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TECHNOLOGY RELIABILITY INSPECTION COMPANY

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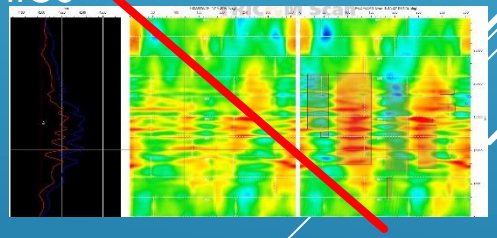
How We started with TricomScan?

The services had some caracteristics as:

- Big Equipment
- Only the cylindrical section was scanned
- Not possible to compare mappings from other Service Companies



- Commercialy costly and complicated

That make me think!... And TricomScan started

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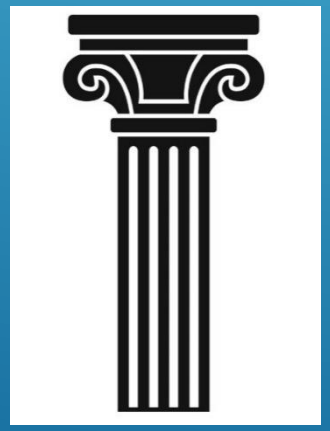
What kind of Company we would like to be?

We rely on this columns:



- Quality
- Professionalism
- Innovation
- Customer Service
- Continuous improvements

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How could we differentiate ourselves from the existing Companies in the market?

- Being humble , because that helps our Staff to learn from our Clients, from their experience their needs.
- Developing new technologies.
- Being Client friendly.
- Prioritize the technical honesty upon the marketing needs.

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8 Years ago we started in the Indian Market

We have found many "Myths" around this service.

- Video is better than Pictures/Images.
- The mappings cannot be compare between different service Companies.
- One of the requierements was and still is (in some refineries) a low density/accuracy scan 3,2 mm in a 1"x1" área.
- Working with a Public Company is "different" as working for a Private one.
- Etc.

And now we are in front of new ones.

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- Faster is better.
- Sharpness = Higher Stress = Risk = Critical = Damage ???

I will go back later with this.
Now Let me present the latest advances

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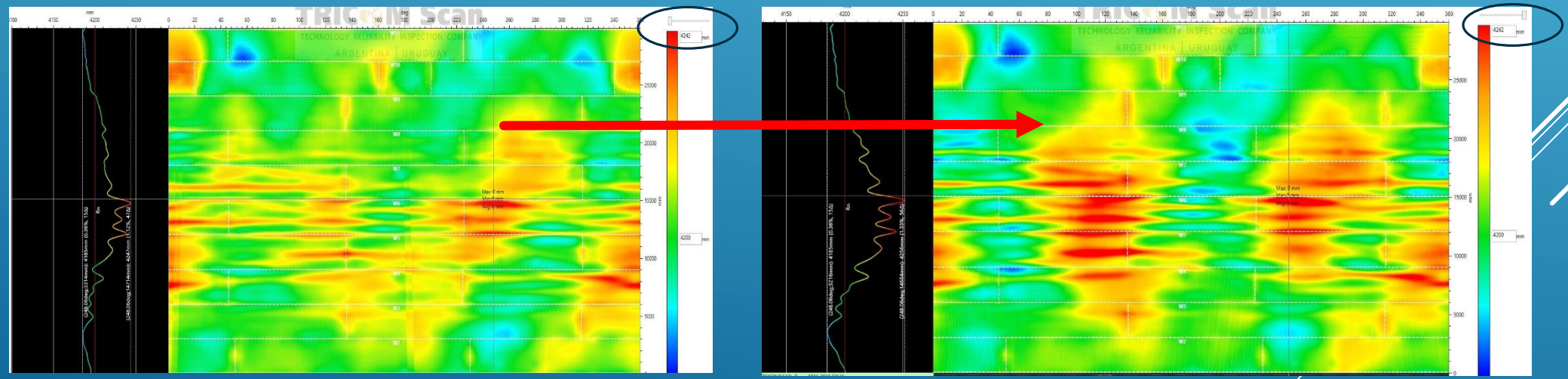
Comparison Tool .

First Company in comparing mappings from different Service Companies.

Overlay Comparison. Easy interpretation of how the bulges are evolving throughout the life of the drum.
Our last upgrade allows the clients for comparing up to
20 mappings simultaneously .
Best tool to analyze the evolution of the Drum.



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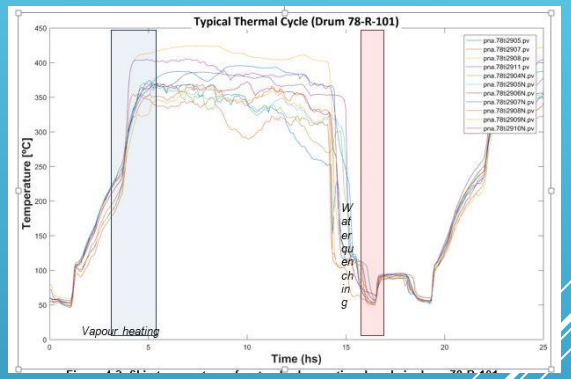
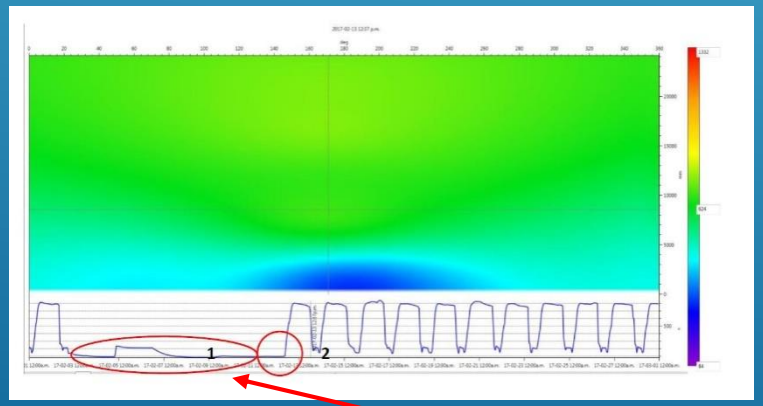
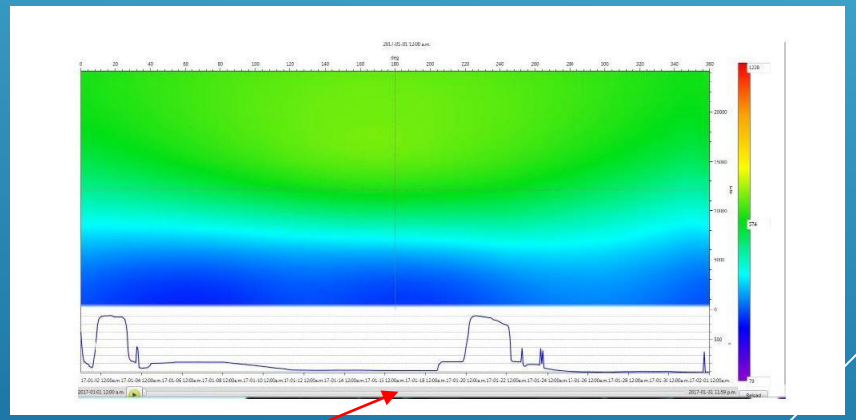
Thermal Mapping

