Quest Integrity
A TEAM Company

CHALLENGE CONVENTION

THE CHALLENGE OF INSPECTING PIPELINES WITH 'UNKNOWNS'

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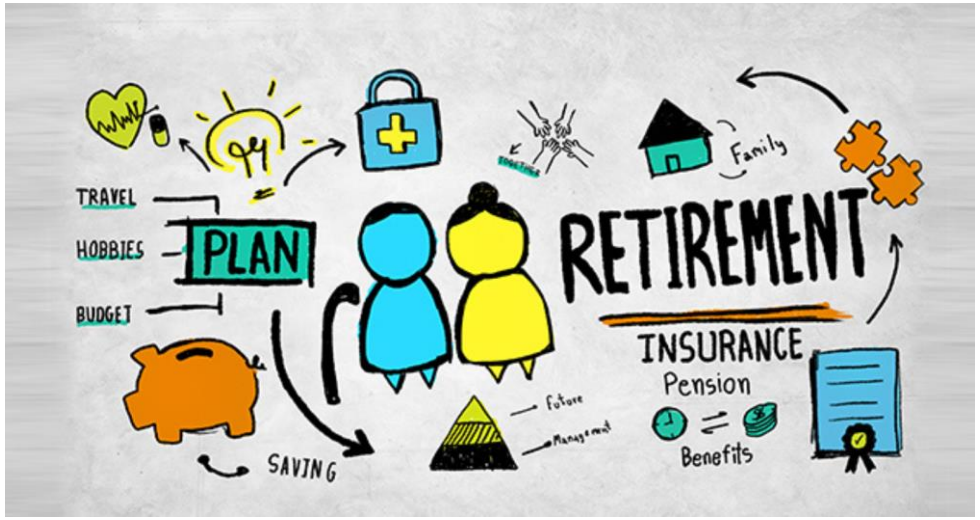
UNKNOWNS – Loss of Knowledge

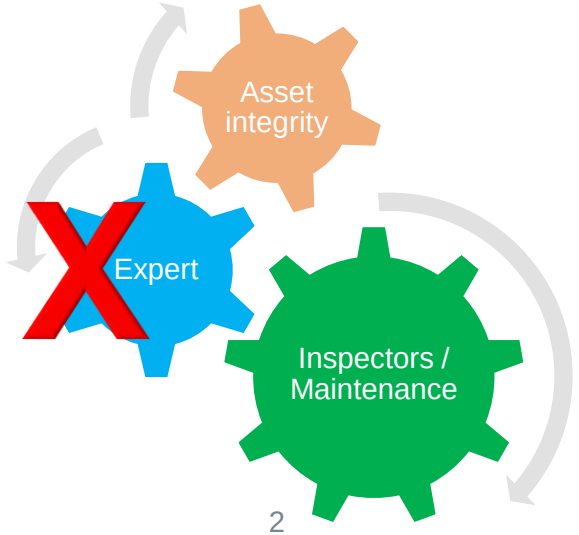
Operational Memory loss

Planning for retirement = 40 years

Handover of all knowledge of an asset gathered over 40 years = ?

