



# LANKELMA



**THE EXPERT IN COASTAL AND NEARSHORE  
GEOTECHNICAL INVESTIGATIONS**





## **Lankelma is a leading provider of geotechnical investigations for marine civil engineering, coastal and flood defences and energy projects around the world.**

We are experts in cone penetration testing (CPT); as well as cable percussion, rotary, wireline and sonic drilling and sampling; and in installing monitoring instrumentation in a range of environments, from land to the beach, through the surf zone, to nearshore, in water depths of up to 25m.

Our extensive fleet of CPT equipment is operated by our experienced staff, with mobilisation anywhere in the world at short notice, with services tailored to suit different geological and marine environments and investigation aims.

We are a member of the International Jack-Up Barge Owners Association, demonstrating our commitment to the safety, training and competency of our staff and to protecting the environment.

### **THE BENEFITS OF CPT**



**Fast, clean and safe gathering of data in overwater environments**



**High quality, repeatable results, available in real time**



**Data that can be used directly in geotechnical design**



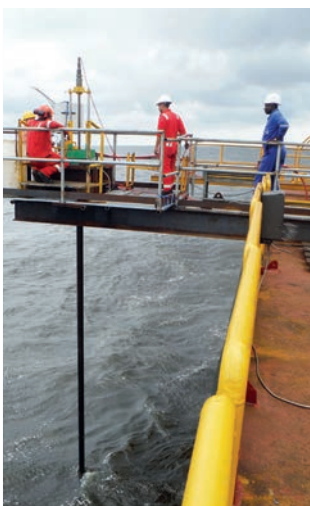
**Giving confidence in conventional borehole and testing results**

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**We are renowned for our technical developments, winning the Ground Engineering Award for Equipment Innovation in 2017.**

# OUR COASTAL & OVERWATER FLEET

We are innovators, working with universities, manufacturers, contractors and consultants to develop new ways of gathering and delivering high quality geotechnical data in marine environments that can be used directly in design.





### **Sandpiper C5 jack-up platform**

Sandpiper carries out geotechnical borehole drilling and CPT testing in coastal waters.

We operate Sandpiper on a 24-hour basis or it can be hired as a standalone unit, supplied with a range of equipment, including CPT rigs, drilling equipment and air conditioned work units.

### **Coastal CPT rigs**

The Wilson-APB wireline deployable CPT system is ideal for deeper nearshore investigations. It is lowered through the drill string to the base of the borehole, to carry out testing or take high quality Shelby samples.

Our self-contained top-push CPT rams work with a dedicated hydraulic power pack, generator and logging system for testing in shallow nearshore environments.

### **Sonic drilling**

Our CompactRotoSonic XL-Duo rig has a dual drill head, enabling it to switch between sonic drilling or Geobor-S drilling.

Sonic drilling uses rotation and vibrations to make drilling through a wide range of soil and rock faster and easier. Borehole verticality is maintained, enabling long and continuous samples to be taken.

### **Coastal drilling**

Our multipurpose Dando 9000 rotary rig can carry out triple tube, wireline and Geobor-S drilling to recover high quality undisturbed samples and Shelby samples.

Our Dando 4000 cable percussion rig can carry out a range of sampling and insitu testing, including SPT, U100 sampling, piston sampling, vane shear tests and pressuremeter tests.

### **Tracked rigs and track-trucks for working in the intertidal zone**

Our track-mounted CPT rigs are ideal for soft or boggy ground conditions, such as the intertidal zone, due to their large footprint and low bearing capacities.

Our track-trucks can switch easily between using wheels and tracks, allowing them to be driven to site and then to travel between test positions over soft and uneven ground.

### **Excavator-mounted units and cantilever frames for accessing difficult locations**

Our excavator-mounted CPT units and are ideally suited for carrying out testing from jetties or quaysides and from jack-up platforms, with the excavator providing the reaction force.

Our top-push CPT rams can also be used from cantilever platforms where deeper testing is required.