First Company to include Thermal mapping in its reports.



- We provide a temperature profil with the thermal data of the refineries. This allow to knowledge the opperational condition of the Drums.
- This study help to assess the bulge severity and possible reasons of a damage.





Operational problems

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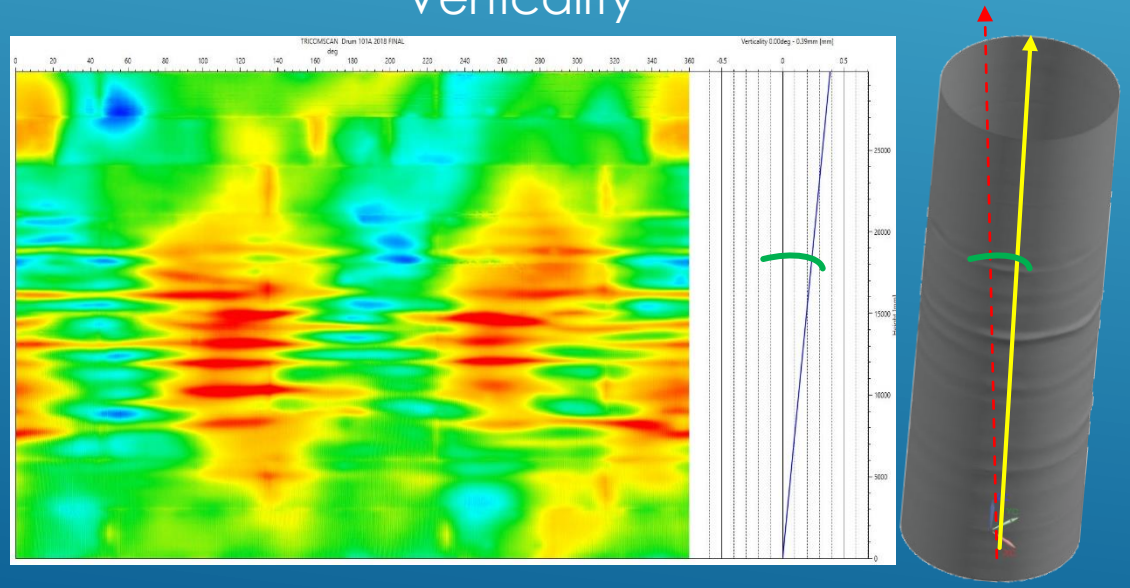
2019/2020

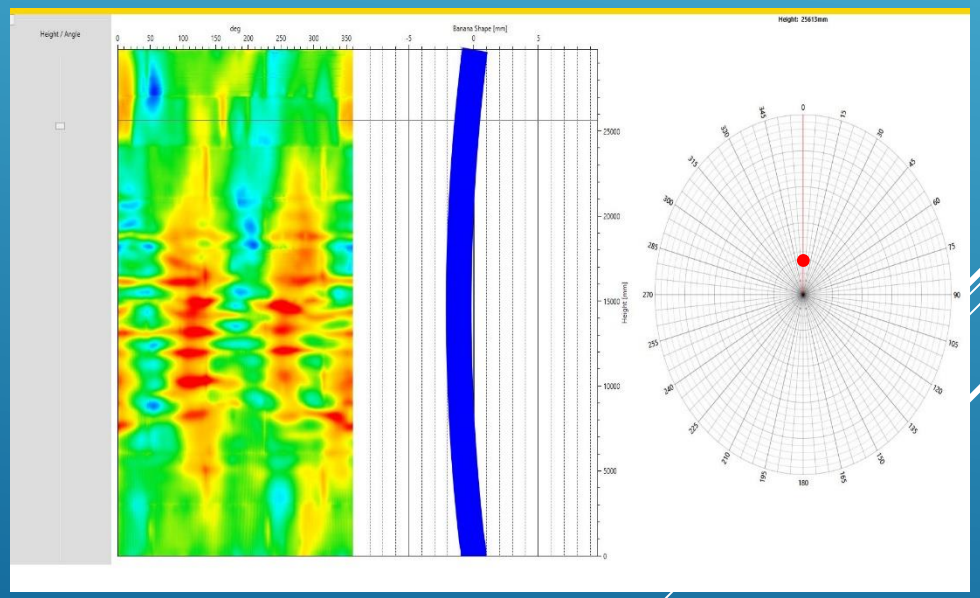
Verticality – Banana Shape

- First Company to develop the Verticality / Banana Shape Analysis.
- Tricom Scan Can analyze the evolution of the verticality.

