



An Integrated Approach to Integrity Management

Sonomatic is a worldwide organisation whose expertise in ultrasonic inspection design, development and application dates back more than 30 years to our roots in the nuclear sector.

Today the company has widened its focus and provides proven yet pioneering inspection and associated engineering services to customers across a wide range of sectors. However, our largest client base remains the challenging oil and gas industry, both upstream and downstream.

Industries

- Oil and Gas Production
- Refineries
- Petrochemical
- Power Generation
- Renewables
- Nuclear
- Mining
- Defence
- Marine
- Pulp and paper

Applications

- Pipelines
- Pressure Vessels
- Heat Exchangers
- Pipework
- Topside
- Subsea
- Remote Access
- Turbines
- Structures
- Storage Tanks

Offices Globally

- Warrington, England
- Aberdeen, Scotland
- Houston, USA
- Mooresville, USA
- Muscat, Oman
- Abu Dhabi, UAE
- Johannesburg, SA
- Secunda, SA
- Vanderbijlpark, SA
- Perth, Australia
- Brisbane, Australia

Sonomatic's in depth knowledge of non-destructive testing along with how it is applied in the integrity management process is supported by a strong internal capability for the development of ultrasonic systems, software, scanners and associated equipment.

As a leader in techniques such as TOFD (time of flight diffraction), Sonomatic has designed and continues to develop innovative inspection methods that are applied by our own team of experienced field service experts.

Integration of our integrity and inspection services for Non-Intrusive Inspection (NII) benefits clients by allowing vessels and equipment suitable for NII to be identified and reduces the need for costly plant shutdowns to assess the internal condition.

Sonomatic is committed to providing inspection solutions that best meet our client's needs. We understand that effective integrity decision making depends on reliable information on asset condition.

Our goal is to provide this, such that clients can most effectively manage the integrity of maturing assets, assuring safe operation and making informed decisions on life extension. Sonomatic has now extended its service capability by adding Rope Access and Conventional NDT, reinforcing its Integrated Approach to Integrity Management.



Technical Ability and Industry Knowledge

With internal capabilities covering software, mechanical and electronics engineering, mechanical design and field delivery support, Sonomatic is a dynamic organisation offering bespoke solutions to challenging problems. Effective, and reliable, field service delivery is made possible by versatile and innovative internal capabilities covering inspection systems deployment, software engineering, mechanical design and electronics engineering. This also facilitates more cost-effective approaches to routine inspection applications, for example, by providing faster inspection whilst maintaining improved accuracy and reliability.



- Internal technique research along with systems and scanner development for the Field Services Division of the company, together with 30 years of experience makes Sonomatic a formidable inspection entity offering high levels of delivery and technical excellence both on and offshore, topside and subsea.
- Design, qualification, management and implementation of bespoke inspection applications is part of Sonomatic's culture. Major projects, supporting integrity of high value assets, for clients such as Shell, BP, Chevron, ExxonMobil, Apache and others have been completed successfully.
- The Integrity Division of Sonomatic offers industry leading expertise in NII, statistical analysis of inspection data and Fitness for Service (FFS) assessments.
- These skills are also used to assist clients in assuring asset integrity while reducing plant shutdowns and lost production. This provides clients with the justification for life extensions, deferral of internal inspection, or re-instatement of equipment and pipework.
- Inspections performed by Sonomatic, covering both advanced and conventional NDT, can be applied by Rope Access Techniques or a range of Automated Scanners suitable for a wide range of environments.



Services to the Oil and Gas Industry

A unique feature of Sonomatic is the manner in which the various disciplines have a thorough and mutual comprehension of each other's activity. This facilitates constructive and strong interactions throughout the inspection process. Over a number of years Sonomatic has developed a strong interaction between inspection planning, advanced ultrasonics, data analysis and life assessment functions. This has proven to be highly effective within the context of asset integrity management. Our training programmes and management systems are structured around this concept and it is now being extended to our rope access activity and other areas of NDT. Our goal is to enable our clients to meet their business objectives. This concept is a key element in our delivery of effective solutions to the applications described.

