In-line Inspection

Arpan Bandhu
Operations Manager – Subsea Inpection
abandhu@oceaneering.com
+47 90408757

OCEANEERING®

Agenda

1. Pipeline Inspection – Why?
2. What is an Unpiggable Pipeline?
3. Intelligent Tethered Inspection Tools
4. Inspection Campaigns

OCEANEERING®

Why Inspect?

Less is More. Our industry must meet the challenge of shrinking its cost basis while maintaining the ability to deliver hydrocarbons safely and productively. Inspection of traditionally unpiggable pipelines, flowlines and risers is key to this objective.

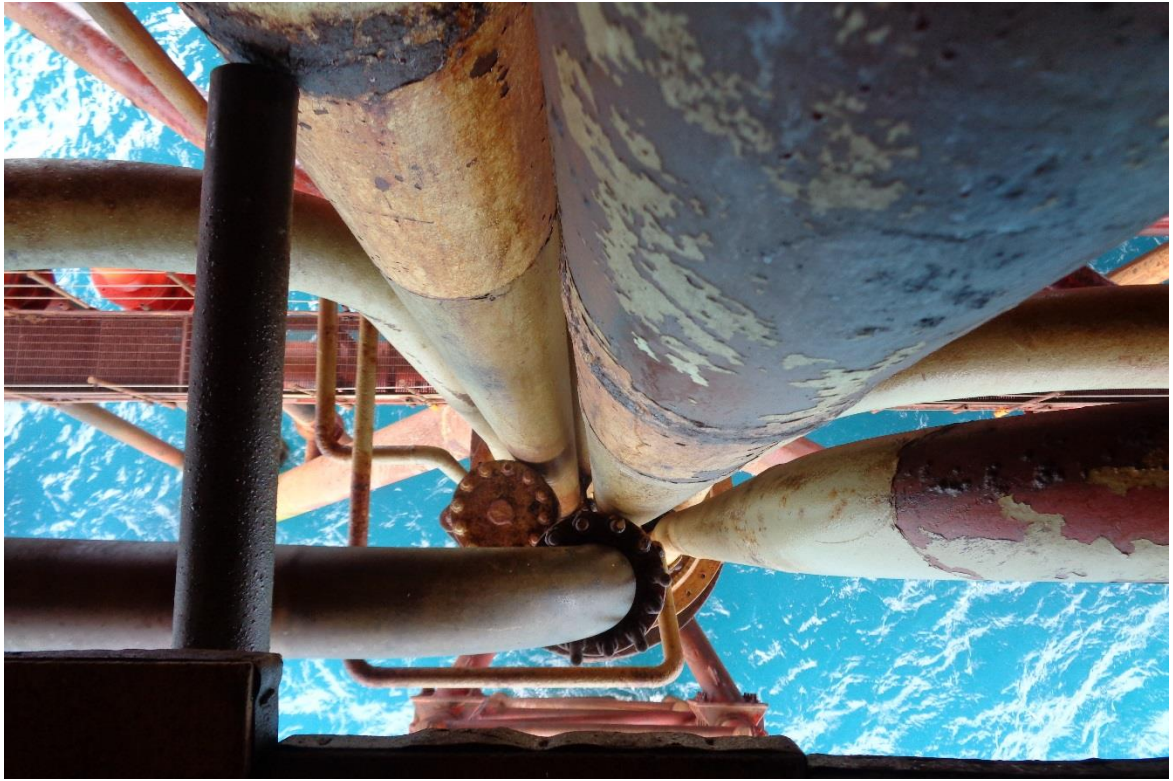
Regularly Scheduled Inspection	Sudden and Unexplained Production Loss/Drop	Tie-ins to an Existing Pipeline	Life Extension
Part of Company HSE Plan Mandated by Regulators	Corrosion and erosion, damage, foreign objects	Is Line Suitable for a Tie-In? Where to Tie-In?	Provide Data to Underpin Integrity Assessment

These inspection scenarios can all be addressed using tethered inspection tools

What is an unpiggable pipeline?

