Pipelaying

The technology innovator.
As a result of global economic and political developments, oil and gas prices are fluctuating. Therefore, energy companies are investing in the optimisation of existing wells while searching for new reserves. However, because easily accessible resources are already used for production, these searches are focused on less accessible areas, such as the polar regions and deep oceans.

In response to these developments, Royal IHC has expanded its offshore activities. It has gained a respected position in the market as a supplier of innovative equipment and complex integrated offshore vessels.

As a leader in technology and innovation IHC Engineering Business, an IHC business unit, is focused on the development of pipelaying systems to satisfy the most demanding requirements of the offshore construction industry. IHC continues to lead the way with advanced technology in the field of subsea vehicle technology.

In addition, combined with the expertise of IHC SAS, it designs and delivers advanced and complete pipelaying systems that provide a commercial and technical advantage for its customers. These IHC business units collaborate on projects ranging from fully integrated vessel systems to the rapid supply of subsystems.

Safety and regulations

After major oil spills, 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 is well aware of how its customers have to comply with legislation. Due to its vast experience in this field, the company has become an authority on this area of the business, and can advise customers on the safest optimum solutions to meet specific regulations.

The installation of pipelines for oil and gas transport is an important part of the construction of offshore infrastructures. 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 pipelines and infrastructure even more challenging. The totally integrated solutions offered by IHC ensure the delivery of reliable equipment.

With a track record of supplying multiple innovative pipelaying vessels, the company has already demonstrated its expertise in this field. It is renowned for delivering pipelaying vessels within the agreed schedule.
IHC strives to deliver the best value to its customers. It is a partner of choice for innovative, sustainable and integrated offshore vessels and equipment, as evidenced by IHC’s creation of the world’s first pipelaying vessels (for Sapura Navegação Marítima) that will be fully integrated by one supplier.

The company’s offshore solutions are reliable, efficient and flexible to meet 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 ensures compliance with the strictest safety regulations and most stringent environmental standards.

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

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

Partnership
Specific demands require bespoke designs. IHC products are cost-effective – not only when newly acquired, but also throughout their working lives. The IHC team works closely with the customer and becomes an extension of their organization, so that both sides can complement each other’s expertise. IHC can, for example, advise on the design, regulations and structure of a project, reduce risk and cost to create a smoother process, which leads to better results. It can also provide support throughout the vessel’s life cycle.

Efficient solutions
Conducting business in an offshore environment is often turbulent. Technical and financial risks are significant, and margins are constantly 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.

IHC’s pipelaying solutions are custom-built, powerful and reliable. They are multifunctional, with a capacity for field development work, deep-water offshore construction, S-lay, Reel-lay, Flex-lay, J-lay, and ROV work for oil field infrastructure work. All IHC pipelaying equipment is fully integrated with vessel design, significantly improving operational efficiency and system capability.

Efficiency, reliability and durability are key factors to success. IHC understands its customers’ needs and has the ability to provide innovative and efficient solutions for a variety of activities, such as pipelaying, trenching and handling of equipment.
IHC is responsible for the design, construction and commissioning of five identical, fully integrated 550-tonne pipelaying vessels and their mission equipment for Sapura Navegação Maritima, a joint venture between SapuraKencana and Seadrill. IHC Engineering Business supplied the pipelaying spreads, which included tensioners from IHC SAS. These are designed to maximise operational efficiency, and as such are fully integrated with the vessels.

In addition, IHC Drives & Automation will deliver the integrated automation systems, full electrical installations, and complete electrical machinery packages.

The pipelaying spreads for these 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 integrated tower orientation allows for maximum deck space, while utilising a high-capacity 615-tonne abandonment and recovery (A&R) system and a secondary lower capacity A&R system for increased operational flexibility. A custom-designed control system integrates each aspect of the pipelaying spread to ensure excellent performance, safety and reliability. It is designed to maximise operational efficiency as a result of complete integration with the vessel.

