

Ovality Assessment

Determination of Potential Local Pipeline Collapse / Buckling

What are ovalities?

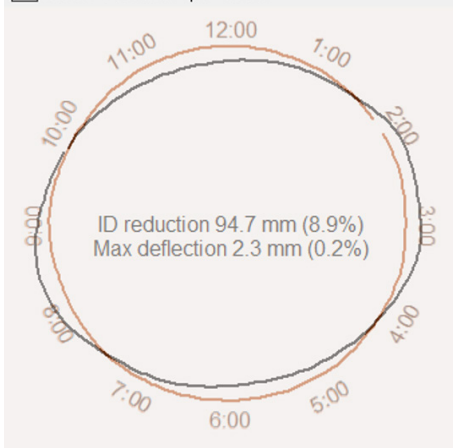
An ovality (out-of-roundness of the pipe) is a deviation from circular cross-section and is a common result of external pressure, bending and / or compressive axial stress.

Ovalities are identifiable and measurable using high resolution caliper data. Ovalities are measured in terms of their maximum and minimum internal pipe diameters (D_{max} and D_{min}).

Why assess ovalities?

Ovalities cause a variation in the hoop stress around the circumference of the pipe as well as local stress concentrations. Ovalities can also reduce the collapse pressure of the pipe under external pressure loading and can also reduce the static and fatigue strength of the pipe.

- Show Base Points
- Show Round Pipe Value



Our assessment approach

The assessment is performed using data from high-resolution caliper in-line inspection tools.

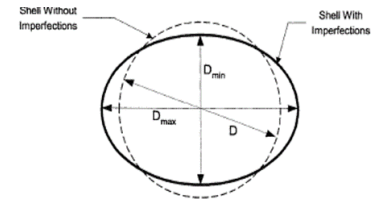
The local strain associated with the geometry of the ovalities are determined and assessed against allowable codified strain limits.

The imposed hoop stress at the ovalities is calculated to determine those which exceed design and/or global yield limits.

Where previous measurement data of ovalities is available (i.e. from a caliper inspection tool), any changes, i.e. increase in, or extent of ovalisation is determined.

Alignment of the ovality locations with pipeline bending strain / pipe strain change (pipeline movement) data resulting from analysis of any available inertial mapping unit (IMU) data. This allows identification of possible cause, additional external loading, and possible ongoing instability issues.

Further qualitative consideration of any pipeline cyclic pressure loading, coincident pipeline features, e.g. dents, metal loss etc. as well as geographical terrain and proximity to local infrastructure e.g. major roads.



Features and benefits

- Identification of unacceptable levels of localised strain due to the ovalities, calculation of the imposed hoop stress and determination of maximum depths of cover to limit further ovalisation which could lead to potential collapse / buckling
- Determination of any change in ovalisation
- Identification of possible cause, and threats to the future stability of the ovalities
- Qualitative consideration of cyclic pressure, coincident features, geographical terrain and proximity to local infrastructure
- An integrity consultancy report detailing the assessment and identifying potential problematic ovalities with appropriate measures given for their mitigation