Flowlines without receivers such as lines ending in subsea manifolds, production or injection wells

Pipeline maybe open underwater such as waterlifting caissons



What is an unpiggable pipeline?

Require scaffolding for accessing the entry into the pipeline

No installed launching facilities

Pipelines maybe isolated or under preservation

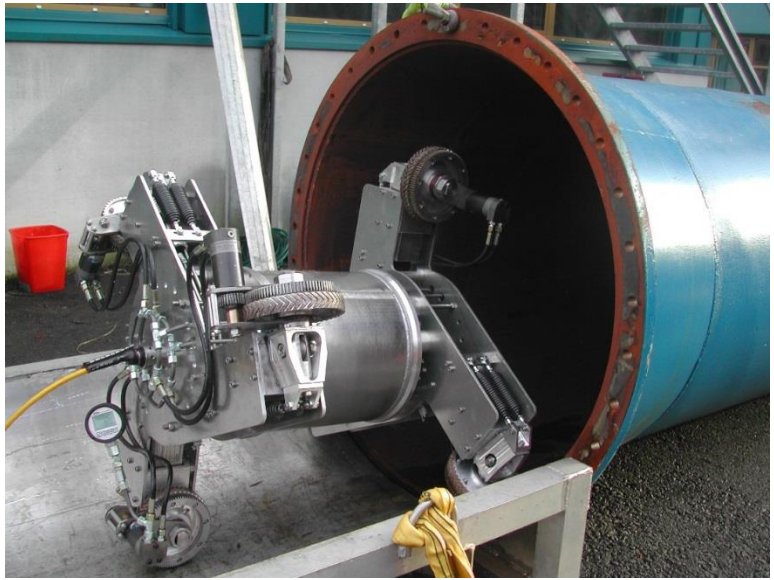
Content inside the line may be polluted and cannot be processed or discharged

What is an unpiggable pipeline?

Have difficult to negotiate bends or unbarred tees that would trap pigs

Pipelines may need to be cut to provide access, ensuring bends are avoided. This is obviously unfavourable

Propulsion Tools



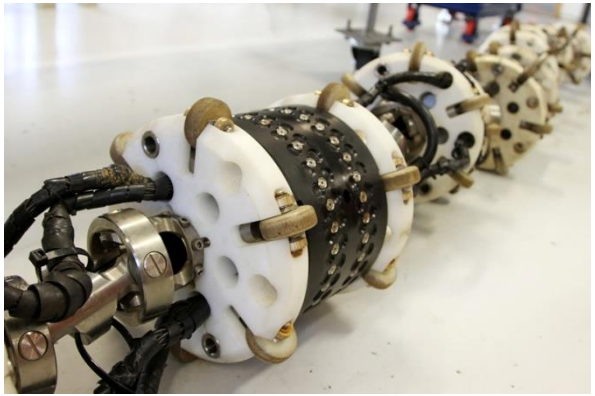
Tractor

Pipe Intruder

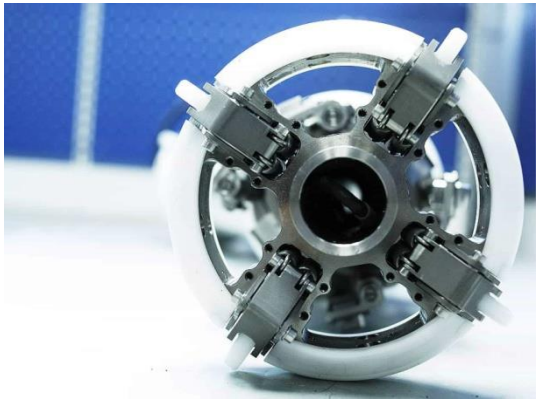
Ovecoming the Challenges

In-Line Inspection Tools

Our portfolio enables asset owners to make informed decisions about an asset's fitness for service and identify required intervention.



