

ROYALIHC.COM

ROYAL IHC PIPELAY



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**THE TECHNOLOGY
INNOVATOR.**



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PIPELAY SOLUTIONS

Royal IHC is the global market leader for the design and construction of high-end pipelay vessels and equipment.

IHC is unique in its ability to provide single-source solutions for all pipelay and cablelay disciplines, from shallow water cablelay to ultra-deep water J-lay, and everything in between.

We have in-depth knowledge and expertise of engineering and manufacturing high-performance integrated vessels and equipment. In close collaboration with our customers, we create the optimal solution. We can offer a complete in-house package, from concept design to the turnkey delivery of an integrated vessel and crew training, or design and deliver integrated pipelay systems for existing or third-party vessels. All our systems are designed and built to ensure maximum safety, performance and reliability.

As the technology innovator, we continuously invest in R&D and innovation, and forge ahead to deliver the most efficient vessels, equipment and services. With our head office in The Netherlands and sites and offices around the world, we are able to ensure a local presence and provide support on every continent.

J-LAY SYSTEMS



2,000T J-LAY TOWER



2,000T J-LAY TOWER

IHC's advanced J-lay systems enable the efficient, reliable and safe installation of a wide range of multi-joint rigid pipes. The wide angle of adjustment ensures that the systems can perform efficiently in both shallow and ultra-deep waters.

IHC's track record includes the record-breaking J-lay tower for Saipem's FDS2. This J-lay system was delivered in 2010 and is still one of the world's largest and most versatile of its kind. It is capable of deploying quad joints at line tensions of up to 1,500t and holding the pipe string in the hang-of clamp at catenary tensions of up to 2,000t. The system is able to accommodate pipes from 4 to 36 inches and can work in shallow and deep water, with the tower angle adjustable from 45 to 96 degrees.

Multiple travelling tower clamps, an adjustable stinger, a dedicated bulky item handler and fully integrated IHC multi joint pipe factory also contribute to the high functionality and low cycle time of the system. IHC's second 2,000t J-lay system was commissioned at IHC's production facility in the Port of Blyth in 2017.

Having delivered the world's most advanced J-lay systems, we are continuing to push the boundaries with new technology. The key design drivers throughout development of our J-lay systems are cycle time reduction, weight optimisation and safety in all areas. The pipe factory design is tailored specifically to J-lay operations to ensure that there is no compromise in performance, resulting in high laying rates.



FLEX-LAY SYSTEMS



FLEX-LAY SYSTEM



85T VERTICAL LAY SYSTEM

Our flex-lay systems are known in the industry for their excellent usability and uptime. We design and build high performance, low risk flex-lay systems capable of installing power cables, umbilical cables and flexible pipelines, for both new-build and existing pipelay vessels. IHC flex-lay systems range from highly customised and bespoke designs to standard modular units, all with the same common focus – safety, efficiency and reliability.

Among the flex-lay systems we have delivered over the years are those for the five identical 550t-capacity pipelay vessels for Sapura Navegação Marítima and a 300t flex-lay system for another newly designed IHC vessel. Furthermore, we have supplied horizontal lay systems to several customers. 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.

In addition to building bespoke systems that meet a specific set of project requirements, we also offer modular flex-lay equipment. This flexible solution helps to support our customers in today's rapidly evolving market.

