TALCYON

PRESENTED BY

VIGNESH SIVANANDAM
BUSINESS DEVELOPMENT

TALCYON

APRIS

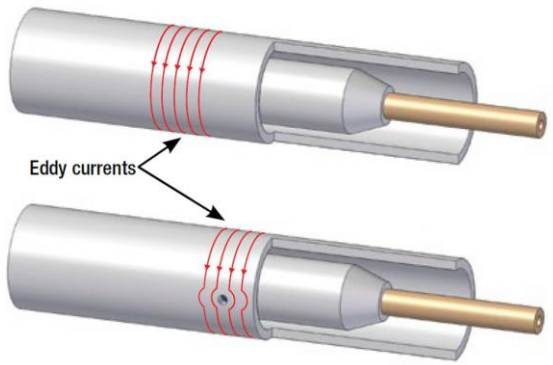
Fast Reliable Intuitive

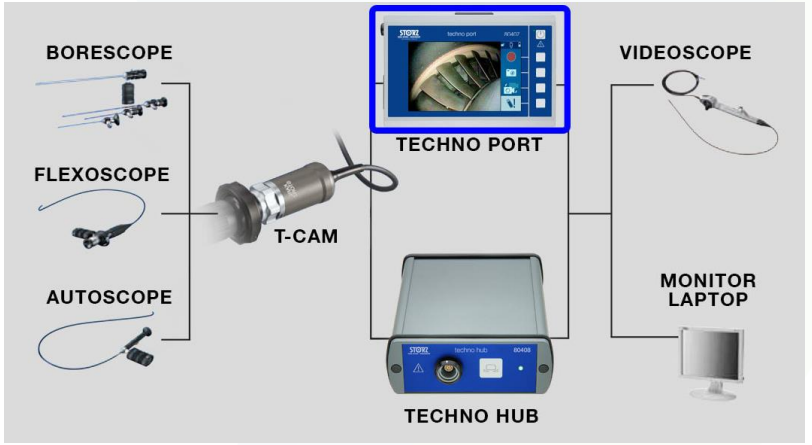
Acoustic Pulse Reflectometry Inspection System for heat exchanger tubes

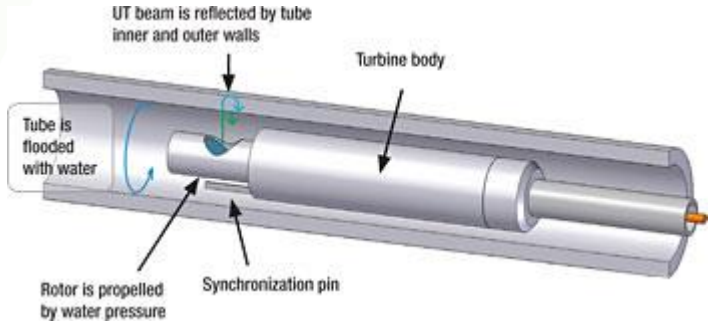




Conventional Tube inspection Technologies







EDDYCURRENT
— electromagnetic test

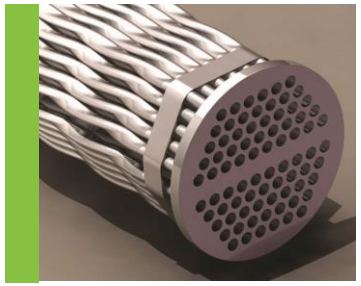
VIDEO SCOPE
— optics

IRIS
— ultrasonic

APRIS **Key Features**









ADAPTABLE UP TO 4” INNER DIAMETER, ANY SHAPE OR MATERIAL

- Boilers, Fin Fans, other heat exchangers
- U-bends, twisted, spiral wound tubes
- Ferrous and non-ferrous metals, graphite and plastics



APRIS **Key Features**



ULTRA-FAST, NON-INVASIVE, INSPECTION

- Less than 10 seconds per tube, 5 seconds < 20ft (6m)
- No need for inventory of consumable probes or standards



APRIS **Key Features**



LESS EXPERTISE REQUIRED

- Easy operation with minimal training
- Computer-based data interpretation and report generation

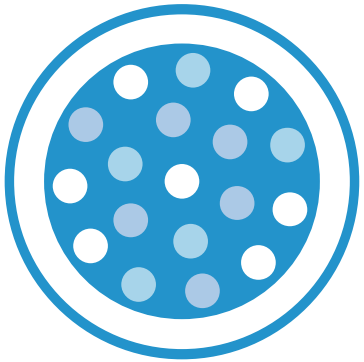


Industry Standards

ASTM
E2906/E2906M-13

ASME / ASNT
ASME BPVC.V-2017 - Article 18

How Does It Works



Step 1

Set-up



Step 2

Take measurements



Step 3

Analyse results and generate report

Detected Defects

TUBE SIZE

- 5/16” – 4” (7mm – 100mm)



