

QUICK SOLUTION TO INSPECTION OF TWISTED TUBES

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DATE OF INSPECTION	22 Jan 2020	TOTAL NO. OF TUBES INSPECTED	2
LOCATION	Singapore	CONFIGURATION	Twisted, Straight tube
		MATERIAL	SS316
		PITCH	137.16mm (5.4")
		TUBE OUTER DIAMETER	19.05mm
		TUBE THICKNESS	2.01mm
		TUBE LENGTH	1.5m

INTRODUCTION

Twisted tube or corrugated tube has higher thermal-hydraulic performance, higher thermal effectiveness, lower fouling and cleanability and vibration avoidance. They are commonly used in chemical, petroleum and power industries.

THE PROBLEM

The twist on the tube makes it challenging for conventional NDT methods to inspect as the probes need to be have good contact with the inner wall. Material such as titanium make it impossible to use Eddy Current Testing.

SOLUTION

Acoustic Pulse Reflectometry Inspection System (APRIS) can identify blockages and holes in a tube regardless of tube configuration and material. It is quick, as it takes only 10 seconds per tube for measurement and can give the location and size of the defects.



Figure 1: Two twisted tubes

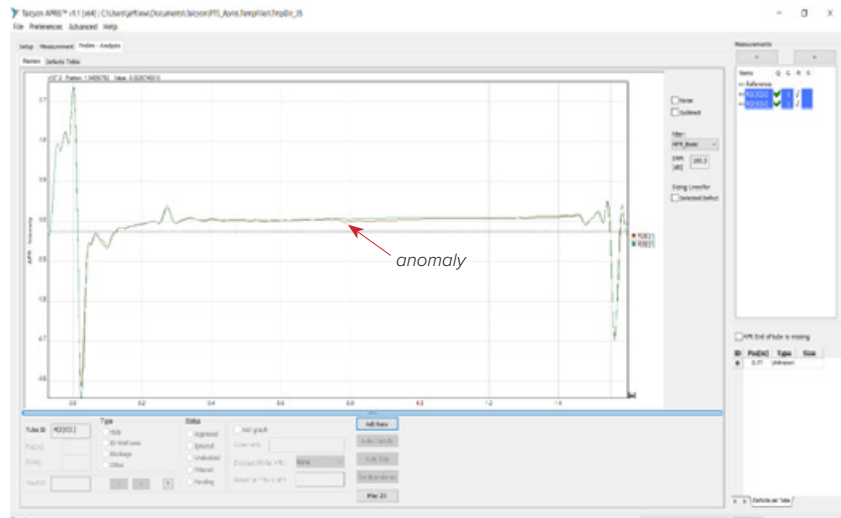
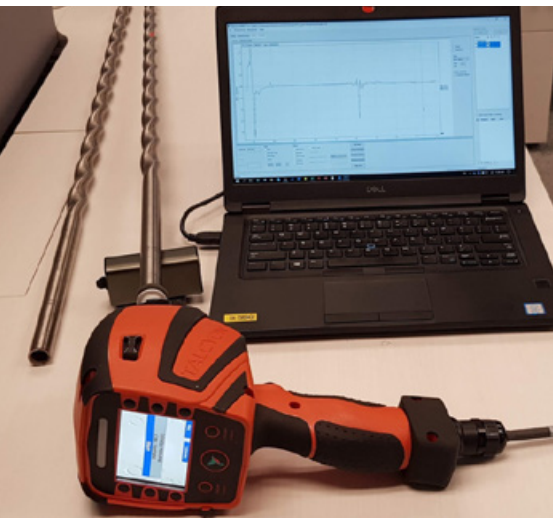


Figure 2: Two signals overlaid

On comparing the two signals, an anomaly can be seen as show on Figure 2 above. Using the APRIS Fullcheck software, the located of the anomaly was found at the position 0.77m from the start of the tube, and the anomaly is identified as a hole with size 0.5 mm (Figure 3).



Figure 3: Hole location and sizing.

CONCLUSION

APRIS provides a solution to twisted tube inspection with the follow uniqueness:

- Fast – measuring of a tube takes only 10 seconds
- Defects sizing and location – it gives precise sizing and the location of the defects
- Simple – APRIS is simple and quick to setup

The unique features of APRIS has the following benefits to the industry:

- Increase reliability of the tube bundle by screening all the tubes in a short time
- Reduce the turnaround time or inspect more tube within the given time window
- Increase safety by reducing the operator exposure time onsite