### Innovative vessels

<table>
<thead>
<tr>
<th>Name</th>
<th>SAPURA TOPÁZIO</th>
<th>Sapura Navegação Maritima</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length overall</td>
<td>145.97 m</td>
<td></td>
<td></td>
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<tr>
<td>Length between perpendiculars</td>
<td>135.12 m</td>
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<td></td>
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<tr>
<td>Breadth</td>
<td>29.94 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>13 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design draught</td>
<td>8.3 m</td>
<td></td>
<td></td>
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<tr>
<td>Scantling draught</td>
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<td></td>
</tr>
<tr>
<td>Speed</td>
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<td></td>
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<tr>
<td>Deadweight</td>
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<td></td>
</tr>
<tr>
<td>DP Class</td>
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<td></td>
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<tr>
<td>Main crane capacity</td>
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<td></td>
<td></td>
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<tr>
<td>Pipe capacity</td>
<td>4,000 t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum diameter</td>
<td>630mm</td>
<td></td>
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<tr>
<td>Operating depth</td>
<td>2,500m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of work class ROVs</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total installed power</td>
<td>23,040 kW</td>
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</table>

The development of deep-sea oil resources has implications on a vessel’s design, requiring it to stay at sea for longer periods of time. IHC designed the SEVEN WAVES, in close cooperation with Subsea 7, to fulfil specific project requirements for work on the Santos Basin. The vessel is equipped to transport and install flexible flow lines and umbilicals in water depths of up to 2,500 metres. It can operate fully autonomously for over 30 days, with all facilities on board and can lay 50-650mm diameter flexible pipes.

SEVEN WAVES is a dynamically positioned vessel (DP2) and is suitable for worldwide operation. The 30-metre beam is determined as a result of stability and operational requirements. Considering the effect that the weight of deck equipment has on a vessel’s centre of gravity, meeting stability requirements – while also carrying a width restriction – was a challenge.

The vessel is equipped with a vertical tiltable lay system and mast crane (both Huisman), as well as a knuckle-boom crane and twin ROV systems. The hull features two underdeck storage carousels for flexible pipe and a moon pool, which is designed to hang off products of up to 600 tonnes and is fitted with a mechanism that allows the product to be rotated under full load.

<table>
<thead>
<tr>
<th>Name</th>
<th>SEVEN WAVES</th>
<th>Subsea 7</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length overall</td>
<td>145.95 m</td>
<td>135.22 m</td>
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<tr>
<td>Length between perpendiculars</td>
<td>135.22 m</td>
<td>135.22 m</td>
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</tr>
<tr>
<td>Breadth</td>
<td>29.94 m</td>
<td>13 m</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>8.3 m</td>
<td>8.5 m</td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>13.8 knots</td>
<td>13.8 knots</td>
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</tr>
<tr>
<td>Deadweight</td>
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</tr>
<tr>
<td>DP Class</td>
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<td>2</td>
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<tr>
<td>Main crane capacity</td>
<td>400mt</td>
<td>400mt</td>
<td></td>
</tr>
<tr>
<td>Pipe capacity</td>
<td>4,000 t</td>
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</tr>
<tr>
<td>Maximum pipe diameter</td>
<td>630mm</td>
<td>630mm</td>
<td></td>
</tr>
<tr>
<td>Operating depth</td>
<td>3,000m</td>
<td>3,000m</td>
<td></td>
</tr>
<tr>
<td>Number of work class ROVs</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Total installed power</td>
<td>24,730 kW</td>
<td>24,730 kW</td>
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</table>
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 deep-water offshore crane and two additional large deck cranes are provided on the working deck.

Furthermore, the vessel’s pipelaying equipment (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.

To respond to the increasing demand for pipelaying and offshore construction vessels, and to expand its current fleet, the customer required a vessel that would meet the highest standards and latest regulations. This pipelaying vessel falls into the intermediate category.