HOLES

Min. diameter (0.5mm)



BLOCKAGES

Min. 5% of cross section



EROSION

Min. 10% of wall thickness

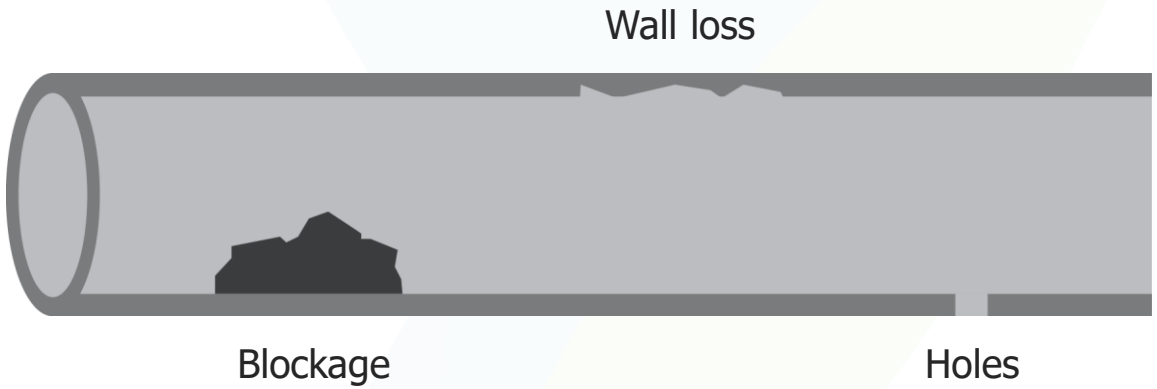


PITTING

Min. 10% of wall thickness

Sample Defect Types

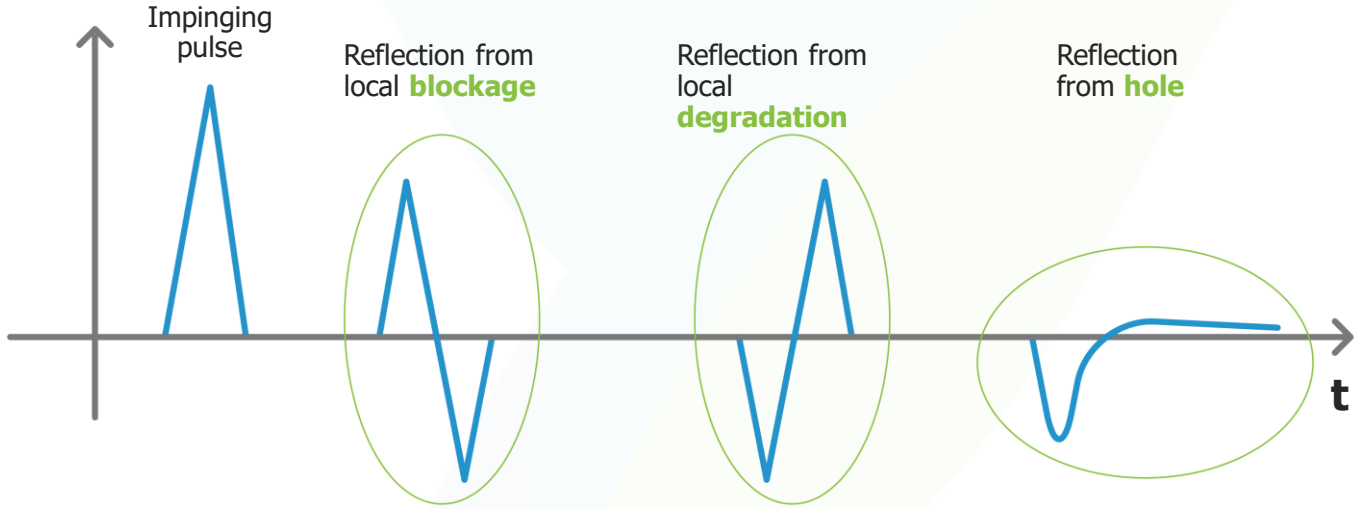
Receive qualitative and quantitative information of defect types



Identifying Defect Signatures

Each inner diameter defect has its own signature.

