



PROD

PORTABLE REMOTELY OPERATED DRILL

OIL & GAS | OFFSHORE RENEWABLES

Superior Quality Data ◀

Increased Weather Operability ◀

Inherently Safer Solution ◀

Maximum Productivity ◀



PROD AT A GLANCE

PROD is a fully self-contained, remotely operated seabed drilling and geotechnical testing system, capable of operating in water depths to 3000m and investigating subsea bed depths in excess of 130m. The first system of its kind in operation, PROD has a proven global, track record including operations in ultra deepwater, challenging soil conditions and extreme seabed slopes.

Using the high-quality data generated by PROD, Benthic's team of experienced geotechnical engineers provide a complete solution, from site investigation planning, data gathering and sample testing, to data integration, interpretation and foundation design.



THE PROD ADVANTAGE

EFFICIENCY

Operating directly on the seabed, PROD avoids time-consuming deployment of drill string, yielding immediate efficiency gains, in deep water. PROD's ability to switch dynamically between drilling and testing tools in a single deployment or a single hole, allows the device to penetrate a wide range of soils and deliver a variety of samples, from hard rock to soft sediments, without the need to recover the drill module to the vessel.

When relocated subsea between test sites, PROD can also conduct multiple borings in a single deployment from the vessel. PROD has been shown to deliver a lower cost per meter of data than other testing methods.

QUALITY

With the drill unit located on the seabed, PROD provides a highly stable and controlled platform, enabling Benthic's geotechnical team to make precise tool adjustments and collect extremely accurate data. In addition, PROD has been designed to produce minimal disturbance to the seabed and deliver undisturbed samples from the mudline, with a borehole depth accuracy of 25mm.

SAFETY

Safety is a key consideration in the PROD design. Deployed on an umbilical and controlled remotely by computer, human interaction with heavy, mechanical equipment is kept to a minimum. PROD eliminates the need to manipulate pipe sections on the deck, a leading cause of accidents. As a result, PROD has achieved an outstanding safety record in deployments around the world.

PROVEN EXPERIENCE

Since 2000, PROD has proven itself in a wide variety of projects, including site investigations for jack-up and platform foundations, FPSO anchor spreads, subsea structures and pipelines. PROD has been particularly successful when presented with challenging conditions such as extreme seabed slopes, very soft sediments, adverse sea-states, operations close to existing platforms, pipelines or seabed structures. PROD has successfully completed more projects than all other seabed based drilling systems combined across the major oil producing regions of the Americas, West Africa, Europe, the Atlantic and Australasia.

ENVIRONMENTALLY FRIENDLY

PROD has a lower environmental impact than traditional geotechnical drilling methods. PROD produces minimal noise during its seabed operations and has the ability to utilize biodegradable hydraulic and environmentally considerate drilling fluids.

GEOSCIENCE & ENGINEERING EXPERTISE

Using PROD technology, Benthic's team of experienced geotechnical engineers can generate a highly accurate dataset, adjusting the testing regime while the device is in operation to produce optimal information for each client's objectives. With extensive experience in geotechnical site investigation, data analysis and foundation design, we offer a complete end-to-end testing and design solution.



INNOVATIVE TECHNOLOGY

Engineered for rapid and cost-effective transport and deployment, PROD is both portable and self-contained. PROD is deployed from vessels of opportunity – chartered by Benthic or free-issued by our clients. Once on the seabed, PROD is powered and controlled by an umbilical cable from a support vessel, so it is unaffected by surface conditions, delivering higher quality data than ship-mounted systems relying on heave compensation.

PROD is controlled by a computerised system that combines operator input with proprietary software automation. Benthic’s operators monitor a range of drilling parameters in real time, including bit weight, rotation speed, torque, elevator position, penetration rate, water pressure, flow rate and current hole depth, allowing them to make precise and delicate adjustments while drilling.



