

ILI Corrosion Growth Rate Analysis with PODS

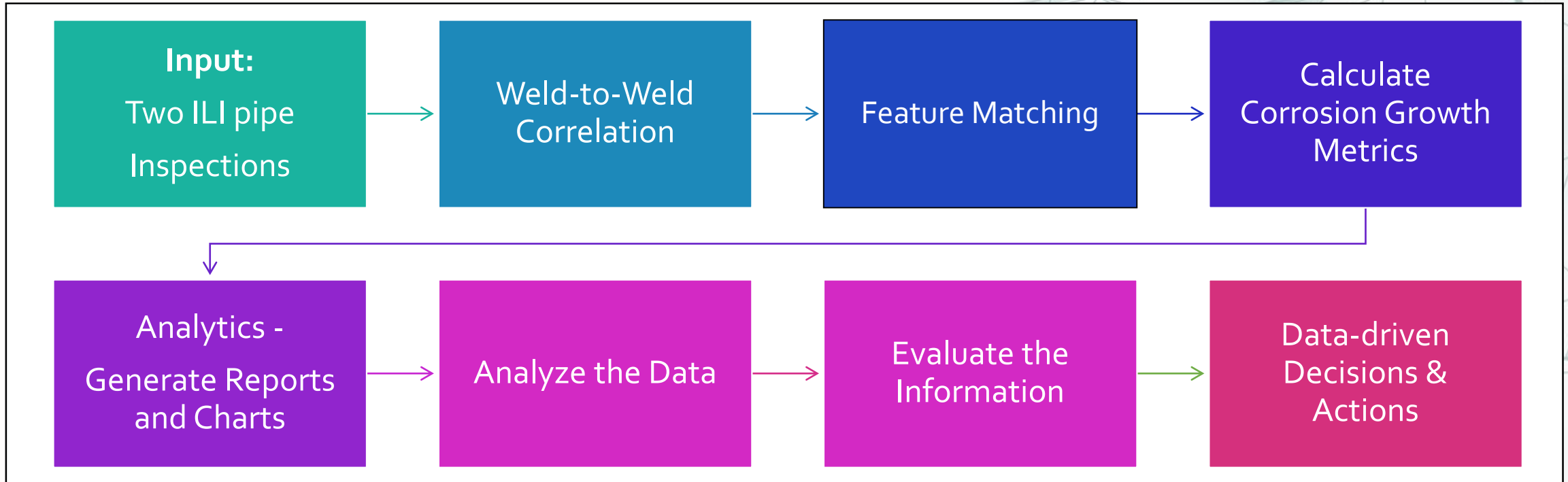
Ron Brush, New Century Software

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Uses for Corrosion Growth Analysis

- Risk assessment calculations
- Identification of corrosion growth trends
- Corrosion (mitigation) monitoring
- Setting or extending ILI intervals
- Planning repairs of defects
- Predicting leak vs. burst
- Estimating remaining life



What is Corrosion Growth Rate Analysis?

Signal-to-Signal Performed by ILI Vendor

- Requires the same ILI vendor for both ILI runs
- Pure comparison of raw ILI signal data
- Highest accuracy