The focus on the SEVEN PACIFIC was for the incorporation of an adaptable pipelaying system for flexible pipes, with an arrangement for three types of storage and transfer. The storage of flexible pipes can take place by means of five reels on the main deck or two large carousels below the main deck. A third option for transporting flexible pipes is a large carousel, positioned on the main deck. Pipelaying is possible thanks to a vertical lay system (VLS), which has an operating depth of 3,000 metres (carousels and VLS by Huisman).

The large heave-compensated 250-tonne knuckleboom crane (Huisman) enables the vessel to carry out offshore construction operations to a depth of 3,000 metres. Two cursor-launched work class ROVs, which are housed in a hangar, enable the operator to monitor the pipelaying process on the seabed and provide support during offshore construction activities. A second knuckleboom crane and a provision crane provide deck service.
Through its specialist business units, IHC Engineering Business and IHC SAS, IHC supplies a wide range of equipment to customers involved in pipelaying activities around the world. This includes a variety of lay systems, including J-lay, S-lay, reel-lay and Flex-lay, as well as carousels and associated deck equipment. The company can also provide trenching equipment, handling systems, winches, including associated electrical and hydraulic power, and automation systems.

IHC is a leading supplier of tailor-made, high-specification lay systems. Its approach to engineering, and its in-house mechanical, structural and control systems design expertise enable it to deliver: lay systems that offer maximum operability and functionality; and tower structures optimised for low system weight, while ensuring safe and reliable operations at all times with detailed fatigue analysis. The company can install integrated lay systems in both new and existing vessels.

S-lay

The S-lay method is popular because of its high production rate, and the ability to lay pipes in almost all water depths. On board the pipelaying vessel, joints of pipe are welded into a pipe string, which is supported by deck-mounted pipe rollers, while the tension in the pipe is controlled by the tensioner(s).

IHC S-lay systems provide precise control of tension in the pipe string through the use of variable speed drives, and the synchronisation of line-up tools and tensioners during the laying process. Safe and efficient operations are achieved through the use of an integrated control and monitoring system, with automatic interlocks.

For the S-lay method, pipe tensioners are the essential means to hold the pipe and maintain pre-set tension in the pipe string while moving it from the deck to the sea. The pipe tension equipment in an S-lay system comprises of:

- 4-track tensioners
- A&R winch systems (single drum or traction winch)
- reel drive systems
- (measurement) sheaves
- electric and hydraulic power units
- local and remote controls.

IHC delivers five identical 550-tonne capacity pipelaying vessels. These fully integrated vessels are the first of their kind, completely designed, engineered and built by IHC. The integrated Flex-lay system comprises of a twin-tensioner tilting lay tower, flexible product storage using two below-deck baskets and support equipment for the spooling and routing of product. The tower orientation allows for maximum open deck space, while utilising a high capacity 615-tonne A&R system and a secondary lower capacity 200-tonne A&R system for increased operational flexibility. A custom-designed control system integrates each aspect of the pipelaying spread to ensure excellent performance, safety and reliability.

In addition, a 300-tonne capacity Flex-lay system for another newly designed IHC vessel uses a similar design. Comprising predominantly the same components, this tower incorporates a high-capacity 340-tonne A&R system and a lower capacity 100-tonne secondary A&R system which again increases flexibility.

IHC previously delivered a 300-tonne capacity vertical Flex-lay system and provided overall integration of the pipelaying system for the upgrading of an existing vessel. This is a modern, high-payload, dynamically positioned, fast-transit and flexible-laying product, which utilised the existing 7,000-tonne capacity of the IHC carousel system.

All systems are designed and built to surpass industry standards for quality, safety and environmental impact. Safety-critical control systems conform to the requirements of IEC 61508 and SIL3.

Reel-lay

IHC specialises in the supply of tailor-made Reel-lay systems, working closely with customers to deliver optimum pipelay performance within often exacting vessel constraints. With its excellent team of engineers and optimum in-house design tools, the company is able to create individual solutions to meet specific requirements. In this way, it provides customers with a commercial and technical advantage.

