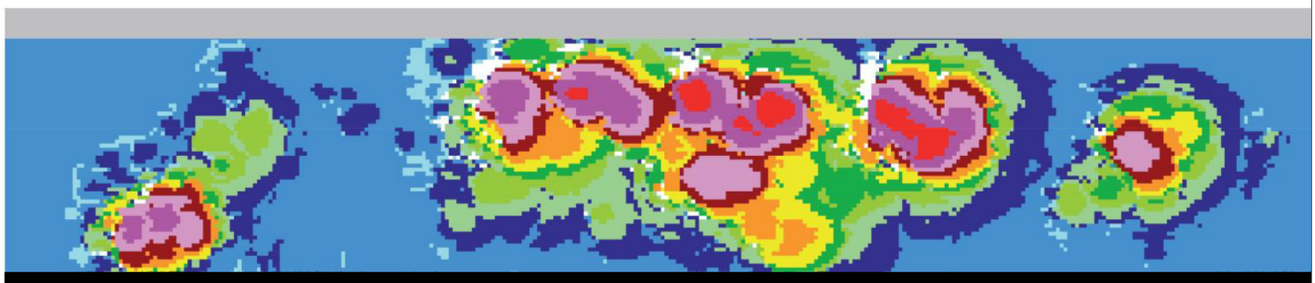
sonomatic®

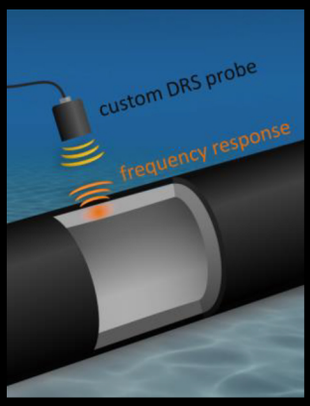
innovative inspection technologies



DRS Corrosion Mapping

Dynamic Response Spectroscopy (DRS) is an innovative ultrasonic inspection technique developed by Sonomatic for corrosion mapping through challenging coatings where conventional UT is ineffective. Low frequency ultrasound excites the steel, causing it to vibrate at its natural frequencies. Using advanced signal processing algorithms, these frequencies are extracted from the returning signals and used to determine the steel thickness profile.

DRS is deployed on Sonomatic's range of proven topside and subsea inspection tools, making corrosion mapping possible on previously inaccessible assets.



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Sonomatic has offices in strategic global locations so we can respond quickly to customers' requirements wherever they may be situated. Our high quality products are matched only by our customer service. In addition to our field services, we offer training and consultancy at our sites in the UK or at clients' premises anywhere in the world. Sonomatic is committed to improving asset performance through applied and innovative technology; to delivering these benefits to our customers in the products and services that we provide; and to working with our customers, as value-added partners, to realise the maximum benefits of inspection technology.

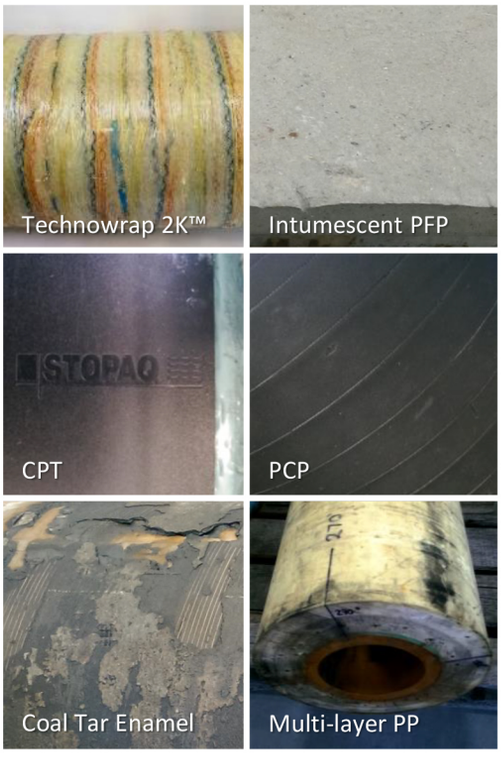
DRS Technique

A custom DRS probe excites the steel with a range of *low* ultrasonic frequencies that pass easily through challenging coatings, which conventional *high* frequency ultrasound cannot penetrate.

