# **Tubing collapse during logging** Investigating a shallow restriction

## Case study: SPACE® Focus

A section of collapsed tubing above a DHSV is imaged and measured in high resolution by **SPACE® Focus** 





Captured by SPACE®

Region: Europe Well Type: Producer

#### **Case Benefits**

- Size of the restriction accurately measured

- Collapse profile imaged in 3D

#### **Key Capabilities**

- Real-time information from e-line conveyed services

- Full 360° circumferential coverage

- Scanning ahead of the tool allows obstructions to be fully evaluated

- Accurate measurements of critical dimensions in real-time

- 3D rendering to aid understanding available immediately on wellsite

#### **Typical Applications**

- Inspection of obstructing fish

- Parted tubing
- Collapsed tubing/casing

#### Challenge

During a logging intervention to identify a shallow leak above the DHSV a sudden increase in production casing pressure from 1 to 148 resulted in loss of communication to the BHA and the wireline cable becoming stuck. Following a lengthy fishing operation most of the cable was retrieved, but the BHA remained stuck at an estimated depth of 50m. A lead impression block tagged a restriction at 40m but was inconclusive in evaluating the tubing condition.

#### Solution

The unique ability of the **SPACE® Focus** to both look ahead as it approaches a fish and take precise measurements in non optically clear fluid made it an obvious choice for this critical intervention. Real-time images and measurement of critical dimensions while downhole allow confident appraisal of the problem area with minimum of time expended.



Composite of logged data with tree and wellhead

Since the collapse was so shallow, the **SPACE**<sup>®</sup> **Focus** tool was logged through the tree and wellhead to allow depth correlation and to allow the collapse to be oriented relative to the tree valves. The top of the collapse was found at 40.2m in the first tubing joint below the hanger. The tubing cross section clearly shows an indentation on one side protruding towards the centre of the tubing.







### Results

A detailed 3-dimensional rendering of the data was constructed to allow easy understanding of the geometry of the restriction.

The wall has been pressed into the interior of the tubing leaving an apparent hole, confirming communication to the annulus. Underneath this protrusion the tubing is also deformed, although to a lesser extent.

There is an object, which appears to be flexible in nature, extending upwards from the area of the collapse, which is likely to be a short section of wireline cable remaining in hole after the fishing job. Tubing wall pressed into interior, leaving a hole

Object protruding above the collapse depth



3-D rendering looking down to restriction



Flat and 3-D views

The visualisation software enables multiple views from differing aspects to be considered, and to zoom in on specific features to enhance understanding.

Examining the Z-theta "flat" view of the data shows the flexible nature of the object, which follows a sinuous path on the interior surface of the tubing.

A cut-away view in 3 dimensions gives perspective and an indication of the size of the object, the estimated diameter being around 10-15mm which is consistent with large electric wireline cable.



Combination radius view with cross-section views at different depths



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# Visualise your well in 3 dimensions



Radius view can be used to visualise a plane cut down the axis of the borehole at any azimuth around the tubing. this view is useful in understanding the changes in ID with depth.

A cross-sectional view at any depth provides a complete ID map, which can be used to accurately measure critical dimensions of the collapse profile. Here, the effective size of the larger lobe between the protrusion reduces from 3.22" to 2.31" in a distance of 11.9cm.