Exact location, type and size identified



BLOCKAGE

Deposits, dents, welding material



WALL LOSS

Pitting, erosion



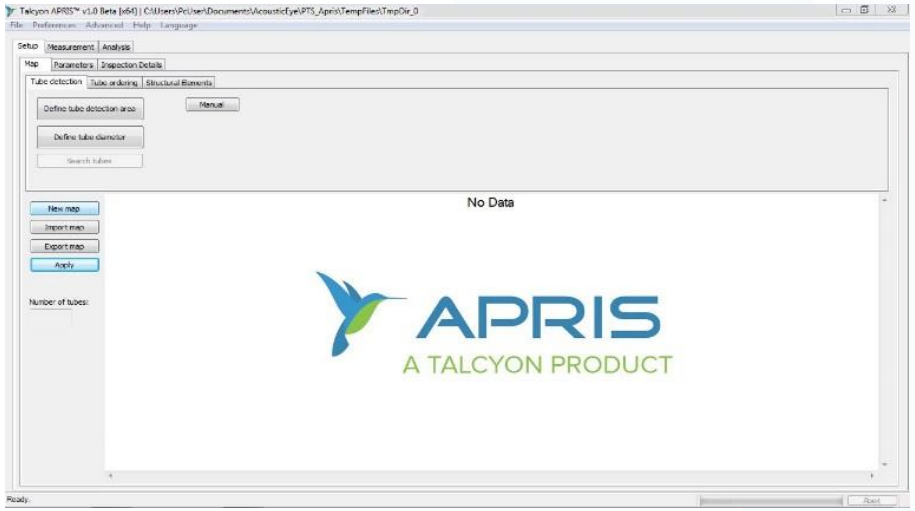
Tube Cleaning



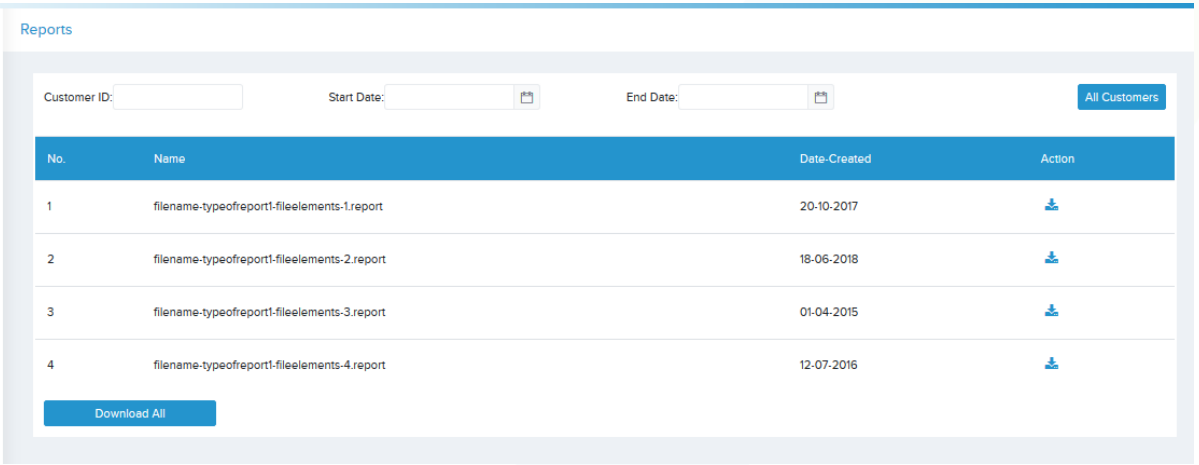
- **Cleaning is required prior to the inspection**
- **Recommended to blow dry, if water jetting is performed**
- **Perform tube mapping either with drawing or with photo**
- **Input following tube parameters in APRIS Software**
  - Tube Outer Diameter (OD)
  - Tube Thickness
  - Tube Length

APRIS FEATURES

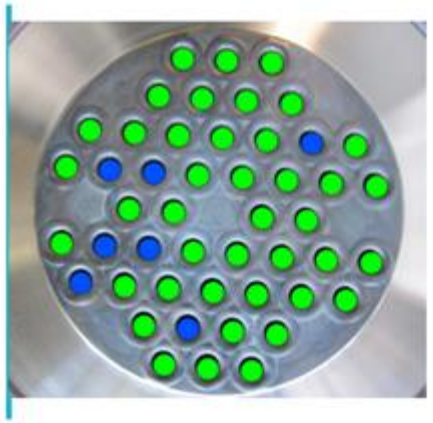
Portal

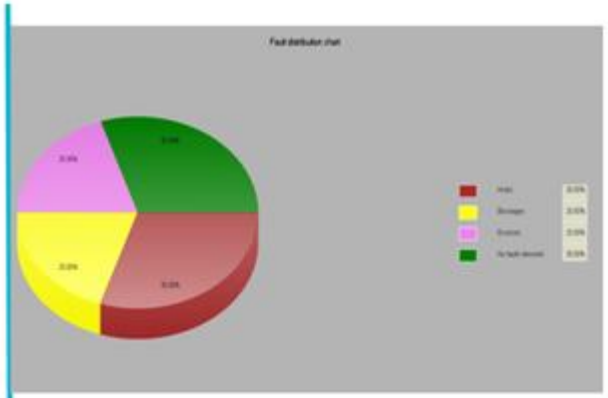


- **Provides access to sophisticated software**
- **Artificial Intelligence & Deep learning algorithm assist users to**
  - Perform (auto) interactive analysis 24x7 from any part of the globe
  - Generate intuitive & customized report that meet the needs of end users