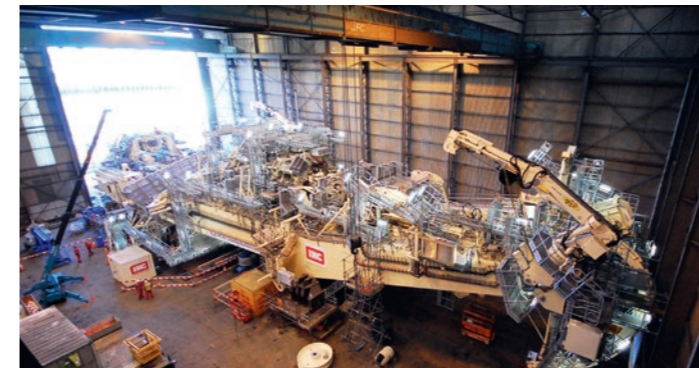


300T FLEX-LAY SYSTEM

REEL-LAY SYSTEMS



REEL-LAY SYSTEM



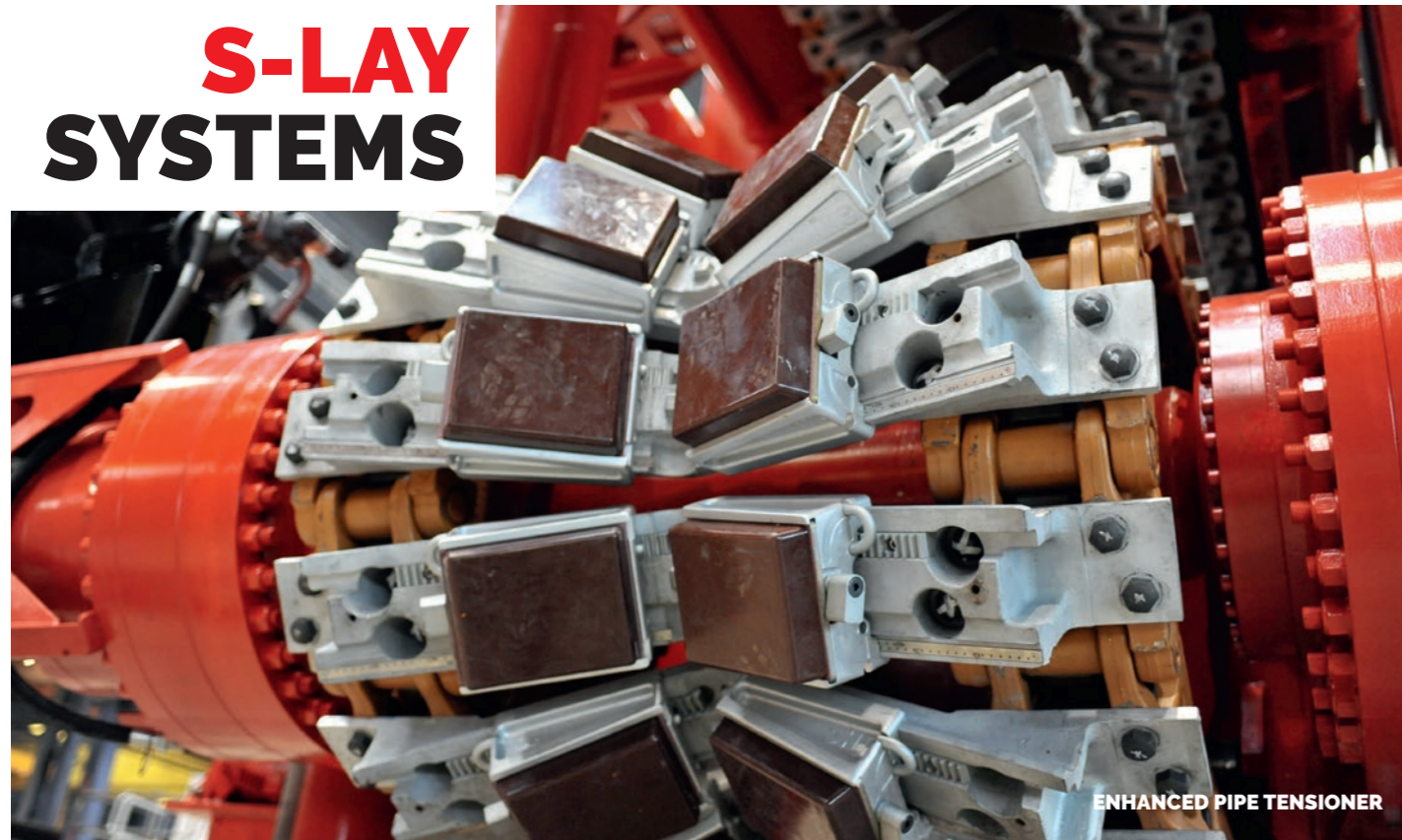
IHC specialises in the supply of tailor-made reel-lay systems, working closely with customers to deliver optimum pipelay performance within often exacting vessel constraints. A range of systems has been supplied to reel-lay vessels. These include pipe roller box assemblies, moon pool handling systems, tensioners, piggyback systems and straighteners. At the heart of our reel-lay technology lies a simple, reliable and safe control system.

