reduce the impact on sea life due to offshore construction activities for oil, gas and renewable energy. The NMS is based on a double-walled steel casing, with stiffeners to resist wave, current and compression impact.

The monopile NMS is equipped with a variable guiding system. This assures the swift guidance of the monopile through the NMS and the positioning of the NMS concentrically with the monopile. Furthermore, the variable guidance isolates the mechanical contact between monopile and screen. A multi-level bubble injector system operating inside the NMS creates an extra noise barrier. The mudmat flange on the bottom of the screen enables a stable positioning on the seabed.

The versatile design of the NMS means that it can be adjusted to meet the demands of individual projects. It can also be easily adapted in multiple installation methods for monopile foundations, for example, installation by jack-up platforms, jack-up vessels or free-floating vessels. A pre-piled jacket solution with integrated NMS is also under development.

The NMS-6900 developed by IHC Offshore Systems is the first of its kind to be operational for the installation of foundations for the Riffgatt offshore wind farm project.
Pile-driving equipment is used for the reliable and controlled installation of conductors, anchor piles, jacket skirt and/or leg piles, monopiles and start-up piles at sea. The installation of subsea structures has moved from shallow waters to deeper, and even ultra-deep waters beyond 3,000 metres. This means that the capabilities, capacities and even design of IHC Merwede equipment are continuously improving to meet these new markets. IHC Merwede’s pile-driving equipment has been designed and manufactured as a response to the installation challenges faced by its customers.

One-stop shop
With hydrohammers from IHC Hydrohammer, piling frames from IHC Sea Steel and handling equipment from IHC Handling Systems, IHC Merwede is a one-stop shop for the rental or sales of all necessary installation equipment related to offshore pile installation projects.

IHC Merwede’s pile-driving equipment offers its customers a more efficient solution for their installation projects. As an example, IHC Sea Steel has developed the Fast Frame to significantly reduce offshore installation times, while maintaining the orientation and verticality of the pile.

Innovative approach
IHC Hydrohammer designs, builds and supplies hydraulic piling hammers, for on- and offshore use and is known throughout the world for its innovative approach. This is not simply confined to the hammers, but also extends to entirely new piling techniques, foundation equipment and hammer accessories, with a view to making pile-driving more efficient, easier to control, quieter and more widely usable.

IHC Hydrohammer technology has been successfully introduced and applied within the offshore industry. The closed hammer housing, excellent control options and reliability make the hydraulic hammer eminently suitable for driving conductors, anchor piles, jackets, monopiles and start-up piles for pipelayers at sea.

Equipment to meet any demand
There are no compromises in the design of the hydraulic IHC Hydrohammer, where reliability, efficiency, possibilities and safety are the focus. The design is forged from billions of hammer strikes, both on- and offshore. The hydrohammer combines a solid one-piece ram with a fully enclosed hammer housing. The result is an elegant yet robust and reliable hammer.

IHC Hydrohammer’s unique design makes it suitable for all types of piling and foundation work, ranging from piling impact-sensitive concrete piles, to piling large and long offshore caisson piles. The hammer can even be used to break rock (also underwater). IHC Hydrohammer develops equipment to meet all requirements.

Shorter installation times
IHC Sea Steel supplies a wide range of pile support frames and other piling solutions, suitable for piles ranging in diameter from 20 to 104 inches. The piling frames have been developed to substantially reduce the time for installation, and safeguard the position of the pile.

The equipment can be utilised for many different applications, including the installation of FPSO mooring piles, pipeline initiation piles, wellhead protection piles, pre-driven jacket foundations and pre-driven conductors. All IHC Sea Steel products can be modified to meet the requirements of a project and bespoke engineering solutions can be developed to suit all subsea conditions.

‘Hands-on’ solutions
IHC Handling Systems equipment is suitable for various offshore activities. It ranges from internal lifting tools (ILT), used during the handling of foundation piles for a jacket structure installation, to specially designed handling and cutting tools, used for decommissioning a complete steel structure.

Renowned IHC Handling Systems equipment used during pile-driving operations includes: external and internal lifting tools; pile anti-running clamps; levelling equipment; and jacket pile grippers.

