

CASE STUDY – ACOUSTIC PULSE REFLECTOMETRY



Geo Thermal Plant (New Zealand) Hydrogen Cooler Tube Inspection





Job Overview

Arise Global conducted an Acoustic Pulse Reflectometry (APR) non-invasive inspection on two hydrogen cooler tube bundle at a Geo Thermal Power plant in New Zealand consisting of a total of 116 tubes, which has fins over the tube and enclosed by header box. The primary reasons for selecting an Acoustic Eye inspection were based on the following:

- ✚ Non-Invasive: Acoustic waves could propagate in any configuration using air as a medium.
- ✚ Accuracy: Defect type, its size and location could be reported precisely.



Video scope Images of Defective Tubes

As per the plant personnel, hydrogen cooler tube bundle plays a vital role in their operating efficiency. When drop in efficiency was observed for a span of week, operations team decided to take out the bundle for inspection. Based on FEM & FEA results, they suspect for pin holes (<1mm) and localized corrosion (pitting). Rutledge were called and Acoustic Eye inspection was performed to highlight the defects as they suspected.

Summary of Inspection Results

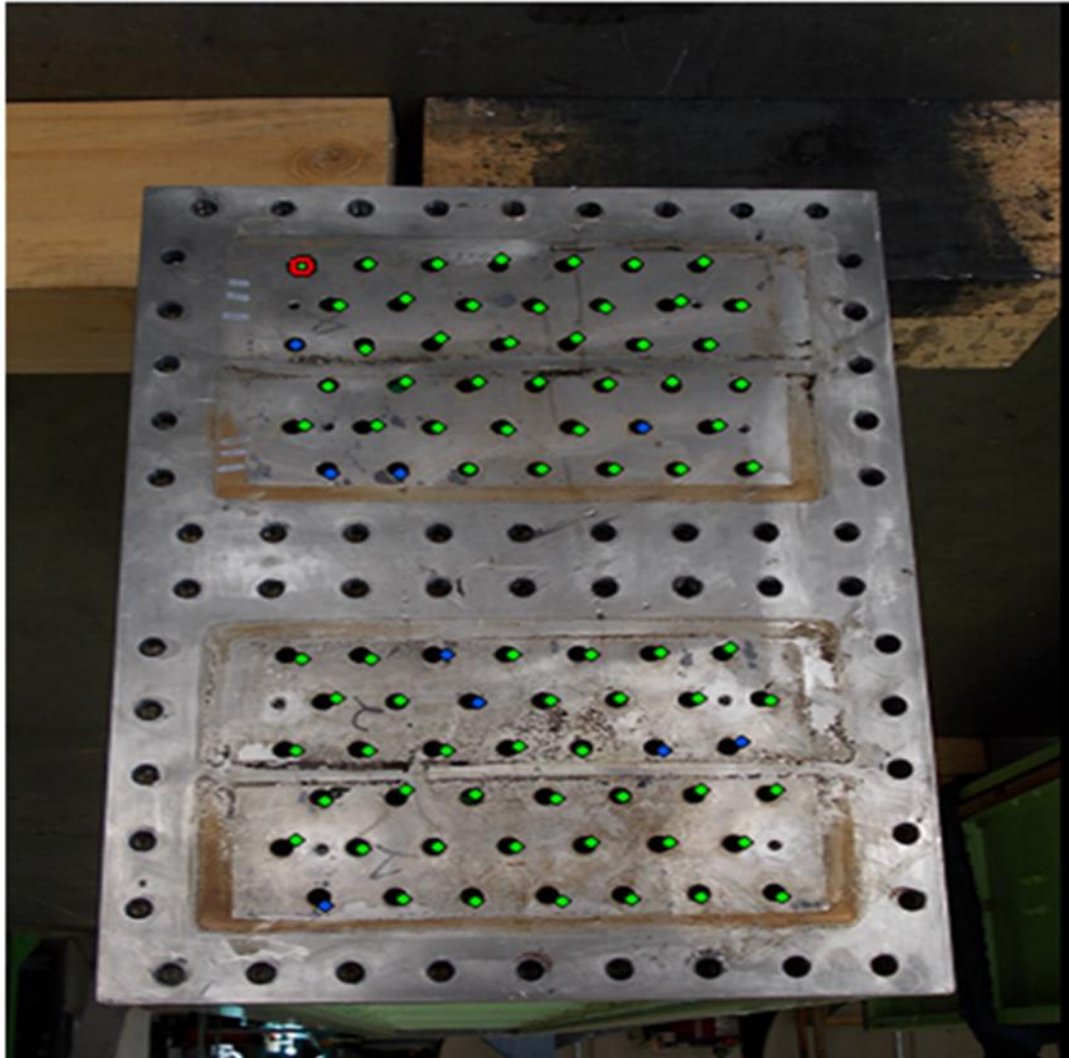
Tube Size	0.6259" (15.9mm) OD
Tube Thickness	0.06299" (1.6mm)
Tube Length	15.41995ft (4.7m)
Tube Shape	Straight tube with fins over it
# of Tubes	116 (2 Equipment)
Defects Found	Pin Hole: 0.0177" (0.45mm); Pin Hole: 0.03149" (0.8mm) Pits 10-20%: 3 Pits <10%: 11
Inspection Time	1 hour (1 APRIS system)

Outcome

- All tubes with pin holes undergone hydro test for confirmation and plugged.
- Repeat inspections are performed for other applications too.



