# EXPERT SERVICES TO SUPPORT MONOPILE INSTALLATION

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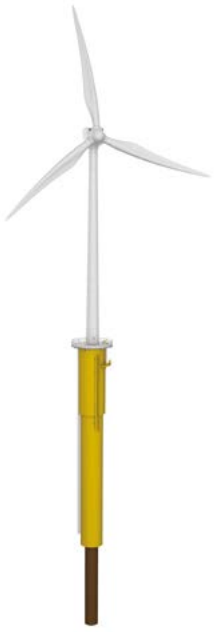

Acteon is a leading provider in delivering monopile installations. We have been involved with these projects since the beginning of offshore wind and have installed over 2500 foundations globally. Through this experience we have developed new technologies to continuously improve project performance and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

We combine specialised products and services to design and engineer 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, backed by years of experience and knowledge of local markets, helps us to reduce project footprints and deliver exactly what our customers need.

## SUPPORTING CUSTOMERS AT EVERY STAGE OF THE PROJECT FROM SITE CHARACTERISATION TO OPERATIONS AND MAINTENANCE

### 1. SITE CHARACTERISATION

We provide integrated survey solutions that serve data insights to optimise the design and installation of monopiles. Our services include **consultancy**, **geophysical** and **geotechnical** site investigations.

### 2. ENGINEERING

Our multi-disciplinary team of engineers specialise in the **design**, **analysis** and **structural engineering** of fixed offshore structures. We apply practical domain expertise and knowledge of technology to optimise foundation designs and create simpler interfaces and leaner installation processes that result in faster delivery and reduced costs.

### 3. MULTI-PURPOSE LIFTING AND HANDLING

We remove all lifting slings and shackles from onshore and offshore operations using our **Rocksteady® quick connector lift tool** which has capacity up to 3000 TE. A fail-safe and visually verifiable lock guarantees safe lifting while saving hours of sling handling.

### 4. MONOPILE DRIVING

MENCK, a Marine Foundations brand in Acteon's Engineering, Moorings and Foundations division, has designed and built **hammers** specifically for driving monopiles with energy up to 4400KJ and pile diameters beyond 8.5 meters. Our hammers have the lowest tonne unit rate per KJ energy output in the market allowing operational flexibility depending on vessel.

### 5. PILE RUN MANAGEMENT

We use the **soft-start technique** and **global navigation satellite systems (GNSS) position control** to reduce the risk of pile run. Our technicians understand the potential challenges associated with pile driving and are able to quickly respond to change the equipment feedback of the equipment to avoid pile run.

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## 6. NOISE REDUCTION

The **MENCK noise reduction unit (MNRU)** is an integral part of the MHU hammer during operation. The MNRU changes the force characteristics of the hammer to reduce the underwater noise to protect the environment.

## 7. PILE DRILLING

We use the **largest electric powered drill** on the market which reduces the CO2 footprint by establishing access to alternative power solutions. Implementing the drive-drill-drive method can be used to reduce project costs by removing the need for a temporary casing, grout, or concrete and also reducing the size of the piling hammer required.

## 8. MARINE GROWTH REMOVAL

We provide a range of **marine growth removal (MGR) tools** for cleaning marine fouling from monopiles. The MGR systems can remove both hard and soft fouling, subsea and topside.

## 9. HIGH OUTPUT GROUTING

Our in-house designed **bulk-batch mixer for grouting** combines the advantages of bulk-supplied material with the robustness and reliability of mechanical mixing systems. This innovation allows us to mix and pump grout at a consistent rate during each operation and reduce maintenance time to a minimum.

## 10. OPERATIONS

We offer a wide range of **balance of plant and inspection** services for the operational life of a turbine including storage and inspection; structural strengthening; marine growth removal; and pile monitoring.

## 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.

## THE PROOF IS IN THE PROJECTS

Installation of **72 monopiles** on Kriegers Flak windfarm in record time

DEME saves critical vessel time with **grouting solution**

## SEE OUR SOLUTION IN ACTION

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