



QC Control

┌───┐ We Measure Quality ───┐

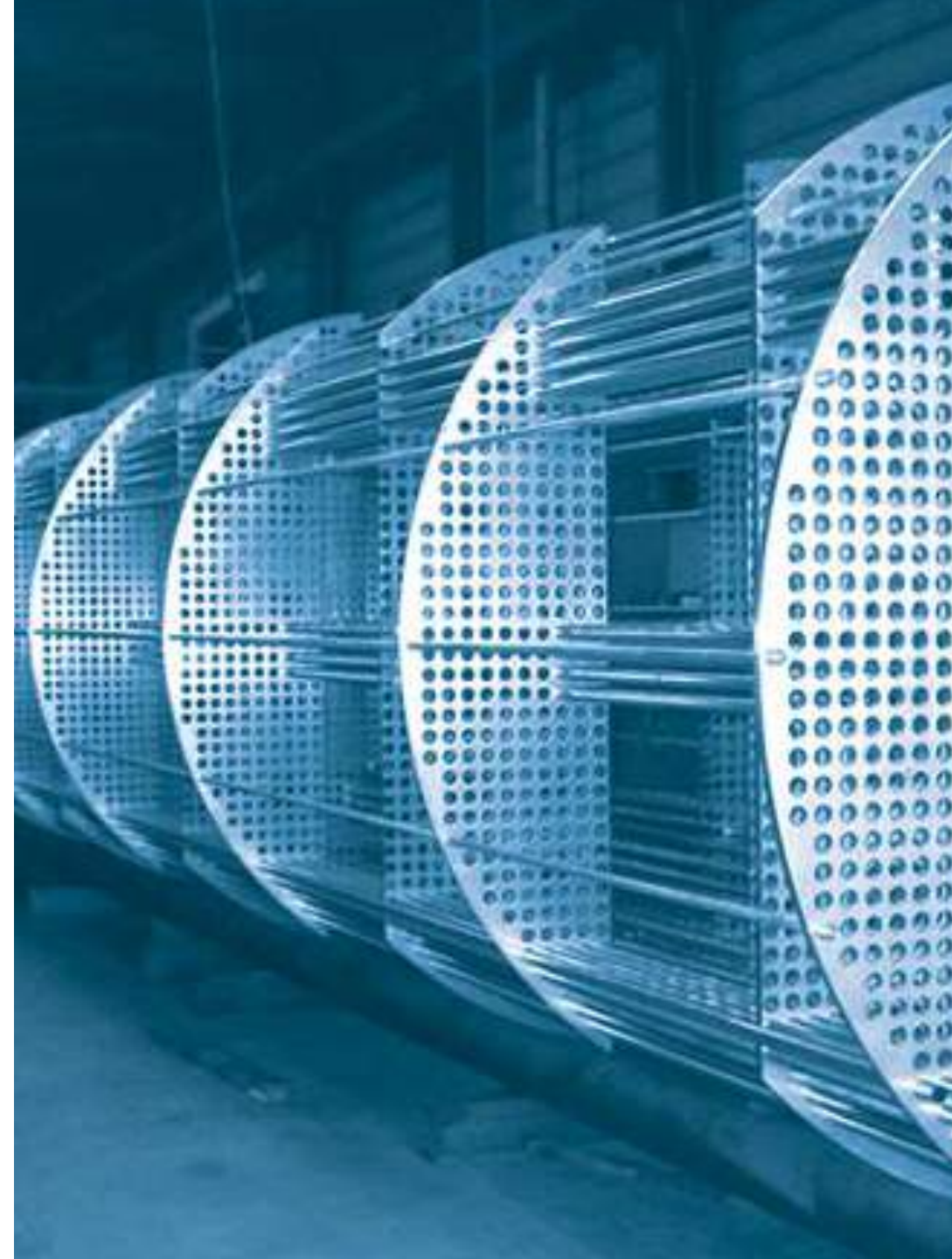
TALCYON

WWW.TALCYON.COM

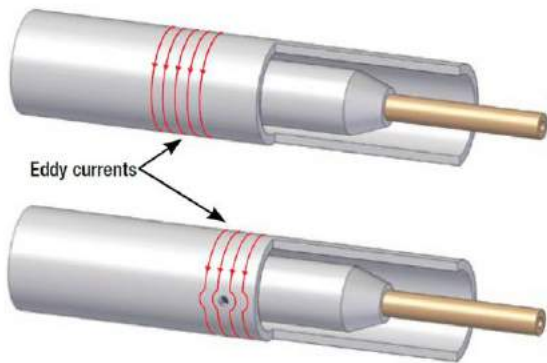


Fast || Reliable || Intuitive

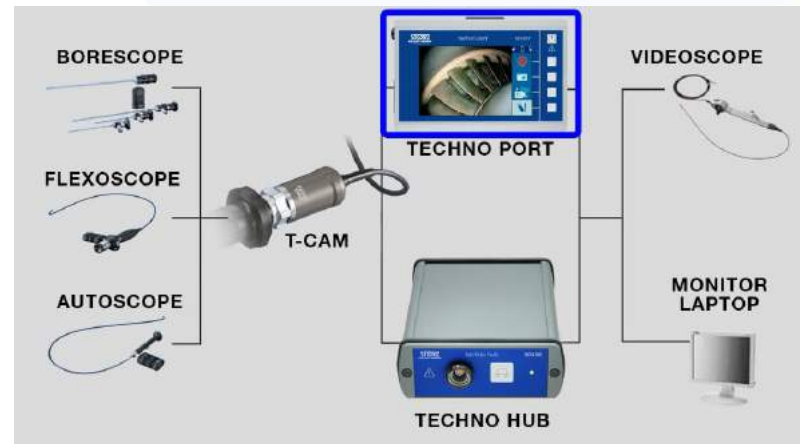
Acoustic Pulse Reflectometry Inspection
System for heat exchanger tubes



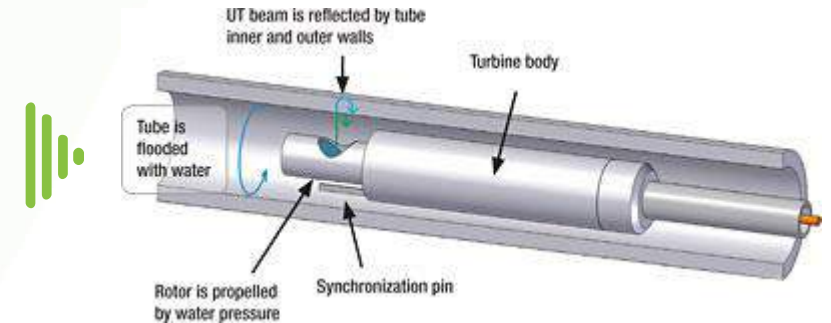
Conventional Tube inspection Technologies