The steel responds, vibrating at natural frequencies related to the local thicknesses.

Using advanced algorithms, these frequencies are extracted from the returning signals and used to determine the steel thickness profile.

The probe travels over the coating, constructing a map of the underlying steel wall thickness.



Applications

DRS has been optimised for inspection through a range of coatings, including

- Composite repairs e.g. Technowrap 2K™ and Technowrap™ Deck Rehabilitation System
- Intumescent Passive Fire Protection (PFP)
- Corrosion Protection Tapes (CPT)
- Polychloroprene (PCP) e.g. Neoprene®
- Coal Tar Enamel
- Multi-layer Polypropylene
- Injection Moulded Polypropylene (IMPP)
- Polypropylene (PP) and Polyethylene (PE) Shrink Wraps

Application to other challenging coatings is ongoing.

Deployment

Sonomatic has extensive field experience of challenging inspections.

DRS is deployed on two proven tools

- Nautilus – topside and subsea inspection system
  - Diver deployed subsea
  - Diameters from 6” to flat
- ROV-iT – subsea inspection system
  - ROV deployed
  - Depths to 2000 m (6500 ft)
  - Diameters from 6” to 30”
  - Horizontal and vertical deployment

Sonomatic inspection systems are designed in-house and can be modified to suit specific inspection requirements.

Corrosion Maps

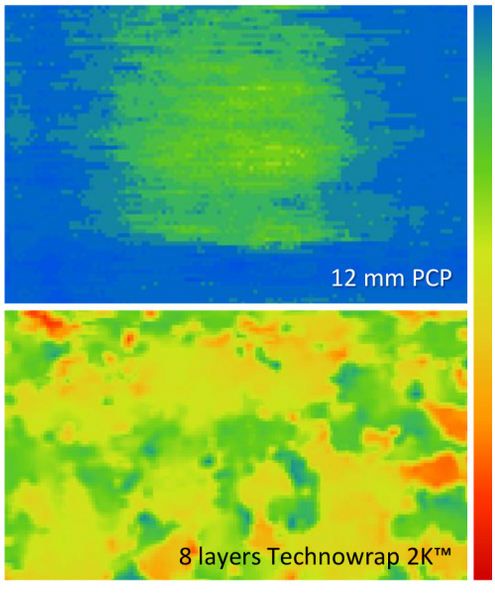
The maps below show DRS inspection through

- 12 mm of PCP showing 1 – 2 mm of steel wall loss
- 8 layers of Technowrap 2K™ showing up to 5 mm of internal corrosion

DRS thickness measurement accuracy is typically ±0.5 mm (80% tolerance)

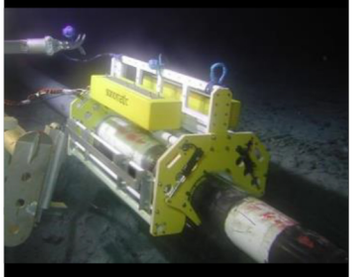
DRS thickness maps are suitable for

- Confirming absence of degradation
- Quantifying extent of wall loss
- Determining if corrosion growth is active
- Estimating corrosion growth rates
- Input to Fitness for Service assessment, including Level 3 using finite element analysis
- Statistical analysis of limited coverage inspections



Topside Nautilus

Subsea Nautilus



Subsea ROV-iT

QA and HS&E

It is Sonomatic’s ongoing commitment to supply services and products, through the application of technical and engineering excellence, which complement both the customer’s and our own QA and HS&E requirements.

Sonomatic’s commitment to quality is maintained through continuous assessment and review of our Quality Management Systems to BS EN ISO 9001:2008. Sonomatic actively promotes the development, implementation and improvement of our QMS as part of our ongoing drive to enhance customer satisfaction by meeting or exceeding customer requirements. In 2009 Sonomatic achieved UKAS accreditation as an Inspection Body to BS EN ISO/IEC 17020 (UKAS IB4276).