Verticality



Banana Shape



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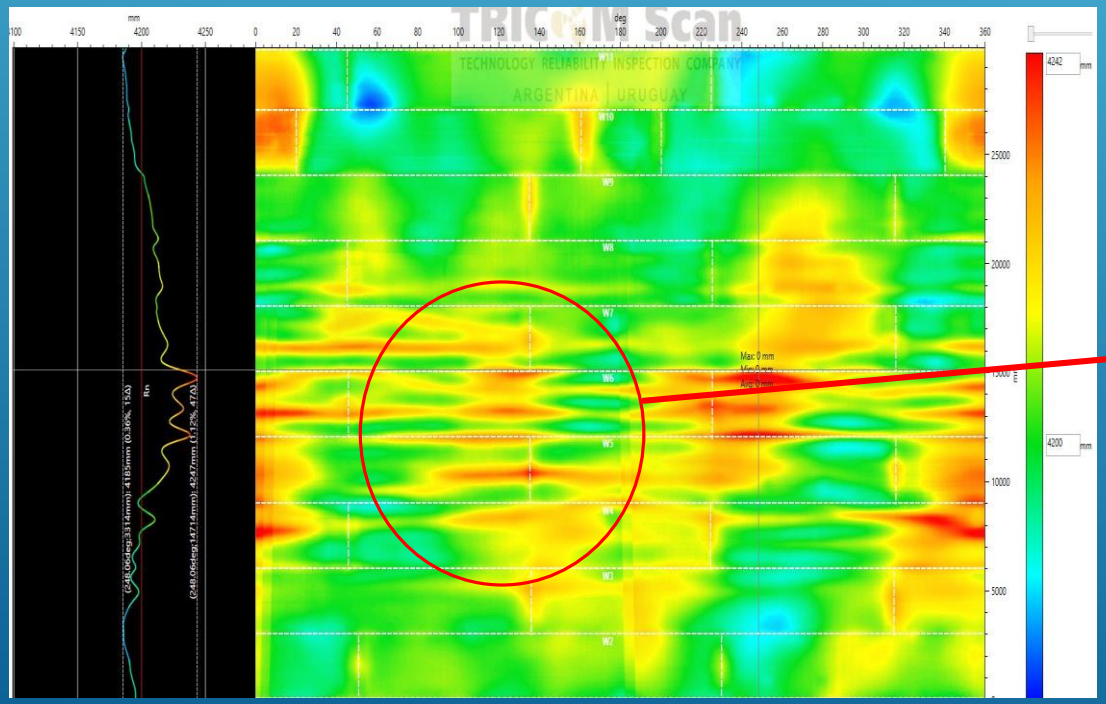
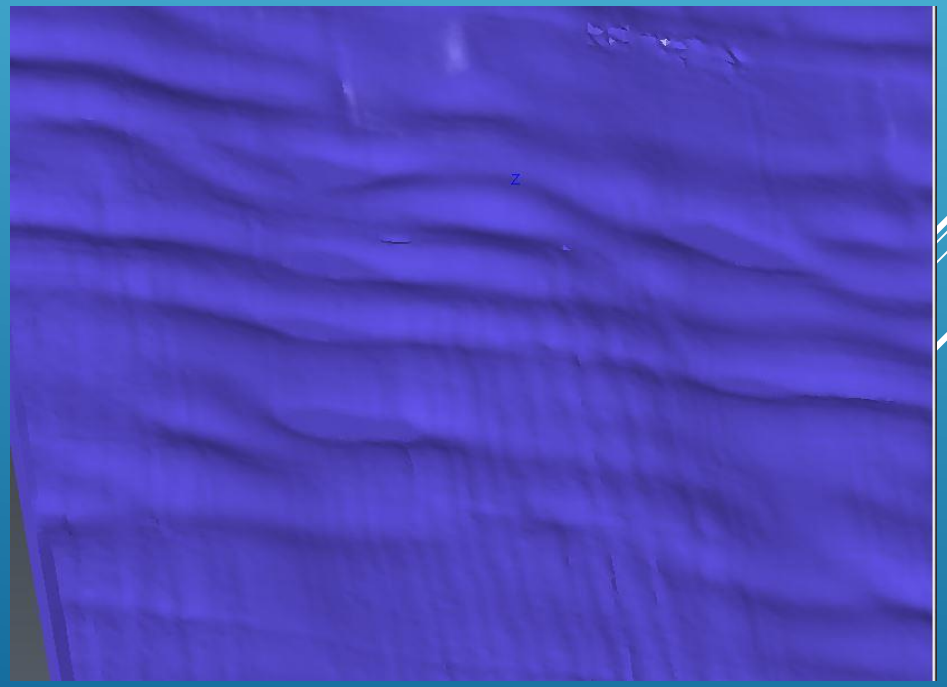
3D Video

First Company to include a 3D video in the reports.

- Having a 3D video help all the engineers to fully understand the Laser mapping.





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On Mapping Visual Inspection

- First Company in introducing High Quality Images and to integrate the visual inspection with the mapping.
- Perfect correlation between Images and Mapping.
- Perfect correlation between Images and TBS / Severity Mapping !!
- Zoom tool .
- Our software allows us to visualize the area of interest of different years and see how it has evolved.

