



Phased Array & TOFD

In this issue:

Introduction

How it works

TOFD

Applications

Phased arrays are used for a wide variety of inspection and measurement applications, like to detect and image defects including cracks, voids, and pits caused by corrosion. They are used to measure material and coating thickness and to detect changes in material properties. Another common application is to assess the quality of welds and rivets. Phased arrays are also used to inspect joints and interfaces.

The advantages of PAUT and TOFD techniques, with respect to conventional techniques, are their versatility, their detection capacity and the cost-benefit ratio associated with the reduction of down-time during execution. These technologies can be applied in various industries: aerospace, power generation, petrochemical, metal fabrication, construction and maintenance, as well as in the manufacturing industry in general.





How it works

Phased-array probes are composed of several piezoelectric crystals that can transmit/receive independently at different times. To focus the ultrasonic beam, time delays are applied to the elements to create constructive interference of the wave fronts, allowing the energy to be focused at any depth in the test specimen undergoing inspection.

TOFD

The difference between PAUT and TOFD lies in the response of the physical principle (Ultrasound) that generates any discontinuity in the material. PAUT is based on the reflection of an ultrasonic wave and TOFD is based on the response of the diffracted wave at the tip of an indication.



Applications

- Weld inspection
- Volumetric inspection of forging or casting materials
- Erosion and corrosion mapping
- Scanning highly complex geometry components
- Detection of hydrogen-induced cracking (HIC), stress corrosion cracking (SCC), and stress-oriented hydrogen induced cracking (SOHIC)
- Weld inspection of pressure vessels, piping, and tubing
- Vessels and piping fabricated with composite materials
- Accurate sizing data for fitness-for-service (FFS) calculations