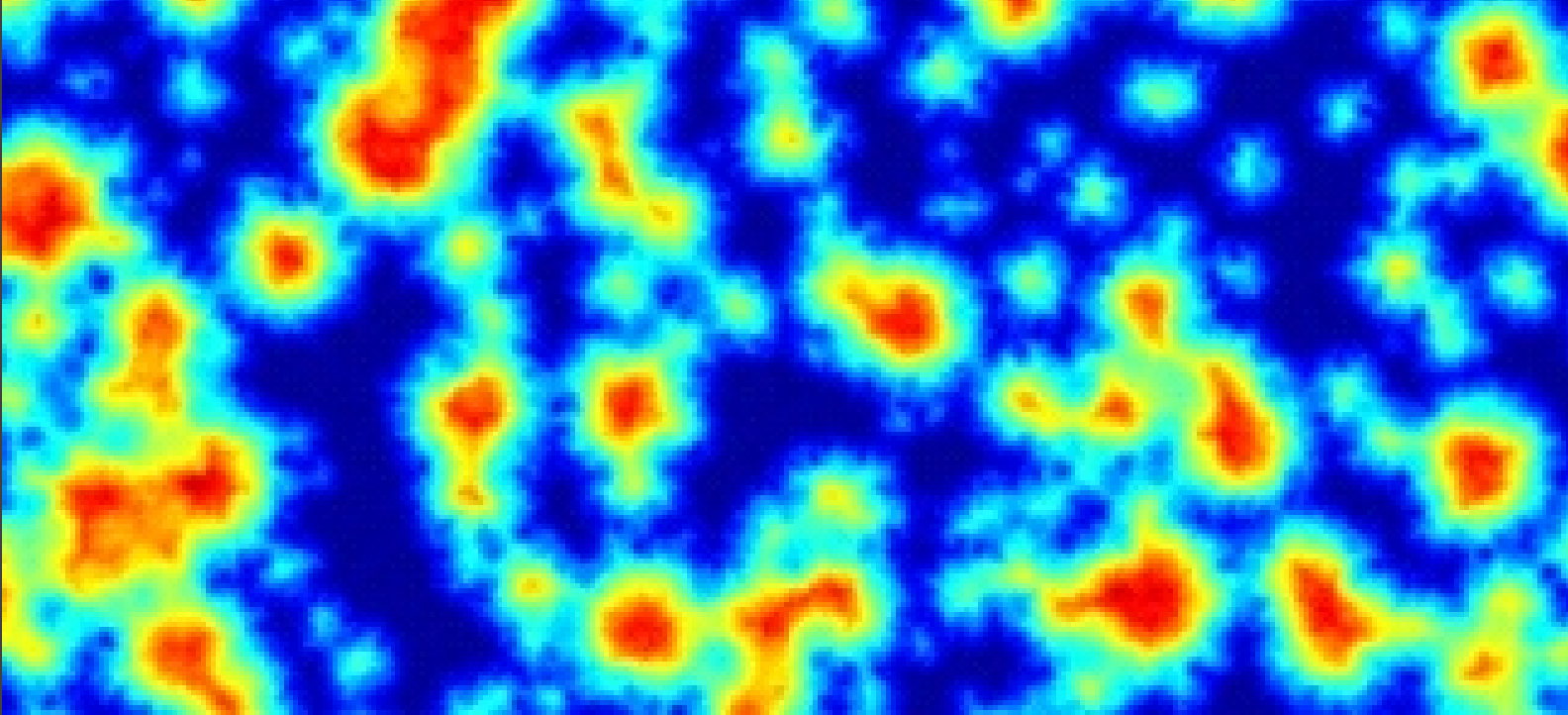


Inspection and Integrity Applications

- NII programmes for pressure vessels
- Fitness for Service Assessments
- Detection, sizing and characterisation of corrosion and cracking
- Pipework inspection assessment, planning and enactment
- Pipeline integrity assessment and inspection
- Platform structural inspection
- Subsea inspection
- Inspection qualification

Enactment

Our goal is to deliver inspection aimed at providing useful information on the condition of equipment. This leads to effective management through an optimal understanding of the risks.



Techniques

Sonomatic has world leading expertise in our field, and many of the unique techniques we deploy are based on internal developments. Our starting point in any situation is to understand the fundamental principles of how the chosen inspection method interacts with the type of flaw we are required to evaluate.

We work backwards from there, selecting the most appropriate technology. If there are gaps, we apply our interactive team of cross-disciplinary experts to fill them. The majority of what we do has been developed internally, but in specialist areas that are non-core for us we work in partnership with acknowledged experts.