Tube Sheet Diagram

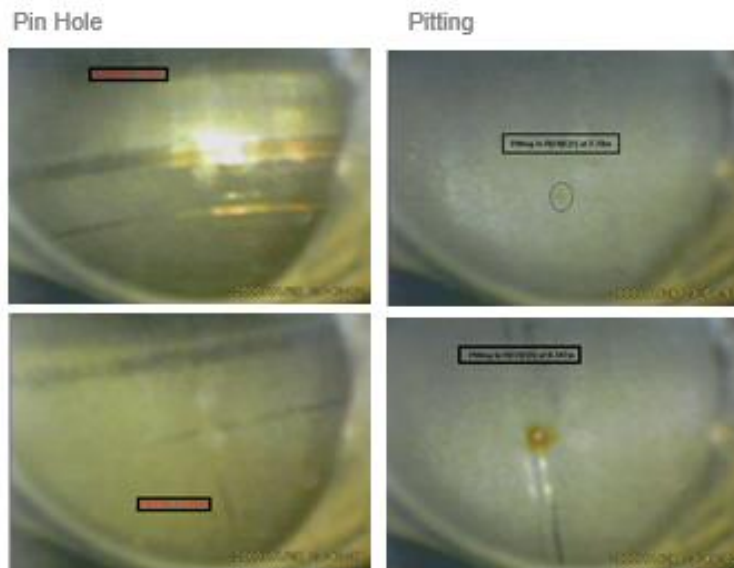


About APRIS's Non-Invasive Inspection

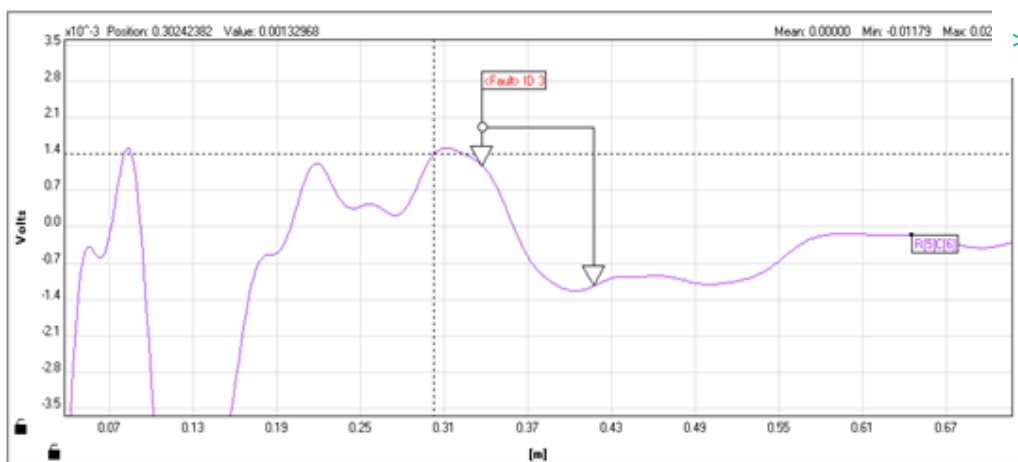
With APRIS's breakthrough capabilities for inspecting today's most challenging tube sizes and configurations up to 4", it is possible to inspect boilers, Fin Fans and other heat exchangers in any shape or material. Ultra-fast, accurate testing can be performed at a fraction of typical inspection cycle times and without extra inventories of consumable probes and standards. Utilizing Acoustic Pulse Reflectometry (APR) technology, APRIS is a very advanced yet easy-to-use tool. With its simple operation, automated analysis and report generation, there are minimal training requirements and far less dependency on operator expertise.



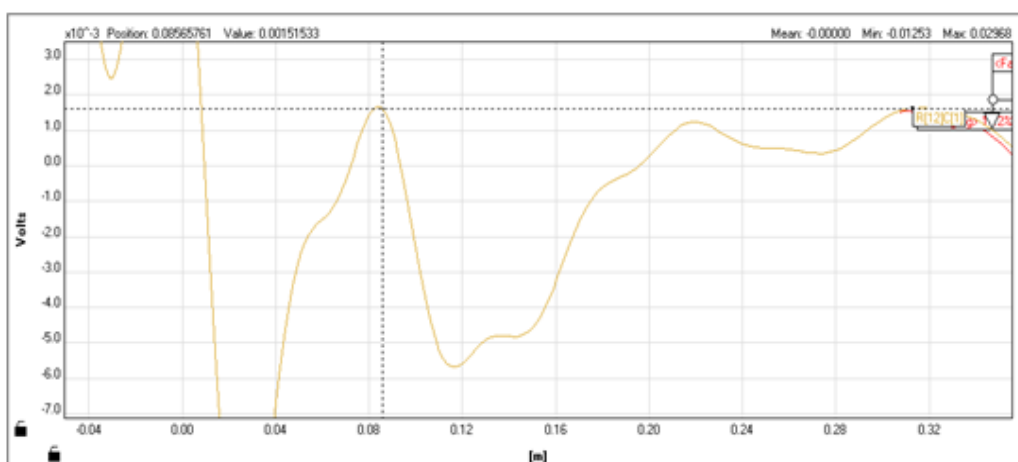
Defect Examples



APR Defect Identification



>> Pin Hole



>> Pitting