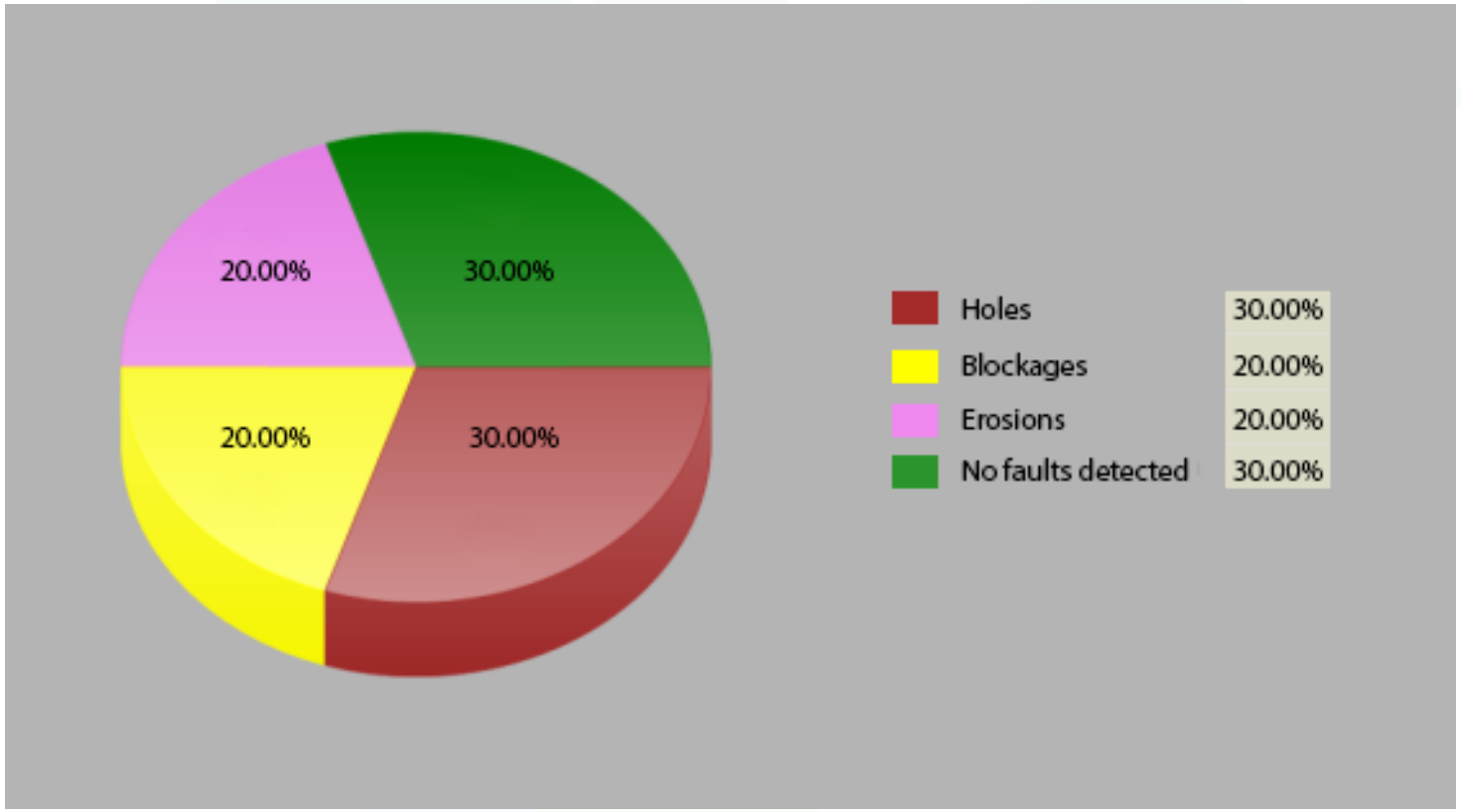
Report Generation





Tube ID	Pos[m]	Wall Reduction[%]	Condition	Comments	Displayed Filter	Graph
R[11]C[1]	1.7	60			None	Link
R[12]C[1]	3.75	60			None	Link
R[21]C[1]	4	80			None	Link
R[23]C[1]	4	70			None	Link
R[31]C[1]	0.722	65			None	Link
R[43]C[1]	0.917	65			None	Link
R[54]C[1]	4.03	85			None	Link
R[55]C[1]	4.96	70			None	Link
R[62]C[1]	2.2	45			None	Link
R[68]C[1]	1.93	70			None	Link
R[76]C[1]	1.56	65			None	Link
R[84]C[1]	1.34	85			None	Link