When the oil price plunges, or bankruptcies = 0



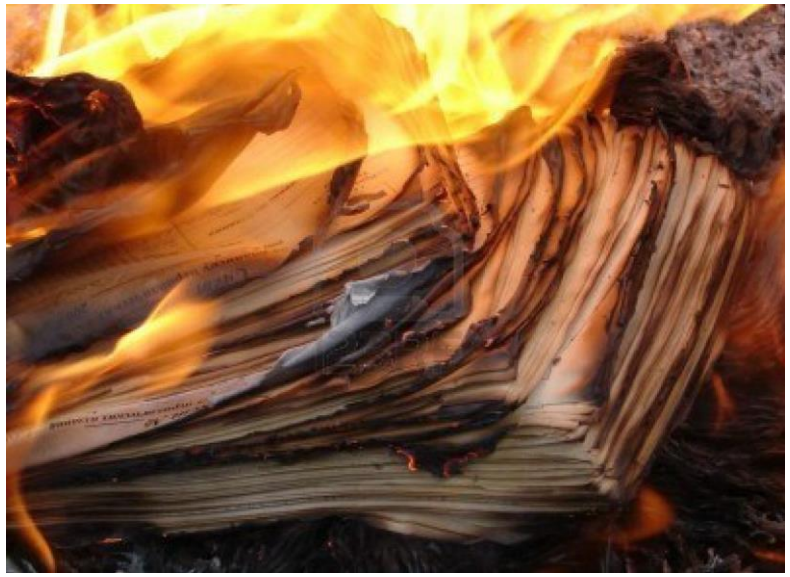


UNKNOWNS – Documentation

Loss of records

Records get lost over time

M&A activity: Transfer of assets, transfer of records



‘According to my records this pipeline is 5 years old’

UNKNOWNS – Pipe Features

- Forgotten thermocouple
- Plug placed in the line

‘Unknowns’ caused by the loss of operational knowledge or records.

The ¾” plug on the left and the Thermo couple caused damage to the cleaning pigs

UNKNOWNS – Third Party Damage

3rd party damage or damage during the installation/operations of a pipeline can be a cause of ‘unknowns’

10% dent caused by a ripper on a shallow gas pipeline

30% dent caused by an anchor

UNKNOWNS – Receiving a Damaged Pig

Damaged cleaning pigs or unexpected pressure increases can be a first indication that there is an unknown

Sending a gauge pig through the line can be the next step

Gauge pig indications are not that reliable, don't tell us geometry or location

UNKNOWNS – Risk

Low risk tolerance for damaged ILI tools or damage/blockage to the pipeline

Identifying the unknown from the exterior in a subsea environment is unreliable.

Case study 1: 10/12” dual diameter subsea pipeline

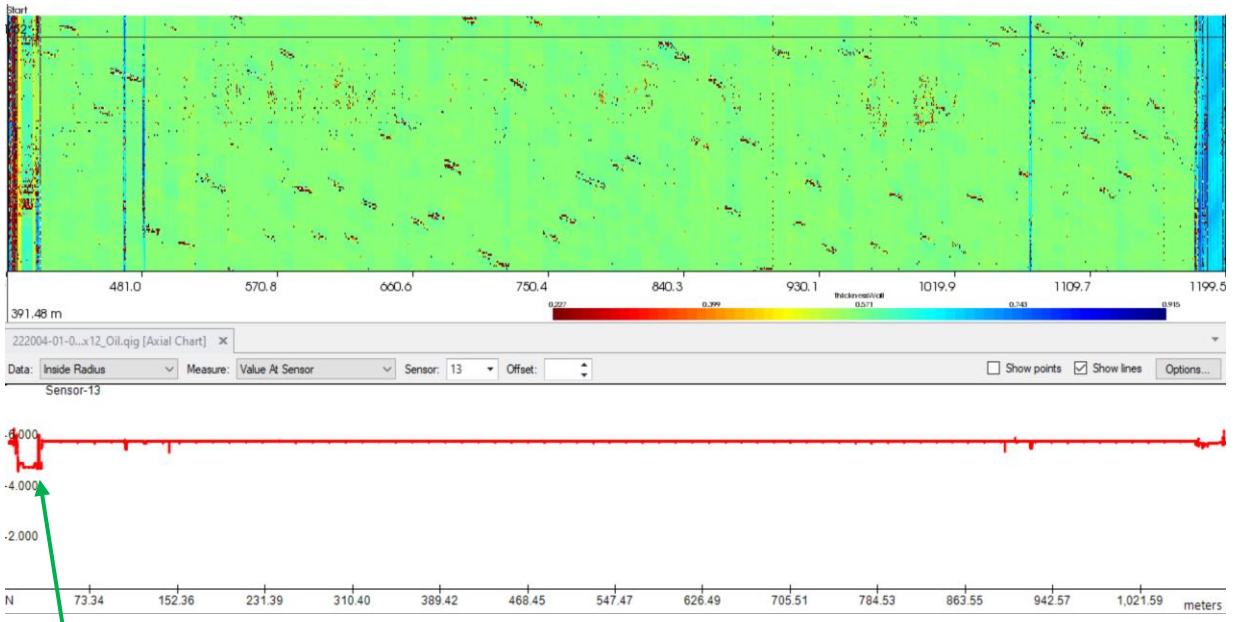
Operationally challenging area

Potential for reduction to 8” under the mud line.