EDDYCURRENT
— electromagnetic test

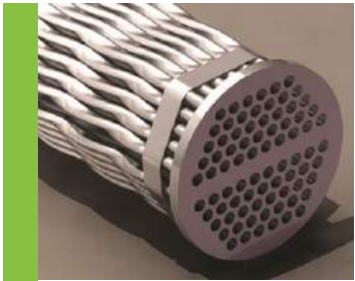


VIDEO SCOPE
— optics



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

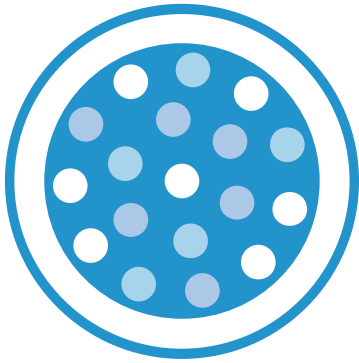
||| **ASTM**
E2906/E2906M-13



||| **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



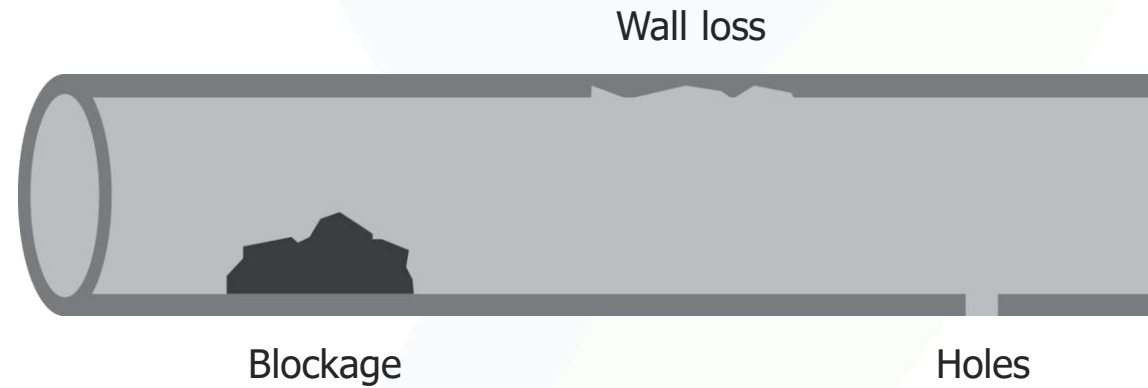
|| PITTING

Min. 10% of wall thickness

Sample Defect Types



Receive qualitative and quantitative information of defect types

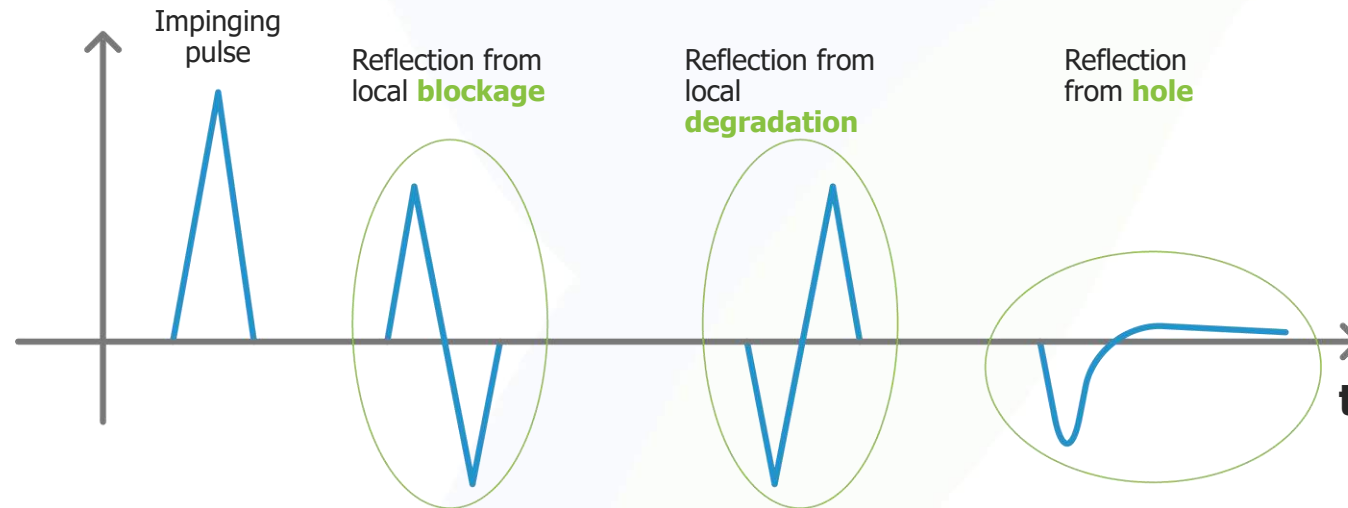


Identifying Defect Signatures



Each inner diameter defect has its own signature.

Exact location, type and size identified



BLOCKAGE

Deposits, dents,