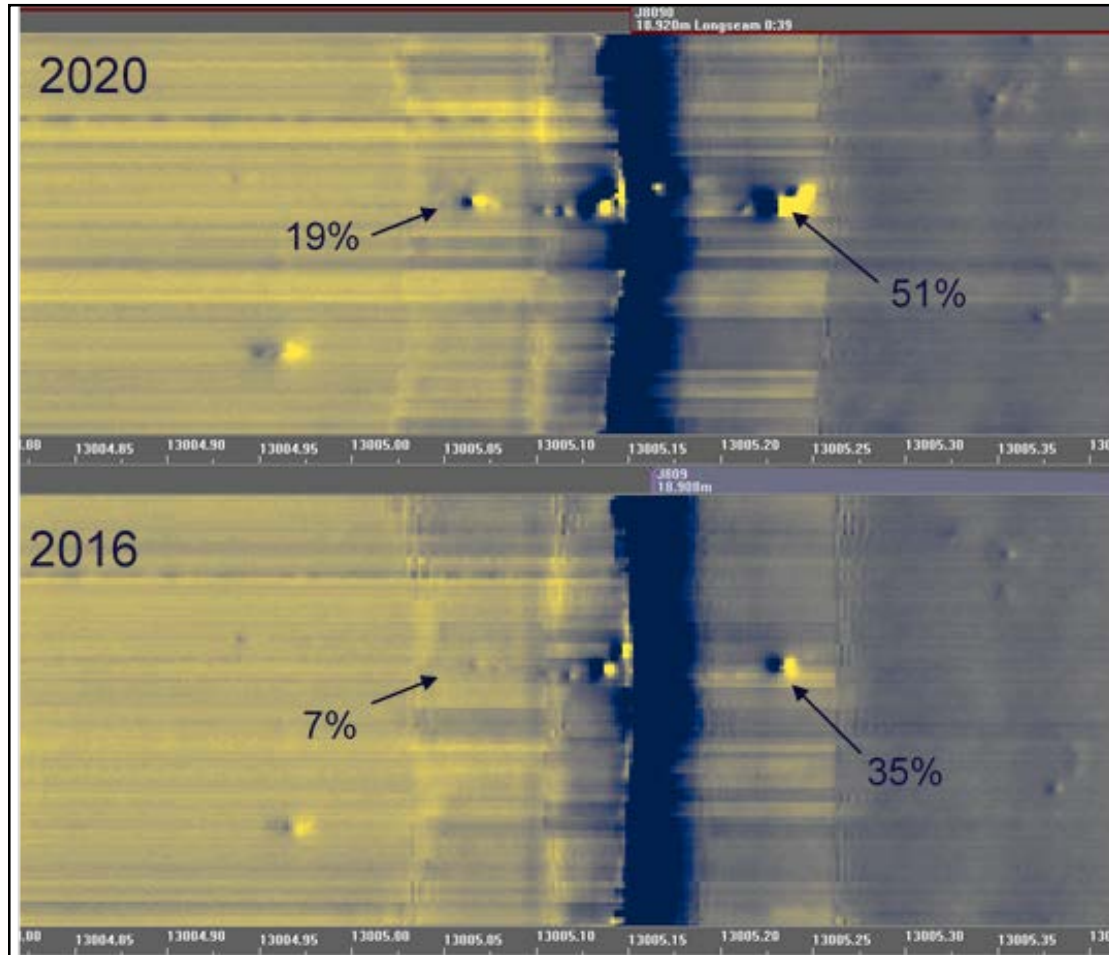
Signal-to-Box Performed by ILI Vendor

- Compare raw signal with boxes from another ILI vendor
- Better accuracy

Box-to-Box Performed with the right tools

- Requires two ILI Pipe Tally reports (Excel format)
- Compare features from two different ILI runs