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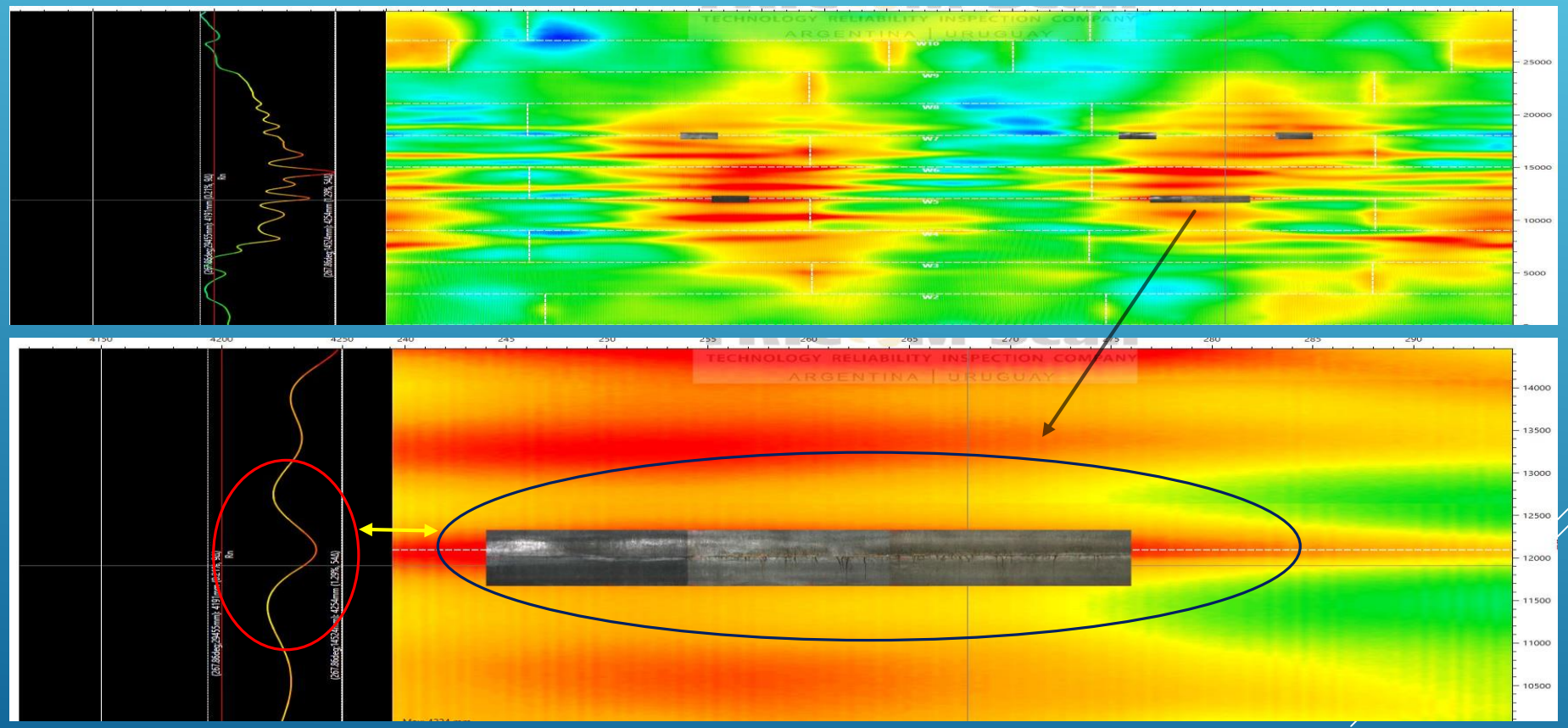
- We have a 1:1 correlation between Mapping and Images.
- Easy to use tool.



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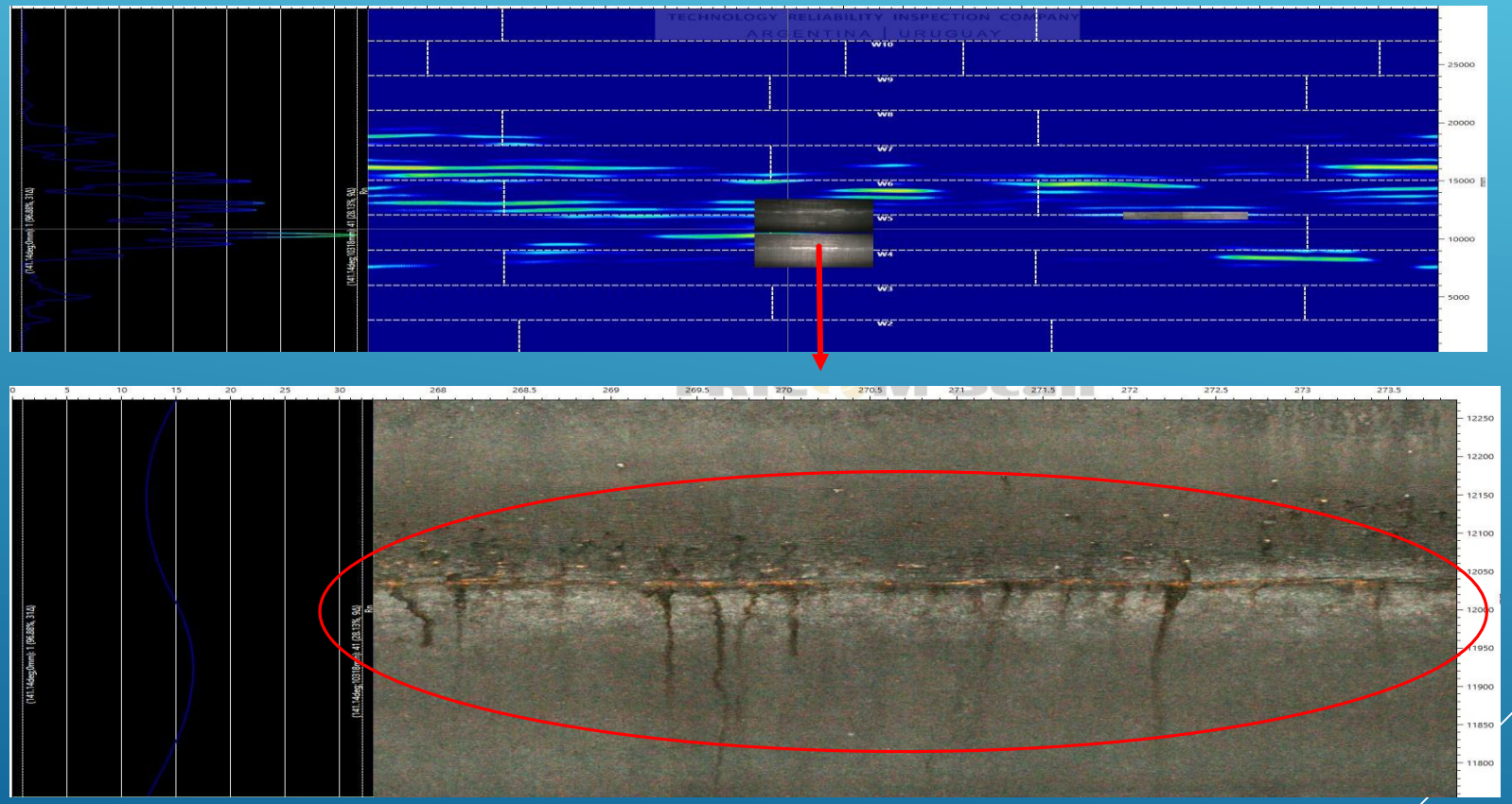
Open the images on the TBS , Tricom Bulge Severity Mapping



