

PHASED ARRAY PIPEWORK INSPECTION



Oceaneering Specialist Inspection Services offers fully code compliant Phased Array Ultrasonic (PAUT) Inspection technology as a replacement to on-site radiography (RT). Developments in construction codes have allowed PAUT to be used as a direct replacement to RT on piping butt welds to meet the quality control requirements of ASME B31.3 and B31.1 and numerous European standards.

PAUT can be worked towards both workmanship and Engineer Critical Assessment (ECA) acceptance criteria, with data being suitable for accurate sizing and defect characterisation.

Phased Array systems allow for a reduced inspection time by simultaneously collecting multiple angle ultrasonic data in a one pass scan from either side of the weld. Typical inspection rates are between 8-12 butts per shift.

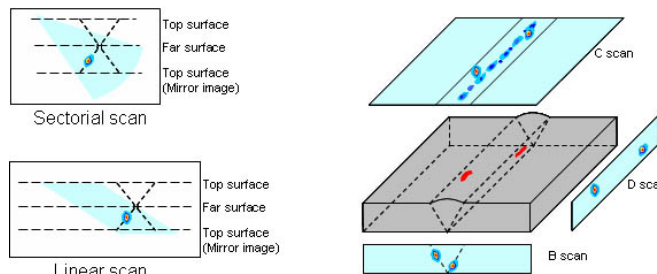
By ensuring accurate scan plans and specifically designed techniques all construction defects are readily detected, sized and sentenced accordingly.

Typical construction defects readily detected include:

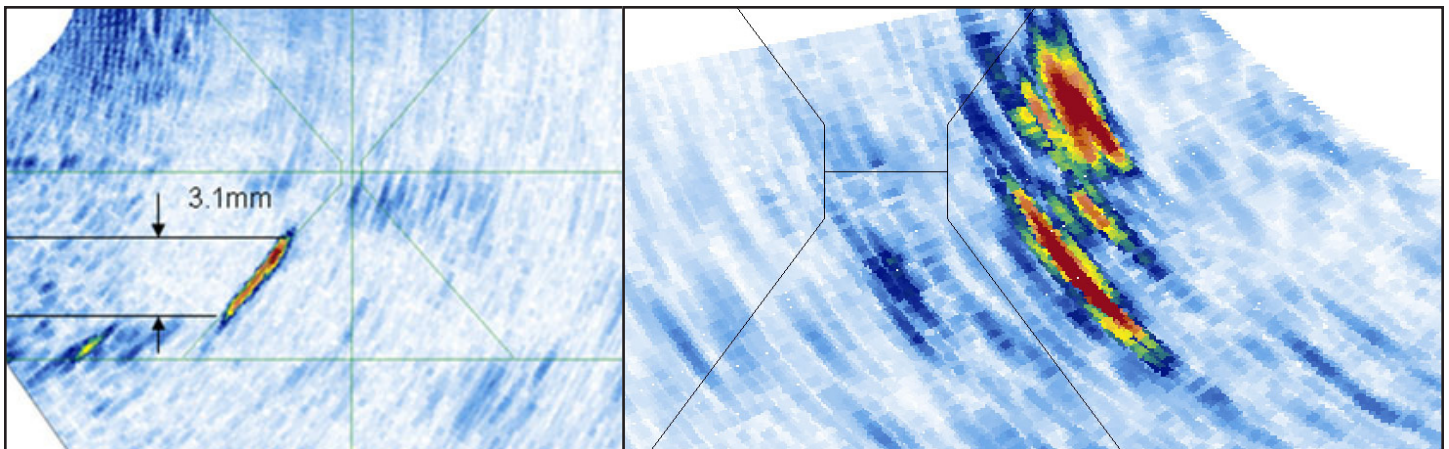
- Lack of fusion
- Lack of penetration
- Slag inclusions
- Cracks

Data Analysis

Sophisticated analysis software allows experienced operators to interrogate welds from multiple orientations including a comprehensive evaluation of the weld root, fusion face and weld toes.



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Piping construction codes include:

- ASME B31.3 code case 181, which permits the use of PAUT on all wall thicknesses. The sentencing for this code case is based on a fracture mechanics module and requires qualification.
- B31.1 and code case 179, which together permits the use of PAUT on all thicknesses. The sentencing for this code is based on workmanship criteria and does not specifically require qualification.
- EN 1714 Non-destructive examination of welded joints – Ultrasonic examination of welded joints, British Standard, 1997
- BS4515: 1-2004 Specification for welding of steel pipelines on land and offshore. Carbon and carbon manganese steel pipelines. PAUT allowable with client dispensation.

Advantages:

- Radiation free ultrasonic technique
- Welds from 3/4 inch in diameter up to flat plate may be inspected with current equipment.
- Wall thicknesses from 5mm. (N.B. Wall thickness below 8mm may require a trial/ validation period.)
- Independent from site utilities due to battery operation and irrigation system
- Rapid inspections with digital recording of data
- Digitally encoded scanning for accurate sizing
- Highly sensitive to fusion face flaws
- Free viewing software available to allow the client to review inspection data
- ASME and European code compliant

Limitations:

- Surface preparation is required to allow the collection of quality data
- 100mm of radial and axial clearance is required for scanner fitment (NB small bore scanner available for restricted access scanning).



Phased array small bore scanner