Time of Flight Diffraction (TOFD)

Sonomatic pioneered the introduction of TOFD to industrial applications and remain the industry leader to this day

Automated Pulse-Echo UT

Our applications typically cover business critical situations, examples include subsea hot-taps where the approach included formal qualification

CHIME/M-Skip

Sonomatic is the leading provider of these medium range UT methods for pipe supports and other inaccessible areas

Topside SH-EMAT

Inspection of pipe supports or rapid screening of piping using shear horizontal waves produced by electromagnetic acoustic transducers

Saturated Eddy Current Fast Scan (SEF)

Rapid screening of pipes and flat surfaces up to 32 mm thick; requires minimal surface preparation

Dynamic Response Spectroscopy (DRS)

This technique was developed by Sonomatic for corrosion mapping through challenging coatings and insulation where conventional UT is ineffective

Corrosion Mapping

Sonomatic are world leaders in this field, specializing in sophisticated UT front-end and post-data collection processing and analysis

Phased Array UT

Typically used for complex geometries such as nozzle welds and turbine components

Teletest Focus®

Guided wave UT with focusing capability for long range inspections

Subsea SH-EMAT

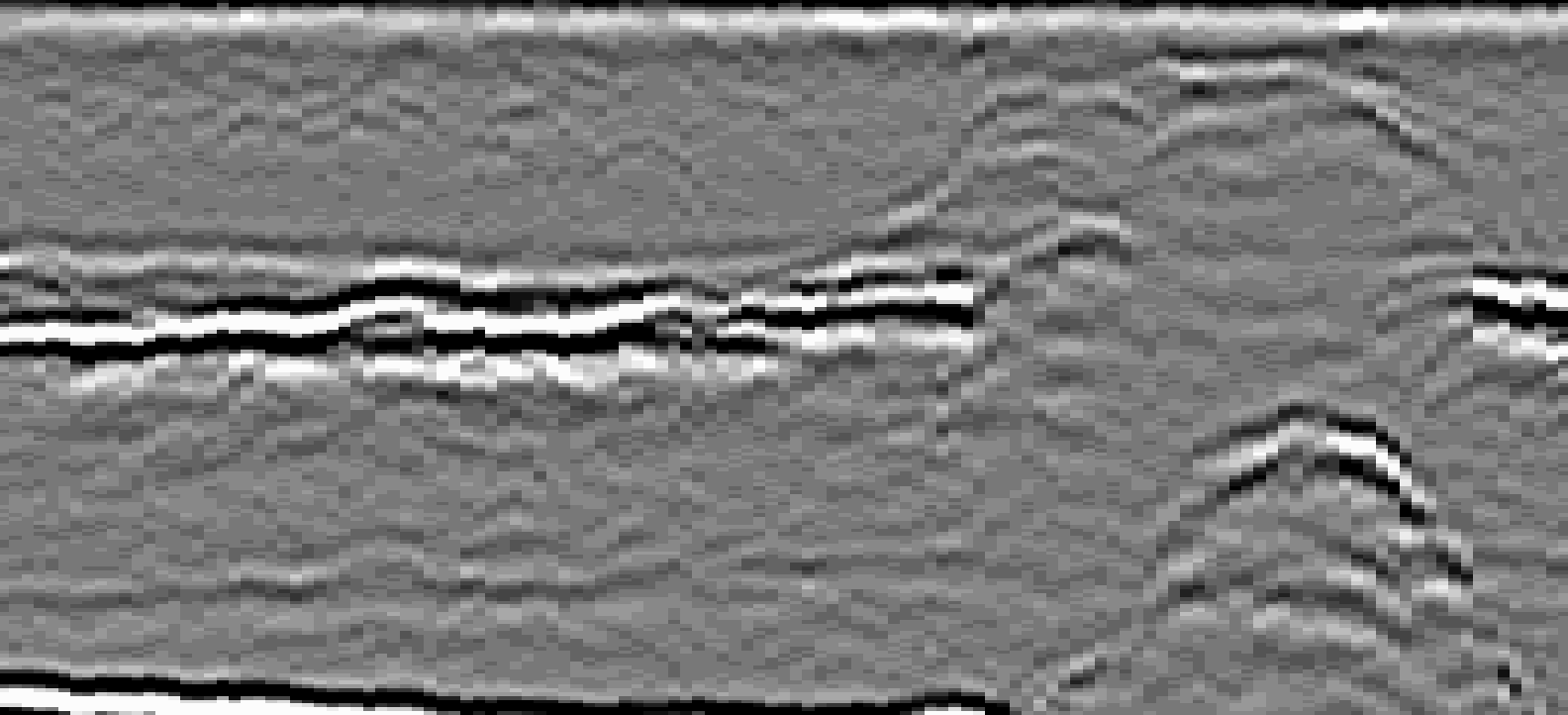
Rapid high coverage screening for subsea pipelines where the upper quadrant is accessible. For use up to a depth of 500 m