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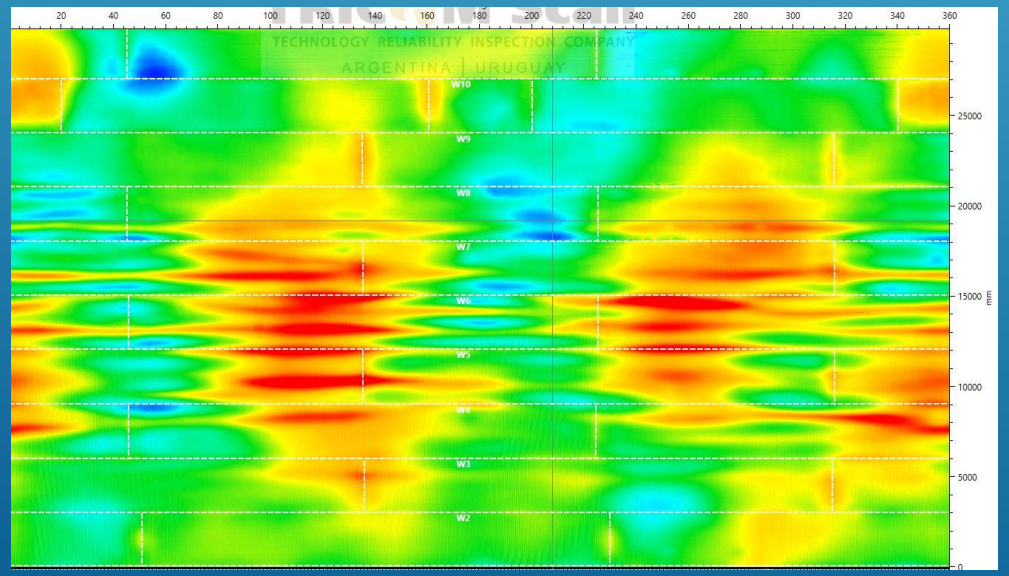
TBS – Bulge Severity Mapping

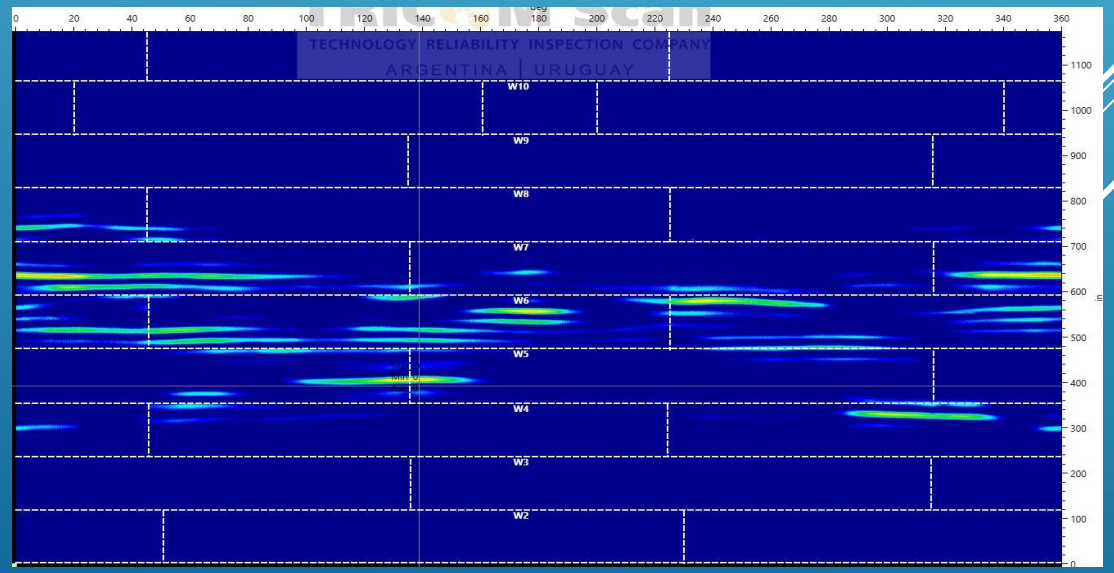
A new way of bulge analysis.
A step forward

- For many years there was only one way to analyze the bulges , and it was because of its sizes.
- We knew that there were other variables that should be considered in the analysis.
- The TBS was develop.