Report Generation



Fault Distribution Chart

Report Generation

Tube ID	Pos[m]	Wall Reduction[%]	Condition	Comments	Displayed Filter	Graph
R[11]C[1]	1.7	60			None	Link
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R[76]C[1]	1.56	65			None	Link
R[84]C[1]	1.34	85			None	Link

Defect Table

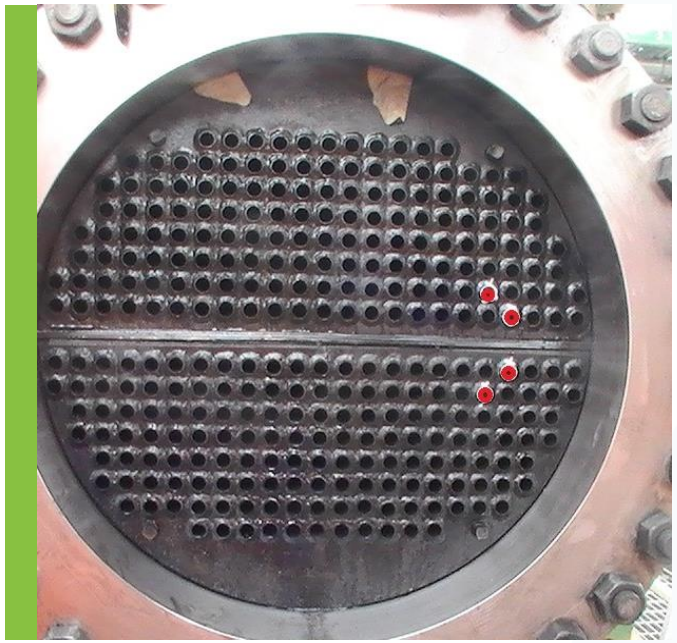
Industrial Sectors and Applications



- Refineries, fuel processing
- Power generation utilities
- Petrochemicals, chemicals, fertilizers, pulp and paper
- Offshore/Onshore oil and gas processing, OCTG
- Marine (boilers, HRSG/WHSG, condensers/coolers)
- Food and beverage, pharmaceutical
- Metal / Steel / Cement
- HX and Tube manufacturing QA

Project Overview

BP Tangguh
LNG Inspection

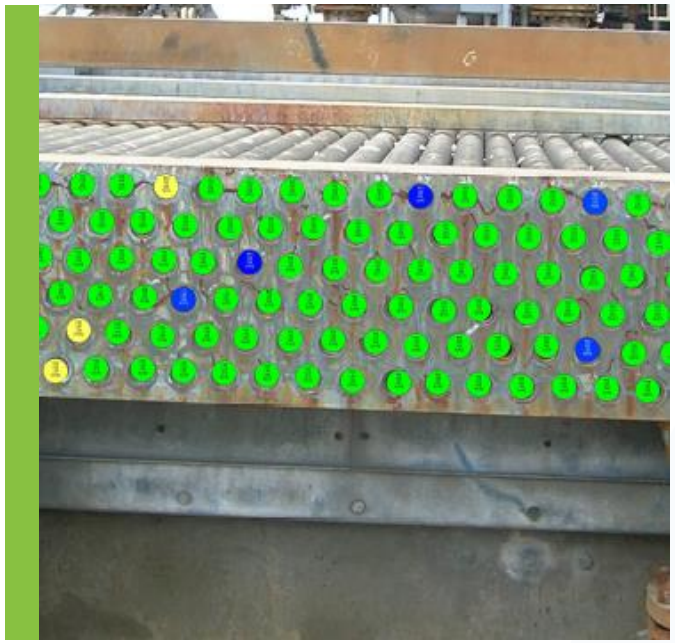


Inspected condensate stabilizer reboiler

- Tested 256 U-Tubes in 1 hour 15 mins
- Report was issued 2 hours later
- Reported 2 holes, verified with videoscope
- Reported: pitting > 20%
  erosion > 10%
  blockages > 5%