We have supplied a reel-lay system for Technip's DEEP ENERGY vessel. This is one of the most effective pipelay vessels ever built. It has the capacity to handle rigid pipe up to 18 inches and incorporates an integrated, efficient PLET handling system. Shanghai Salvage has also ordered an IHC-integrated 550t reel-lay system. This includes not only rigid pipe, but also flexible pipelay capabilities and will be installed on a new offshore construction vessel in 2020.

In 2017, IHC and Subsea 7 signed a contract for the design and build for a new integrated reel-lay vessel incorporating the reel-lay equipment. Delivery of the vessel is planned for the first half of 2020.



S-LAY SYSTEMS



ENHANCED PIPE TENSIONER



HORIZONTAL 60T 2-TRACK TENSIONER



VERTICAL 350T 2-TRACK TENSIONER

The S-lay method is popular because of its high production rate and the ability to lay pipes in almost all water depths. At IHC, we design and deliver complete SAS® S-lay pipelay systems for shallow to ultra-deep water.

Our pipelay systems include a sophisticated, fully integrated and user-friendly monitoring and control system that provides precise control of tension in the line string, guaranteeing safe and efficient operations. The control system also allows for fully automatic tension transfer from the tensioners to the A&R winch and vice versa.

IHC has delivered over 100 pipe tensioning and pipe-handling S-lay systems globally, with pipe tension ranging from 20t up to 2,000t. In addition, we can supply pipelay mooring winches for pipelay operations. These high-occupancy winches are integrated into the vessel and pipelay control systems. Optimum energy efficiency is achieved through the re-use of power generated during pipelay operations as this power can be used to operate pipelay mooring winches.

Our latest innovations are related to tensioner pads. New material and an improved design ensures an optimum grip, even on slippery pipes, while our new cross-tie design enables pads to be changed quickly and easily to reduce vessel downtime.



I-TRENCHER



I-TRENCHER

SUBSEA TRENCHING



PIPELINE PLOUGH

As the pipelay specialist, we know how to handle product – both on deck and in subsea conditions. In addition, our expertise in dredging and soil mechanics enables us to develop a solution for any pipeline burial requirement. Our track record in subsea trenching enables us to successfully upgrade and modify previously designed ploughs, as well as design and manufacture some of the world's leading systems.

IHC's PL3 plough and BPL3 backfill plough systems represent the largest of their kind in the world. These systems can bury and backfill product to a depth of 2.5m in water depths of up to 1,000m. Designed to handle up to 60-inch diameter pipelines, the ploughs are used on pipeline burial operations across the globe, including the Nord Stream gas pipeline.



PIPELINE PLOUGH

IHC has developed and delivered a number of self-propelled tracked trenching machines, used in a variety of applications, from hard ground oil and gas pipeline installation to offshore wind inter-array cable burial. The 1.25MW I-Trencher is a self-propelled and highly manoeuvrable tracked machine capable of excavating a two-metre deep trench in a single pass at a maximum water depth of 1,500m. It has been designed with three primary modes of operation: cutting using digger chains, open V-cut trenching, and backfilling. All three operations are performed using digger chain assemblies – proven mine-based technology – instead of cutting and transporting soil.