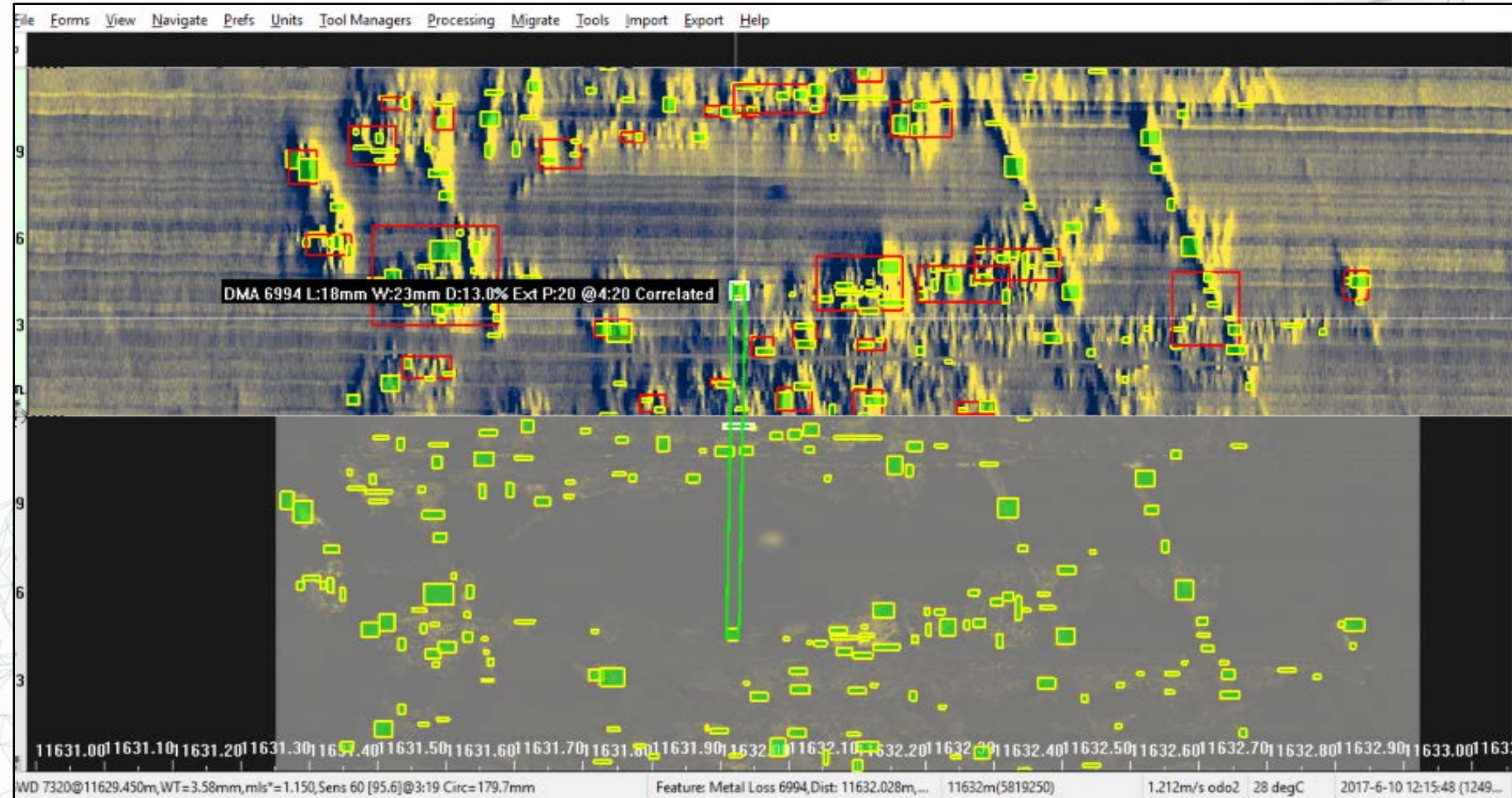
Signal-to-Signal Corrosion Growth



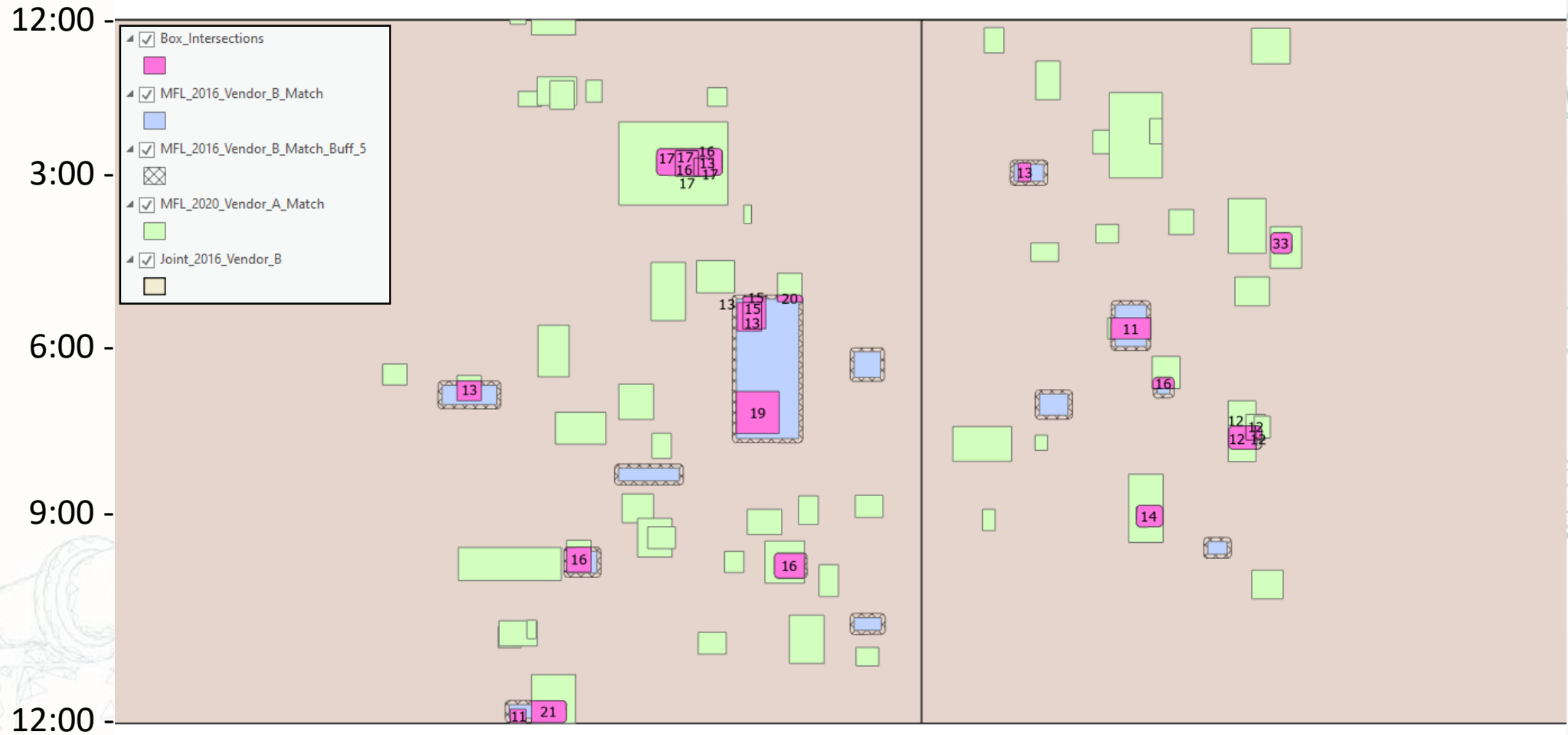
- Raw ILI signal is proprietary to each ILI vendor
- Raw signal is magnetic flux measurement, not a 3D scan
- Compares Raw Signal with Raw Signal
- Done with ILI Vendor's analysis software
- Requires same ILI Vendor and same ILI tool

