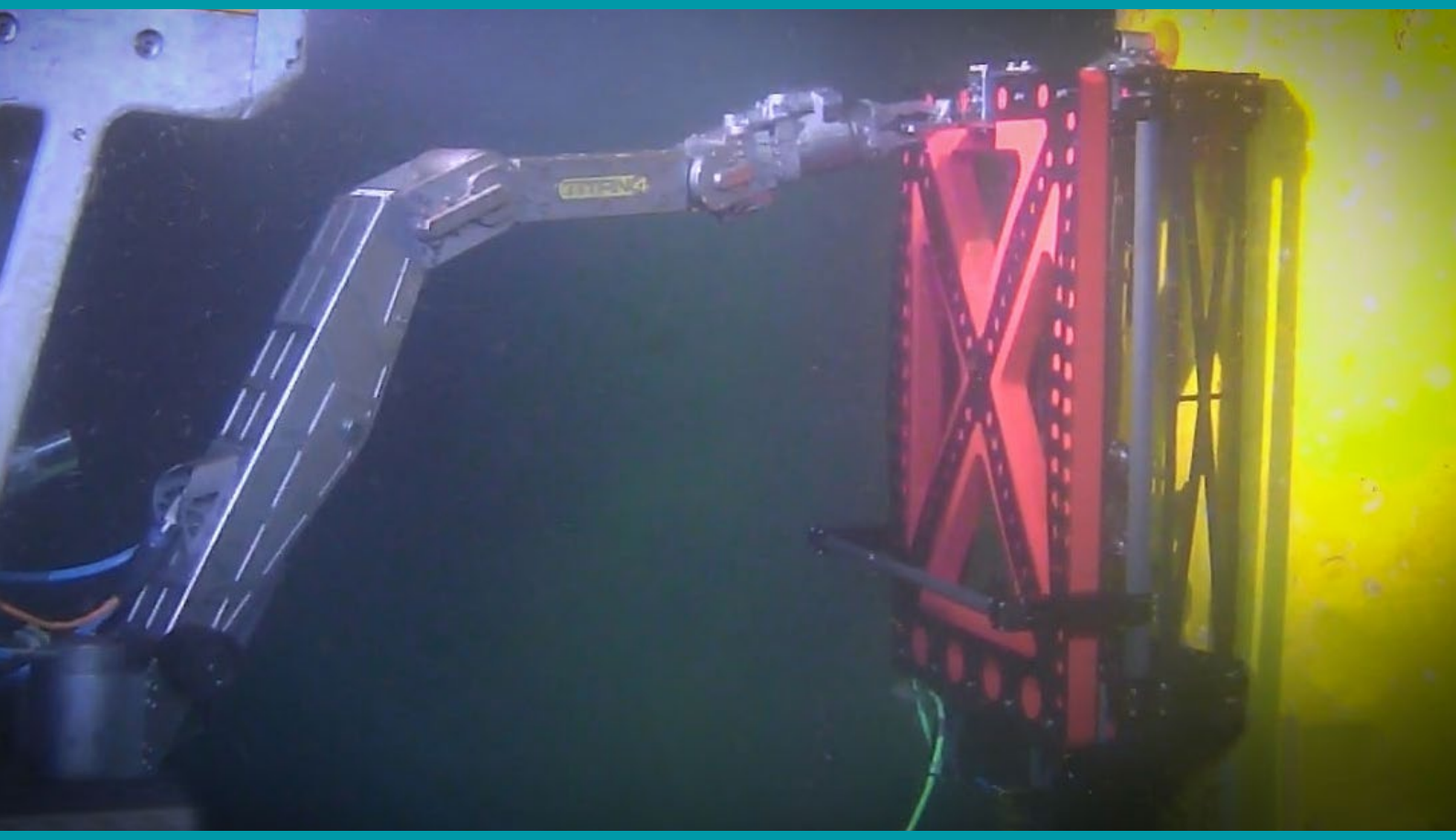
TSC SUBSEA

ART GUIDE

Grout Integrity Assessments for Offshore Jackets and Monopile Structures.



- Detect and size voids, crushing, cracks and dis-bonding from the external surface.
- Focuses on inspecting the most critical zone susceptible to faults.
- Inspect through painted coatings and soft marine growth.

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ART GUIDE

Custom designed to assess grouting integrity of pile sleeves

A custom-designed ROV-deployed subsea solution which assesses and accurately maps the integrity of grouted connections, efficiently and cost-effectively.

The ART GUIDE system, (Acoustic Resonance Technology Grout Underwater Inspection DElivery) is an ROV deployed subsea external solution for grouting integrity assessment.

The only subsea external scanning inspection for grouting integrity assessment currently in use in the North Sea, it was custom designed for a major operator to cover a technology gap in the market for a solution that could improve the input data for the integrity assessment of offshore structures.