PipeScan

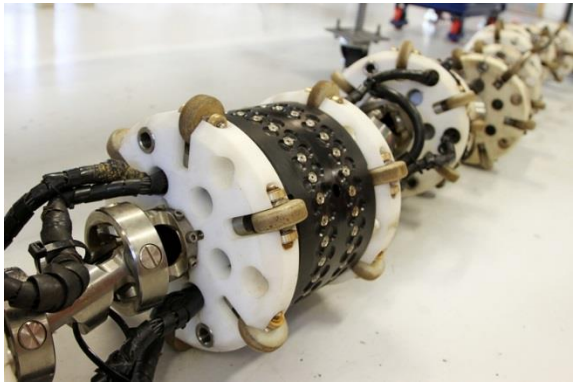


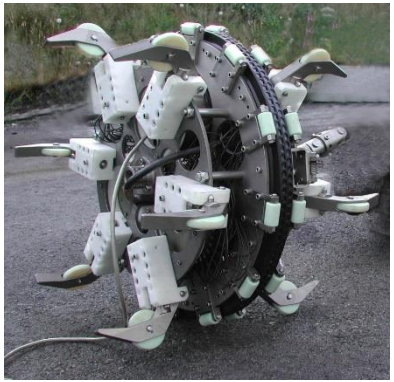
WeldScan

Video and Laser

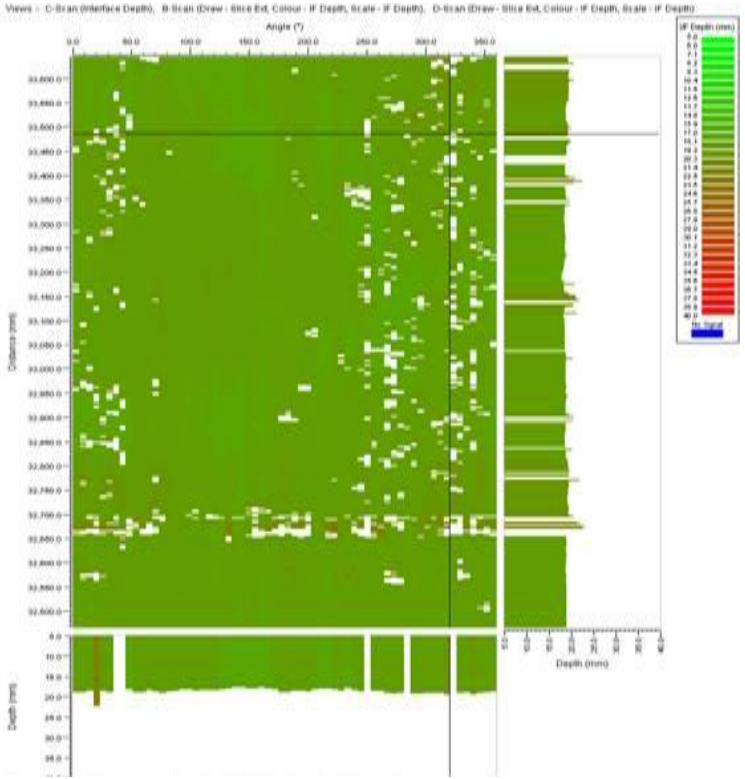
PipeScan

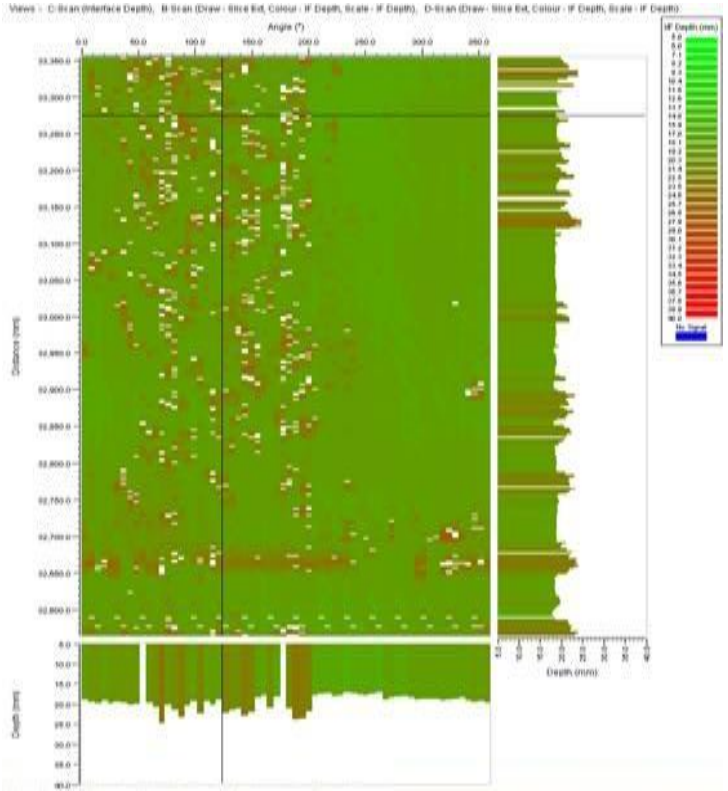
- Generates data on wall thickness, measures ID and OD, corrosion geometric features
- All data is encoded and stored digitally for analysis, review, verification and periodic comparision
- Real-time communications between the tool and its operator / UT inspector enables live data collection adjustments and monitoring of results
- Sizes 6 inch to 52 inch pipe diameter

