

SHORE LANDINGS FOR OFFSHORE WIND ENERGY CABLES

Offshore wind energy cable installation is a critical part of the process for bringing offshore wind farms online. Offshore wind farms are connected to the power network on land via underwater cables that transmit the electricity produced by the turbines. This involves laying and burying high-voltage cables on the seabed to connect the wind turbines to each other and to the offshore substation, which then transmits the electricity generated to the onshore grid.

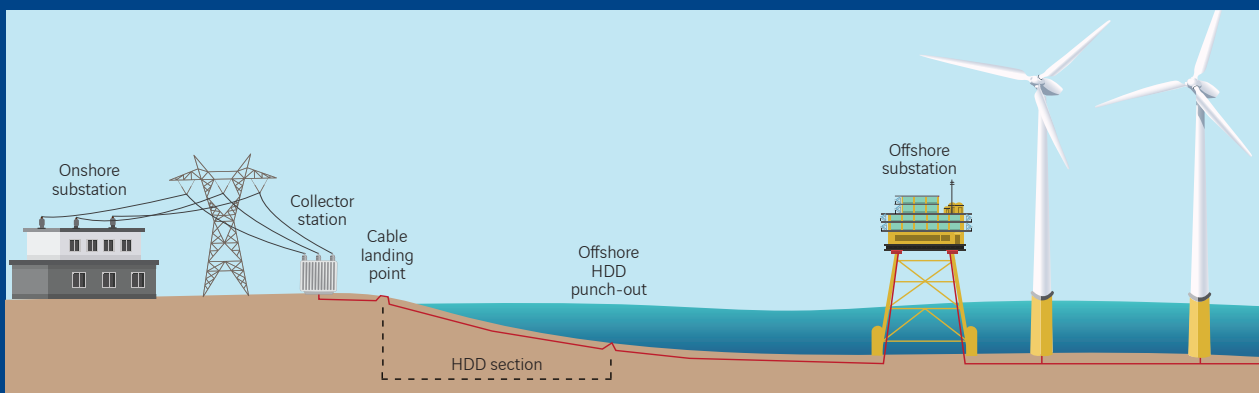
Installing submarine cables is always a delicate operation, particularly when the transmission cable reaches land. The coastline crossing is usually carried out using Horizontal Directional Drilling (HDD) technology. This is the least invasive way to install cable lines as it avoids open cut trenching in a busy coastal environment or in environmentally sensitive locations. It is a safe method, carried out at a considerable depth beneath artificial or natural obstacles, preserving pre-existing infrastructure and/or the natural environment.

As off-shore and on-shore wind farms continue to expand, HDD is fast becoming the technology of choice when it comes to cable duct installation. Whether the cable duct route is under a beach, road, water course, woodland, pipeline, high or low voltage cable, highway or railway line, the advantages of trenchless HDD go beyond the environmental benefits, saving time and cost along the way.

HDI Lucas (a subsidiary of Spiecapag Australia) is a leading contractor in the field of HDD. It is the Oceanian arm of HDI, an internationally recognised HDD contractor, headquartered in France with decades of experience in thousands of HDD projects around the world.

We are renowned for our innovative approaches and our ability to adapt to any kind of project. Over the years, thanks to a combination of experience, the use of the latest technology and state-of-the-art equipment, we have extended the capabilities of HDD, continuously redefining the limits of HDD and setting the benchmarks for HDD in the Australasia region.

HDI Lucas is able to perform all HDD works, onshore trenching, construction of onshore transition joint bays, and provide full support to offshore vessels for cable installation.



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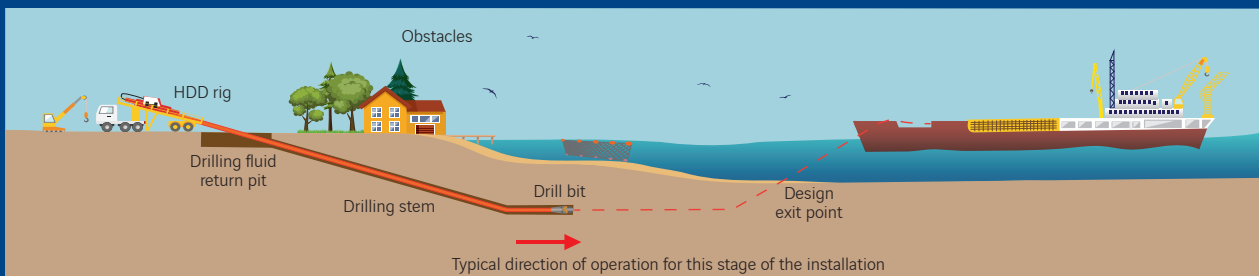
For further information or if you would like to discuss your project with our team, please contact John Stuart-Robertson, john.stuart-robertson@spiecapag.com, 0408 617 869, or Jason Paterson, jason.paterson@spiecapag.com, 0499 499 301.

