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 **IHC** Offshore Energy

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Royal 
Creating the maritime future

Cablelay



Introduction

Connecting the future of energy. IHC Offshore Energy has the knowledge and experience to rise to the global challenges facing the offshore industry by providing reliable and advanced vessels, equipment and services. With our extensive knowledge and experience, and through our passionate colleagues, we provide a competitive edge to our customers in the offshore industry worldwide.

As the global market leader for the design and construction of high-tech vessels and

equipment for the oil and gas industry, IHC Offshore Energy is fully equipped to provide other offshore industries such as renewables and telecoms with superior solutions based on our market-leading expertise.

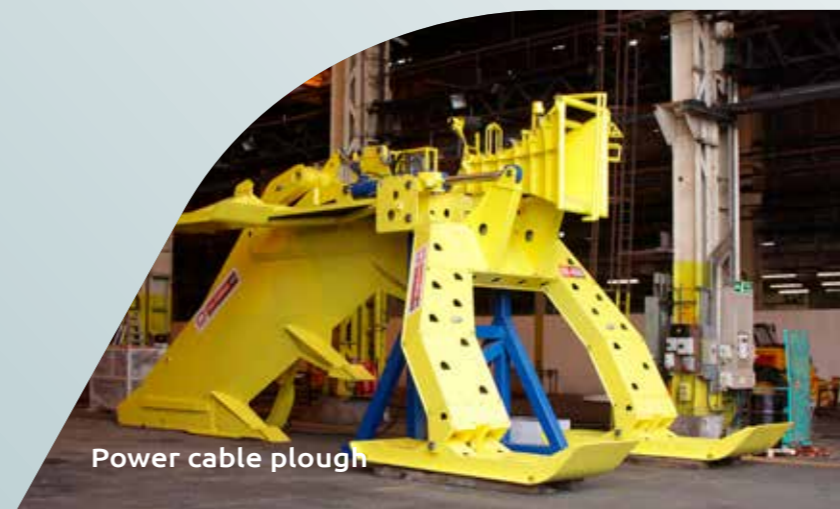
With a proven track record in delivering sustainable offshore systems, including pipe and cablelay equipment, subsea vehicles, FPSO equipment and a wide range of integrated vessels, IHC Offshore Energy can provide standard or tailored solutions

to improve operational efficiency for our customers.

With our experts working on a global basis, we guarantee a local presence and industry-leading support on every continent. In addition, our responsive spares and services team has a wealth of operational experience and will support customers in all matters beyond the initial design and build to maximise the productivity of vessels and equipment.

IHC Offshore Energy is part of Royal IHC, a leading designer, builder and supplier of integrated vessels, equipment and services to customers in the dredging, offshore, mining and defence industries. We deliver reliable solutions that improve operational efficiency and allow for a more sustainable performance. As we navigate new waters, our aim remains unchanged: to discover the smartest and safest way forward for both our customers and our people.

Together, we create the maritime future.



Power cable plough



Hi-Traq™

Cablelay services

Engineering

IHC Offshore Energy has many years of expertise in shipbuilding and mission equipment. We offer complete design, engineering and manufacturing packages for cablelay spreads or their components. IHC Offshore Energy is also able to analyse cable behaviour during an operation and offer solutions to optimise the process.