Eddy Current and IRIS Tube Inspection

Using various techniques Sonomatic is capable of inspecting ferromagnetic and non-ferromagnetic tubes of varying diameters

ACFM®

In partnership with TSC for ROV-deployed subsea applications



Applications

The techniques we select for client applications are deployed in a manner focuses on the intended purposes of the inspection and associated performance needs. The drivers may be code or regulatory requirements at one end of the scale through to support for critical investment decisions and initiatives to enhance asset performance and availability. Sonomatic is highly experienced in the field of performance demonstration and formal qualification across a range of industries. We are also experienced in supporting our clients in high level legal disputes and submissions to regulators. These events are never planned for, but Sonomatic are ready to support our clients with the strongest and most respected technical support in the industry.

Weld Root Corrosion/Erosion (WRC/WRE)

A speciality of Sonomatic, with techniques available to address a wide range of weld configurations

Exotic Weld Materials

Includes techniques for austenitic stainless steels, nickel alloys and duplex stainless steels

TOFD Screening

The technique was developed, along with scanners and data processing and analysis tools, to facilitate high speed accurate scanning in support of NII

High Temperature UT

Corrosion mapping, TOFD and Phased Array inspections available up to 400° C

Service-Induced Damage Mechanisms

Includes hydrogen induced cracking (HIC), high temperature hydrogen attack (HTHA), carburization of heater tubes and environmentally assisted cracking (EAC)

Non-Intrusive Inspection (NII)

Sonomatic are able to provide the full range of inspection services needed to support NII that is sufficient to justify replacement or deferment of internal visual inspection. This is critical to maximising production savings

Turbine and Generator Inspection

AUT of solid & hollow rotor shafts, discs blades, generator end rings, etc. Includes EPRI qualified boresonics capability. Full conventional NDT services are also available

Caisson Inspection

Internal and externally applied inspections, providing accurate measurements and a high probability of detection