A wide range of systems has been supplied to Reel-lay vessels. These include pipe roller box assemblies, moon pool handling systems, tensioners, piggybacking and straightener systems. IHC has supplied a turnkey Reel-lay system for Technip’s new DEEP ENERGY vessel. This is one of the most capable pipelaying vessels ever built. It has the capacity to handle rigid pipe up to 18 inches and incorporates an integrated, efficient PLET handling system.
Carousels

IHC Engineering Business is IHC’s specialist business unit for the design and build of high-quality carousels for the demanding offshore industry.

It designs and builds offshore carousels for the spooling and storage of power cables, umbilicals, and 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 a modular design to ensure that mobilisation time is minimised. These handling solutions have an excellent track record of the safe, reliable and rapid installation of products.

IHC has designed a number of basket and reel carousels of different sizes and complexities to suit the needs of its customers. Its carousels are designed for ease of mobilisation. A system is often mobilised in a maximum of three lifts, allowing projects to be completed without incurring costs as a result of downtime.

The benefits of the ploughs include:

- operation in the toughest seabed conditions
- suitability for use with a wide range of pipe sizes, water depths and vessels
- safe and efficient launch and recovery
- rapid backfilling operation achieved by folding the BPL3 for launch and recovery
- tailor-made solutions to meet customer requirements.

Following the successful delivery of a mounted 7,000-tonne capacity reel carousel system for the North Ocean 102, and a 3,000-tonne reel carousel system for Subsea 7, IHC applied its engineering knowledge to develop a 5,000-tonne capacity basket carousel and loader system, two of which have now been delivered to both Royal Boskalis and Van Oord.

In addition to the range of high capacity carousels developed as part of the integrated IHC vessel SAPURA ESMERALDA, IHC has designed and manufactured smaller below-deck basket carousels of 500-tonne and 2,000-tonne capacities, along with hydraulically slewling and actuated spooling arms to assist with product placement and removal. Where required, IHC’s advanced hydraulic compliant roller system provides more reliability, reduces life-cycle costs and significantly extends the working life of the entire system.

Operational performance is enhanced by its innovative design. Load is evenly distributed from the product stored in the basket or reel to the grillage and onto the vessel’s deck. This optimises the size of grillage, which in turn reduces mass and the vertical centre of gravity, along with the need for modifications to the deck for carousel installations. IHC carousels are designed to meet operational requirements, and include sufficient redundancy should a problem occur to allow projects to be completed without incurring costs as a result of downtime.

IHC’s innovative range of equipment in the field of horizontal cablelay, including carousels, spooling systems and tensioners, will continue to develop in order to meet specific customer requirements.

Trenching systems

Extensive experience in the design and build of subsea trenching equipment has enabled IHC Engineering Business to develop a wide range of pipeline burial 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 larger pipe diameters as projects develop more challenging requirements.

Pipeline ploughing systems

The PL3 and BPL3 allow the product to be buried to a depth of 2.5 metres and then subsequently backfilled, in water depths to 1,000 metres. Designed to handle pipeline diameters up to 1.55 metres, PL3 and BPL3 are used across the globe for the burial of main pipeline trunk routes.

The PL3 plough can be towed with up to 400 tonnes of pull force to cope with extremely tough seabed conditions and incorporates multi-pass capability to guarantee that the full specified trench depth is achieved. It is able to accommodate simultaneous pipe support loads up to 100 tonnes fore and aft. Both ploughs operate in deep water without the use of divers for deployment or pipe loading and unloading.

The benefits of the trenchers include:

- diverless deep-water operation
- the capability of trenching a range of products in hard soil conditions
- a variety of trenching and backfilling operations.

IHC has developed and delivered a number of self-propelled tracked trenching machines featuring both surface-fed and vehicle-based control systems. These machines are used in a variety of applications, from hard ground oil and gas pipeline installation to offshore wind inter-array cable burial.

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. All three operations are performed using digger chain assemblies, the proven mining-based technology, instead of cutting and transporting soil.