Project Overview

Pertamina Balongan
Air Coolers Inspection



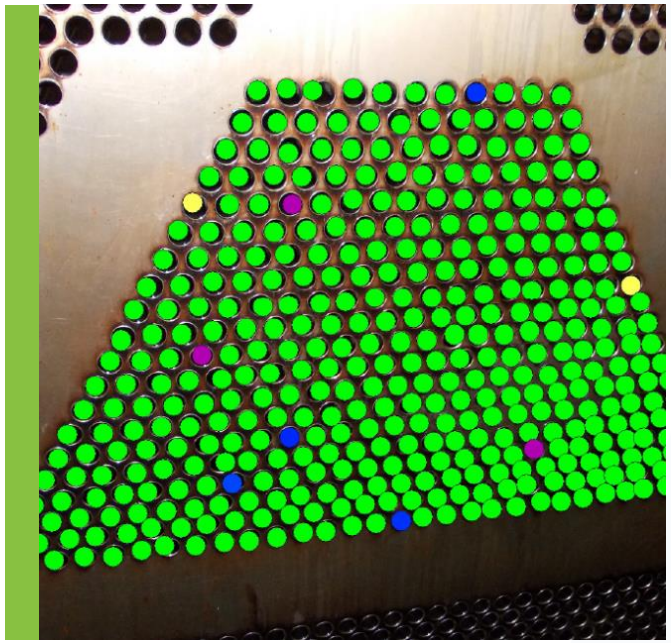
Inspected 16,000 Fin Fan air cooler tubes in 6 days

- Reported defects such as blockage, pitting, erosion and holes
- Our defects were confirmed by plant personnel

Project Overview

TNB

Power Plant Condenser Inspection



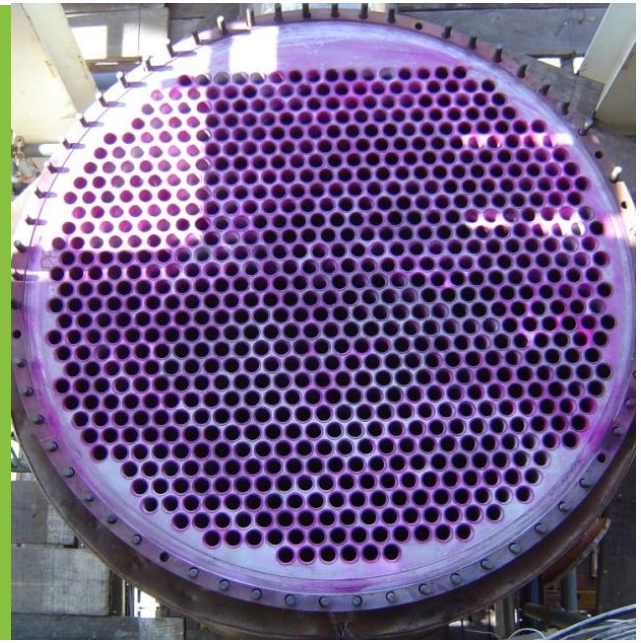
Inspected titanium condenser tubes

- Final analysis of 45,000 tubes with APR technology revealed pitting of up to 60%

Project Overview

BP Petronas

Reboiler Inspection



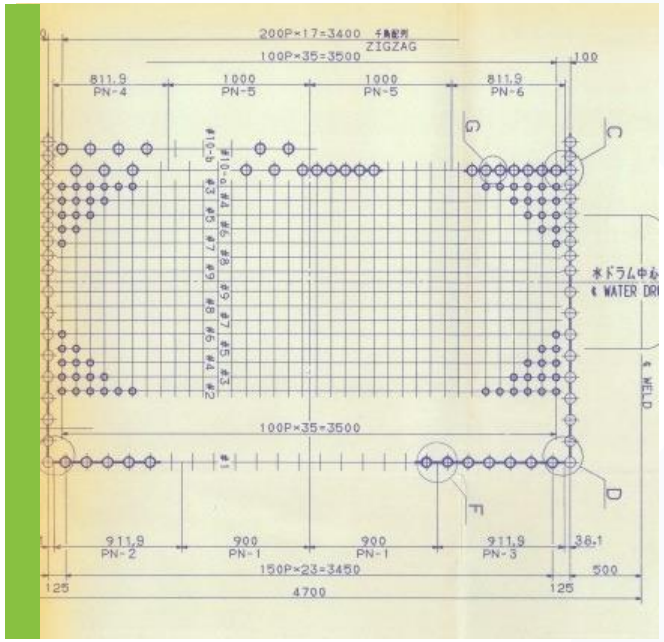
Inspected 908 tubes in 4 hours

- Inspection was requested during an unexpected shutdown after a plant turnaround of 1 month due to leak
- Issued report within 3 hours
- Reported leaks and majority of tubes found to be sagging and highly corroded

