



SOCOTEC

9,700 > **5,000**
EMPLOYEES ENGINEERS

200,000 **€1 billion**
CUSTOMERS REVENUE

23
COUNTRIES

➤ Austria	➤ Ireland	➤ Luxembourg	➤ The Netherlands	➤ United Kingdom
➤ Bahrain	➤ Italy	➤ Madagascar	➤ Philippines	➤ United States
➤ Belgium	➤ Ivory Coast	➤ Mauritius	➤ Singapore	➤ Vietnam
➤ France	➤ Japan	➤ Monaco	➤ Thailand	
➤ Germany	➤ Lebanon	➤ Morocco	➤ U.A.E. (Abu Dhabi, Dubai)	

CONTACT US
geotechnical@socotec.com

**BUILDING TRUST FOR A SAFER
AND SUSTAINABLE WORLD**

GROUND INVESTIGATION & RISK MANAGEMENT

Geotechnics and Geophysics

YOUR INTERESTS

- › Prevent and manage effectively the risks of soils and materials handling and re-use on your infrastructure and on neighborhoods
- › Effective on and off-site laboratory testing to allow decision making and on-site verification
- › Reduced timescales and cost of earthworks and remediation
- › Fast results delivery and automated data interpretation for decision-making
- › Compliance with regulatory and design requirements

SOCOTEC OPERATES IN DIFFERENT SECTORS



OUR EXPERTS PROVIDE A LARGE RANGE OF GEOLOGICAL AND GEOTECHNICAL SERVICES

SOCOTEC provides an unrivalled range of infrastructure testing, inspection and compliance services to all civil engineering contractors, consulting engineers, public sector and commercial organisations.

We follow projects from design to testing and we are able to monitor and assess the state of preservation of your structures during their life, helping you to plan and verify all types of maintenance and recovery operations. In parallel, we offer geotechnical engineering : investigation, test and advise on ground, geological and structural conditions.



FOUNDATIONS & MONITORING

SOCOTEC offers whole-site monitoring prior to, during and post foundation installation to ensure clients have a full and comprehensive record of site activities. Our engineers has extensive experience in ground improvement and piled foundation testing schemes using non-destructive methods on all forms of driven or cast in place piles or pile groups (zone pad testing) installed in connection with infrastructure projects, large or small.

- › Static Pile Load Testing axial, tension, lateral or cyclic
- › Dynamic Pile Load Testing
- › Pile Instrumentation and Monitoring
- › Low Strain Sonic Echo Integrity Assessments
- › Ultrasonic Crosshole logging Integrity Assessments
- › Thermal Integrity Profiling (TIP)
- › Noise, Dust and Vibration Monitoring



ON-SITE TESTING

SOCOTEC provides a comprehensive range of field testing services providing sampling and testing including strength testing, structural assessments and surveying of ground density.

- Probing
 - › Cone Penetration Testing (CPT)
 - › Dynamic Cone Penetration (DCP)
 - › Dynamic probing (eg DPH, DPSH-B)
 - › Mackintosh probing
 - › Mexecone
 - › Peat probing
- Geophysics
 - › Seizure reflection & refraction
 - › Wireline geologging (eg televiewer, P-S suspension sonde)
 - › Downhole and crosshole seismic
 - › Tomography
- Borehole tests
 - › Standard Penetration Test (SPT)
 - › Borehole vane
 - › Permeability
 - › Pressuremeter
 - › Geophysics
 - › Permeability testing
 - › Variable (rising and falling) head test
 - › Constant head / constant flow test
 - › Slug test
 - › Packer (water pressure) test
 - › Pumping test
 - › Soakaway / soil infiltration test
- Loading tests
 - › Plate bearing test, California Bearing Ratio (CBR) & EV2 Testing
 - › Skip test
 - › Zone test



LABORATORY TESTING

SOCOTEC has Multi-Site and Flexible Scope UKAS accreditation, which allows our laboratories to provide customers with comprehensive reports and analysis; aiding quality assurance, compliance and control whilst providing vital data to support cost-effective decision making.