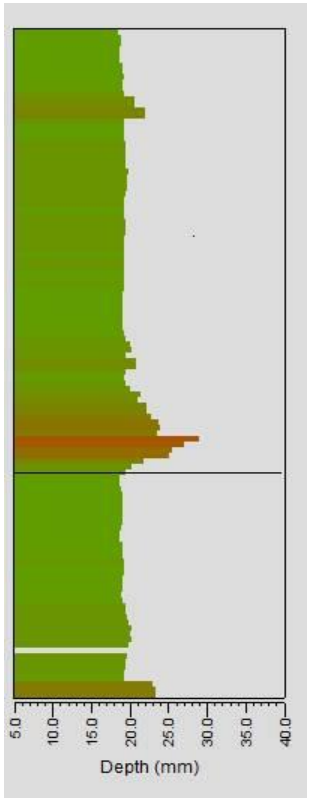




PipeScan



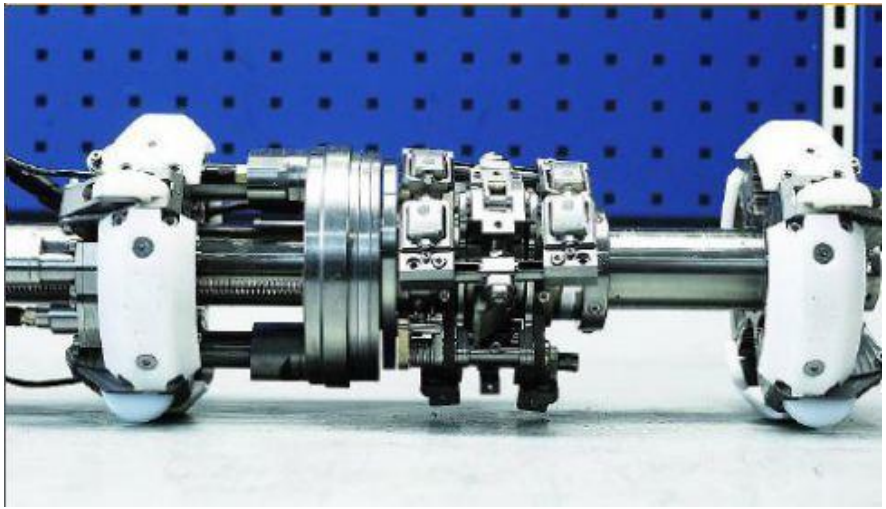




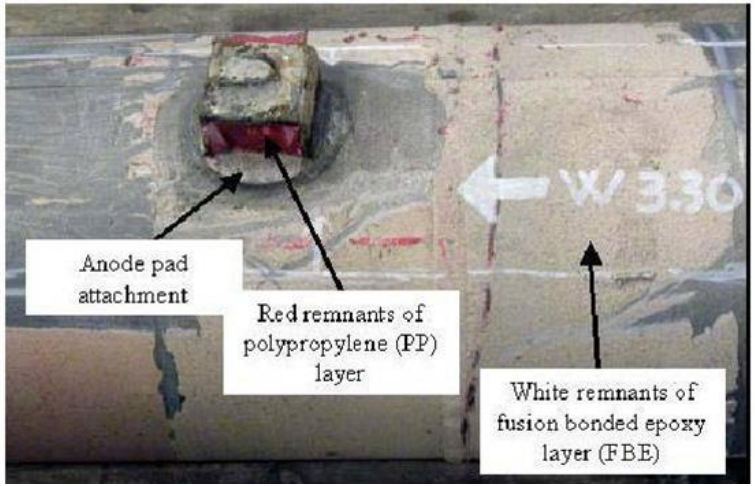
WeldScan

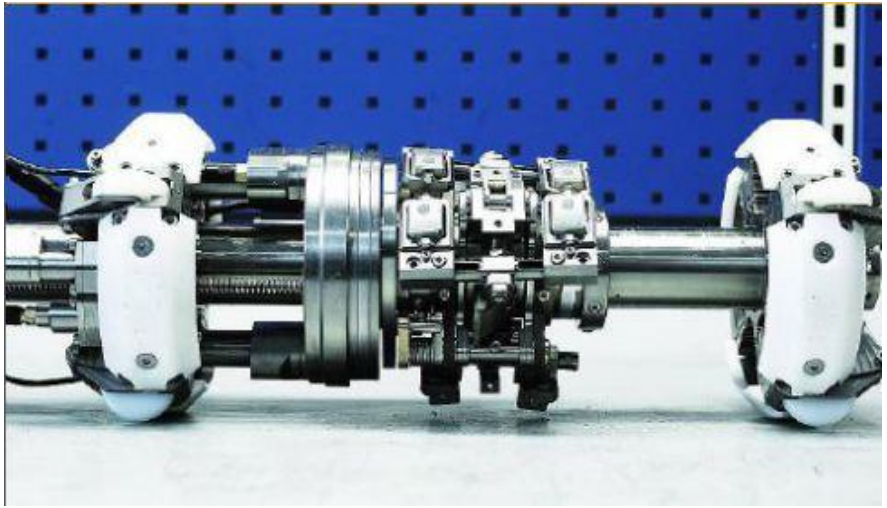
- Combines Pulse Echo UT with ToFD (Time of Flight Diffraction Technique) and PA (Phased Array Technique)

- Detects cracks, lack of fusion, lack of penetration, slag inclusions, porosity, corrosion, geometric deviations, and evaluates wall thickness



WeldScan


W 3.30
Anode pad attachment
Red remnants of polypropylene (PP) layer
White remnants of fusion bonded epoxy layer (FBE)