Using its wide experience and innovative skills, IHC Handling Systems maintains a market focus, which places emphasis on quality products, either standard or custom-made, and services designed to meet specific customer needs. All equipment is designed using a ‘hands-on’ operational approach, based on IHC Merwede’s long experience in the oil and gas installation market.
There are several floating production systems, such as FPSOs, semi-submersibles, TLPs and spars, each with their own characteristics and special demands. Floating production, storage and offloading vessels, for example, are effective in remote or deep water areas.

The environment of the oil field determines the requirements of the on-board equipment. Deep-water fields have different requirements to those in shallow water, as do oil fields in calm water or rough seas. IHC Merwede is aware of these various needs and delivers safe and efficient riser pull-in, offloading (oil export) and mooring-leg installation solutions.

Custom-built mooring pull-in equipment packages

Mooring systems in particular are custom-built solutions, because the location and characteristics of the oil field determine the requirements. IHC Offshore Systems delivers complete turnkey mooring pull-in installations, comprising underwater fairleads, chain jacks, chain stoppers and chain handling systems.

The dedicated IHC Merwede team reduces material and non-material interfaces, resulting in lower project risk for customers.

Combined technology for riser pull-in equipment

For MdOEC’s FPSO vessel, IHC Merwede delivered an integrated riser pull-in system consisting of: a riser pull-in winch (550mT maximum line pull) and two auxiliary pull-in winches (150mT maximum line pull), which were designed and manufactured by IHC Hytop. It also included a sheave trolley system created by IHC Offshore Systems.

IHC Winches’ riser pull-in winches are mounted on the deck of the FPSO and are able to pull in all the flexible risers that will be connected to the FPSO vessel.

Custom-built sheave trolleys

IHC Offshore Systems’ sheave trolleys are custom-built installations that combine several IHC Merwede technologies into one autonomic system dedicated for riser handling. The trolley position can be adjusted in a longitudinal direction alongside the vessel to ensure vertical riser pulling on multiple riser slots, which are predominantly found on spread-moored FPSO vessels.

Tandem offloading systems

IHC Winches engineers and delivers complete tandem offloading systems, comprising of a hose reel, hawser reel and quick-release mooring hook. Its comprehensive and fully integrated systems are reliable, easy to operate and tailored to meet specific customer requirements. To complement these products, IHC Winches can also deliver complete integrated systems, incorporating advanced power, control and monitored systems.

The experts at IHC Winches can commission the offloading system and take care of its start-up operation. To maintain proper use and safe operations of the system, and enhance reliability, IHC Winches can also offer a maintenance plan.

Winches for all requirements

With years of experience in designing and manufacturing winches, IHC Merwede produces both standard and customised versions. The standard winches have a line pull of between 2.5 and 100mT; the customised winches anything between 100 and 600mT. IHC Winches can supply any winch to meet the requirements of its customers, designed for the harsh conditions in the offshore industry.

Hydraulic power packs

IHC Hytop designs and manufactures electrically and diesel driven hydraulic power packs. The former are equipped with installed power up to 2MW and above, according to customer specifications and classification requirements.

Power packs with and without hydraulic reservoirs, control manifolds, filtration systems, lubrication systems and local control panels can be delivered skid-mounted or completely containerised – even when these are to be used in hazardous areas.

Diesel-driven hydraulic power packs offer an alternative to electrical hydraulic power packs. IHC Hytop can easily deliver both individual and bulk orders of diesel power packs.

Custom-built diesel power packs are available in a variety of configurations, such as permanently skid-mounted, or as completely self-contained, offshore-certified portable units. In addition to high quality, reliability and low maintenance costs, sound attenuation is incorporated into the unit design.

Perfect solutions

All the necessary disciplines are represented within the company, enabling it to supply perfect solutions for any application.
IHC Merwede supplies a wide range of offshore handling, lifting and deep-water lowering equipment. All of these products are of very high quality, guaranteeing an extensive field of application. Working in deep and ultra-deep waters brings several challenges. IHC Merwede designs equipment to withstand these extreme conditions and heavy loads.