- › Concrete testing (fresh & hardened)
- › Soil classification
- › Construction materials : aggregates
- › Rock Testing
- › Consolidation & Permeability testing
- › Electrochemical testing
- › Asphalt Analysis (In situ & Laboratory)
- › Core Recovery Testing (Asphalt & Concrete)
- › Diagnosis in regards to materials disorders and pathologies evolution
- › Repair and / or reinforcement programme in case of damage
- › Testing new materials for a new construction with a performance approach



INSTRUMENTATION & MONITORING

SOCOTEC provides a range of borehole instrumentation for real-time monitoring groundwater, gas, movement, pressure and more.

- › Ground movement
- › Ground Water (standpipe, piezometer, VWP, data logger)
- › Groundgas (standpipe, gas clam)
- › Structural deformation
- › Landslip
- › Settlement
- › Deformation
- › Convergence
- › Divergence
- › Deflection
- › Polluted soils and sites
- › Noise, Dust and Vibration Monitoring
- › Integrated monitoring, reporting and visualisation



DATA MANAGEMENT

SOCOTEC offers value engineering advice combined with integrated environmental and geotechnical data collection, management and reporting throughout a project's life cycle.

Data processing carried out to derive (according to soil type):

- › Soil behaviour type
- › Undrained shear strength, S_u
- › Relative density
- › Angle of friction
- › Drained cohesion
- › Equivalent SPT N60 value
- › Consolidation parameters (from dissipation tests using piezocone)

SOCOTEC prides itself on providing reliable ground investigation information from our fieldwork, monitoring and laboratory testing work.

As well as conventional hard copy reports (generally PDF) we routinely provide the data in digital AGS4 format. This can be supplied throughout the investigation.



GEOLOGICAL & GEOPHYSICAL ADVICE

Our experts offer fully integrated services, relating to all geotechnical and environmental requirements in earthworks and remediation projects.

We help you at any stage of your project to take the right decision in regards to the risk evaluation.

- › Chemical, geotechnical and materials testing
- › Site investigation
- › Ground conditions
- › Groundwater depths
- › Geohazards
- › Topographical surveys
- › Geophysical surveys / seismic surveys
- › Risk assessment and regulator negotiations
- › Reports, remediation design and method statements
- › Materials/contamination mapping
- › PPE and RPE assessments
- › Geotechnical assessment and design
 - Foundations options
 - Bearing capacity and settlement for shallow and piled foundations
 - Excavation methods and support requirements
 - Slope stability
 - Ground improvement
 - Reuse of material

OUR INNOVATIVE TOOLS AND TECHNICAL CAPABILITIES



FOUNDATIONS

SOCOTEC's foundation testing division has adapted its vast technical knowledge, data capture capability and hydraulic system design to provide solutions that enable the wind energy researchers to develop new foundation design codes and parameters for the installation of offshore monopile wind farms.

Most recently SOCOTEC has deployed a bidirectional load test solution providing compact high-load axial strain in a number of large pile types. This solution uses technology unique to SOCOTEC across Europe.



STREAM D - Radar system for real-time investigation

The key benefits are :

- **DETAIL** – Stream D provides very high resolution and is also characterised by an excellent penetration capacity.
- **PRECISION** – the result is an effective, precise and easily usable 3D map.
- **PRODUCTIVITY** – The Type V antennas allow GPR to work at a distance from the structure, assisted by sensors that constantly monitor the positioning.
- **VISUALISATION** – Supported by software that delivers usable high quality data and profiling images.



PRIME : Proactive Infrastructure Monitoring and Evaluation

It is an innovative monitoring system designed to deliver non-intrusive imaging of geotechnical assets and provide valuable insight into sub-surface processes for improved asset management and risk mitigation.