Signal-to-Box Corrosion Growth

- Performed by ILI Vendor using a previous Pipe Tally Report

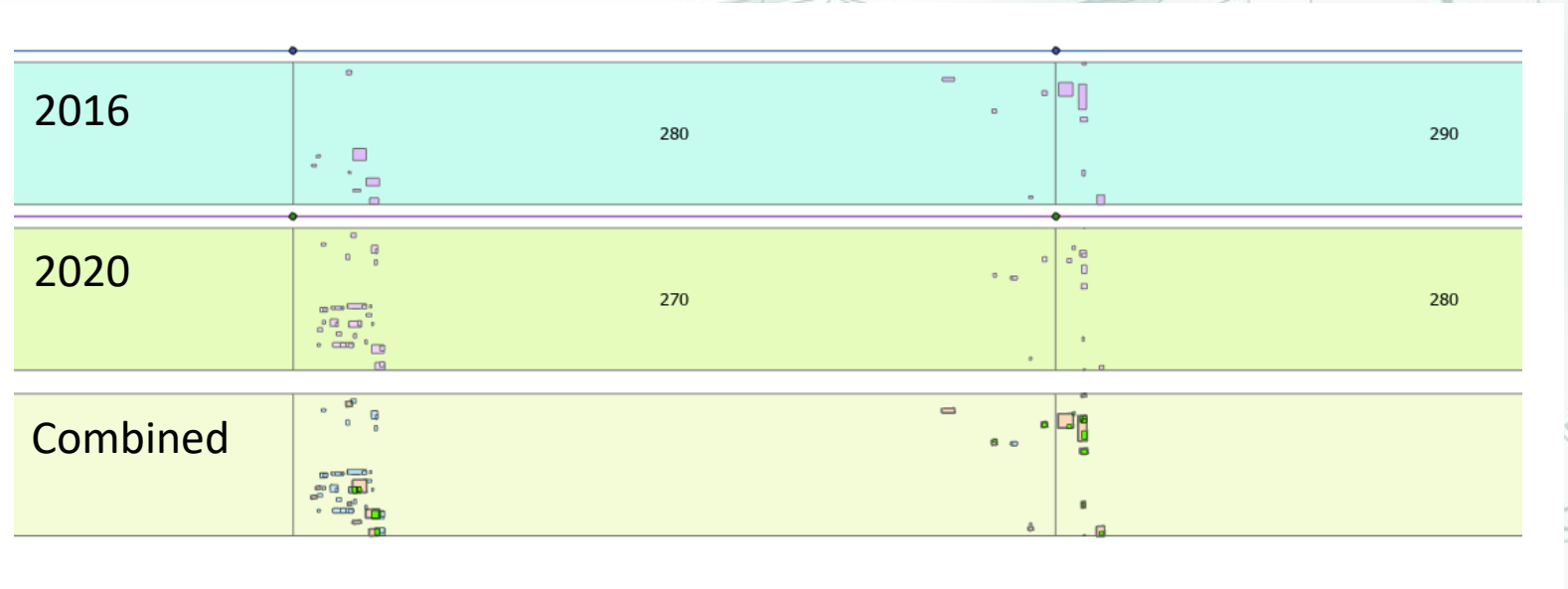


Box-to-Box Corrosion Growth



Box-to-Box Corrosion Growth

- Compare two ILI runs from same or different vendors
- GIS-based visualization and analysis
- Joint Matching
- Calculate corrosion statistics for each joint
- Box matching and corrosion growth calculations



Turning Data into Knowledge



OR



This block contains several data visualization outputs:

- A map showing colored polygons (green, blue, purple) on a brown background.
- A table of contents for 'Integrity Plus' with sections for 'PIPE TALLY' and 'TABLES'.
- A topographic map showing a red boundary.
- A scatter plot with blue data points and a red trend line.
- A line graph showing a red line on a white background.
- Several Excel spreadsheets showing data tables and charts.

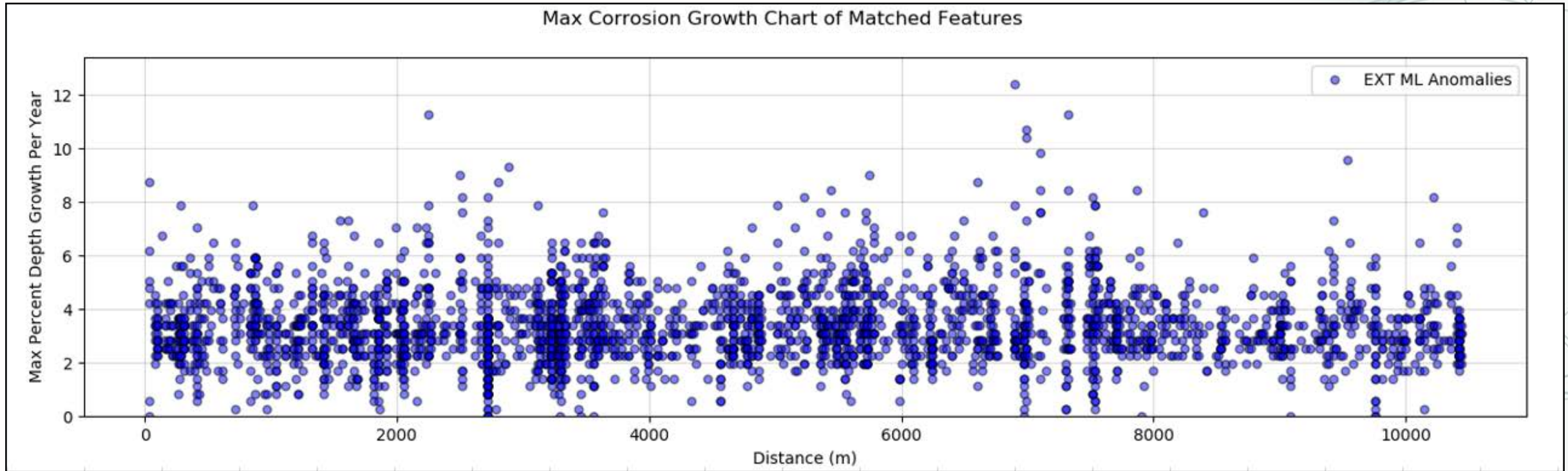
Examples of Corrosion Growth Reports & Charts