OTHER EQUIPMENT



CAROUSEL

CAROUSELS AND BASKETS

IHC has a proven track record in designing and building offshore carousels for the spooling and storage of power cables, umbilicals, and rigid and flexible products with capacities of 500-7,000t. Each carousel is designed to ensure maximum productivity and minimum downtime. To suit the customer's individual requirements, a number of features can be incorporated, such as compliant roller mountings, changeable core diameters, hydraulically adjustable roof positions and a modular design to ensure that mobilisation time is minimised.

WINCHES

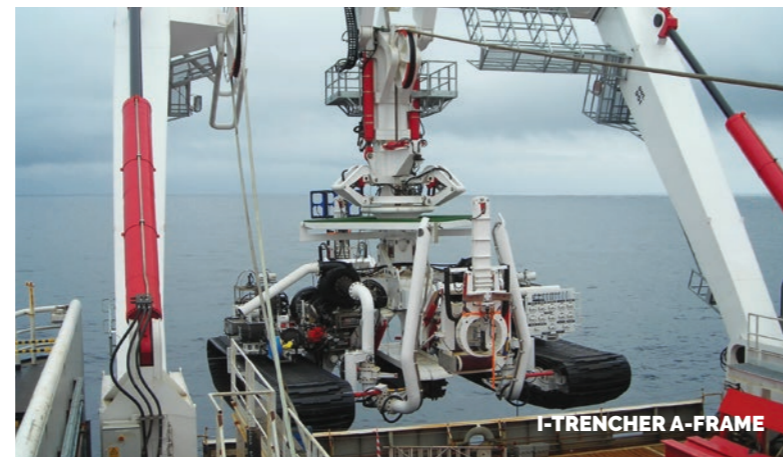
The delivery of standard and customised winch systems is one of our specialties. Our in-house resources cover engineering, procurement, construction and on-site commissioning activities to deliver complete hydraulic or electric motor-driven winch systems. The winches have a line pull of between 2.5 and 800t. We can supply any winch designed for harsh offshore conditions, including single-drum A&R winches, and traction and storage winch systems for high-capacity winches and/or winches for deep-water applications. IHC's expertise in active heave compensation (AHC) systems enables us to provide complete deep-water lowering systems. Our AHC systems can also be added to existing A&R winch systems.



A&R TRACTION WINCH SYSTEM

HANDLING SYSTEMS

IHC has been designing and building launch and recovery systems for over 30 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. We have supplied customers with handling systems that have been used to handle a wide range of equipment, from ROVs to ploughs all over the world.



I-TRENCHER A-FRAME

HYDRAULIC, ELECTRICAL AND AUTOMATION SOLUTIONS

In addition to vessels and equipment, IHC is able to deliver complete hydraulic installations, including manifolds, piping, hydraulic cylinders and hydraulic winches. Moreover, IHC provides electrical 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. We design and deliver: 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.



ELECTRICAL POWER DISTRIBUTION BOARD

PIPELAY VESSELS



REEL-LAY VESSEL

IHC pipelay vessels are built to suit specialist requirements and specifications with full integration of the pipelay equipment, either provided by third-party suppliers or by IHC itself.

Our pipelay vessels are in operation all over the world, from the Norwegian continental shelf to the Brazilian deep-water pre-salt fields. We deliver innovative vessels with high functionality and an optimised operational profile. The designs are made in close cooperation with our customers, which results in an effective customised design fit for the most efficient operations.

IHC has a long track record for the timely delivery of flex-lay and reel-lay vessels. These include: Seven Waves, Seven Pacific, Seven Oceans, Seven Seas, Seven Rio, Seven Sun, Seven Cruzeiro, Sapura Diamante, Sapura Topázio, Sapura Onix, Sapura Jade and Sapura Rubi.



FLEX-LAY VESSEL

INTEGRATED VESSELS AND EQUIPMENT



At IHC, we strive to deliver the best solution to our customers. By combining our extensive knowledge in the design and construction of highly efficient pipelay equipment with our shipbuilding capabilities, we are able to integrate all the critical mission equipment into the concept design of a vessel. This allows us to offer innovative pipelay vessels that meet our customers' specific needs and exceed their expectations.