Developed by the British Geological Survey (BGS), PRIME combines geophysical ground imaging technology, remote data acquisition and web-based data visualisation with intelligent monitoring, to develop the basis of a new generation of 'smart' earthworks technology, capable of imaging the internal physical condition of infrastructure earthworks, whilst simultaneously monitoring ground movements. SOCOTEC has exclusive use of PRIME throughout Europe.



INTERFEROMETRY

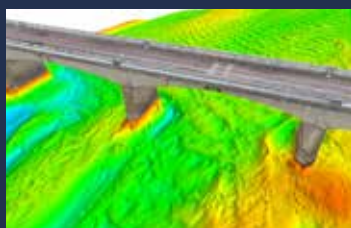
Terrestrial Interferometry exploits the same principles as satellites. However, it uses very practical portable equipment that can be easily transported where necessary, maintaining safety even in dangerous scenario, as it allows operations from long distances remote from the structure. It is ideal for monitoring movement of quarries, landslides and large civil structures such as bridges. Monitoring can be continuous to detect slow movements as in the case of landslides or dynamic with a very high measurement frequency to detect the main vibration frequencies of the structures.



DATA VISUALISATION SOFTWARE

SOCOTEC Monitoring's proprietary data visualisation software is used to process and visualise data for all of our remote monitoring systems. Designed to offer a user-friendly graphical interface, it allows quick and easy interpretation of large amounts of validated instrumentation data from multiple sources, regardless of project scale.

This web-based platform propose to set up site-specific thresholds, SMS and email action alerts to those who need to maintain the integrity and safety of the site. Data is also available for use with other applications, such as asset management platforms.



HYDROGRAPHIC DRONE FOR SURVEYS IN PORTS AND WATER

The hydrographic drone is specifically designed for surveys in ports and internal waters. It is an easy-to-use and cost-effectiveness solution. Monitoring and control (including the vehicle and on-board instrumentation) can be carried out either remotely or completely autonomously. It is possible to carry out:

- Survey of the submerged part of the infrastructure
- Multibeam seabed survey
- Control of riverbeds, river flow profiles
- Flowrate calculation

TRUST
& **TECH**
BY **SOCOTEC**

As a trusted and independent third party, we provide on our missions the most valuable technical capabilities and technologies.



OUR STRENGTHS

We operate as a trusted third-party contractor in tunnels, railways, highways, utilities, mines and seaports across the world. Our highly trained engineers provide geotechnical and structural monitoring to all types of construction projects and at all stages, from pre-construction to deconstruction.

- Experience in applying testing, monitoring and consultancy throughout different type of projects
- Integration of services to deliver value for money, ease of procurement and a single point of contact
- Highly trained experts with a diverse range of skills across the geotechnical and geoenvironmental industry
- Effective on and off-site laboratory testing to allow decision making and on-site verification
- Fast results delivery and automated data interpretation
- Data reporting tailored to site decision making

80 YEARS
Of experience

>200
Equipments, sensors,
trucks

120
Engineers and technicians
specialised in ground
investigation

>150,000
Tests done in 2021 in our
laboratories

14
Laboratories

- 6 in Italy – accredited by infrastructure Ministry,
- 1 in the USA,
- 6 in the UK – accredited by UKAS
- 1 in the Netherlands

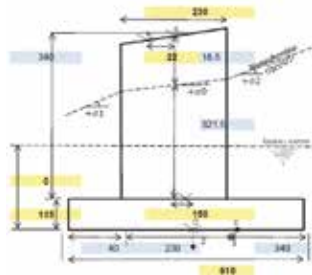
OUR REFERENCE PROJECTS WORLDWIDE



Seafront extension construction

Monaco – 6ha district size – SAM L'Anse du Portier

By 2025, the extension to the sea will represent the new residential district of Monaco: Mareterra. The project represented a technical feat. Indeed, the horizontal forces generated by the seismic modeling forced us to find solutions such as taking into account the provisional tube in the recovery of long-term forces. In terms of execution, the drilling of the piles went through very heterogeneous materials, the backfill over 35 meters then a very resistant substratum, sometimes very deteriorated in slope which made the drilling tool ripping and caused issues of verticality.