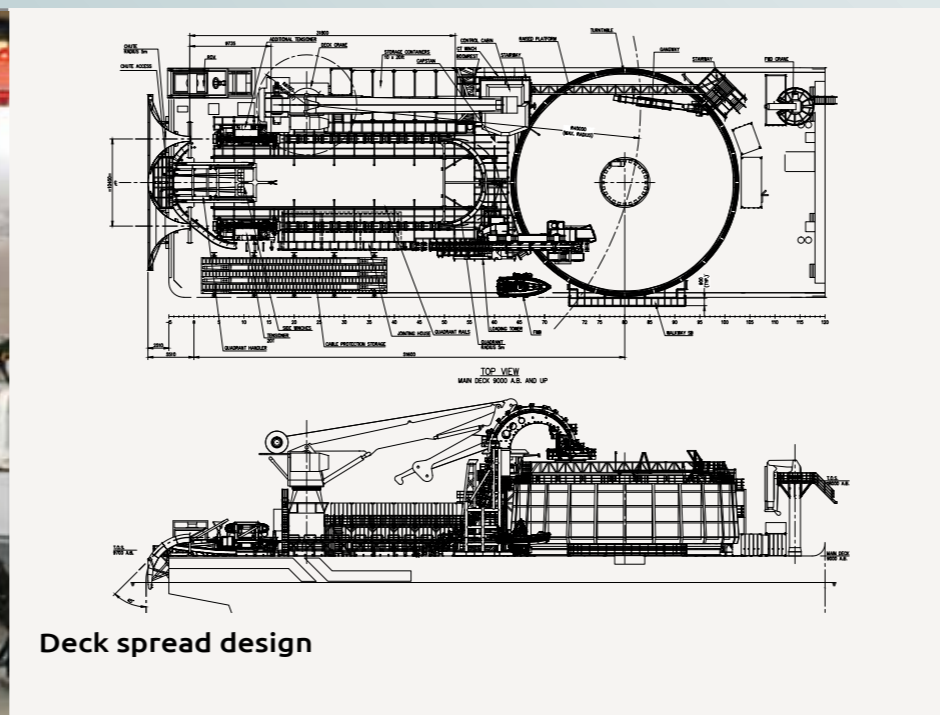
Rental

IHC Offshore Energy offers short-, medium- and long-term rentals of modular and flexible cablelay equipment from our locations in Europe or our local offices such as China, the USA and Singapore. These services range from the short-term rental of a single piece of equipment to complete life-cycle rental solutions for full back-deck spreads.

In addition, we have a strong team of offshore operators and engineers to run and maintain our rental fleet, which includes:

- tracked tensioners
- linear cable engines
- hydraulic power units (HPUs)
- winches
- spooling drum engines
- spoolers
- powered quadrants.

IHC Offshore Energy can provide full deck solutions, including sea-fastening base frames, LCEs and control systems. Our rental LCEs have a proven track record across multiple markets, including international telecoms, as well as oil and gas, and offshore renewables industries, and military and seismic cables. If required, we can offer local building solutions from China, the USA and Asia Pacific.



Power cablelay

Carousel systems

IHC Offshore Energy has a proven track record in designing and building offshore carousel systems for the lay and storage of power cables, umbilicals, and flexible products (500-7,000t+). Each carousel and loader arm is designed to ensure maximum productivity and minimum downtime by incorporating features such as an innovative hydraulic roller suspension system.

Depending on your project, the carousel can be designed to be modular or to be lifted containing product for rapid mobilisation.

Tensioners

We design and deliver tracked tensioners that have a strong track record of laying inter-array and export cables on projects throughout Europe. Our customised tensioners include containerised systems and units that have a break-back feature, which allows the passage of a quadrant to speed up inter-array cablelay operations. The iterative design of our tensioners draws on the operational experience we have from the rental fleet. We also produce four track tensioners, which can be used for deepwater flexible product and power cablelay.

Quadrant systems

IHC Offshore Energy has developed an innovative quadrant handling system for cablelay vessels. This allows for safe and easy overboarding of the quadrant with only one controlled motion, meaning that a crane does not need to be used for this operation. This patented system ensures that the minimum bend radius is maintained while the cable is being overboarded.

Integrated deck spreads

IHC Offshore Energy can supply integrated cablelay spreads for existing or newly built vessels. We are also able to build

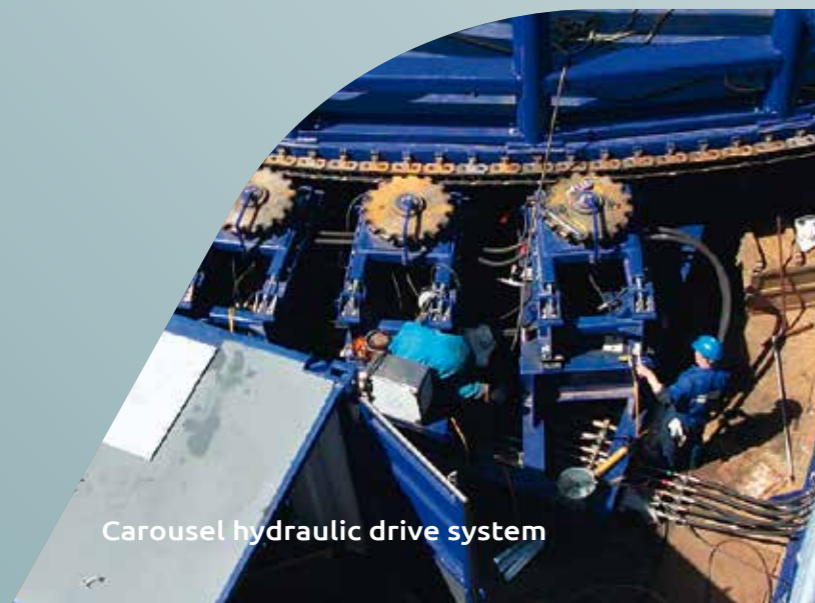
components locally, reducing transport and building costs, and involving regional supply chains.

Power cablelay vessels

IHC Offshore Energy has designed a vessel dedicated to inter-array cablelaying that combines two underdeck 2,000t carousels with an in-line quadrant system. The vessel is able to lay cable via SB and PS, which means that the optimal heading can be selected dependent on weather conditions. With two tensioners, the two carousels can be loaded simultaneously, while the deck layout provides ample space for cable protection systems.