The I-trencher is designed and built by IHC. It includes the 1.25 megawatt trenching vehicle, its launch and recovery systems, and heave compensation system. The I-trencher is capable of excavating a two-metre deep trench.

The benefits of the I-trencher include:

- the capability of trenching a range of products in hard soil conditions
- a variety of trenching and backfilling operations.
Handling systems
ICH has designed and built launch and recovery systems for over 25 years. All systems are designed to maximise availability, provide a long and reliable service life, and minimise operational costs through careful design and high-quality construction. It has supplied customers with handling systems that have been used to handle a wide range of equipment, from ROVs to the largest cable ploughs all over the world.

The company’s engineers combine practical offshore experience with technical excellence to deliver systems that will permit safe operations in a wide range of sea conditions. They have also developed innovative vehicle-stabilising systems that maximise the safe launch-and-recovery windows and increase uptime as a result. These range from passive stabilising frames to active stabilising systems that utilise the precise design and the use of high-quality components. As a simple example of this philosophy, the main pivot pins on A-Frames are designed to keep water out and lubricant in, while increasing the service life and reducing maintenance costs.

The company’s A-Frames are specifically designed for easy mobility and rapid mobilisation onto a support vessel. The entire A-Frame (and stabilisation frame if supplied) can be lifted from pre-installed shackle points and lowered on to a vessel in one lift.

The A-Frame includes bases that are bolted to stools. In general, the A-Frame includes bases that are bolted to stools. In general, these stools are welded to the ship’s deck, but are not usually supplied by IHC. The bases are designed to minimise the size of the deck area used by the A-Frame.

Portables launch and recovery system
The portable launch and recovery system supplied for the NSRS forms a vital part of this high-specification emergency response system. This is portable by air and intended for mobilisation on to a wide range of vessels within a short time frame. Divertless recovery and sea state six operations are possible using this innovation system.

Advanced equipment

A-Frames
The A-Frames produced by IHC feature a symmetrical design to evenly distribute loads into the system structure, and ensure redundancy of operations should owners experience a hydraulic cylinder failure. It ensures reliability by precise design and the use of high-quality components. As a simple example of this philosophy, the main pivot pins on A-Frames are designed to keep water out and lubricant in, while increasing the service life and reducing maintenance costs.

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Specialist handling systems
ICH offers its offshore handling experience for a wide range of applications. Its designs are frequently driven by exacting constraints, operational requirements and short delivery schedules. They feature wide-angle linkages for large angles of outboard and inboard gantry movement.

An example was the supply of a 500-tonne SWL PLEM handling frame to Dutch pipelaying contractor, Allseas. Other projects include an innovative installation and retrieval system for tidal turbine developer, Voith Hydro. The system is used to deploy and recover its turbine nacelle to a pre-installation foundation.

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

The standard winches have a line pull of between 2.5 and 600mt, and the customised winches between 100 and 650mt. It can supply any winch designed for harsh offshore conditions and its customers’ requirements.

A&R winches
An A&R winch is designed specially 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 longer cable lengths, resulting in larger systems. IHC A&R winches are available as single-drum winches or as traction and storage winches combined. The control systems for both the A&R winches and the tensioners are fully integrated, which results in an easy shift between operations at the touch of a button. Furthermore, they are built in compliance with the regulations of ABS, DNV, Lloyd’s and so on.

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

Both products have a relatively compact design, are extremely reliable and smooth for the wire rope to safeguard the continuity of operations. IHC’s expertise in active heave compensation systems enables it to provide complete deep-water lowering systems. The IHC ‘in line’ AHC system can be optionally added to existing A&R winch systems.

As water depths and loads are limited by available wire rope diameters and maximum production weights, IHC is conducting tests using special synthetic wire rope on to traction winches. This helps to extend water depth limits for its customers’ future projects.

Stinger hoist winches
A stinger hoist winch is specially designed to lift the stinger of an S-lay pipelaying vessel. This product is extremely compact with a spooling device, including cylinders, instead of a diamond screw or spindle shaft. It is equipped with a pawl and ratchet system for the large holding capacity.
Hydraulic systems

The harsh conditions of the offshore industry demand high-quality equipment, with high levels of reliability. IHC 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 through its business unit, IHC Hytop.