1st exploratory run with UT based extra large operating envelope ILI tool.

Collect data in 12” pipeline

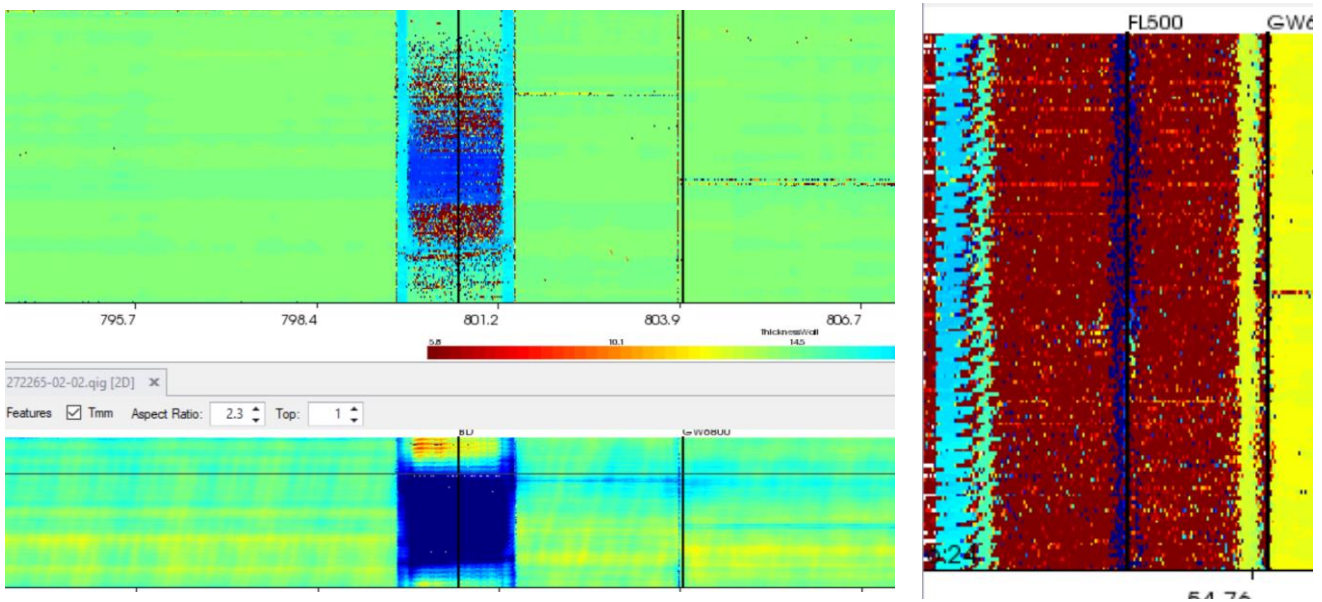
Ability to collapse and pass a reduction to 8”



10” reduction identified at the start of the line

Case study 1: 10/12” dual diameter subsea pipeline

- ✓ Avoided the elevated risk of a 12” gauge pig stalling in the reduction
- ✓ Identified the ‘unknown’ and converted into a known
- ✓ Deployed 10/12” dual diameter ILI tool for the inspection run.
- ✓ Executed low risk combination of runs in a single mobilization
- ✓ Acquired high quality data for the entire pipeline



10” flange identified below the mudline.