WeldScan

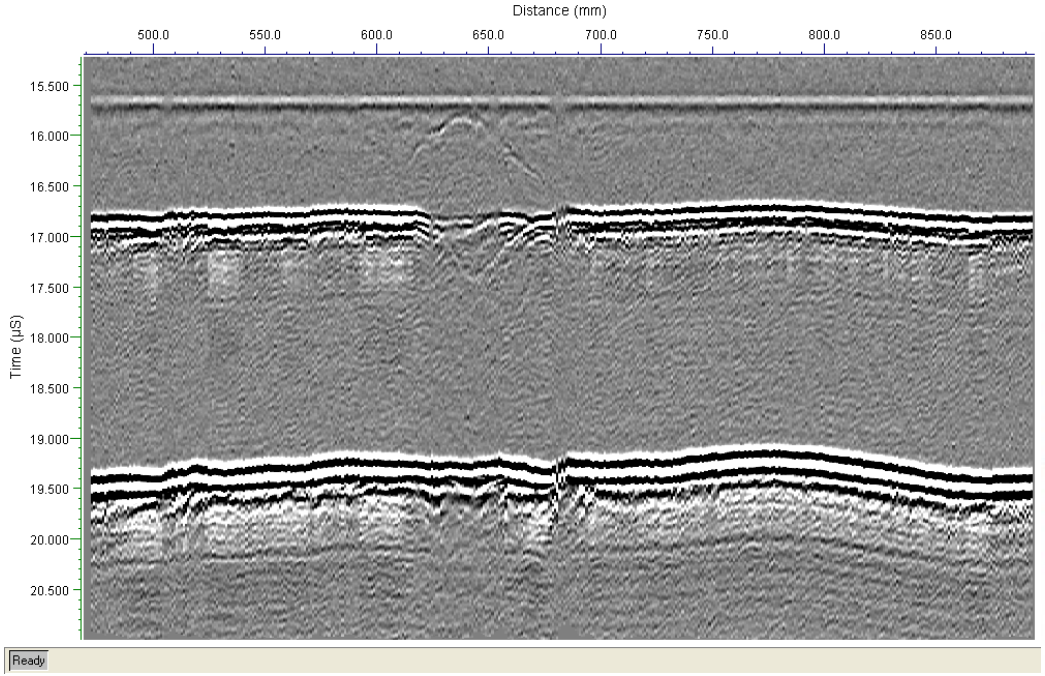
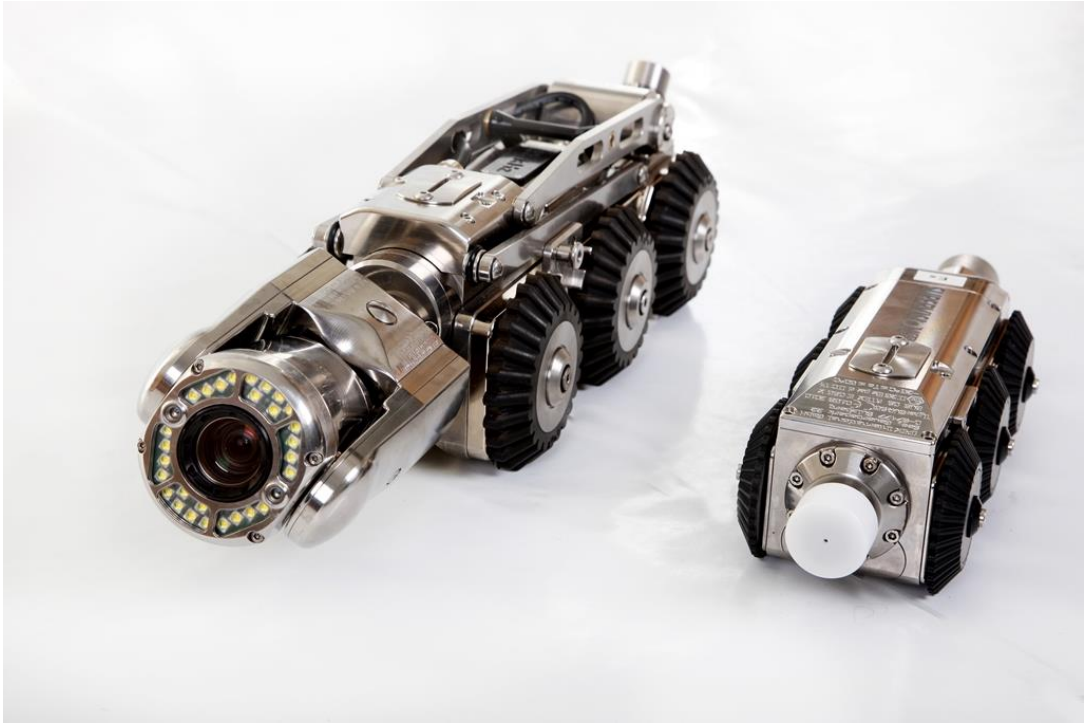