Its heavy lifting and deep-water lowering equipment provides first-class transportation and construction services to the offshore oil and gas industries. For example, it encompasses the safe movement of large piles and pipes, or even complete platforms.

**Efficient handling equipment**
Handling equipment is required for upending, handling and taking the full load of long piles or any other object in a safe and controlled way. The pile upending frame, for example, has been designed for upending foundation piles that exceed the height of the crane boom. The frame operates as a fixed ‘clamping’ hinge on the edge of the deck, allowing the pile to extend overboard during the upending operation.

This equipment can significantly improve the usability and efficiency of the installation contractor’s crane vessel. What was originally a project-related design is now a well known standard piece of equipment in the market.

**Tailor-made solutions**
As well as handling solutions for surface and/or shallow water use, IHC Merwede is also familiar with water depths beyond 3,000 metres. It has successfully completed projects that involved positioning mooring piles in depths of 2,500 metres or installing subsea manifolds in depths of 3,000 metres. In addition to IHC Merwede’s supply of standard equipment, its ability to offer tailor-made solutions has resulted in an outstanding reputation as a manufacturer of custom-made equipment.

**Traction winches for deep water**
The water depth limits for offshore field development are extending continuously. This means that the limits for IHC Merwede winches are constantly evolving as well. The company’s answer is a new generation of traction and storage winches.

Both have a relatively compact design, are extremely reliable and are smooth for the wire rope to safeguard continuity of operations. IHC Merwede’s expertise of swell compensation systems, together with its new generation traction winches, enables it to also provide customers with complete deep-water lowering systems.

As water depths and loads are limited by available wire rope diameters and their maximum production weight, IHC Winches is running tests using special synthetic wire rope onto traction winches, extending water depth limits for its customers’ future projects.

**The equipment on offer includes:**
- external and internal lifting tools
- surface and subsea levelling systems
- jacket pile grippers
- upending frames
- pile plugs
- skidding equipment
- hydraulic release shackles and pin-release systems for subsea use
- hydraulic power packs for surface and subsea use
- hose reels
- lifting frames
- traction winches and storage winches for deep-water lowering
- jacking systems
- pipe cutters
- pile anti-running clamps
- bear cages.

**Fail-safe internal lifting tools**
Internal lifting tools are hydraulically activated, fail-safe lifting tools that clamp on the inside of the top of a pile. Required to lift piles, conductors, small jackets and even modules, they can also be used for decommissioning projects and in the removal market.

The diameter of IHC Merwede’s standard internal lifting tools ranges from 16 to 106 inches and the lifting capacity varies from 200 to 2,000 tonnes. Internal lifting tools are globally used by the majority of offshore contractors in standard water depths of 500 metres and up to 2,250 metres with a special deep-water package.
The harsh conditions of the offshore industry demand high-quality equipment, with high levels of reliability. IHC Merwede is not only able to offer hydraulic power packs, but can also provide a complete hydraulic system, including manifolds, piping, hydraulic cylinders and hydraulic winches.

The specialists at IHC Hytop have the capability to deliver complete, large-scale hydraulic installations, as well as serial production of compact hydraulic systems and equipment. It has the know-how to execute its customers’ projects with basic or detailed engineering, and with planning and production facilities. In addition, it tests the hydraulic systems and equipment before it is delivered to customers.

Complete hydraulic systems

IHC Hytop specialises in the provision of complete hydraulic systems for use in the offshore industry. It is focused on upstream oil and gas industrial applications, such as hydraulic systems for catenary anchor leg mooring systems (CALM buoys), floating production storage and offloading facilities (FPSO), jack-up platforms, jack-up vessels, and pipelaying vessels.

Wide range

IHC Hytop uses its in-house resources for engineering, procurement, construction, installation and on-site commissioning activities to deliver: complete, large-scale hydraulic installations and hydraulic equipment for turret mooring and connect systems; buoy pull-in and locking systems; hose and hawser reeling systems for tandem mooring; spread mooring systems; jack-ups; cantilever skidding systems; stinger handling systems; stinger uplift compensation systems; stinger shock absorption systems; and special handling systems.