(Output can be loaded to PODS GIS)

- Average corrosion per Joint
- Avg. growth per feature
- Near weld
- Between 4-8 o'clock
- Internal vs. external
- Moving aperture window
- Max. corrosion growth

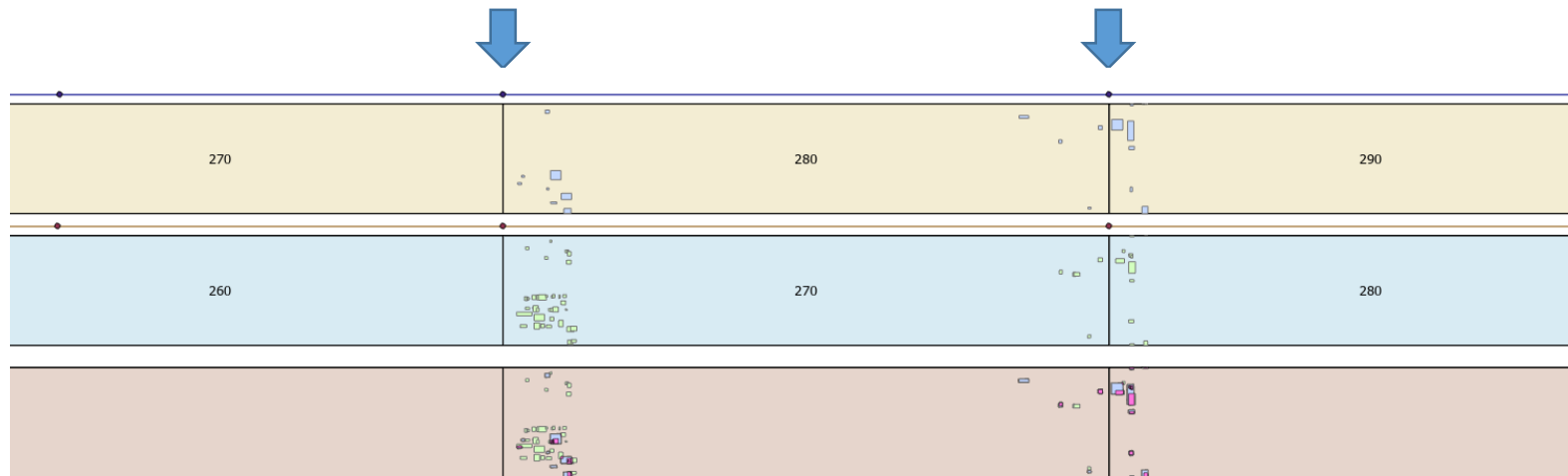
- Dynamic Segmentation Growth Rate
- Mod. B31G burst failure
- Mod. B31G Time to Failure
- Active vs. inactive Growth
- Matched vs. Unmatched Features
- Compare with NDE results
- Growth Distributions

Max. Growth Rate of Matched Features (Depth%)



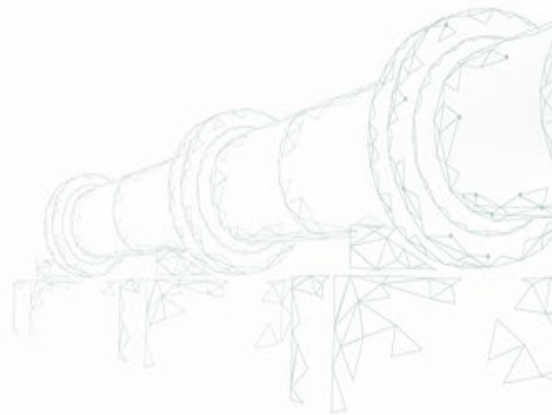
Corrosion Near Girth Weld

Description	Number of Joints	% of All Joints	Number of Features	% of All Ext Features
Ext. Corrosion adjacent to girth welds (within 0.5 m of GW)	583	91%	7,895	97.5%
Ext. Corrosion within pipe body (greater than 0.5 m of GW)	32	5%	199	2.5%
No Ext. Corrosion	3	0.5%		
Total	641		8,094	



