



## DRIVE-DRILL-DRIVE (3D) TECHNIQUE FOR PILE INSTALLATION

Acteon is a leading provider in delivering pile installations for offshore wind. We have been involved with these projects since the beginning of offshore wind and have installed over 2500 foundations globally. Through this experience we have developed new technologies to continuously improve project performance and help lower the overall levelised cost of electricity (LCOE).

We combine specialised products and services to provide the best solution for a wind turbine project. With a large fleet of rental hammers, ranging from 100 to 4400 KJ and an extensive inventory of drilling equipment, this capacity and knowledge of local markets, helps us to reduce project footprints and deliver exactly what our customers need.



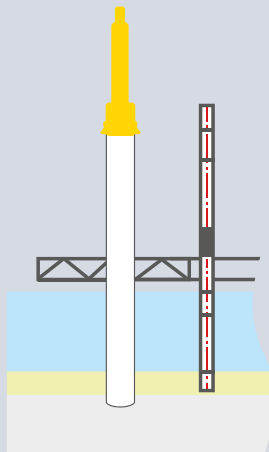
### WHAT AND WHEN IS THE 3D METHOD REQUIRED?

In certain soil conditions monopiles cannot simply be driven because the pile cannot penetrate through the seabed based on driving alone. Drilling is used to help with installation of the piles, however, on its own it takes longer and therefore is a lot more expensive than driving. The innovative drive-drill-drive method, also known as '3D', can be applied to these scenarios to improve project efficiencies.

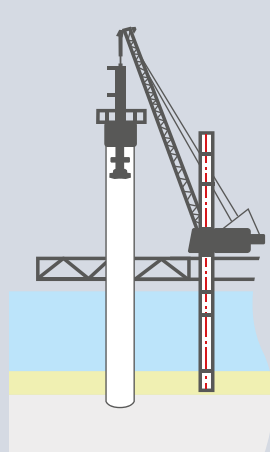


## HOW DOES IT WORK?

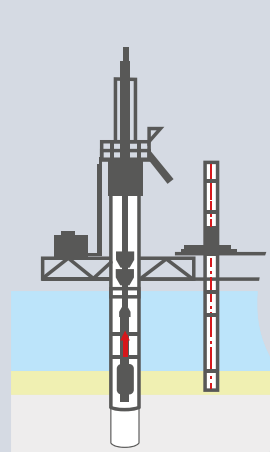
The 3D method combines the use of a drill and hammer and saves time and cost by negating the use of a temporary casing, whilst reducing the size, and associated cost, of the piling hammer. Where pile fatigue is a factor, relief drilling inside and below the pre-driven pile can also significantly reduce the ultimate energy required to install the pile to the target elevation.



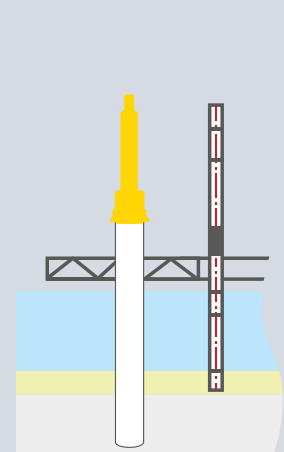
**1.** DRIVE PILE TO REFUSAL



**2.** LIFT AND INSTALL DRILL ONTO MONOPILE



**3.** COMPLETE DRILLING OPERATIONS TO TARGET DEPTH



**4.** RE-DRIVE PILE TO TARGET DEPTH

## BENEFITS AND FEATURES OF 3D TECHNOLOGY

- ▶ Makes cost effective monopile foundations a feasible option even in rocky and challenging soil conditions
- ▶ Fully adjustable under-reaming system to accommodate tapered pile profiles
- ▶ Eliminates pile fatigue with relief drilling
- ▶ Reduces the size of equipment spread
- ▶ Significant contingency for unexpected ground conditions
- ▶ Reduces time, cost, and materials required on projects where driving alone cannot be used
- ▶ Reduces onsite schedule

## DISCUSS YOUR NEXT PROJECT

Acteon encourages operators to partner with us as early as possible in the wind farm planning process so we can help develop robust installation plans for projects, leading to operational efficiencies and costs savings.

## PROJECT IN FOCUS

### Installation of monopiles on the Gwynt Y Môr

- ▶ Delivered a new drilling system, LD5000
- ▶ Drill operated for over two years on the project
- ▶ Fully modular drill-bit capable of being converted up to 8.0m diameter
- ▶ Pile driving services performed with MHU 1900S hydraulic hammer