Namur cable car construction

Namur – Belgium

- Control of geotechnical aspects and stability of pylon foundations
- Analysis of the geological context
- Checking of the stability of the foundation for pylons P3, P4 and P6 (verification of lift, slip check, verification of eccentricity, verification settlement)
- New survey on 3 pylons foundations
- Assessment of previous survey



Line B of the Rennes automated Metro

Rennes – France – 13km & 15 stations– SEMTCAR

Usually carried out by drilling with a TBM, the construction site also includes areas in covered trench, open trench and a pre-stressed concrete aerial viaduct of almost 3 km in length. The latter consists of a succession of 42 independent structures, including 40 with two spans and two with single spans. SOCOTEC has been entrusted with numerous missions relating to the sturdiness and equipment of this infrastructure. To tackle other important technical, rail and geotechnical challenges, we support SEMTCAR on: EOQA co-contracting, excavation vulnerability diagnostics of the existing buildings, classification of the buildings to allow adaptation of the execution methods and external control of studies and works on temporary structures.



Luxury high-rise development on 67 coastal areas

Kalea Bay – Florida – USA

The towers feature 22 stories, 120 unit structures with rooftop terraces. SOCOTEC provided Geotechnical Exploration, continuing Construction Materials Testing, and Threshold Services for the project. The structures are founded on a deep auger cast pile foundation system, and consist of: cast-in-place pile caps, columns & shearwalls and elevated decks of post-tension slabs. Our experts produced all soils, concrete testing, post-tension observations, and threshold structural observations.



Geotechnical diagnosis & rebar dimensioning

Saltillo- Mexico– Saint-Gobain

During the calibration of the glass production machines, Saint-Gobain noted deformations for the commissioning of its factory. Cracks in the building structure were identified. The shallow foundations on overconsolidated clay were the cause of the damage. Actually, a water leak under the building was revealed causing the swelling of the clays and damaging movements on the installations.

- Geotechnical diagnosis with advice to do additional analysis
- Pre-sizing of remedial micropiles to Eurocodes and ASTM (American codes)
- Cost evaluation
- Customer support in risk management and advice on production restart date