Corrosion between 4-8 o'clock

	Number of Joints	% of All Joints	Number of Features	% of All Int Features
Internal Features along the bottom of the pipe (4 o'clock to 8 o'clock)	7	1.1%	13	86.7%
Internal Features along the top of the pipe (8 o'clock to 4 o'clock)	2	0.3%	2	13.3%
Total	641		15	

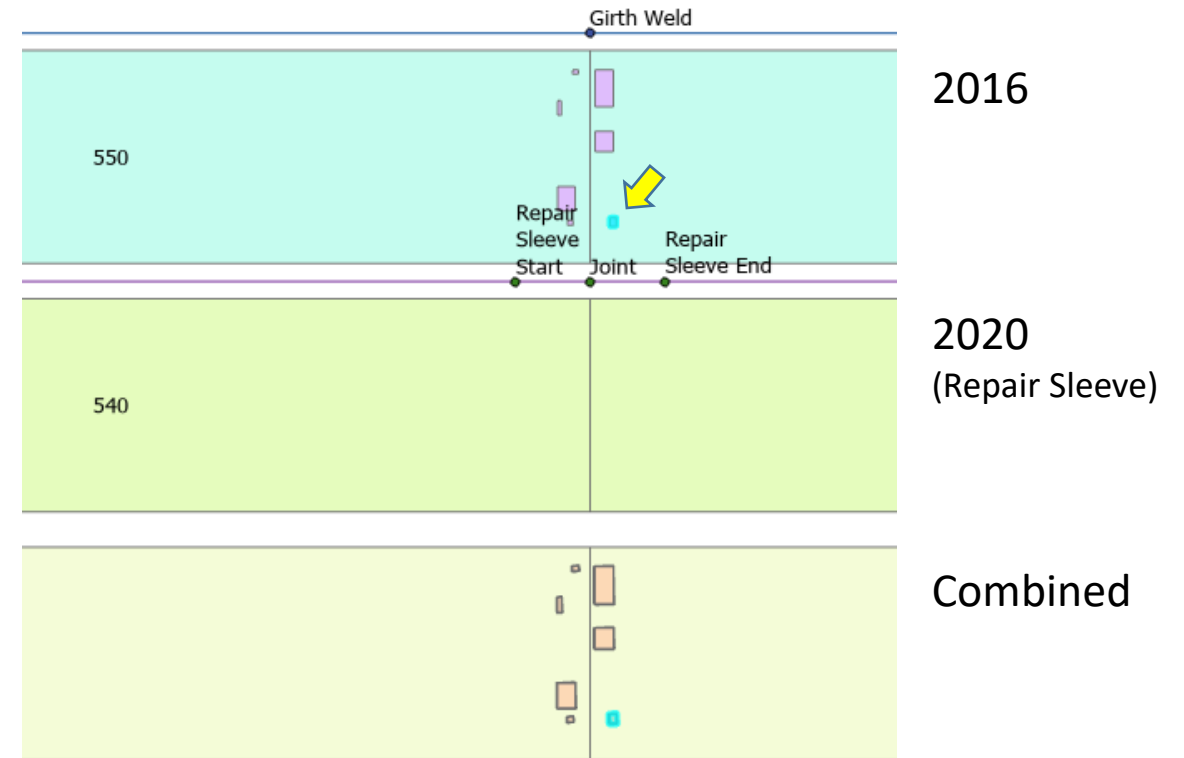



Unmatched Features from Previous Run

→

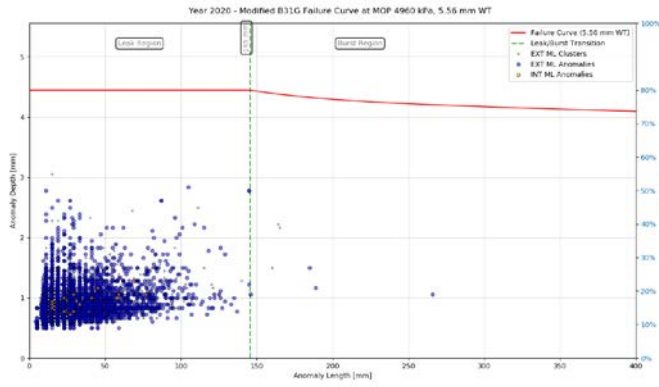
ID	Joint	Length	Width	DepthPct	Clock	Int_Ext
294.0	560	25	35	32	09:25:00	EXT
2649.0	4580	50	57	26	11:32:00	EXT
2649.0	4580	50	57	26	11:32:00	EXT
2681.0	4610	17	23	26	08:27:00	EXT
2411.0	4130	26	26	25	01:58:00	EXT
2645.0	4570	50	26	24	06:20:00	EXT
2925.0	5040	18	19	23	08:52:00	EXT
2139.0	3590	27	49	22	01:16:00	EXT
254.0	520	18	32	22	08:41:00	EXT
2625.0	4510	34	18	22	12:10:00	EXT