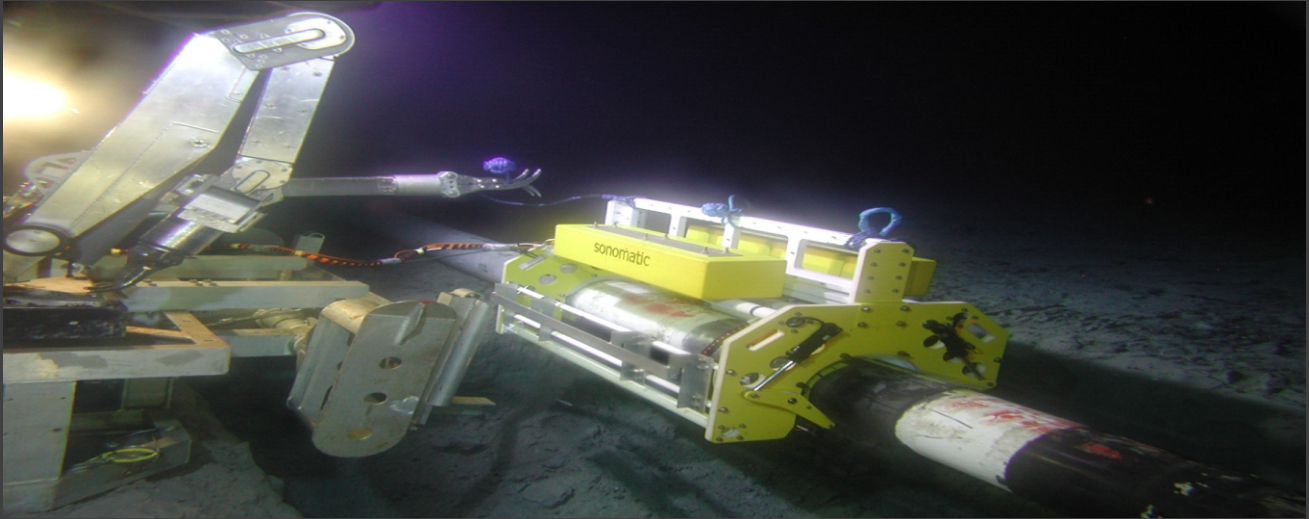


Subsea Inspection – Diver and ROV Deployed

Sonomatic is the world's leading provider of automated subsea ultrasonic inspection services. Our technology is designed and developed by our own people for use by our own service teams. This closely knit process ensures that delivery is fit-for-purpose. Our equipment has the highest level of reliability in order to ensure availability at all times. Sonomatic has been providing automated ultrasonic inspections for over 30 years, 25 of these in subsea applications. Sonomatic's subsea technology is designed for deployment by diver or by ROV. ROV deployment is often more cost effective, and it also facilitates inspection at increased depth. Work programmes have been successfully completed to 1500 m water depth, and 3000 m is within reach.

Applications include TOFD, Corrosion Mapping, Automated Pulse Echo, SH-EMAT, DRS together with surface crack detection methods such as Magnetic Particle Inspection (MPI) and ACFM.

Subsea inspection programmes are seldom alike. The versatile and comprehensive structure of Sonomatic's resources ensures that solution to technical challenges can be addressed quickly and reliably. This applies to technology and technique development. An example of the latter is where TOFD Screening, that was originally developed for topsides NII applications was applied by diver to the complex geometry of a subsea manifold. This cost-effective solution would otherwise have required complex robotics.



These methods and techniques are applied by a range of scanners including:

- Subsea ManScan: A range of manually propelled scanners from 2" (50 mm) diameter pipe to flat
- Nautilus: Diver deployed dual axis inspection system from 4" (200 mm) diameter pipe to flat
- Nautilus hot-tap: Diver deployed triple axis inspection system for complex geometry welds
- Nautilus dead leg: Diver deployed multiple-angle scanner for 2" & 4" weldolet deadlegs
- ROV-iT: Work-class ROV-deployed scanner for dual axis corrosion/ovality/dent mapping and weld inspection on tubulars, 6" to 30"
- MagRover: Work-class or large inspection class ROV deployed steerable magnetic wheeled crawler for weld inspection and special corrosion mapping applications

Sonomatic has developed a range of ROV deployed scanners to enable inspection of:

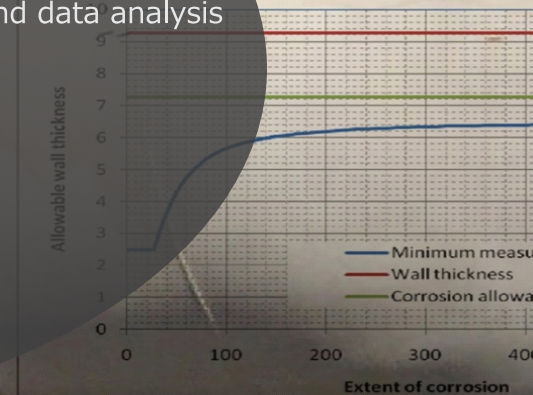
- Rigid and flexible pipelines, both horizontal and vertical, including bends
- Structural welds of various configurations
- Caissons
- Subsea manifolds and other production infrastructure

Integrity Support Services

The Integrity Division of Sonomatic assists clients with a range of consultancy services aimed at ensuring effective use of inspection in meeting their integrity requirements. Sonomatic applies innovative analysis methods to maximise the value of data from inspections in support of integrity decision making.

We also provide an Integrity Management contracting service, which can cover specific systems or an entire plant. Clients benefit from our best practice methods and industry leading innovations that ensure cost effective management of risk.