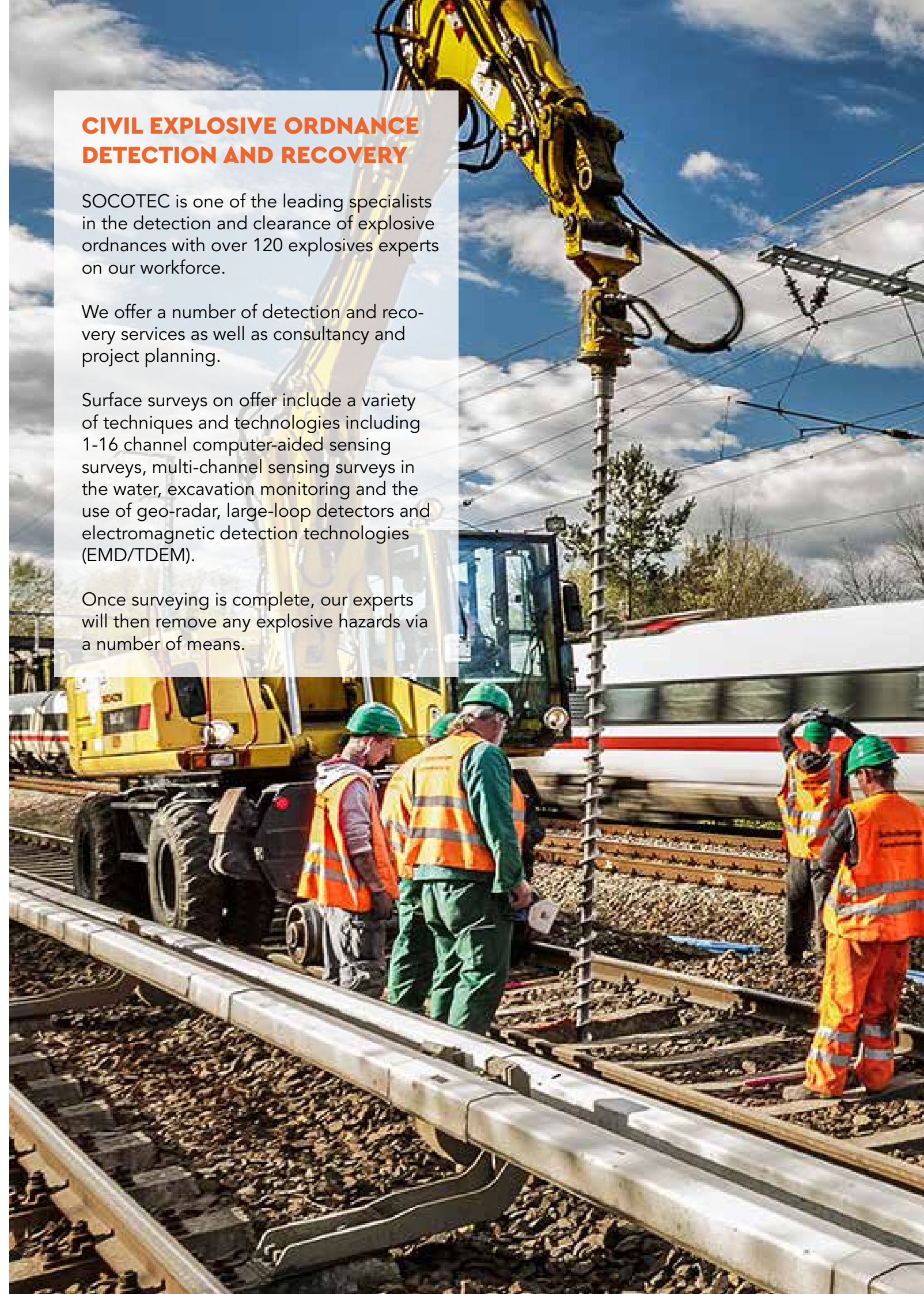
CIVIL EXPLOSIVE ORDNANCE DETECTION AND RECOVERY

SOCOTEC is one of the leading specialists in the detection and clearance of explosive ordnances with over 120 explosives experts on our workforce.

We offer a number of detection and recovery services as well as consultancy and project planning.

Surface surveys on offer include a variety of techniques and technologies including 1-16 channel computer-aided sensing surveys, multi-channel sensing surveys in the water, excavation monitoring and the use of geo-radar, large-loop detectors and electromagnetic detection technologies (EMD/TDEM).

Once surveying is complete, our experts will then remove any explosive hazards via a number of means.





OUR REFERENCE PROJECTS WORLDWIDE



300m high tower construction

Abidjan – Ivory Coast – Pierre Fakhoury

Construction in a lagoon made of sand over 100m deep. The tower rests on 70 load-bars of 62m depth with injected point to ensure a more resistant anchoring in a ground without substratum. The bars are made with a bucket and the ground is maintained by bentonitic mud.

Control of the design and execution of the foundations by barrettes

Analysis of the soil-structure interaction for the distribution of loads between the raft and the foundations

Assessment of the risks for the neighbouring buildings. Verification of the stability criteria required to ensure the durability of the structures.



Additional investigations for high-speed line design

Terzo Valico dei Giovi – Italy – CO.C.I.V. Consorzio COLLEGAMENTI INTEGRATI VELOCI

The Terzo Valico is a new high-speed line connecting Ligurian port system with the main European railways lines.