Laser Mapping



TBS – Severity Mapping



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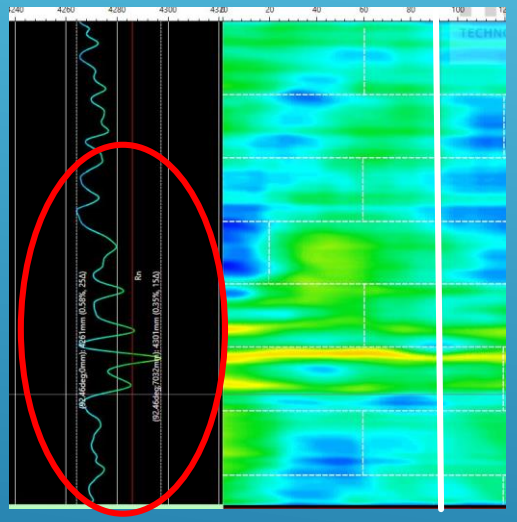
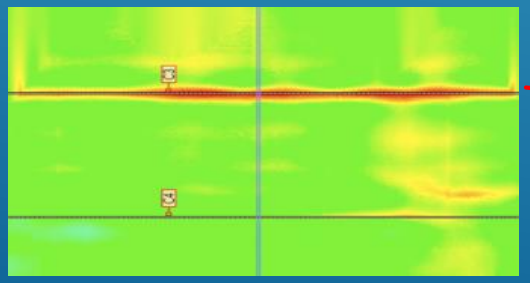
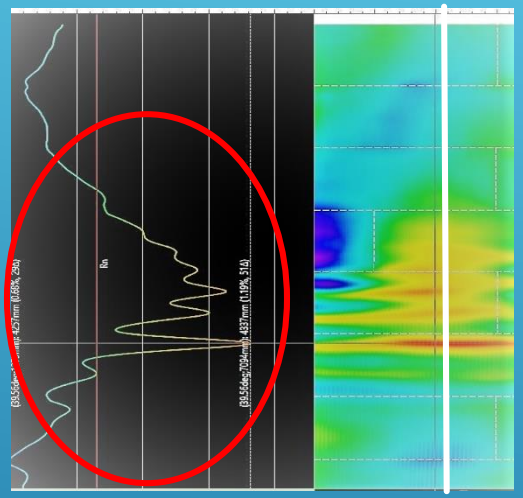
Criticalness – The state or quality of being critical

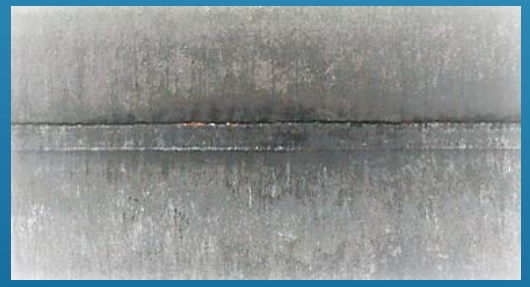


Critical Bulge on weld





Passing Crack



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EMPIRICAL CORRELATION

The fact that two variables appear to be correlated does not necessarily mean that one is causing the other.

?

FALACY = IS A FAULTY REASONING

FAULTY REASONING = Principle or idea that can be considered flawed according to a system of logic or rational thought

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- Sharpness = Higher Stress = Risk = Critical = Damage ???
- SHARPNESS = AREAS OF CONCERN AND RISK?
- SHARPNESS = IDENTIFYING AREAS OF STRESS?
- SHARPNESS = REPLACE TRADITIONAL ENGINEERING ANALYSIS??

There is only one answere →

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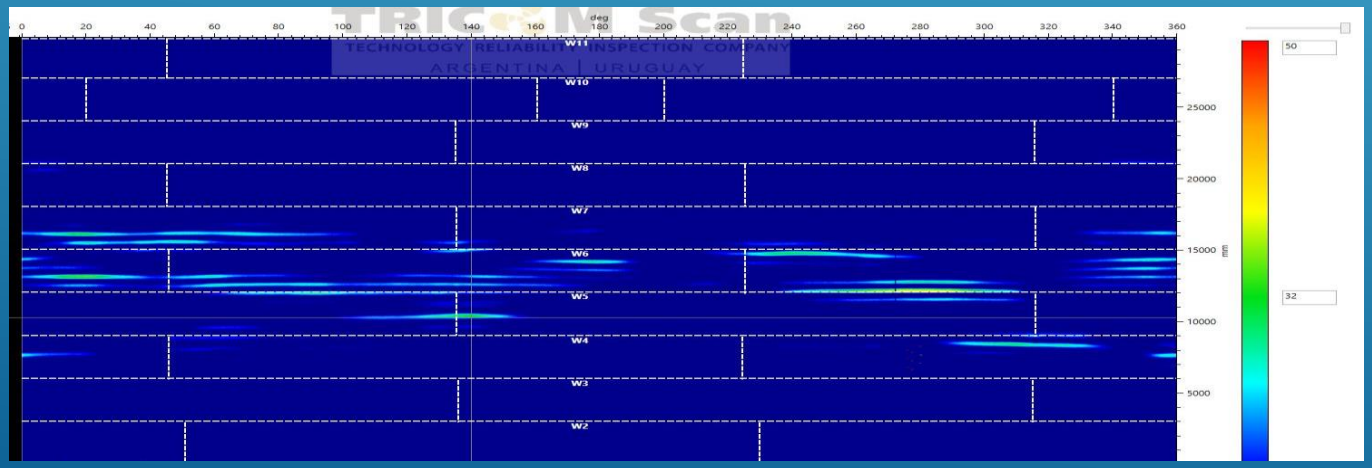
- What happens if we reduce the cycle?
- Is the same single feed / doble feed entry ?
- Horizontal plate and vertical plate design should they be considered the same?
- If the operational conditions change? If there are problems with the preheating/quenching.

For develope the TBS we have considered more situations base on our experience and FEA of more than 13 years.



