

## **BEND AND DENT STRAIN ASSESSMENT**

*ATLAS INS & ATLAS UG*

### **THE PROBLEM**

A simplified definition of strain is the change of the shape of an object when a force is applied. Pipeline movement caused by natural phenomena like landslides, subsidences, earth movements, floods or earthquakes is a reality that could compromise the integrity of your assets by generating bending strain concentrated in specific areas.

This bending strain can cause pipeline buckling and eventually, failure of the pipe wall causing leaks that result in lost product and environmental damage. Strain concentrations with other types of defects, e.g. metal loss, deformations or cracking, become particularly severe threats to the asset.

### **THE SOLUTION**

Using high-resolution INS data acquisition and leveraging leading-edge software products, NDT Global's Atlas INS service is the most reliable way to identify areas where a pipe wall could be deformed close to or exceeding the critical strain limit of the steel. The accuracy of the Atlas INS attitude (altitude) measurements is far greater than the tolerances required for bending strain analysis.

The robot can also detect very slight changes in curvature. Moreover, by performing these surveys regularly, NDT Global can detect changes in strain over time and accurately locate the hinge points of the pipeline movement.

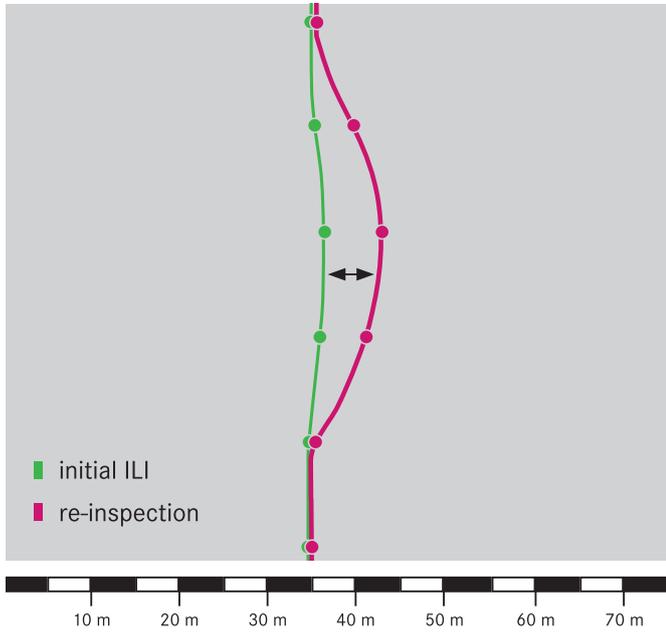
Combined with NDT Global's Atlas UG technology, strains corresponding to other features like misaligned welds or dents are filtered out. For local strain, NDT Global has developed a point-wise local strain methodology that estimates the small-scale strain along the local deformations. The ultrasonic geometry sensor technology introduces an overlap to get a complete ultrasonic image of the shape of the deformations used in local strain estimation.

### **YOUR BENEFITS**

- Pinpoint tensile and compressive longitudinal strains
- Detect strain areas in proximity to girth welds (most susceptible points due to residual thermal stress and material imperfections)
- Compare strain results to detect strain over the time

# ATLAS INS & ATLAS UG

## BEND AND DENT STRAIN ASSESSMENT



### Pipeline movement

Two INS inspections in the same pipeline are aligned and the strain calculations are compared to locate areas with possible pipeline movement.



### High strain areas

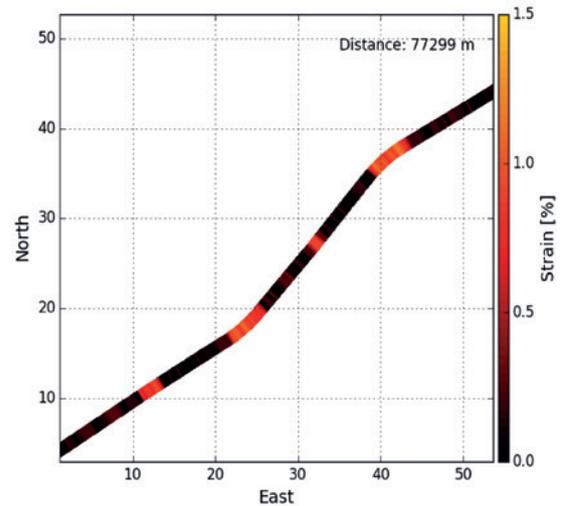
Wrinkles are often indicators of pipeline settling or imminent buckling, these are areas with a high strain on the pipeline. The Atlas INS and Atlas UG robots offer the most accurate robot combinations to pinpoint high strain areas that represent a threat for your assets.

**Please note:** Robot and performance specifications depend on inspection and pipeline conditions. Please contact your local NDT Global representative for further information.

NDT Global reserves the right to introduce modifications and changes without prior notice.

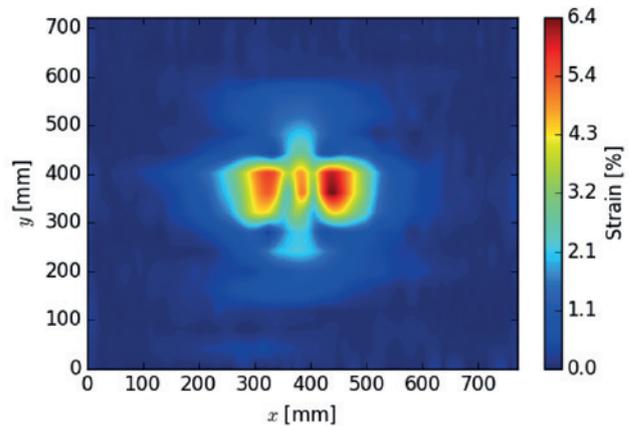
[www.ndt-global.com](http://www.ndt-global.com)

Australia | Canada | Germany | Ireland | Mexico | Spain | UAE | UK | USA



### Bend strain

A detailed analysis of the pipeline curvature data is performed to identify areas of bending strain that spanned more than one pipe joint and exceeded 0.1% strain.



### Dent strain

NDT Global implements a point-wise local strain estimation for every single data point along the deformation. Taking advantage of Atlas UG axial resolution and overlapped sensors, a detailed geometry of the deformation is used for the strain estimation.