FIVE 550T PIPELAY VESSELS FOR SAPURA NAVEGAÇÃO MARÍTIMA

Limitations in terms of vessel length and air-draught, in combination with large pipelay capacity requirements, called for an innovative approach. We came up with a design of the 550t flex-lay tower with a tiltable top, that folds away in a matter of minutes to meet the height restrictions. In addition, the vertical lay system is positioned directly forward of the moonpool and tilts towards the superstructure. Compared to the usual design for flexible pipelay vessels, in which the tower faces towards the stern and tilts towards the deck, this results in greater deck space, which is important considering the length limitations.

Another smart solution to save valuable space on deck is the integration of the chutes into the steel structure of the vessel for pipe loading over the stern. Pipe is fed through a loading tensioner on deck and passes over intermediate guide chutes, before being loaded into one of two underdeck carousels (2,500t and 1,500t).

Achieving these solutions was easier as we were the single supplier for both vessel and equipment. Moreover, Sapura had one point of contact for the entire duration of the project. The SAPURA DIAMANTE, SAPURA TOPÁZIO, SAPURA ÔNIX, SAPURA JADE and SAPURA RUBI were all delivered on or ahead of schedule and their performance is unmatched in the industry.



INTEGRATED REEL-LAY VESSEL FOR SUBSEA 7

IHC is contracted to design and build a new reel-lay vessel for Subsea 7. This high-specification vessel will be capable of installing complex rigid flowlines including pipe-in-pipe systems and electrical trace heating, in water depths up to 3,000m. In close cooperation with Subsea 7, we have incorporated several innovative features to make this our most technologically advanced vessel to date. The vessel's compact dimensions are facilitated by the creative positioning of its three engine rooms and main reel, efficient use of the superstructure, and low-profile pipelay ramp. The smart use of space opens a large aft working deck, while the optimised mass distribution minimises the ballast water requirement.

The design of the reel-lay system focuses on operational efficiency and flexibility, alongside crew safety. The twin tensioner pipelay ramp tilts to allow pipeline installation from shallow waters to depths of up to 3,000m. The large multi-level workstation optimises the efficiency of operations in and around the firing line, while a fixed auxiliary reel, recessed into the main deck, gives payload flexibility.

Over the years, we have delivered a total of eight vessels to Subsea 7. This new reel-lay vessel will be the first to be equipped with a pipelay system, also designed, engineered and built by IHC. Delivery of the vessel is planned for the first half of 2020.



SERVICES



Achieving the best possible results is what you aim for and it is our mission is to help you reach that goal. By offering high-quality services and global support, we assist you to operate in a highly skilled and efficient manner in order to achieve optimum levels of productivity.

INCREASE UPTIME

We offer 24/7 worldwide support to keep your vessels and equipment up and running under all operational conditions. We are renowned for our quick response to technical queries. If any assistance is required during your operation, our experienced support team and the online platform IHC Service Portal are at your disposal. Our global service network and professionally trained engineers are available 24/7, 365 days a year, for troubleshooting, operational advice and support, repairs and spare parts.

RENOVATIONS AND VESSEL UPGRADES

By providing renovations, we are able to improve the operational efficiency of your vessel, reducing emissions and the total operational or maintenance costs. Our training simulator facilitates the training of PLV operators in pipelay procedures and operational safety protocols, even before the delivery of a vessel or equipment; guaranteeing a flying start. Moreover, we can help you during the preparation, operation and optimisation phase of your offshore project to achieve the best results for your operation.

FINANCING AND RENTAL OPTIONS

We can offer several financing and rental options. Our extensive range of financial solutions includes attractive payment terms, supplier credits, commercial financing, rental and leasing options, as well as (export credit agency supported) buyers' credits. Our rental fleet ranges from hydraulic and electric drive winches, all the way to carousels, tensioners and complete flex-lay systems. In fact, if IHC can design and build it, we have flexible ways to lease or rent the equipment you need – even for specially designed and adapted projects.