## CONE PENETROMETERS

We use a wide range of cones for geotechnical and environmental investigations, from our standard cone and piezocone to more specialist cones designed to gather a wide range of ground information in different environments.

These include:

- ✓ Lubricating module to test at greater depths in stiff soils
- ✓ Seismic cone for measuring small strain stiffness and  $G_{Max}$
- ✓ Cone Pressuremeter for measuring large strain stiffness and soil strength
- ✓ High Pressure Dilatometer for elastic measuring in rock
- ✓ Membrane Interface Probe for characterising ground contamination
- ✓ Videocone, providing visual assessment of geological conditions and UV fluorescence of contaminants
- ✓ Push-in shear vane for measuring undrained shear strength of clay

## CONSULTANCY & STAFF PLACEMENT

We offer a range of other services, including supplying fieldwork teams, supervision of local contractors, project management and acting as client representative for remote projects.

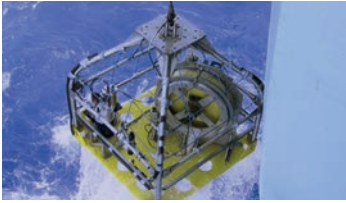
We also provide consultancy, reviewing interpretative reports, data quality, test reporting of third party tests in AGS or other formats and advise on the appropriate testing and equipment for ground conditions and project-specific requirements.

## RESEARCH AND DEVELOPMENT

We believe in constant improvement of our equipment and systems. We have fully-equipped electro-technical and hydraulic workshops, where we design and build innovative equipment for use on our projects. We are renowned for our development work, winning the Ground Engineering Award for Equipment Innovation in 2017.



# OUR EXPERIENCE



## Innovative approach in the Baltic

Our innovative approach, using rotary and sonic drilling plus wireline CPT, on overwater investigations for a new Baltic transport link, was praised by the client, which said we “impacted positively on the project”. Being able to switch between rotary and sonic drilling enabled us to deal with difficult ground conditions and deliver data outside the original investigation scope.

## Comprehensive investigations for terminal expansion

We carried out investigations for a 500m jetty extension, construction of a bauxite-handling jetty and dredging of a 17km approach channel at a container terminal in Guinea. CPTs and borehole drilling were carried out from our Sandpiper jack-up to maximum depths of 50m. Along with piston and thin wall sampling, we also undertook laboratory testing, data correlation and reporting.

## Finding safe locations for offshore platforms

We carried out leg penetration assessment services to enable location approval and certification for production platforms in highly variable ground at the mouth of the River Congo in the Gulf of Guinea. Our team and equipment was mobilised in two weeks and worked 24/7 in up to 25m of water with testing to 80m. We also provided a field laboratory, geotechnical analysis and real-time preliminary assessments.

## Successful seabed CPT for Hong Kong-Zhuhai-Macau crossing

Our work on investigations for the 38km long Hong Kong-Zhuhai-Macau (HKZM) Bridge in China saw the first successful use of seabed CPT in completely decomposed granite. A Roson CPT rig carried out testing to up to 40m below the seabed.

## Sandpiper delivers at Puente Nigale

Our jack-up Sandpiper was used to complete 60 boreholes, 2,440m of CPT and take 138 Shelby samples during investigations for Puente Nigale, a 10.8km bridge over Lake Maracaibo, Venezuela. Work was carried out up to 10km offshore using Wison-APB wireline CPT and a Dando 9000 rotary rig, with boreholes reaching a maximum of 70m.

## Strong defences

We worked for the BAM Nuttall and Mott MacDonald joint venture building the Boston Barrier flood defence scheme in Lincolnshire, carrying out 13 CPTs from our jack-up Sandpiper, including seismic and pressuremeter testing. We mobilised two sets of CPT rams and our Dando 9000 rotary rig to carry out the work, which took two weeks. One of our track-truck CPT rigs undertook a further 18 onshore CPTs, which also included seismic and pressuremeter tests.



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