Comprehensive in situ testing tool suite

including CPTU, BPT, Seismic Probe, Hydrocarbon Analysis system, permanent piezometers



3 independently adjustable outriggers

enabling PROD to land on uneven ground and seabed slopes to 20 degrees

CAPABILITIES & TOOLING

Benthic’s patented sampling tools and penetrometers allow a range of site investigation options. PROD systems offer data for geotechnical analysis, geohazard studies, EBS surveys, pipeline routes and sites for permanent structures or moored facilities. For shallower water projects in challenging geologies, PROD can be mobilized with a vessel based mud system, whereby sophisticated drilling muds can be pumped to PROD to enhance drilling efficacy.

IN SITU TESTING

PROD can deliver real-time data from a range of in situ testing tools, including a standard piezocone penetrometer, Benthic’s innovative ball penetrometer, our specially designed hydrocarbon analysis system and our deepwater seismic probe for measuring shear wave velocity.

HARD ROCK CORING

PROD takes rock and strong sediment cores using Benthic’s proprietary thin kerf rotary diamond core barrels and other specialised coring bits as required. After many years of coring technology development, PROD now delivers the highest core recovery in even the most challenging geologies. Each barrel is fitted with its own drill bit and used only once, allowing PROD to resume operations rapidly if a drill bit is blocked.

SEDIMENT SAMPLING

Sediment cores are taken using Benthic’s patented hydraulically tethered piston core (HTPC), which exploits ambient hydrostatic pressures to deliver optimal sample quality and recovery outcomes. Independent testing has demonstrated that PROD recovers high quality samples of extremely delicate sediments from the mudline, with minimal fabric disturbance.



Two rotary magazines

holding up to 260m of sampling barrels, test tools, rods and casing, enabling penetration depths in excess of 130m sub-seabed



Umbilical deployed

delivering superior productivity in deeper water



Advanced drilling mud system

optimise borehole stability and cutting removal



Decoupled from vessel motion

resulting in higher quality data set and superior weather operability

PROD SPECIFICATIONS

	PROD1	PROD2 & PROD3	PROD5		
	2,000m	3,000m	4,000m	Max Water Depth	General
	>100m	>125m	>150m	Max Sampling Depth	
	40m	54m	100m	Max Casing Depth	
	44mm	72mm	72mm	Sampling Diameter	Hard Rock Sampling
	2.75m/Barrel	2.75m/Barrel	2.75m/Barrel	Core Length	
	100hp	130hp	130hp	Rotary Coring Power	
	44mm	75mm	75mm	Sampling Diameter	Soft Sediment Sampling
	2.75m/Barrel	2.75m/Barrel	2.75m/Barrel	Core Length	
	6t	>8t	>12t	Max Push Thrust	



EXTREME ENVIRONMENTS

PROD is unique in its ability to operate successfully in extreme and challenging environments. PROD has successfully operated on seabed slopes up to 30 degrees, in ultra-soft sediments with mud-line shear strengths at 1-1.5 kpa, as well as in extreme weather conditions.

PROD's tripod structure and accurate sensors enable our engineers to keep the rig vertical even on a sloping or undulating surface. Meanwhile, PROD's specially designed large area feet allow it to land on the softest sediments without penetrating the seabed, thus guaranteeing data gathering commences at mudline. Augmenting PROD with tracks (TracPROD) enables PROD to drive itself into ultra-shallow areas that are inaccessible by vessel.

Once on the seabed, PROD is effectively isolated from surface conditions, allowing the rig to continue working in weather conditions that would prevent a drill ship from operating.

PROD has the ability to land and operate near existing offshore platforms whilst the survey vessel is stationed away from exclusion zone enables the acquisition of geotechnical data safely, e.g., sufficient for an assessment of jack-up rig stability.

PUT THE PROD ADVANTAGE TO WORK



With expert support, proven efficiency, superior data quality and demonstrated capabilities in challenging environments, PROD offers significant advantages over competing site investigation technologies. **Contact Benthic to find out how you can put the PROD advantage to work in your next subsea geotechnical survey.**