Criticalness

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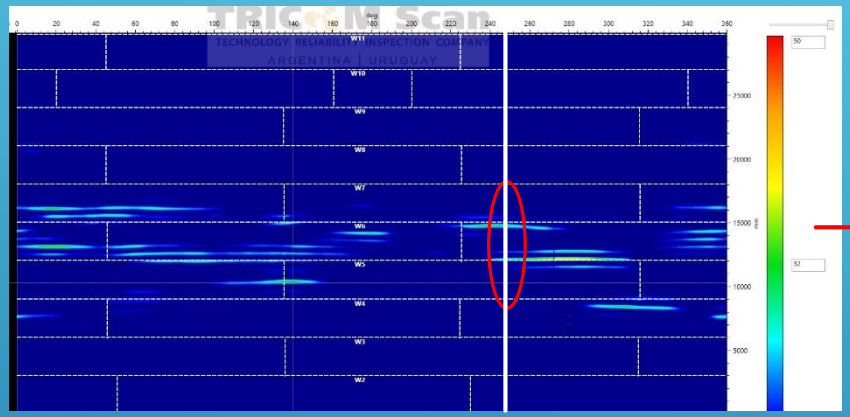
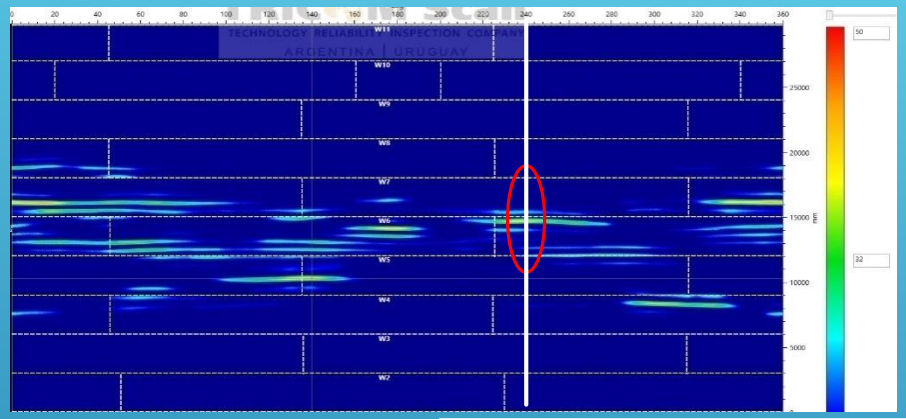
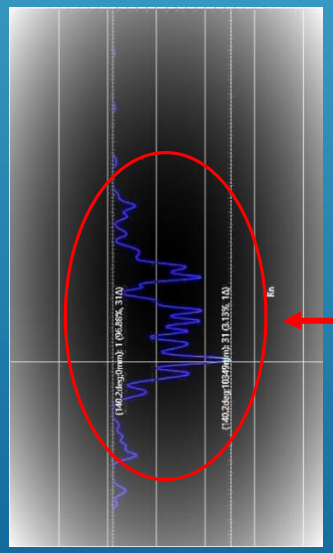
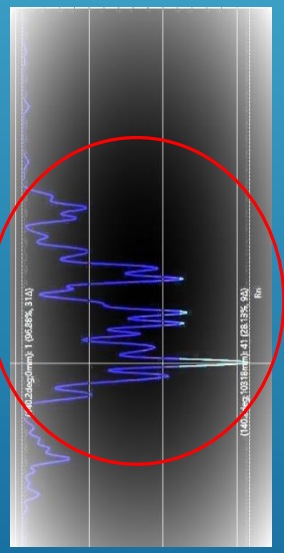
TBS – Criticalness evolution over the years



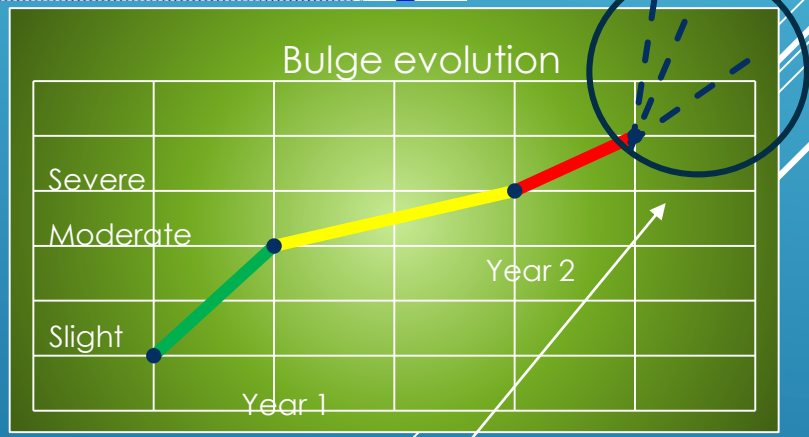






Year 1

Year 2



Can we predict what may happen in the future?

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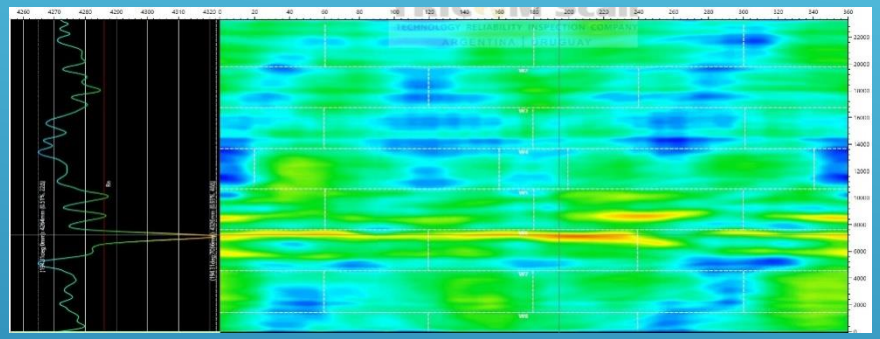
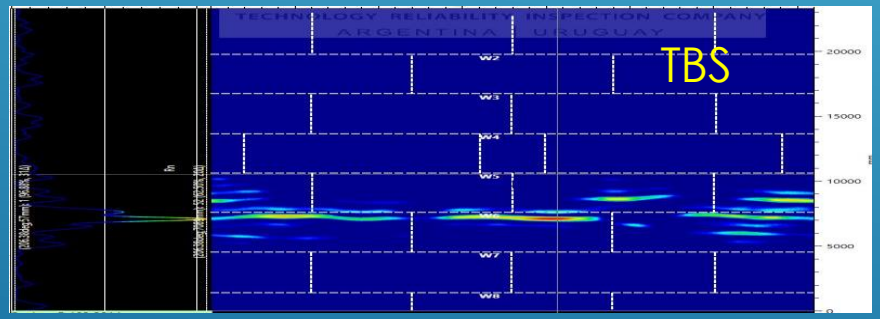
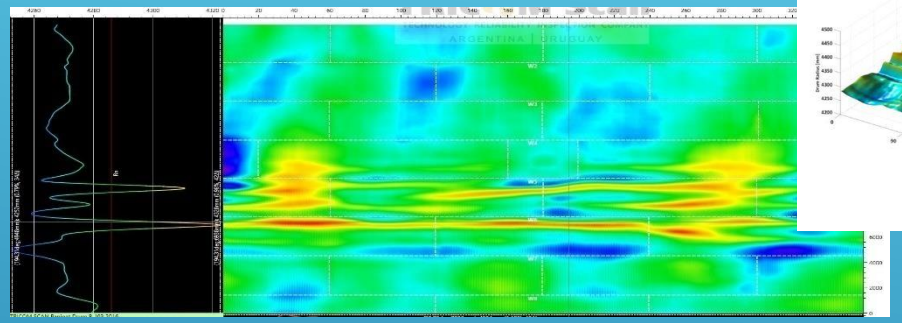
Correlation between Laser Mapping – TBS (Severity Mapping Analysis) – Strain Analysis