Inter-array cablelay vessel



Carousel hydraulic drive system



Tensioner



Integrated deck spread



Tensioner



Fibre optic cablelay vessel

Fibre optic cablelay

Linear cable engines

As part of IHC Offshore Energy, Fraser Hydraulic Power (FHP) has been providing technical expertise to the global cablelay market for 30 years. Our linear cable engines have evolved over this time to apply new technologies to ensure that products are handled in a safe and controlled way. Custom designed hydraulic and electrical control systems reduce the risk of wheel spin or 'looping out' between wheel pairs and our field proven methods for load and distance sensing ensure that you will always have reliable data.

IHC Offshore Energy's standard range of cable engines can be adapted to match any specific project requirement such as very small diameter cable or high-speed cablelay. The control system can be integrated into the cablelay deck spread to reduce the number of personnel required for your operations.

Cable drum engines

For cable repairs, IHC Offshore Energy offers a wide range of cable drum engines (CDEs), which can be hydraulically or electrically driven and can be offered in a range of diameters to suit individual specifications. The CDEs are supplied with draw-off/hold-back (DOHB) devices and the PLC automatically controls the two units as a pair. CDEs can be either top or bottom loading depending on whether they are to be placed within the vessel structure or on a flat back deck, and can be containerised for transport.

IHC Offshore Energy also has experience in carrying out turnkey replacement projects for ageing cable drum engines, even when located within the vessel structure. We can handle the removal, new build, installation and commissioning of a system, therefore de-risking your equipment upgrade project.

Control systems

Our integrated control systems are based on proven industry-standard equipment and open software. This ensures that support and spare parts are readily available, and that the equipment can be maintained, developed and extended easily.

The system equipment is controlled by a Siemens PLC and Siemens Remote IO modules operating on a Profinet network.

The supervisory and control system is generally a Siemens HMI/WinCC SCADA package, which provides full operational and diagnostic capability. The loader arm and drive system are independently controlled within an integrated monitoring system for the carousel.

Fibre optic cablelay vessels

IHC Offshore Energy's knowledge of cablelay and burial equipment, control systems and innovative vessels is combined in our newly developed fibre optic cablelay vessel. Its design builds upon our previous vessels and includes features such as a hybrid engine arrangement, higher cablelay speed, and separation between the working and living areas.



Linear cable engine



Fibre optic cablelay spread



Cable drum engine

Cable burial equipment

Ploughs

IHC Offshore Energy has more than 15 years' experience in the supply of cable burial equipment, which started with the market-leading Sea Stallion. Unlike other 'vertical knife' ploughs, the forward rake of the Sea Stallion's cutting elements creates an additional downward force. This ensures consistent and reliable product burial up to three metres in a wide range of seabed conditions, at depths of up to 1,500m.

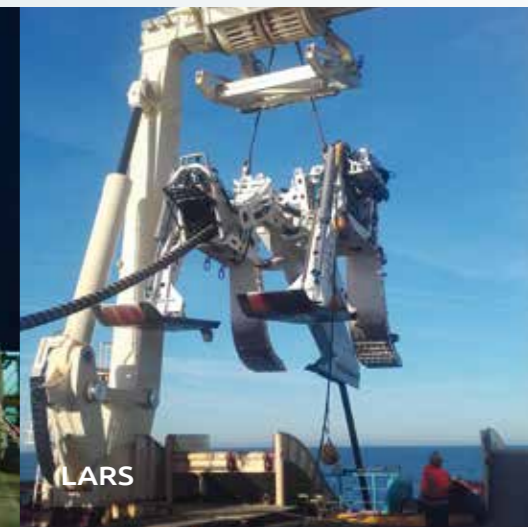
Sea Stallion 3 cable ploughs have extensive track records in burying telecommunication cables worldwide. In addition, the Sea Stallion 4 has gained global recognition for its performance in the offshore wind power cable industry.

Trenchers

Our award-winning Hi-Traq™ trencher is ideal for projects in harsh environments. It is equipped with a unique self-levelling

suspension system for the installation and burial of power cables. Due to its multi-tool functionality, Hi-Traq™ can perform both jetting and mechanical cutting operations. These features enable it to seamlessly handle varying soil types and minimise delays.

The I-Trencher is a versatile system with a high power-to-weight ratio suitable for trenching and backfilling flowlines, umbilicals and cable products. It is one of the most widely used tracked trenchers in the world, having completed numerous pipeline protection projects. The I-Trencher has been used extensively for the installation of inter-array and export cables at a number of North Sea wind farms.



Launch and recovery systems

IHC Offshore Energy offers a wide range of launch and recovery systems (LARS) which are designed to maximise productivity, provide a long and reliable service life, and minimise operational costs. This is achieved through their robust design and high-quality construction, while our tailor-made LARS offer increased flexibility and operability.

Jet sleds

IHC Offshore Energy provides jet sleds to assist with pipeline burials in soft seabed

conditions. These can be supplied with deeper burial capabilities for operations in deeper waters. The sea tempest shallow water jet sled uses high-pressure, surface-fed water through forward-facing jetting nozzles to soften the seabed and allow product burial.