Figure 4. Detected crack on anode pad 16B after the 3 point bending operation (upper image). The crack was forced open and revealed an oxidized fracture surface. The length and depth of the crack was measured to be respectively 76 mm and 8.1 mm.

Video and Laser



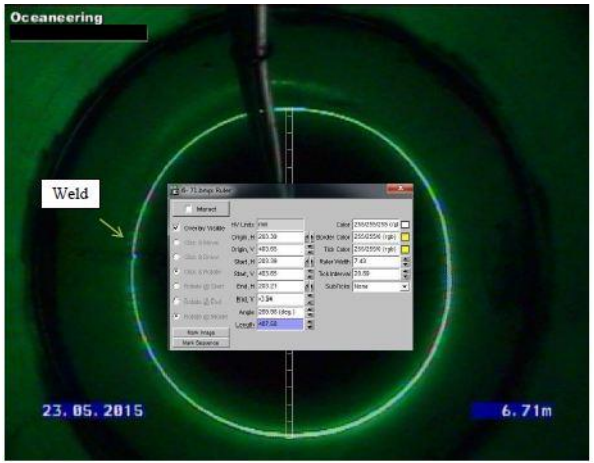
Video and Laser

Challenge

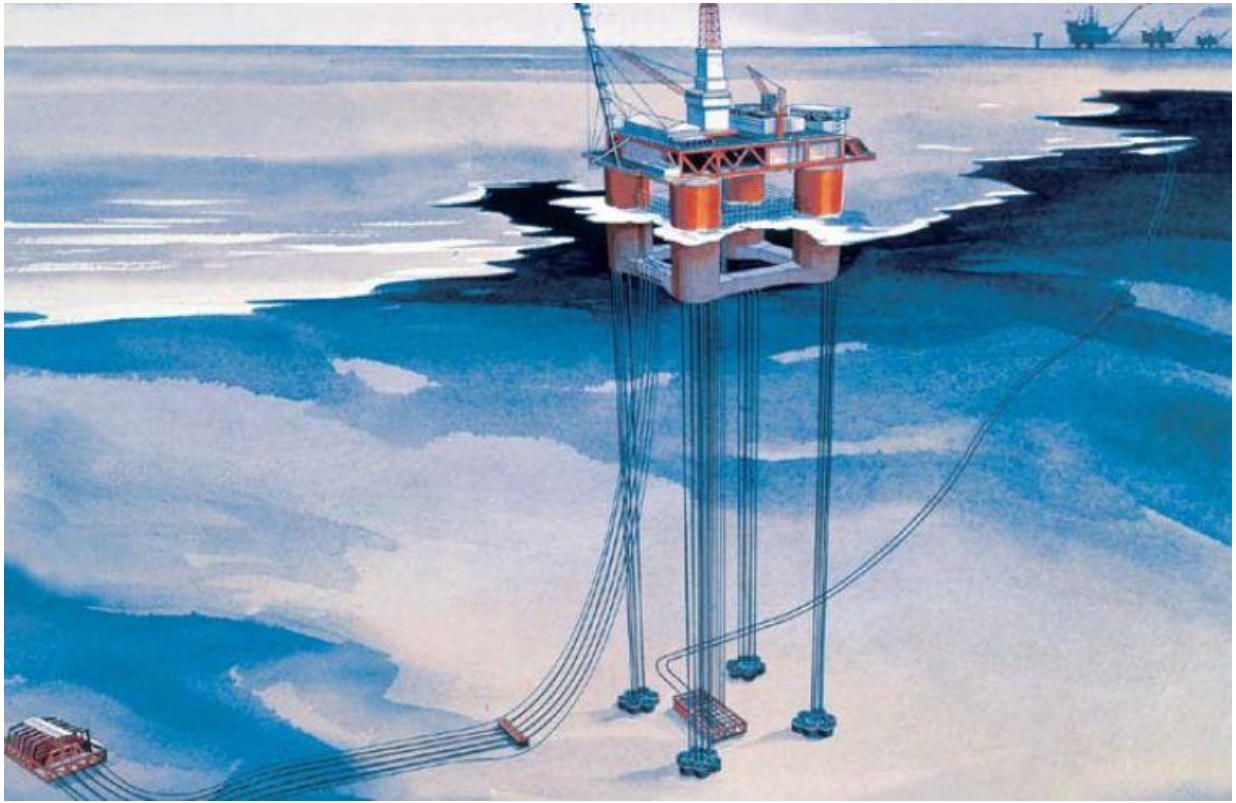
An operator was inspecting pig traps via a camera and crawler system to avoid having to perform confined space entry or external NDT. The visual inspection provided no measurement of anomalies encountered.