The project is taking place in Rhine - Alps Corridor part of trans-European strategic transport network (TEN-T core network). SOCOTEC provided extensive knowledge on geological, geotechnical, geomechanical and hydrogeological level through:

- Continuous core drilling
- In situ tests
- Instrumentation and monitoring activities
- Geophysical tests



Carrying out an in-depth reconnaissance campaign for soils and structural supports as part of the regeneration of the rail bridge "Pont Mollien"

Calais – France – PPRA Mollien - SNCF

Our experts did:

- Pressuremeter tests
- Destructive polls
- Core surveys
- Lugeons tests
- Endoscopic inspection



Monitoring of the Schiphol tunnel railway

Amsterdam – The Netherlands – Schiphol train station

Our experts monitored in XYZ the railway of the Schiphol tunnel thanks to a total station. The objectives was to prevent risks.



Ground investigation for Thames Tideway Tunnel

London – UK – CVB Joint venture

SOCOTEC provided CVB with ground investigation services at five infrastructure sites to support work on the eastern section of the Thames Tideway Tunnel project. The UK water industry's biggest ever infrastructure project, this super sewer tunnel will be 25km long and located 65m below the surface.

Partially located on recently cleared brownfield land as well as on the adjacent river foreshore, the site potentially featured a range of soil strata and surface deposit types, as well as buried structures. To understand ground conditions prior to construction, SOCOTEC provided a team of ground investigation experts that undertook fast and accurate core drilling services, in situ testing and laboratory analysis.

OUR REFERENCE PROJECTS WORLDWIDE



Geognostic and seismic investigations with related laboratory tests

Naples-Bari railway line – Italy – Teleso S.C.A.R.L.

The main objective is to speed up the current connection and improve accessibility to the service by doubling and changing the current route and increasing connections speed. Reduce CO2 emissions is key as well : 30% of freight traffic from road to rail by 2030.

SOCOTEC provides geognostic and seismic surveys with related laboratory tests of the railway line, including:

- In situ and laboratory geognostic investigations,
- Drafting of the cards (log) of each in situ survey / laboratory test,
- Drafting of technical reports illustrating the investigations carried out and the results obtained.



Laying the foundations for High Rise Construction

London – UK- 13km & 15 stations- Laing O'Rourke Group

Wood Wharf in East London has a project to regenerate more than 22 acres of former dockland adjacent to the Canary Wharf financial district.

Ground engineering contractor was contracted to lay the foundations for the first three buildings in the development. As parts of these buildings were to be built over water, this involved boring steel cased marine piles directly into the bed of the Wood Wharf basin.

Deep bored base grouted piles were also installed on land reclaimed from the former dock.

SOCOTEC was engaged to assess the piles by load and integrity testing during the course of the project. In addition, we provided compressive strength testing of the concrete used in the foundation piles.



Preliminary offshore investigations for the wind farm project

Mar grande of Taranto – Italy - PRISMA s.r.l.

The first wind farm in the Mediterranean consist of 2 groups of aircraft-generators, for a total of 10 wind turbines. Each turbine has a nominal power of 3 MW, with a hub height of 100 meters, for an expected annual production of 80 GWh, with a depth of the seabed between 4 and 18 meter.

SOCOTEC assists the customer on geotechnical, geophysical, geomorphological, biocenotic characterization of the outer harbor of Taranto port. The objective is to propose analysis prior final design of the of the wind farm, through:

- Direct geognostic investigations
- Geotechnical laboratory tests



Recovery during construction phase

Casablanca- Morocco- Compagnie des grands hôtel d'Afrique

Rock wall fell down during the Royal Mansour hotel parking earthworks.

SOCOTEC assisted the client to avoid new more important slide and to resume the nailing works with a methodology adapted to the site: dry core drilling without water or air pressure on the first two meters to avoid generating a disbonding of the interstices of the rock faces - bank on bank.



Vibration and height monitoring

Amsterdam - The Netherlands- Kwintijn

Our experts monitored the whole construction pit itself in XYZ and the surrounding houses. We did a vibration monitoring and height monitoring (Z-level) as well.