welding material



WALL LOSS

Pitting, erosion



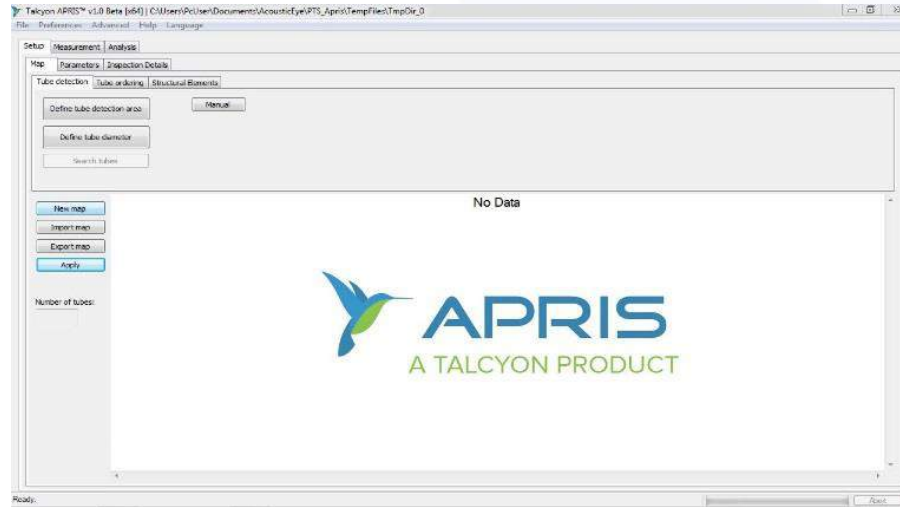
Tube Cleaning



- ||| **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

Reports

Customer ID: Start Date: End Date: [All Customers](#)

No.	Name	Date-Created	Action
1	filename-typeofreport1-fileelements-1.report	20-10-2017	Download
2	filename-typeofreport1-fileelements-2.report	18-06-2018	Download
3	filename-typeofreport1-fileelements-3.report	01-04-2015	Download
4	filename-typeofreport1-fileelements-4.report	12-07-2016	Download

[Download All](#)

Portal

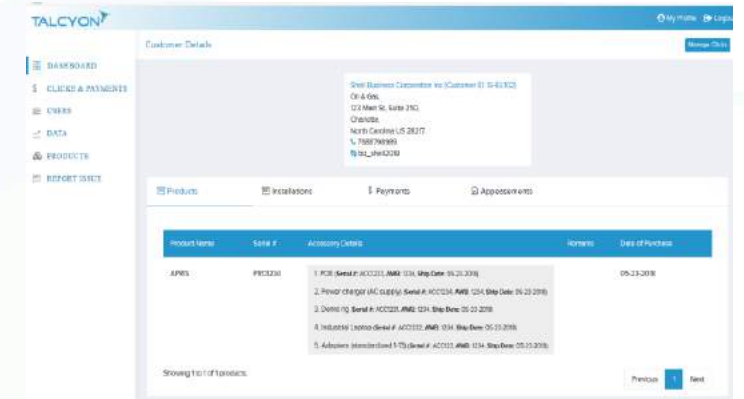
Seamless interaction to enhance user experience that