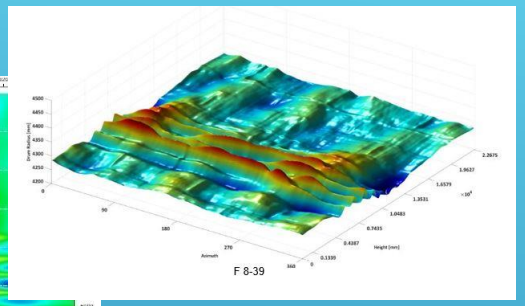
Year 1

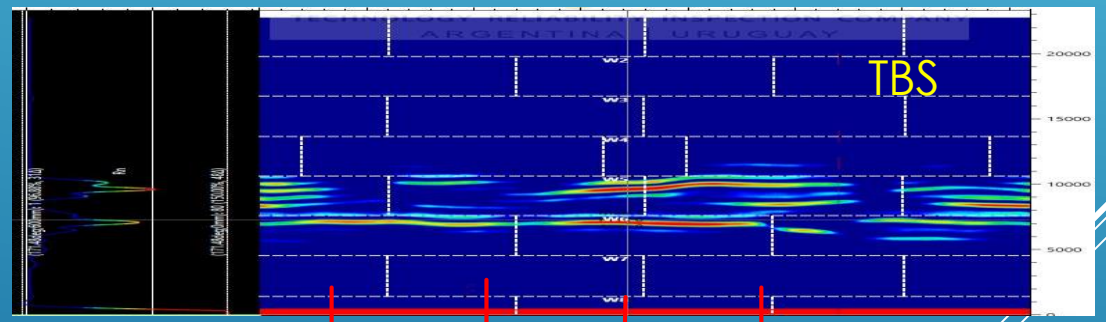


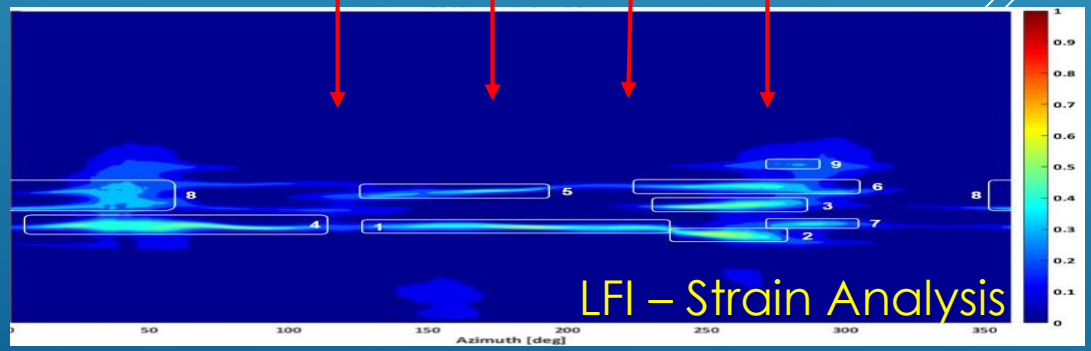


Year 2









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Tables of the reports

Level	Position (º)	Height (mm)	Seize of bulges				Status
			Arc extension	Width	R Deviation	Growth	
S1	0	11680	360	1000	50	22	Seam Bulge/moderate
S2	0	14260	360	1000	60	21	Seam Bulge/Moderate
B1	0	7700	360	1000	50	15	Band Bulge/Moderate
B2	0	9850	360	1000	57	26	Band Bulge /Moderate
B3	0	12940	360	1000	55	24	Band Bulge/Moderate
B4	0	15850	360	1000	47	19	Band Bulge/Moderate
B5	0	18540	360	1000	36	15	Band Bulge/Slight

Range #	Azimuth range [º]	Elevation range [m]	Maximum LFI	Criticalness	Recommended NDT	Recommended repair
1	141.0 – 200.7	6.690 – 7.320	0.83	Failure	Ultrasonic Testing (PA)	Weld overlay
2	342.1 – 045.3	8.650 – 9.940	0.78	Danger	Ultrasonic Testing (PA)	Weld overlay
3	258.4 – 306.2	6.540 – 7.090	0.58	Concern	Ultrasonic Testing (PA)	---
4	163.5 – 250.0	9.450 – 9.880	0.55	Concern	Ultrasonic Testing (PA)	---
5	119.2 – 160.7	9.180 – 9.800	0.46	Concern	Ultrasonic Testing (PA)	---
6	264.0 – 273.2	8.200 – 8.350	0.31	Concern	Ultrasonic Testing (PA)	---

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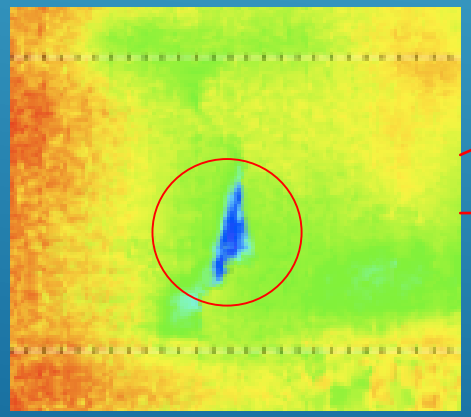
LASER – MAPPING AND VISUAL CORROBORATION

- Missing Cladding as seen in the Point Cloud
- Risen Cladding shown in the Cylinder Viewer



Remote Visual Inspection Corroboration

High density Laser

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Thank You !!!