Best Practice and common pitfalls in Tube inspection

Vignesh . M – Product Manager

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Tube inspection Methods

- Eddy current testing
- Remote field testing
- Near field testing
- Magnetic Flux Leakage
- Internal rotary inspection system
What is their differences?

IRIS

- Nonferromagnetic
  - Aluminum
  - Brass
  - Copper
  - Hastelloy
  - Incoloy
  - 300-series stainless steel
  - Titanium
  - Zirconium

- Mildly Ferromagnetic
  - Monel
  - 3RE60
  - SAE-CURE
  - 400-series stainless steel
  - Duplex-series stainless steel

- Ferromagnetic
  - Carbon steel
  - Nickel
  - 400-series stainless steel
  - Chromoly 4130
  - Iron

Eddy Current

Remote field testing

Magnetic Bais ECT

Near field testing / Magnetic Flux Leakage
Eddy Current testing

• One of the most widely used methods for inspecting Non Magnetic materials.

• Standard Bobbin probes.

• Detection using Standard Bobbin probes.
Common pitfalls- Case 1

• Circumferential Cracks with SS material.
• Standard bobbin probe work only for wall loss.

• But for circumferential defects it might be difficult
What is the best practice?

• Making the right probes selection.

• Probes with Bobbin & Pancake coils are suitable for such inspections.

• Should have suitable reference and easier set-up to avoid mistakes.
Common Pitfalls – Case 2

- Techniques can be used for Ferromagnetic tube inspection. - RFT / MFL / IRIS.
- Most used technique are RFT / MFL.
- In case of higher thickness with lower diameter.
Using MFL in such cases

• Usually the core for the MFL probe should have permeability equal to or higher then the tube material.

• Core section should be greater then tube cross section.

• As in the case of the Lower diameter and higher thickness saturation wont be enough.

• Hence most suitable technique is RFT.
Common Pitfalls – Case 3

• As seen in the case of SS materials it's also noticed that CS can also have issues related to Circumferential cracking.

• MFL using the Flux leakage methods is more convenient to detect such defects.

• The only difficulty is related to the sizing of the same.
Thank you.