- Records the purchase details
- Monitor the inspection data & reports

Top up the clicks with just one click from the portal

Secured payment gateway that facilitates your purchase and averts operations interruption

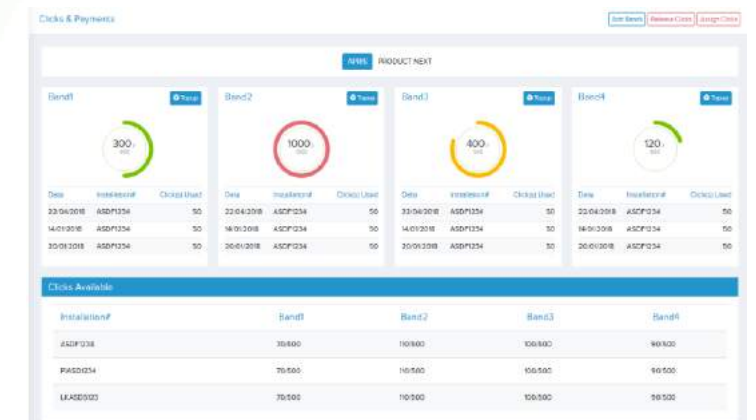
Timely support



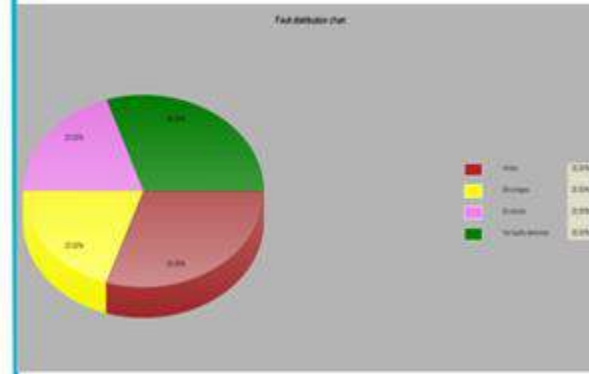
Add Band

BAND 1	BAND 2	BAND 3	BAND 4
\$999 ⁹⁹	\$1999 ⁹⁹	\$2999 ⁹⁹	\$5999 ⁹⁹
1000 Clicks	2000 Clicks	3000 Clicks	4000 Clicks
Adaptor Size - Min: B01 (8mm - 10mm)	Adaptor Size - Min: B05 (16mm - 18mm)	Adaptor Size - Min: B08 (22mm - 24mm)	Adaptor Size - Min: B11 (28mm - 30mm)
Adaptor Size - Max: B04 (14mm - 16mm)	Adaptor Size - Max: B07 (20mm - 22mm)	Adaptor Size - Max: B10 (26mm - 28mm)	Adaptor Size - Max: B13 (32mm - 34mm)
Active	Active	Active	Active
✓ Select	✓ Select	✓ Select	✓ Select

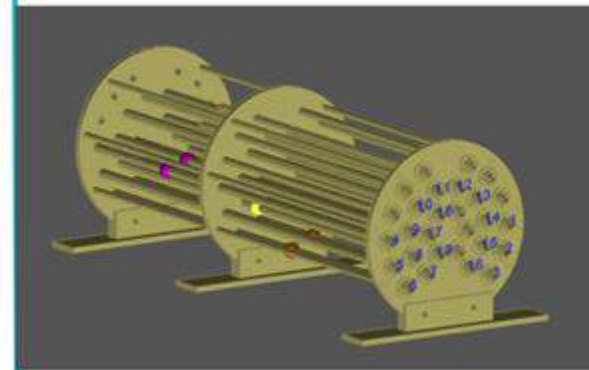
[Proceed to Payments](#)