Project Overview

MTBE

Water Tube Boiler Inspection



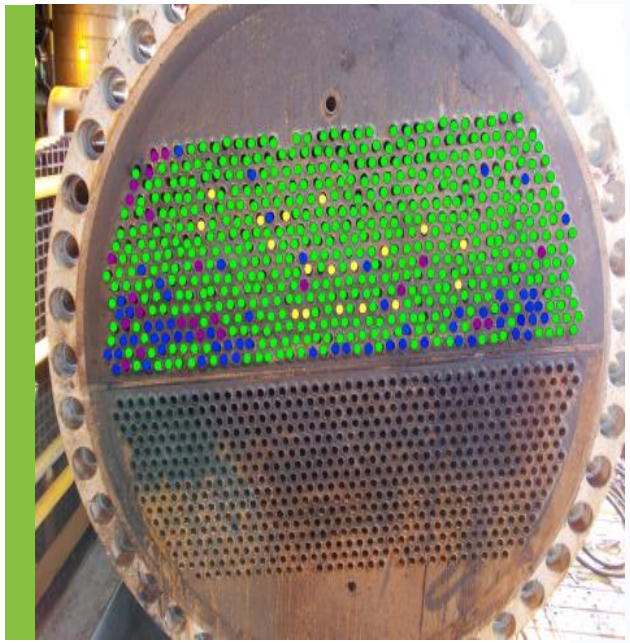
Inspected D-shaped boiler tubes

- Usually a tedious process when using conventional technologies
- Tubes were not inspected for the past 12 years
- Tubes inspected mainly from steam drum and mud drum sides

Project Overview

JVPC

Offshore U-tube Inspection



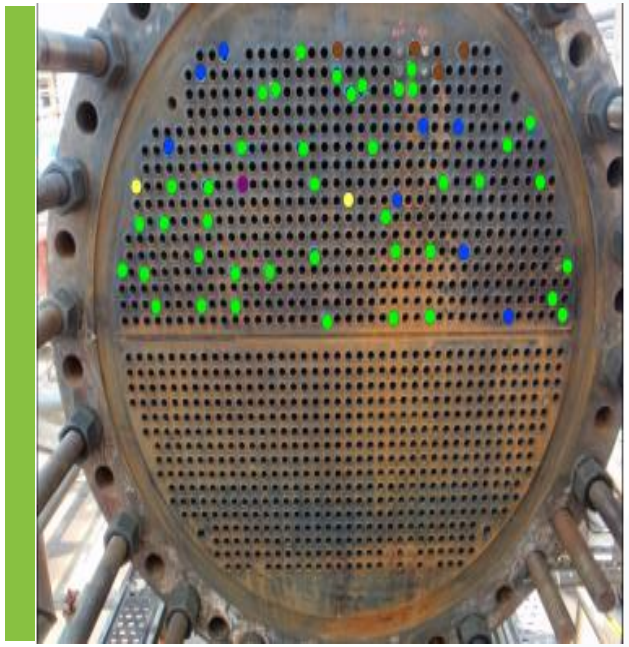
Inspected 618 inlet cooler U-tubes in 2.5 hours

- Report issued within 3 hours
- Reported 100% blockage in last 2 rows
- Equipment resumed operation within 3 days after taking corrective actions based on the report
- APR technology helped to reduce downtime by identifying precise cause of loss in operational efficiency

Project Overview

Petronas Melaka

Refinery U-tube Inspection

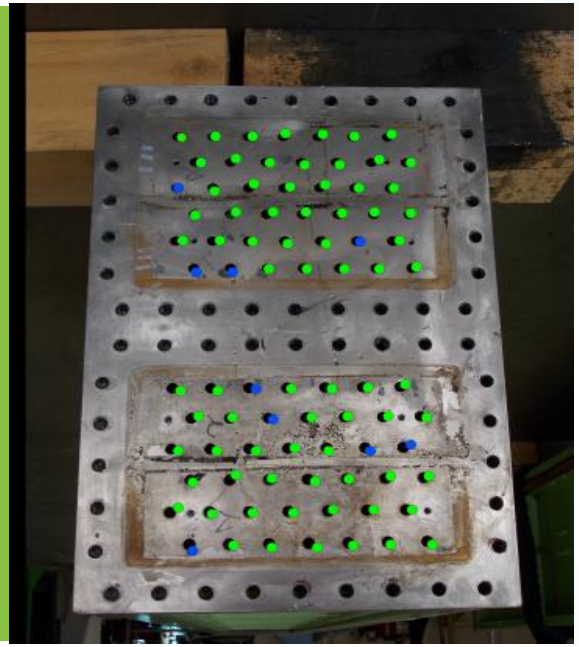


Trial inspection to technology acceptance breakthrough

- Gained access to Petronas Global via creation of specific SWEC code for APR technology
- Contracted to inspect tubes for special applications in distillation (LGO) and blending unit

Project Overview

Contact Energy
Hydrogen Cooler Inspection



Inspected hydrogen coolers

- Biggest geo thermal electricity generator in New Zealand
- Main concern is to identity pin holes and pittings as tubes are enclosed within headers
- Reported pitting between 5 and 10% and pin holes