- NII assessment, planning, facilitation and evaluation
- Fitness for service and remaining life assessment
- Statistical analysis of corrosion data
- Pipeline ILI data analysis and integrity assessment
- Advanced ultrasonic and ILI signal processing and data analysis
- Pipework assessment and planning
- Corrosion risk assessment
- Risk based inspection planning
- Fracture mechanics
- Fatigue modelling
- Failure analysis
- Ultrasonic modelling



Non-Intrusive Inspection (NII)

Sonomatic is the leading provider of NII services to the Oil and Gas sector. Our services include:

- Identifying vessels for which NII is appropriate
- Corrosion risk assessment to ensure appropriate workscope development
- Detailed planning and definition of NII workscopes
- Provision of NII inspection services
- Management of NII inspection activity
- Evaluation of NII programme and results
- Development of integrity systems documentation for integration of NII into current practices, including RBI

Sonomatic were instrumental in the development of DNV-RP-G103, which provides a fully risk-based process for Non-Intrusive Inspection.

We are unique in offering a full range of services needed for effective NII programmes and have the experience to ensure that it is successful.

We have a track record of successful delivery of NII projects comprising thousands of pressure vessels across four continents.





Research and Development

Technique Research

Sonomatic is committed to improving our existing inspection approaches and to developing new techniques for more effective inspection. We also focus on the development of innovative approaches to integrity management. Our research areas are driven by market needs, as identified by inspection and integrity activity. Research is performed in-house by a team of highly qualified scientists and engineers working in collaboration with the integrity, inspection and development groups as needed.

The work is supported by a comprehensive range of modelling and analysis software including Matlab®, CIVA© and Pzflex©.

Technology Development

Sonomatic is unique amongst inspection service providers in designing and building inspection equipment for our exclusive use. This means the equipment and systems we use are best matched to our inspection service needs, allowing us to deliver the best solutions for our clients. To support this approach Sonomatic has an exceptionally strong in-house development team consisting of:

- Mechanical Engineers and Designers
- Electrical Engineers
- Electronics Engineers
- Software Developers
- Ultrasonic Applications Engineers

The development team interacts closely with the inspection and integrity services groups, ensuring innovative new developments are best aligned to end user requirements and ongoing improvements are made to existing technologies.


The development team is responsible for the design of equipment for bespoke solutions and routine applications. This capability is wide ranging and includes both topside and subsea scanners and systems. The in-house capability allows client requirements to be responded to immediately and innovative new solutions, exactly matching requirements, to be delivered quickly and reliably. This sets Sonomatic apart from other inspection service providers who rely on standard commercially available equipment.