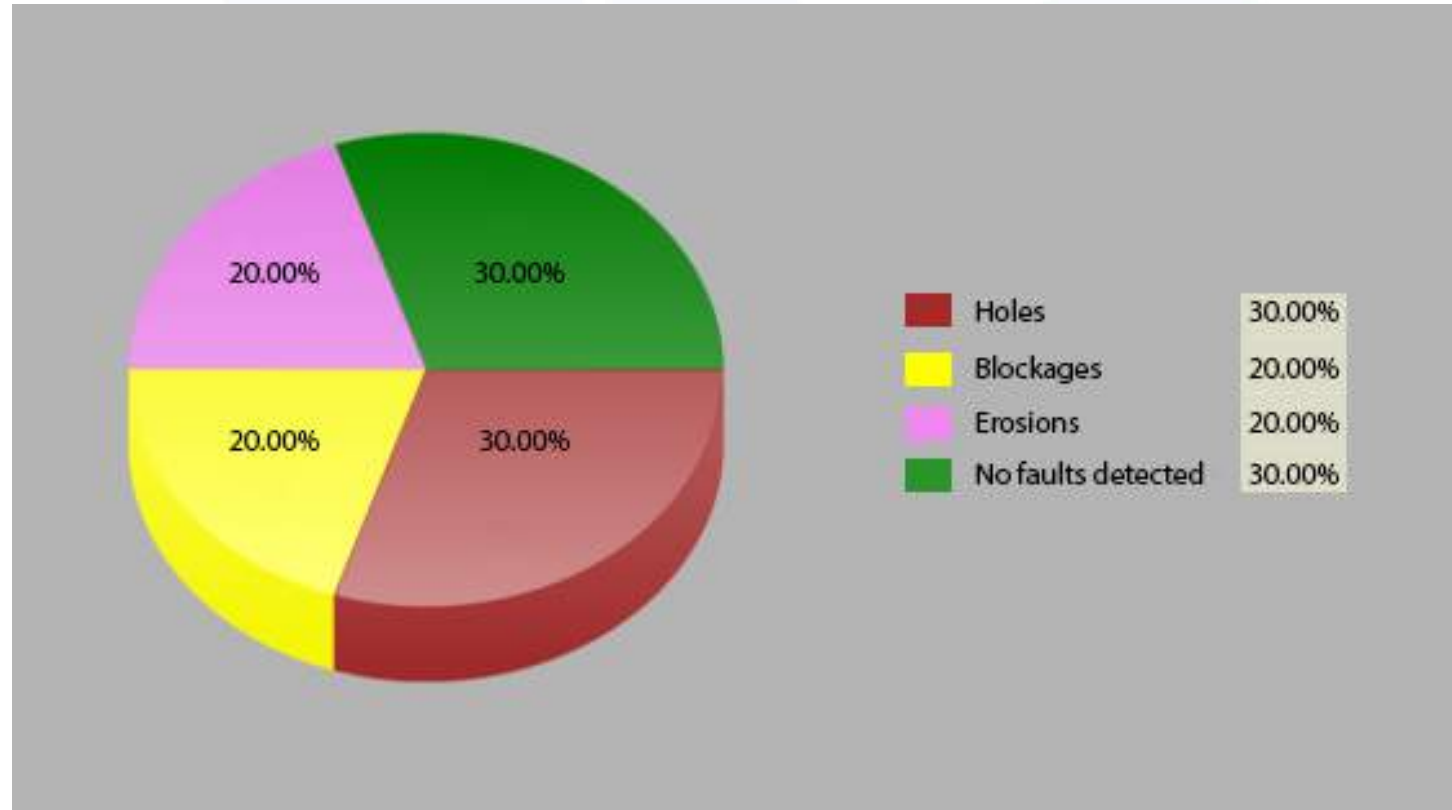
Report Generation



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



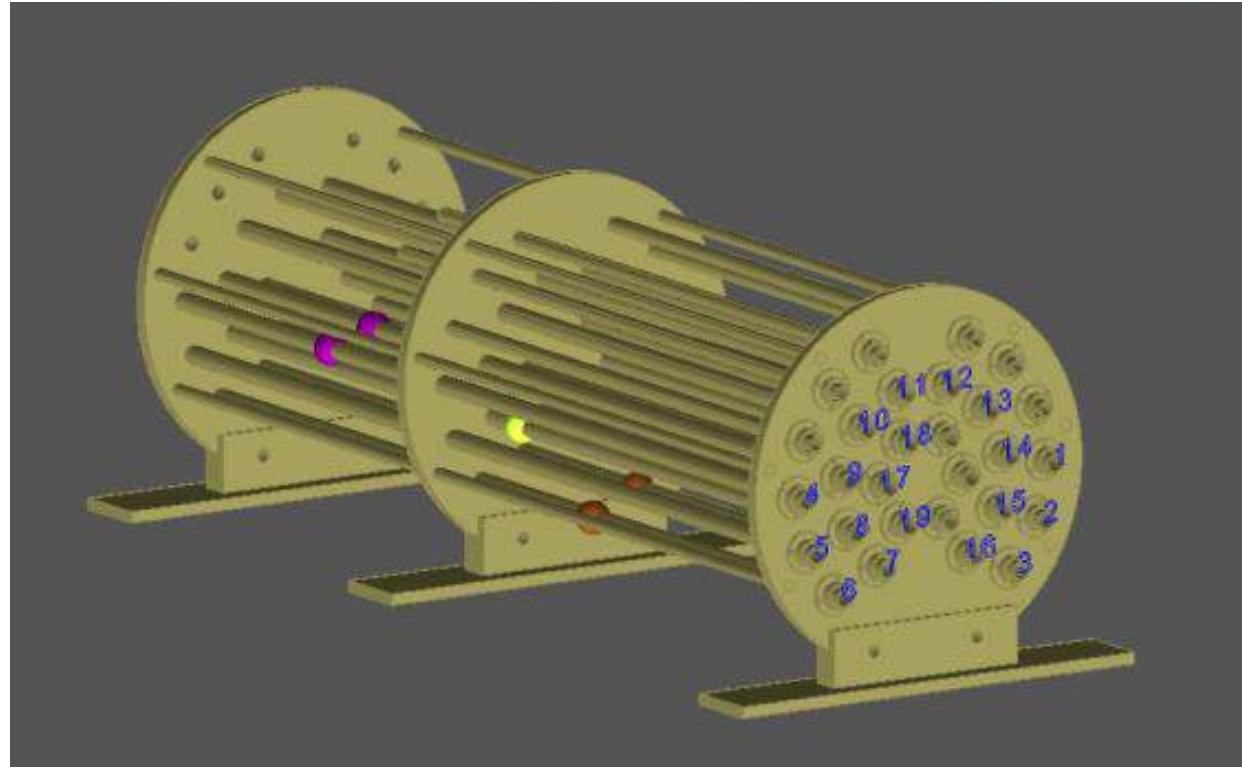
Fault Distribution Chart

Report Generation

Tube ID	Pos[m]	Wall Reduction[%]	Condition	Comments	Displayed Filter	Graph
R[11]C[1]	1.7	60			None	Link
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

Defect Table

Report Generation