WHAT IS HORIZONTAL DIRECTIONAL DRILLING?

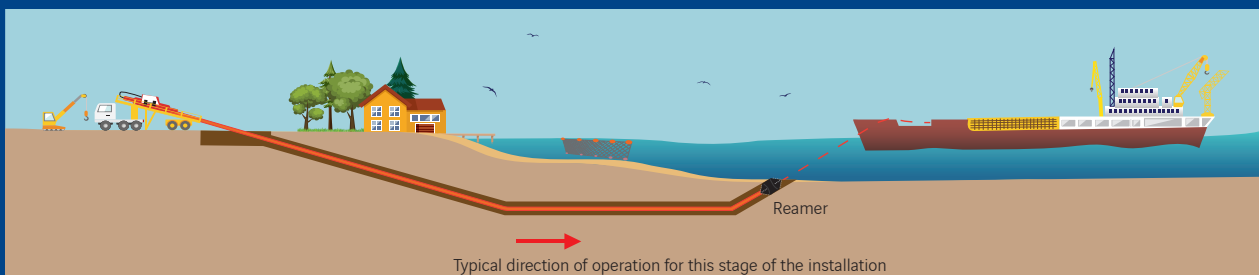
Horizontal Directional Drilling (HDD) is a trenchless, environmentally friendly method that minimises impacts to key surface infrastructure and protected areas and is ideal for the installation of transmission cables at the interface between land and sea. The technique involves the drilling of a steered pilot hole on the desired trajectory. Once completed, the hole is enlarged to enable a conduit pipeline to be pulled through. The cable is then

pulled in through this duct under the beach zone. HDD can be used in all geologies from soft soil to hard rock while achieving a high degree of accuracy.

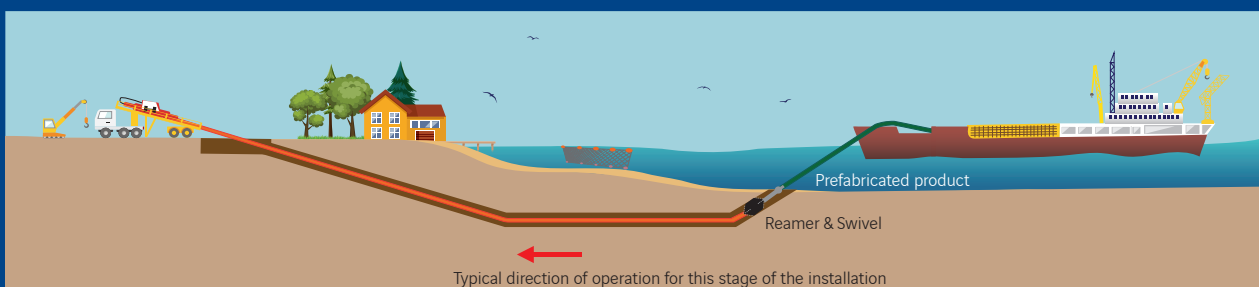
HDI's drilling rigs offer a pulling capacity ranging between 35 and 400 tonnes. They allow for the installation of small size conduits and cables over short distances as well as large diameter up to 1400mm over very long distances.



DRILLING THE PILOT HOLE. The first stage of HDD consists of drilling a small diameter pilot hole using a long guided flexible stem equipped with a wire-line guidance system.



REAMING. The pilot hole is then enlarged to install the liner (pipeline or conduit), this is known as (forward or back) reaming. The reamer is either pushed or pulled as it is rotated and lubricated with drilling fluid to expand the diameter of the pilot hole.



PIPE OR CONDUIT PULLBACK. Once the bore is at the desired size, the pipe or duct is either pushed in (pipe thrusting) or pulled back (pipe pullback) within the pre-reamed hole.