As a total system supplier, it offers customers the advantage of commitment coupled with knowledge and experience. This results in creative and innovative hydraulic systems, regardless of size. IHC Hytop is an expert in one-off and serial production, partial solutions and turnkey delivery.

Creative solutions

With 40 years of experience in designing and maintaining cylinders for use in demanding environments, IHC Vremac Cylinders has all the know-how required to transform customer requirements into cylinder specifications that will perform in real-life field applications.

In addition to vessels and equipment, IHC Merwede delivers solutions for optimal offshore operations. Tailored to meet the performance requirements of customers, the latest technology in electrical drives and platform automation optimises the design, construction and operation of its complex working vessels.

Integration of systems

IHC Drives & Automation excels in the integration of a variety of systems, such as navigation functions, communication, energy management, heavy crane operation, offshore handling and propulsion control. The integrated approach ensures high system availability, sustainability and maintainability.

The specialists at IHC Drives & Automation design, manufacture and deliver generators, electric/submersible motors, main switchboards, variable frequency drives of 690V-6.6kV, transformers and inverters, DP2 and DP3 systems, and artificial intelligence-based platform automation systems. Complete electrical installations and additional equipment integrate all features. Training and life-cycle support help to reduce the cost of ownership for customers.

High level of performance

Electrical energy generation and conversion are becoming increasingly important on board. A growing number of electrical systems enables a more flexible vessel layout and, in most cases, greater efficiency in the application of energy. The modular design of IHC Merwede vessels in general and their innovative frequency drives provide a high level of system performance and the lowest cost of ownership.

The integration of platform automation systems is mainly provided in three product lines, accompanied by complete electrical installations:

- Alarm and Monitoring Systems
- Vessel Management Systems
- Condition Monitoring Systems

IHC Merwede offers the optimal integration of electro-technical and automation knowledge with naval and mechanical engineering to its customers, which results in enhanced control of the vessel and a higher level of performance.
IHC Merwede customers know that they can rely on a dedicated and comprehensive global service offering for the life cycle of their investment. This not only helps to extend the lifespan of the vessel or equipment, but also to maintain the correct and safe operation of all IHC Merwede products on board.

As the technology innovator, IHC Merwede has the ability to enhance the reliability and efficiency of its systems, which in turn boosts the productivity of its customers’ investments. The company’s life-cycle support maximises the uptime and return on investment, and therefore reduces the total cost of ownership.

Concepts, design and building
IHC Merwede’s highly qualified life-cycle support personnel can provide new or improved concepts for complete systems and components, as well as project evaluation and advice on the selection of equipment. The company’s team of experts designs optimal vessels and equipment based on customer requirements and their own design, building and operational experience worldwide.

Training
In the months leading up to delivery, IHC Merwede enables its customers to bring their crew on board. While IHC Merwede finalises its work and optimises all of the equipment, the crew becomes acquainted with the vessel and gradually assumes control. As a result, the vessels are fully deployable from their maiden voyage, maximising the value of IHC Merwede customers’ investments.

Maintenance management
IHC Merwede aims to assist offshore operators by improving their system availability in the most efficient way. This can be done with a single service offering, such as condition monitoring, technical surveys or other maintenance tasks. It can also be achieved by an integration of several different services from the company’s life-cycle support programme.

Spare parts and component repair
IHC Merwede wants to be prepared for every eventuality and provide limitless logistical support to its customers. This includes attention to system availability with the immediate supply of spare parts and repair of components. With this approach, the complete IHC Merwede global network of qualified service technicians, sourcing officers and stock locations is available to all customers.

Dry docking and ship repair
IHC Merwede’s team of experts offers a high level of knowledge and expertise to manage dry dockings, ranging from supervision of the repair yard to the performance of complete dockings and ship repairs. All dry docking services are focused on keeping the period of work as short as possible according to forecasted budgets and planning. Experience shows that the correct scope of work and solid preparation – especially for major repairs and dry dockings – are essential for efficient performance.

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Renovations
The renovation of vessels and equipment is a complex process. IHC Merwede possesses expert knowledge to research, engineer and install to such a high standard that these measures will optimise the equipment. This results in the start of a new life cycle for the vessel or the extension of the existing life cycle.
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