3D Defect Distribution

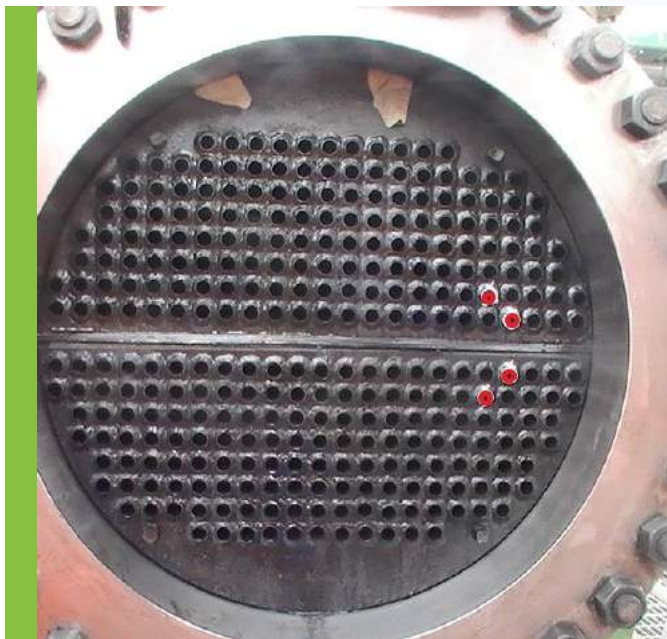
Industrial Sectors and Applications



- ||| 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

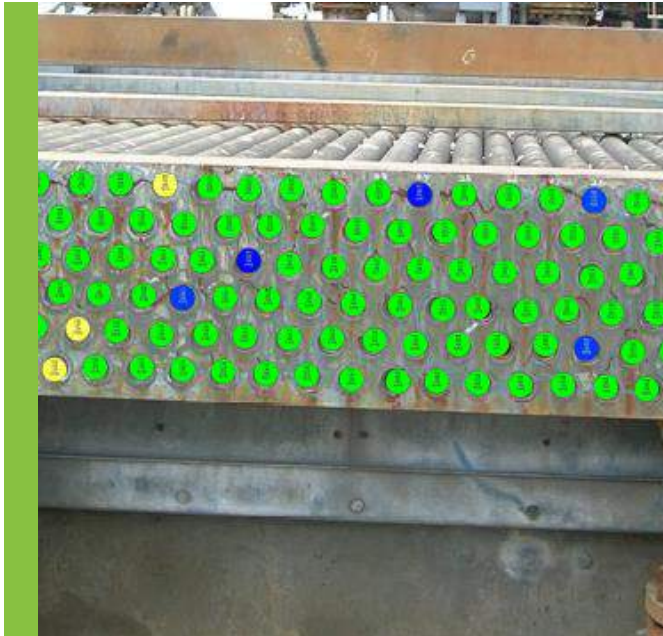


|| Inspected condensate stabilizer reboiler

- 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



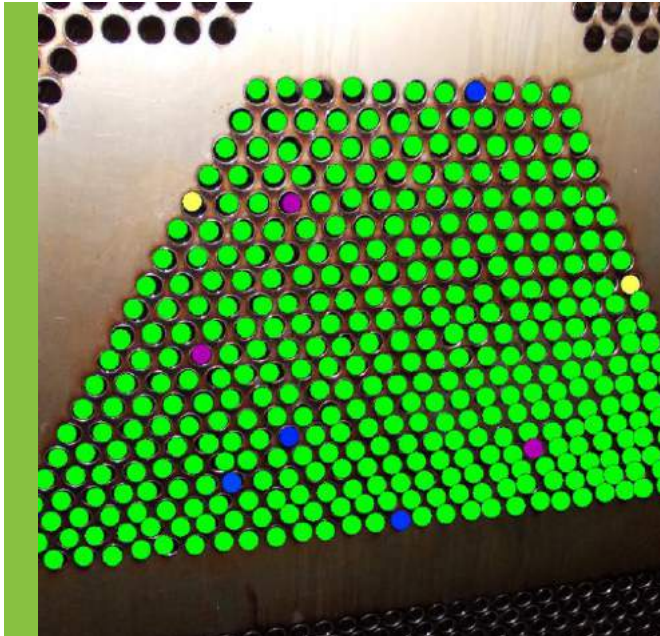
|| Inspected 16,000 Fin Fan air cooler tubes in 6 days