Solution

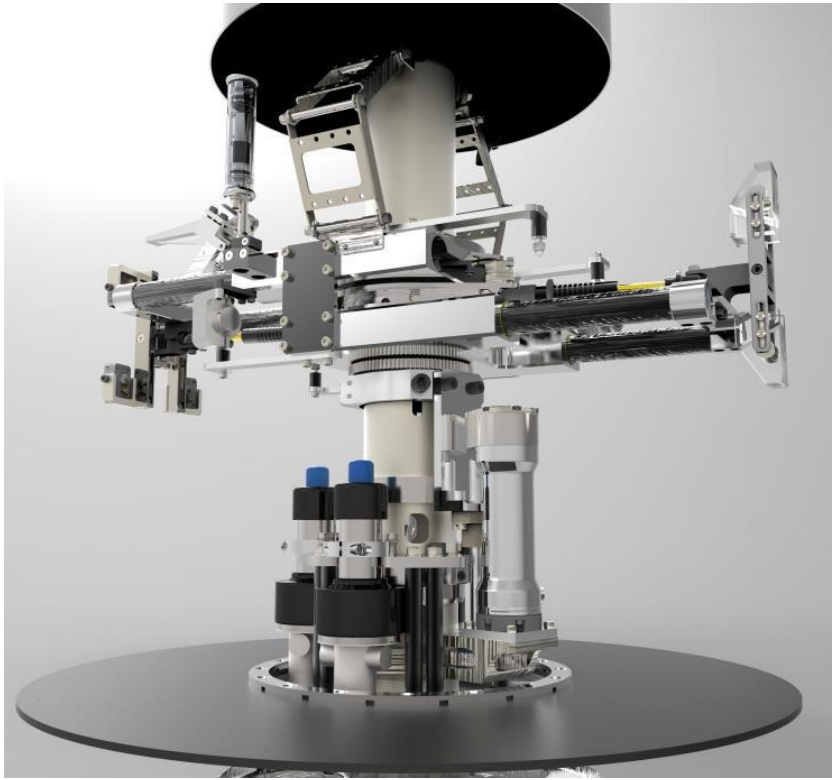
Oceaneering provided a camera and crawler system that used a laser to trace the ID of the pig trap. By overlaying a perfect circle in the tools software, Oceaneering could measure any deflections of the laser greater than 1mm (i.e. Pitting)



Tension Leg Scanner



Tension Leg Scanner



In-line Inspection

Thank You for Your attention!

Please visit oceaneering.com for more information

OCEANEERING®

Connecting What's Needed with What's Next™