IHC has 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 they are delivered to customers.

Complete hydraulic systems

IHC 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 and vessels, and pipelaying vessels.

Wide range

IHC 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; jacking systems; catleaver 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 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.

Electrical power and automation systems

In addition to vessels and equipment, IHC 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 approach ensures high system availability, sustainability and maintainability.

IHC designs and delivers: generators; electric/submersible motors; main switchboards; variable frequency drives for low- and medium-voltage 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.

High level of performance

Electrical powered systems are becoming increasingly important on board. The growing number of these enables a more flexible vessel layout and, in most cases, greater efficiency in the application of energy. The modular design of IHC vessels and their innovative frequency drives provide a high level of system performance.

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

- Alarm and Monitoring Systems (AMS) with principal design appraisal of classification societies
- Vessel Management Systems (VMS) for the integration of all platform functions, including PMS and offshore operation systems
- Condition Monitoring Systems (CMS) for the support of maintenance and logistical decisions.

IHC offers the optimal integration of electro-technical and automation knowledge with naval and mechanical engineering to its customers. This results in enhanced control of the vessel and a higher level of performance.

To ensure optimal energy usage aboard pipelaying vessels, electrical systems can be configured to reuse energy produced by the pipelaying operation itself, for example. Thanks to low operational expenditures – due to better integration of systems, smart power management and recovery of energy, efficient ship design, and clever integration of the various electrical and automation systems – IHC is able to offer pipelaying operations with the lowest environmental emissions and running costs.
IHC customers rely on the unrivalled level of commitment that is offered to them through dedicated and comprehensive life-cycle support services. These help to maximise the equipment’s availability and the return on investment, and therefore reduces the total cost of ownership.

The cycle can be entered at any of its five integrated stages. The technology innovator’s highly qualified experts design and build innovative vessels and advanced equipment based on their vast worldwide experience of the dredging, mining and offshore industries.

The company offers a complete spectrum of high-quality and up-to-date services to ensure that crews operate in a highly skilled and efficient manner to achieve optimum levels of productivity. IHC life-cycle support also allows operators to maintain the durability and reliability of their systems through a range of specialist services.

Furthermore, an upgrade by means of renovation, modification or update of the existing systems, components and/or software can extend the working life of the vessel and equipment. With the expertise to research, engineer and install to the highest possible standard, the IHC team will also utilise complex processes, knowledge and experience to maintain the correct and safe operation of all its products on board.

**Design**

The design phase encompasses the entire trajectory, from the first point of contact about a potential offshore challenge, to the last drawing or calculation, directed to offer a practical solution.

**Build**

Irrespective of the actual location, the building stage integrates the procurement, manufacturing, commissioning and testing of the vessels’ and equipment’s hardware and software. Their future utilisation and operational efficiency are enhanced and ensured by the life-cycle support services. Examples of the services are project management, works and site supervision, commissioning and technical support.

These services improve the quality, sustainability, durability, ease of maintenance, compliance to regulations, and awareness of systems and operations. Depending on the type of equipment and/or contract, they are – partly or wholly – integrated in the scope of delivery, but they can also be offered separately to customers worldwide.

**Operate**

The operational stage of a system covers either the period from the vessel and/or equipment’s day of delivery until its functional withdrawal, or a full lease/rental period. During this trajectory, the aim is to preserve the system’s vital functionality and efficiency under prevailing or changing operational conditions.

**Maintain**

At this stage, the aim is to optimise the system’s availability in a cost-effective manner. This is achieved by intelligently maintaining its technical functionality with regard to prevailing operational circumstances, and by a fast response in the event of an unexpected technical issue.

**Upgrade**

This stage facilitates several options for the necessary overhaul and/or replacement of major or structural systems and subsystems. These are based on economic considerations, continuing compliance to regulations or changing operational requirements.