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

Project Overview

TNB

Power Plant Condenser Inspection

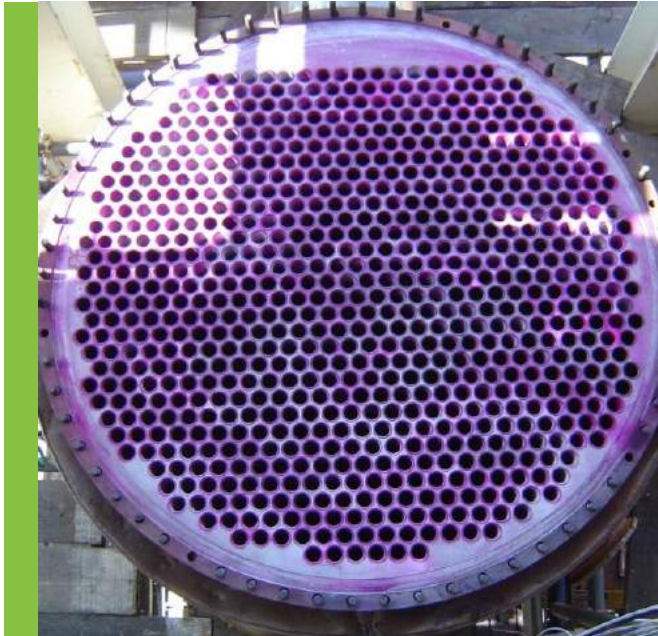


|| Inspected titanium condenser tubes

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

Project Overview

BP Petronas
Reboiler Inspection



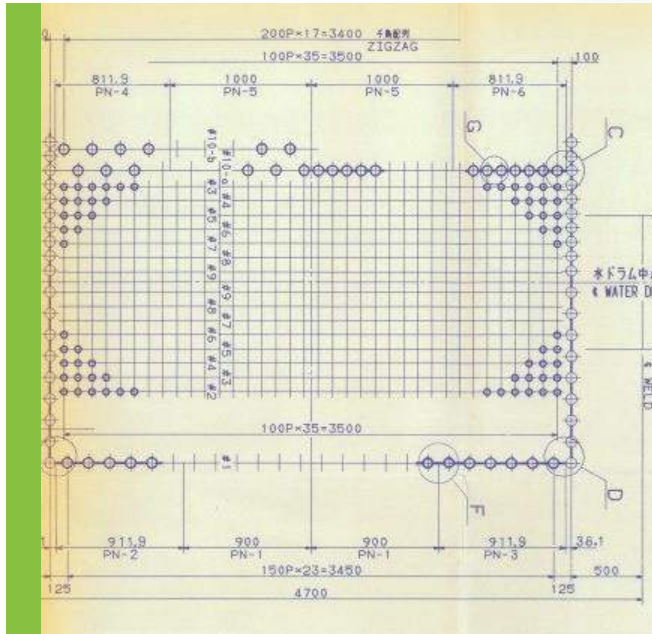
|| Inspected 908 tubes in 4 hours

- 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



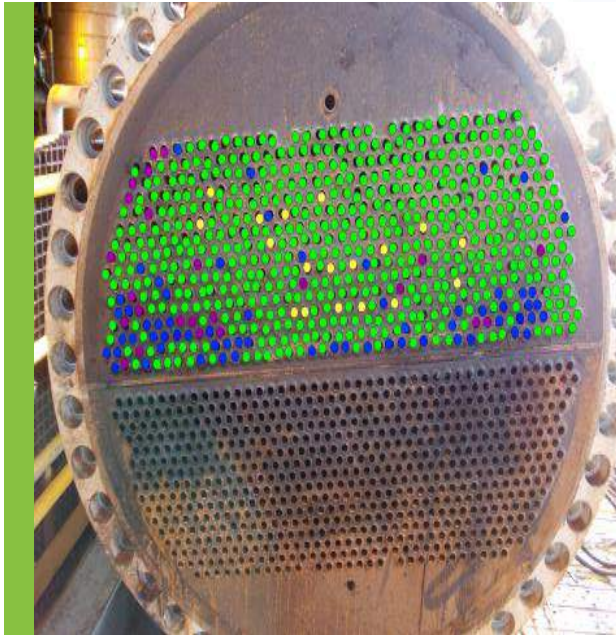
Inspected D-shaped boiler tubes

- 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

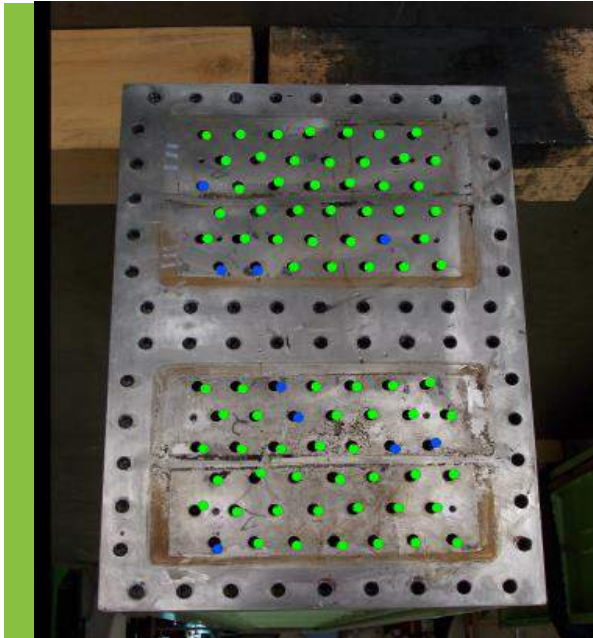


Trial inspection to technology acceptance breakthrough

- 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

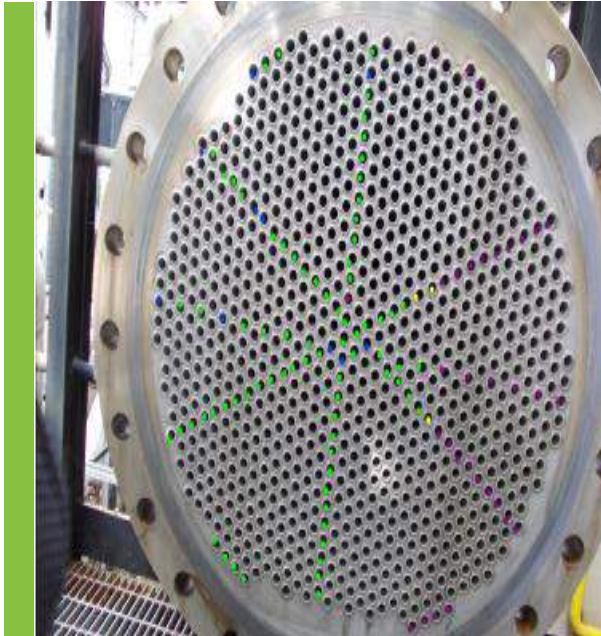


