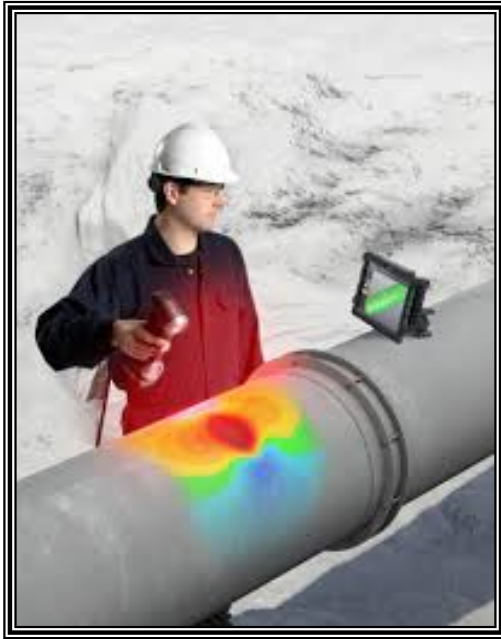


## Pipeline Damage Assessments (Pits, Dents and Corrosion Damage) with Laser Profilometry

IRISNDT offers direct assessment of pipeline corrosion and mechanical damage using laser profilometry for upstream and midstream companies. We use a portable hand held laser scanner and obtain quickly a high resolution scan of the surface; we map out both corrosion losses and mechanical damage.

The pipeline custom developed laser software, allows us to perform basic fitness for service assessments of damaged sections considering corrosion losses, mechanical damage and strain.

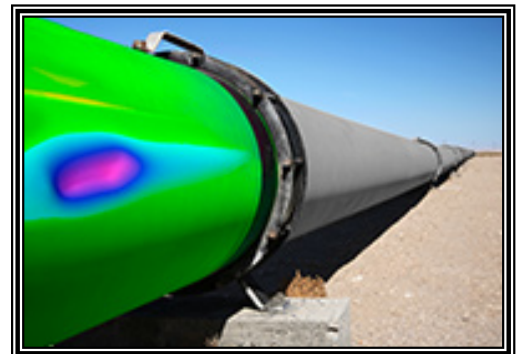


Based on the corrosion software module, IRISNDT personnel can:

- Measure the depth, extent, volume and line position of corrosion losses in line section.
- Assess internal a given and external losses.
- Import inline inspection (ILI) records and correlate them with laser data.
- Generate preliminary reports which we deliver onsite; these include ASME B31G based burst pressure calculations.
- Automatically apply interaction rules for hundreds of corrosion features to identify the pipeline section's worst case profile.
- Facilitate ASME B31.8 strain based mechanical damage assessments.
- Display:
  - 2D and 3D color maps with river bottom path overlays.
  - 2D section views in both axis.
- Obtain enhanced virtual pit gauge measurements.

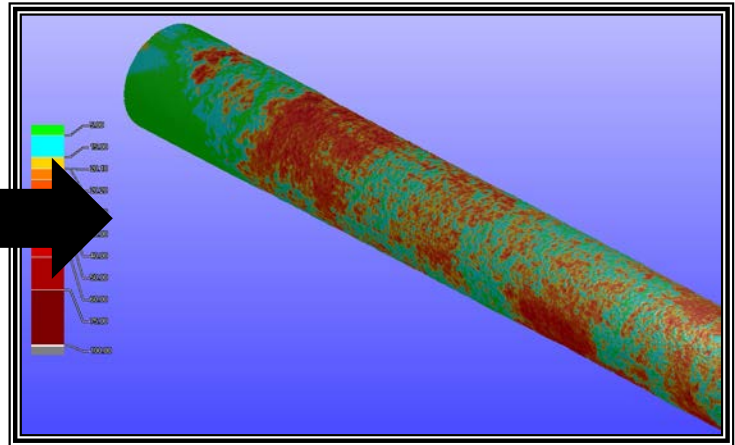
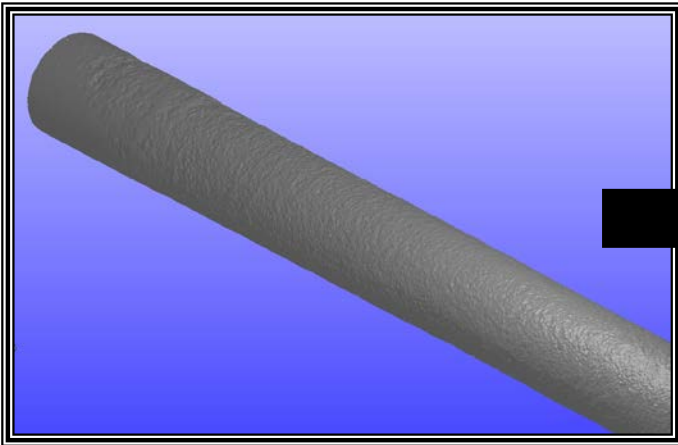
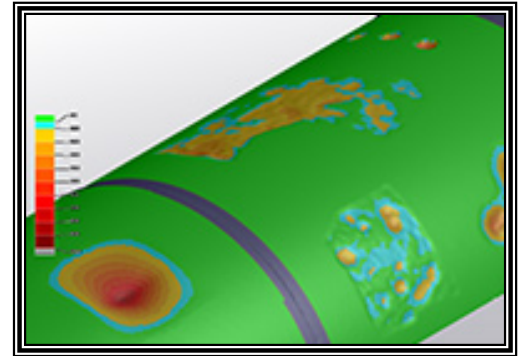
Based on the mechanical depth based damage module, IRISNDT personnel can:

- Perform automatic maximum depth detection.
- Measure the maximum damage depth using straight edge technique in both directions.
- Display:
  - 2D cross-sections.
  - 3D and 2D color maps.
  - Depth-over-diameter ratios.
- Measure the maximum diameter at 90 degrees from the dent.
- Measure the length and width for each dent.
- Perform multiple dent analysis.



Based on the strain-based damage assessment module, IRISNDT personnel can:

- Automatically detect the maximum strain.
- Display 3D and 2D color mapping.
- Quantify the circumferential bending stress, the longitudinal bending strain, the longitudinal extension strain, the total strain on the pipe interior/exterior surface and the maximum effective strain.



## Advantages of Laser Scanning for Pipeline Inspection

1. Thousands of data measurement points are acquired quickly and accurately.
2. Complete data sets are obtained that can be used for future assessments.
3. The data obtained is standardized, reliable and repeatable regardless of the operator.
4. The data can be exported and used for fitness for service or finite element analysis.
5. This is a non-contact NDE.

