



Oil Refinery (Indonesia)

Fin Fan (Air) Cooler Tube Inspection

Project Status: Completed, December 2015

OVERVIEW

A refinery in Indonesia, after conducting trial testing and being convinced on the merits of Acoustic Pulse Reflectometry (APR) technology, sought our services.

All 100% of their air cooler tubes needed to be inspected within their pit stop duration they had available. Prior to this, they were using sampling methodology with conventional technologies for these same tests where only a small portion of their tubes was inspected.

They had 2 weeks to inspect 16,000 tubes with another 2 days allocated for reporting purposes. Aside from saving time, they also needed accuracy and mitigate safety risk as a small leak within an air cooler can adversely affect an entire plant.

The Technology

TUBE SHEET DIAGRAM

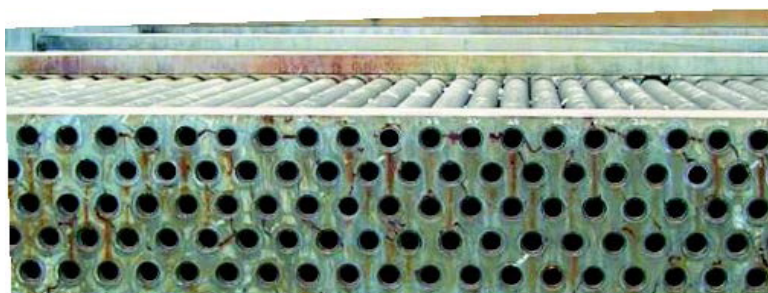
What made this inspection project inordinately challenging was that the root cause was identified as process corrosion inner diameter defects and the air coolers comprised finned tubes with header. If conventional inspection technologies were applied, accuracy of results would be extremely difficult to achieve. APR resolved this issue, since it is material independent.

Despite these limitations, since APR technology can inspect 1 tube in about 10 seconds, the 38-tube bundles with a total of 16,000 tubes were inspected within 10 days with 2 days taken for required reports to be prepared.

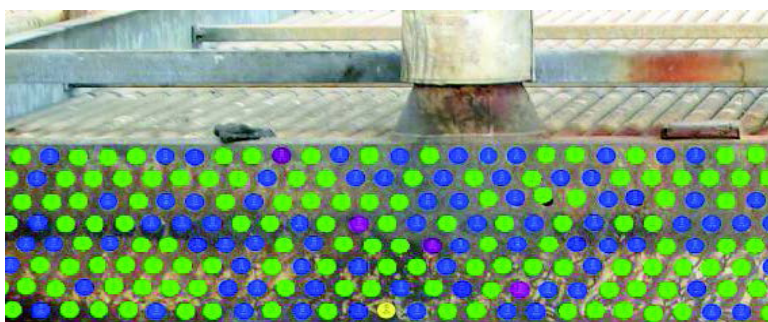
What was also taken into account was that the inspection process was conducted using APR technology and thus did not need to undergo extensive preparations.

As compared with other inspection technologies, neither a lengthy probe used nor extensive cleansing was undertaken.

ø: 25.4mm T: 2.77mm L: 9.1m



Inspection area — Before



Inspection analysis — Tube status identified by APR system

OUTCOME RESULTS

From a risk-based perspective, they wanted to avoid a situation where any faulty tubes could affect their production and potentially lead of an unplanned shutdown that possibly incurs a hefty loss.

1

Using APRIS, it was possible to have 100% of the tubes inspected for the refinery and a precise understanding of their inner diameter condition.

2

It was a requirement to identify the tubes that had 60% or more wall loss.

Upon inspection analysis, it was discovered that 7% of the total inspected tubes were damaged and had to be plugged.