|| Inspected hydrogen coolers

- Biggest geo thermal electricity generator in New Zealand
- Main concern is to identify 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

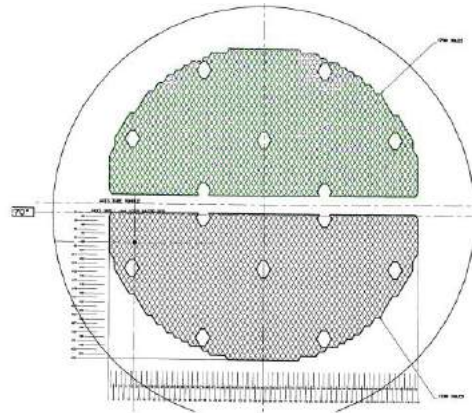


Trial inspection leading to a contract

- 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

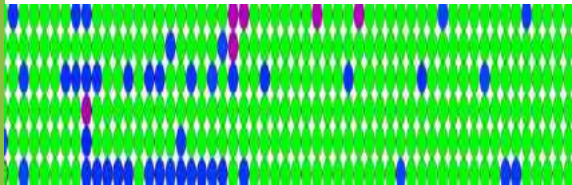


|| Inspected U-type heater tubes

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

Project Overview

GASCO
Air Cooler Inspection



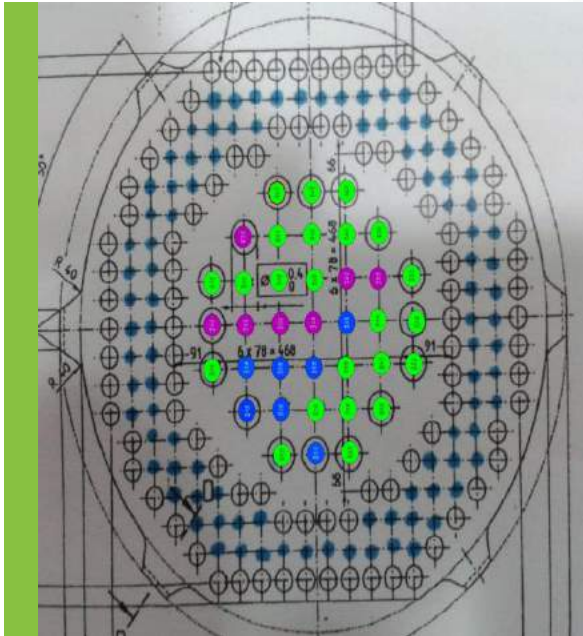
Inspected 3 air cooler finned-tube bundles

- 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



Thank You.

“Designed & Developed by **SCIENTISTS**,
Refined & Perfected by **INSPECTORS**”

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