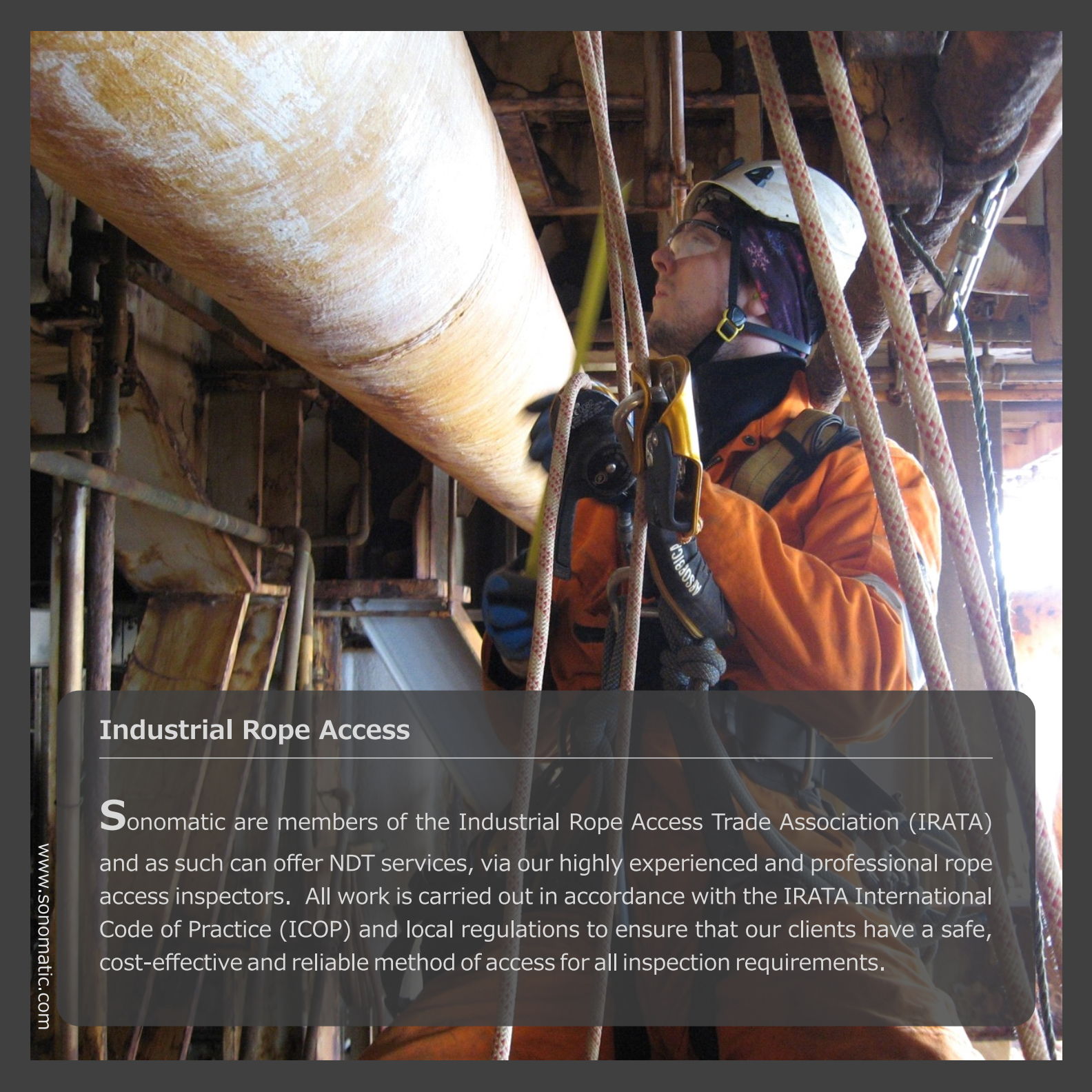


Conventional and Fabrication Inspection

Sonomatic have expanded our Advanced Inspection services with the introduction of Conventional NDT Inspection and Testing services. Sonomatic brings together a team of highly skilled technicians, inspectors, engineers and Rope Access NDT Inspectors, allowing us to offer our clients the highest quality inspections and provide the best support available today.

In addition to the conventional NDT methods of Radiography, Hydro-testing and Heat treatment, Sonomatic also offers alternative inspection methods that include long range and/or remote inspection methods. Our equipment is unique and designed and built by Sonomatics dedicated team of engineers and offers solutions that are bespoke to our clients changing needs.

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- Radiography
 - Heat Treatment
 - Hydro-Testing
 - Visual Inspection
 - Magnetic Particle Inspection (MPI)
 - Eddy Current
 - Liquid Penetrant Inspection
 - Rope Access NDT Inspection
 - Pulsed Eddy Current (PEC)
 - Positive Material Identification (PMI)
 - Heat Exchanger Tube Bundle Inspection
 - Composite Wrap Application and Inspection

A full-page background image showing a worker in an orange safety suit, white helmet, and safety glasses performing industrial rope access. The worker is positioned next to a large, horizontal, light-colored pipe, possibly made of fiberglass or concrete. Several ropes are visible, some with red and white patterns. The worker is holding a yellow and black device, likely a rope grab or similar safety equipment. The background shows a complex industrial structure with various pipes and metal supports.

Industrial Rope Access

Sonomatic are members of the Industrial Rope Access Trade Association (IRATA) and as such can offer NDT services, via our highly experienced and professional rope access inspectors. All work is carried out in accordance with the IRATA International Code of Practice (ICOP) and local regulations to ensure that our clients have a safe, cost-effective and reliable method of access for all inspection requirements.

The use of rope access can also help negate the requirement for costly and time-consuming scaffolding, whilst allowing inspectors quick access to areas that would otherwise be difficult to reach locations. This helps reduce the impact our work has on any other services.

Services offered by our RAIS (Rope Access and Inspection Services) division include:

- Visual Inspection
- Magnetic Particle Inspection
- Eddy Current
- Liquid Particle Inspection
- Ultrasonic Inspection, including all Advanced Services

- Warrington, England • Aberdeen, Scotland • Houston, USA • Mooresville, USA
- Muscat, Oman • Abu Dhabi, UAE
- Johannesburg, South Africa • Secunda, South Africa • Vanderbijlpark, South Africa
- Perth, Australia • Brisbane, Australia



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