Case study 2: 14-Inch subsea pipeline

- Subsea line, between 2 platforms
- Pipeline ID = 311.14 mm
- Gauge plate OD = 305 mm
- Gap between Gauge plate and pipe wall = 3mm

Steel body BiDi Mandrel gauge pig with brushes

- Gauge plate indicated a reduction in bore to 255mm
- ILI contractor did not attempt to inspect the pipeline
- Client suspected a reduced bore feature
- Drawings did not indicate a reduction in ID

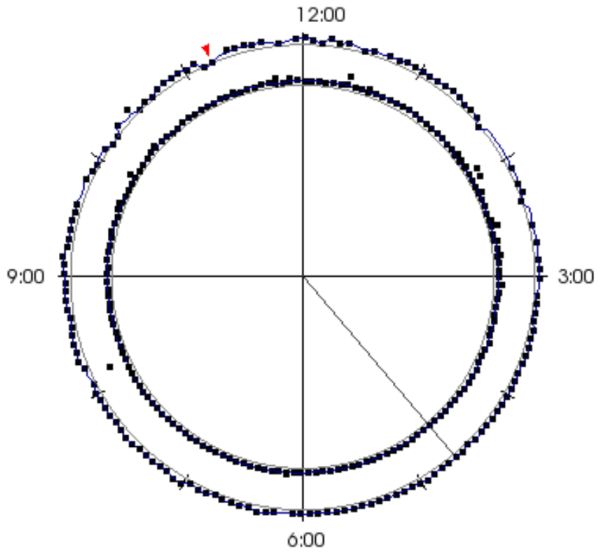
Cup shaped damage could be associated with a 360º reduction. For example a reduced bore valve

Case study 2: 14-Inch subsea pipeline

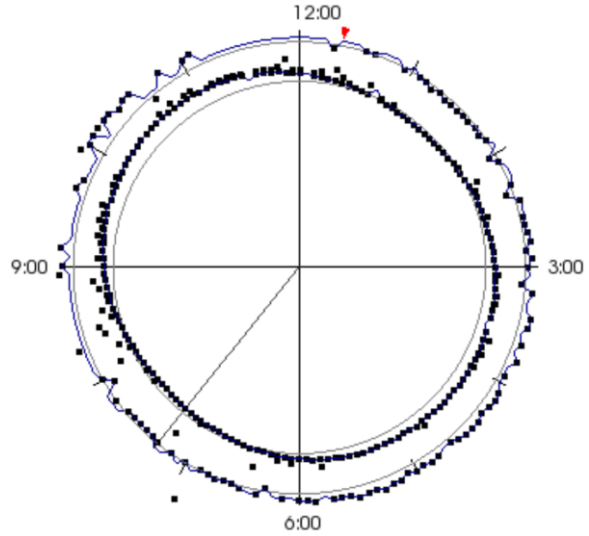
- ✓ An ILI tool was selected with a large ID variation operating envelope.
- ✓ Negated the need to identify the perceived reduction in ID
- ✓ Lowest risk and cost effective solution