Project Overview

Town Gas
U-tube Inspection



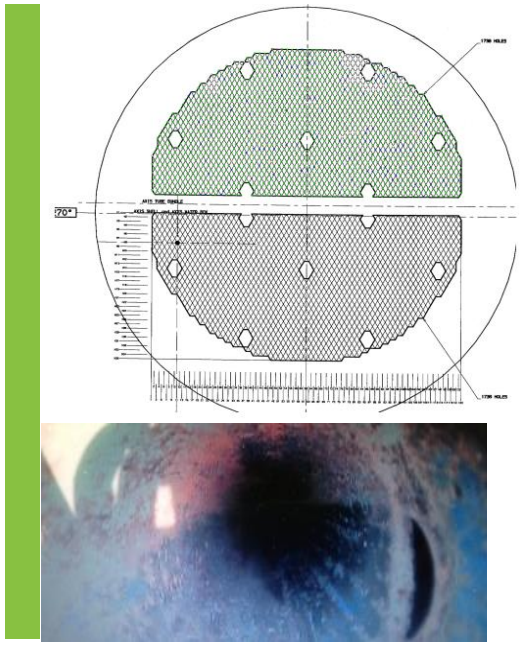
Trial inspection leading to a contract

- Invited to present and demonstrate product
- Inspected U-tube inspection and issued report
- Successful meeting led to work order to inspect 3 more bundles

Project Overview

Hoping Power Corporation

Heater Tube Inspection

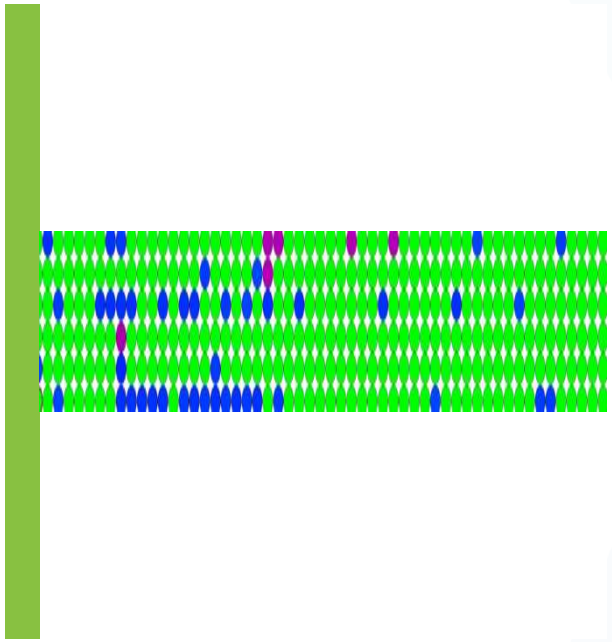


Inspected U-type heater tubes

- Required 100% inspection to identity U-bend defects
- Inspection completed and report submitted for 3 bundles within 3 days

Project Overview

GASCO
Air Cooler Inspection



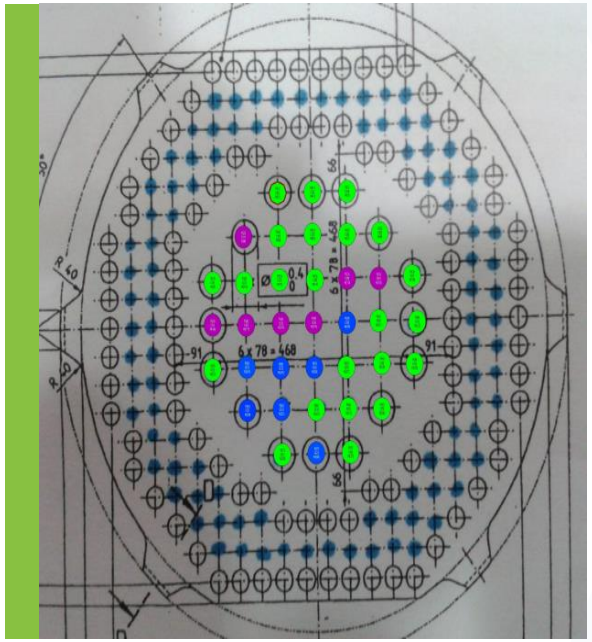
Inspected 3 air cooler finned-tube bundles

- GASCO anticipated 4 weeks to inspect and correct
- Inspection completed within 3 days
- Operating efficiency increased by 3 times

Project Overview

BASF

Waste Heat Boilers Inspection



Inspected waste heat boiler tubes

- BASF was interested in applying APR Technology for their tube inspection
- None of their existing technologies provided health status of tubes
- Produced report of tubes inclusive of ferrules/inserts at tube ends

TALCYON

APRIS

Thank You.

"Designed & Developed by **SCIENTISTS,**
Refined & Perfected by **INSPECTORS**"

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