Made to inspect grouted connections on offshore structures – anywhere that two steel interfaces are connected using grout – the ART GUIDE was designed to detect and confirm grouting presence and to detect typical failures that may occur over time.

TSC Subsea worked closely with the operator throughout 2021 to develop this robust tech-driven solution to accurately map the integrity of connections using ART. It was tested offshore by scanning a 360 band on an offshore pile sleeve structure and field proven by completing multiple targeted inspections on offshore structures without any tool recovery.

The most efficient and cost-effective solution for grouting integrity assessment available, it has global application across a range of sectors. This includes, inspection of offshore platforms, fixed offshore wind installations, the hulls of ship and many other subsea applications.

APPLICATIONS

- Any grouted connection inside pile sleeves on offshore jacket structures.
- Can also be used on grouted connections on windmill foundations etc.
- Can be used on any relevant hull diameter or flat structure after minor modifications.

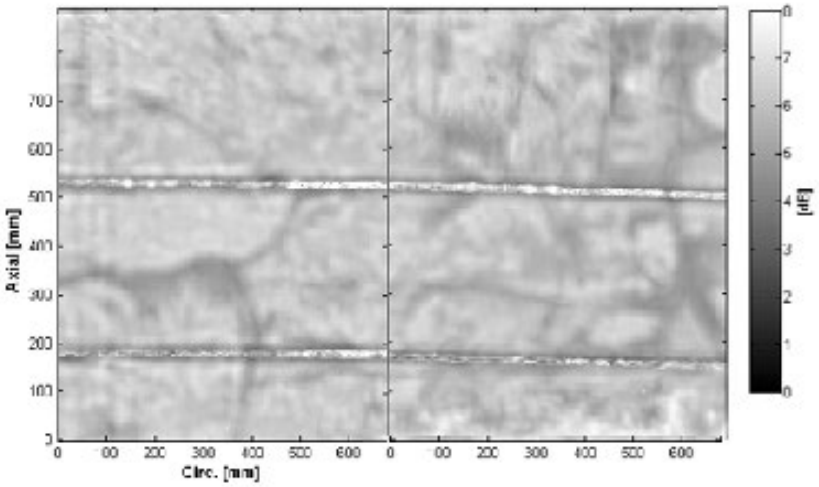
DEPLOYMENT/PROBE CONTROL

The ART GUIDE is remotely deployed via work or inspection-class ROVs, with a design that ensures quick interfacing to reduce operational costs. It connects to the ROV through selectable connections, with options for wet-mate or hard-wired data transfer.

Once positioned on the inspection surface, the ART GUIDE is secured by a strong magnetic attachment, requiring only minimal surface preparation, such as light brushing or water jetting. After placement, the ROV detaches and stands off, allowing the ART GUIDE to operate autonomously.

The scanning process is fully automated and follows a rectangular pattern. Measurements are encoded, with positional data recorded and stored alongside them. Multiple sensors enhance efficiency, enabling inspection of a 1-square-metre area in just 30 minutes. Real-time data processing provides immediate access to results during scanning for prompt assessment.

ART DATA



ART data detailing voids, crushing, cracks and dis-bonding.

FEATURES

- ✓ Robust design, reduces risk of downtime
- ✓ Benchmarked and calibrated against failure modes relevant for grouted connections
- ✓ Tested on samples containing wet/dry grout, voids, cracks and different densities
- ✓ Parallel processing and assessment provide on-line assessment and decision process
- ✓ Parallel inspection of wall thickness and geometry of steel structures in the area inspected
- ✓ Unaffected by coatings and painted surfaces typically used on offshore structures
- ✓ Multiple sensors minimise scanning - inspects 1metre^2 in 30 minutes
- ✓ Costs minimised through quick interface with ROVs
- ✓ Only light brushing or water jetting required to prepare inspection area
- ✓ Direct communication with tool for direct assessment of inspection data

ART GUIDE SPECIFICATIONS

Maximum depth	300mbsl / 30bar pressure
Standard outside diameter range	2300 – 2736mm (custom diameter sizes are available)
Temperature	0-40 degree Celsius
Weight in air	100kg
Weight in seawater	3-4kg
Environment	Air / seawater
Axial movement scan	400mm. 560mm by using 4 transducers.
Radial movement scan	28 degrees (each set of transducers covers 14 degrees)
Transducer stand-off	85mm @ 2736mm diameter
Number of transducers	Selectable 1-4
Interface	Round bar handle for ROV. Lifting eye.
Electrical / comms interface	1.pcs Sea con 5507-2013 connector. 85-264VAC or 120-370VDC. 24VDC option for small ROV can be evaluated. Ethernet coms.
Pipe attachment	Magnet feet. Optional extra magnet feet as required.

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