	Measured Pipeline ID (mm)	ILI tool ID range (mm)
Min	255?	225
Max	311.2	325

- ❖ The riser pipe had no ID reduction
- ❖ Mainline pipe on the seafloor



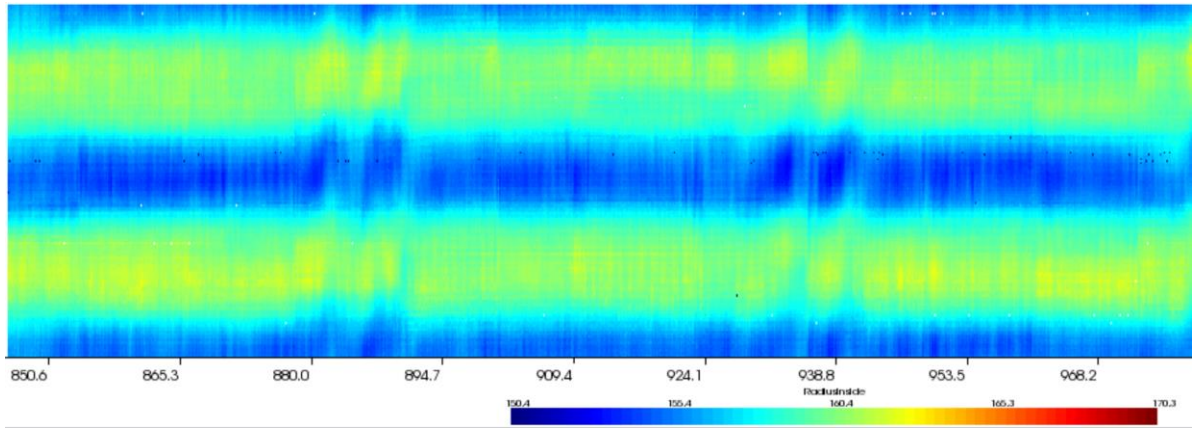
Riser



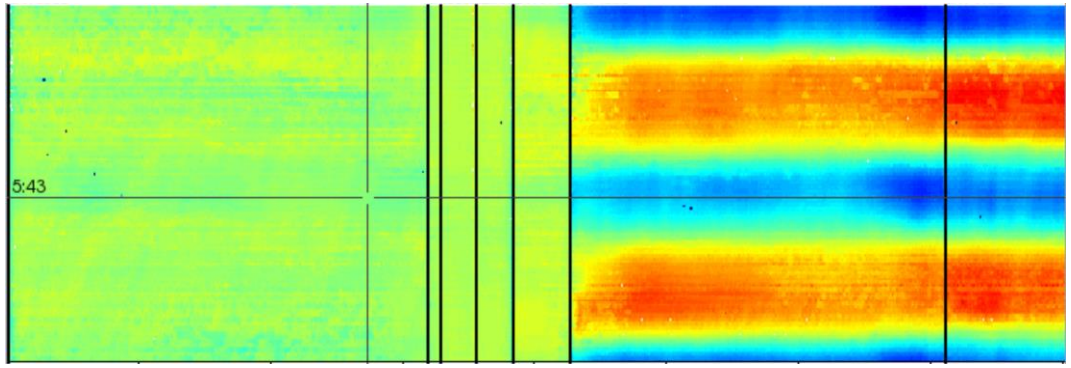
Mainline pipe

Case study 2: 14-Inch subsea pipeline

Ovality was encountered for the entire length on the seabed



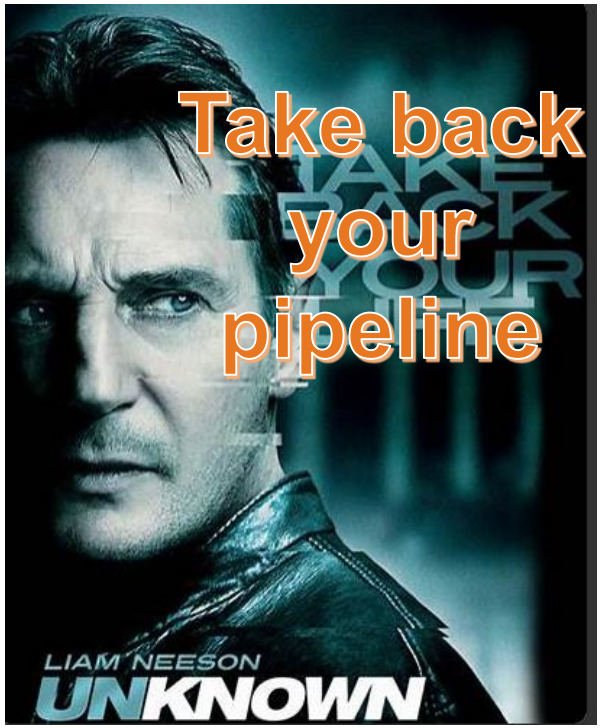
Transition from the platform pipe to the mainline clearly indicates the ovality starting point.



Conclusion

When faced with ‘unknowns’…

Select an ILI tool with a large operating envelope.



Use the most flexible tool on the market

THANK YOU

Thank you for your attention. We welcome your questions.

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