Causes: Misalignment or repairs

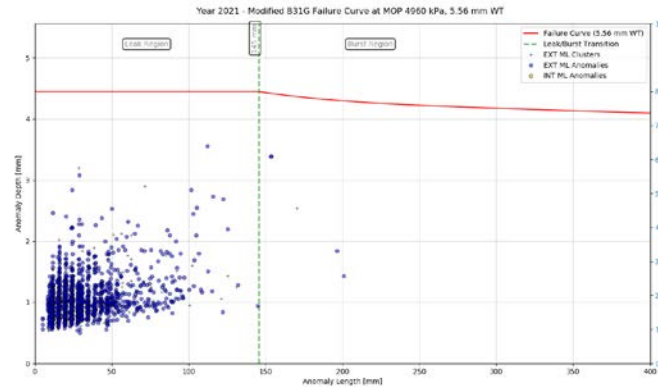


Mod. B31G Burst Calculations

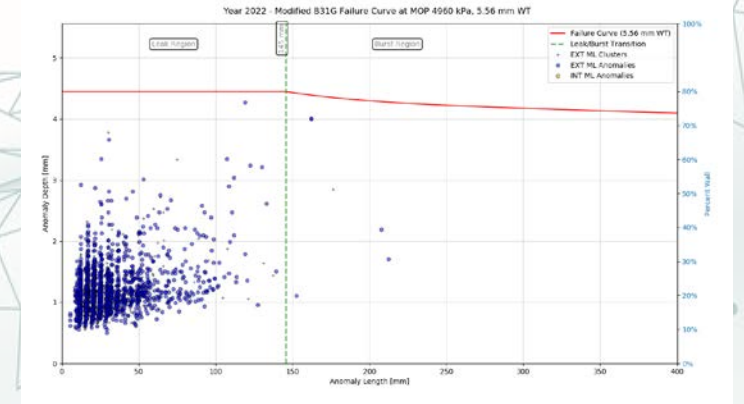
2020



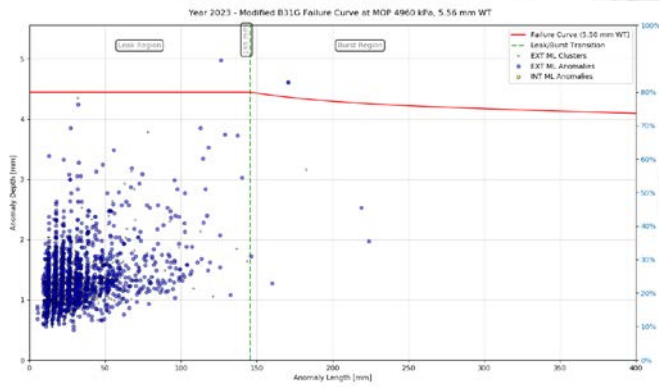
2021



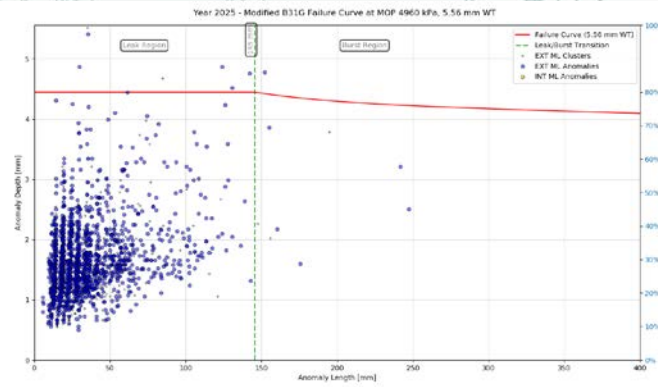
2022



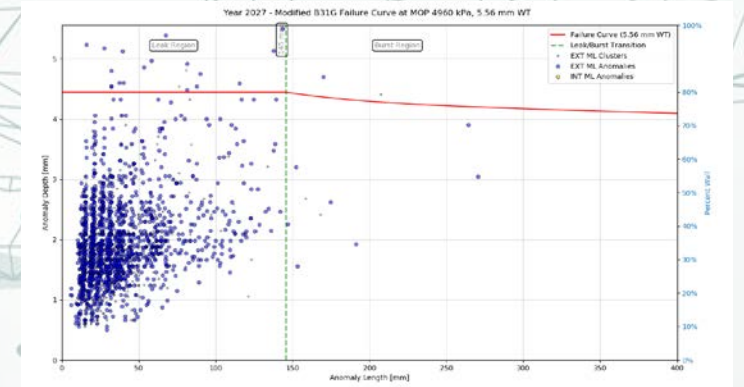
2023



2025



2027



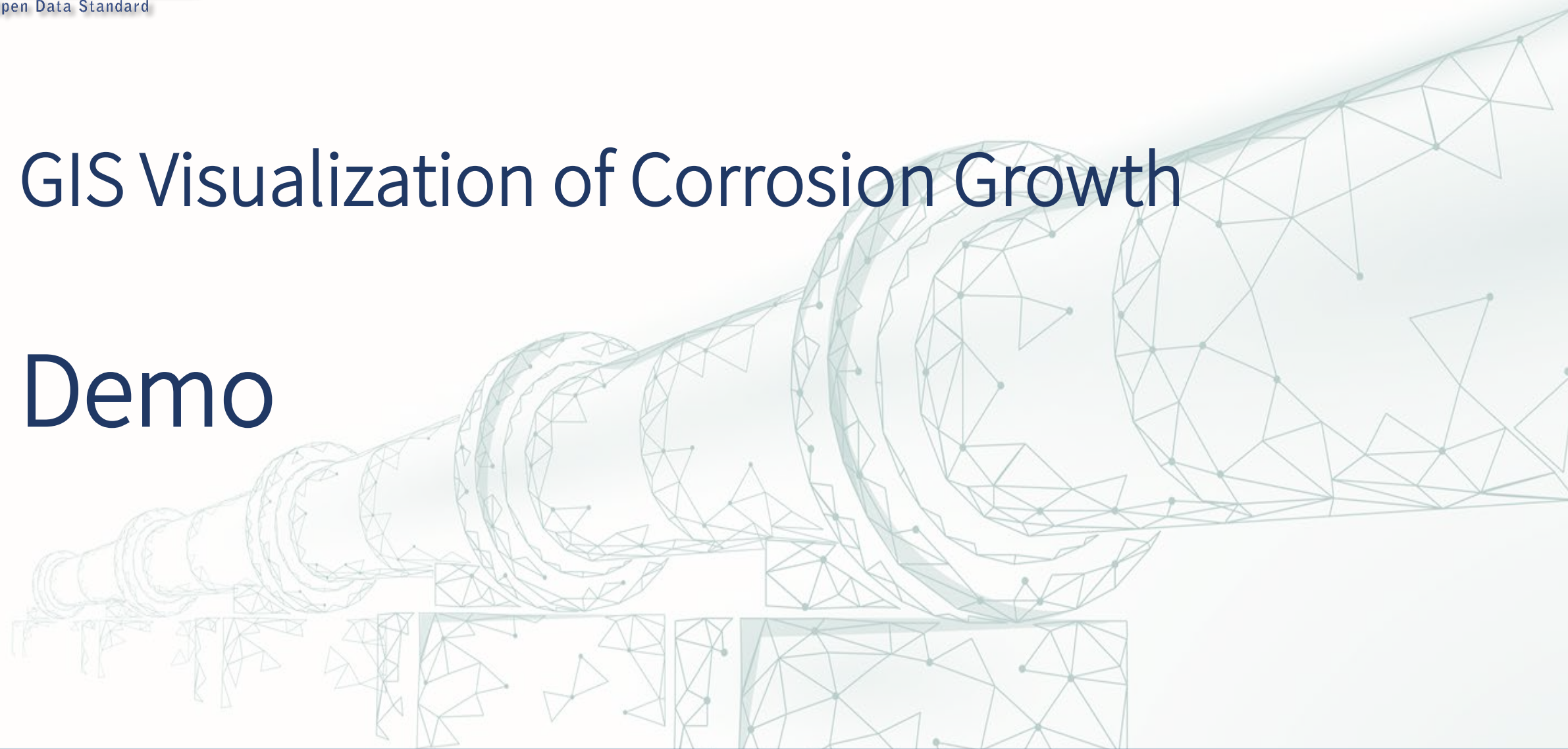
Example Time to Failure Calculations

(Using Mod. B31G)

Joint No.	Feature ID	ILI Distance	Int/Ext	Length (mm)	Feature Depth (mm)	Feature Depth Pct	Wall (mm)	Length Growth Rate (mm/yr)	Depth Growth Rate (mm/yr)	Time to Failure (Years)	Est. Failure Year	Est. Failure Date	Failure Mode	Failure Length (mm)	Failure Depth (mm)
4010	5626	6,434.740	EXT	23	2.335	42%	5.56	1.339	0.507	4.167	2024.417	05/31/2024	Leak	29	4.448
4160	5845	6,726.776	EXT	115	2.168	39%	5.56	7.423	0.522	4.353	2024.602	08/06/2024	Burst	147	4.440
4170	5869	6,745.472	EXT	109	2.224	40%	5.56	6.664	0.507	4.387	2024.636	08/19/2024	Leak	138	4.448
4100	5742	6,623.156	EXT	99	2.057	37%	5.56	6.351	0.492	4.859	2025.108	02/08/2025	Leak	130	4.448
3040	4276	4,855.828	EXT	47	2.057	37%	5.56	2.924	0.477	5.011	2025.260	04/04/2025	Leak	62	4.448
4150	5827	6,707.766	EXT	11	2.002	36%	5.56	0.681	0.462	5.292	2025.542	07/16/2025	Leak	15	4.448
1450	1990	2,270.692	EXT	19	1.946	35%	5.56	1.21	0.462	5.413	2025.662	08/29/2025	Leak	26	4.448
2140	2946	3,341.278	EXT	97	2.002	36%	5.56	5.814	0.447	5.469	2025.718	09/19/2025	Leak	129	4.448
2850	3945	4,632.004	EXT	27	1.89	34%	5.56	1.771	0.462	5.533	2025.782	10/12/2025	Leak	37	4.448

GIS Visualization of Corrosion Growth

Demo



Thank you
Any questions?

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