A³ Monitoring

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SCREENING AND MONITORING AS ALTERNATIVE TO PIGGING

Challenges of Pigging

Pigging is a very effective inspection approach. However pigging is an intrusive technique and requires large investment and planning effort. Old transmission pipelines were not designed to be pigged and the cost and risk of hot tapping pipelines to make them piggable may be considered reasonable only if the line to be inspected is a relatively long section. Although pigging is effective in general terms, more consideration should be given to the specific approach used as each pigging tool is equipped with different detection technologies and this affects the capability to detect different potential threats.

Screening Solutions

Screening is an approach where although a direct measurement of wall thickness is not obtained during inspection, the areas of threat are quickly identified and can therefore be followed up using other techniques.
Screening tools are Visual Inspection, Guided Waves (GW) and Acoustic Emission (AE).
However on buried pipelines visual inspection cannot be applied and the tools that could be used are GW and AE.
Guided wave enables to screen a relatively long area of pipe (about 15 meters on a buried pipe) from a single access point.

Excavations must be carried out at regular intervals in order to cover the full area to be inspected, however in some instances a higher risk areas could be identified and the screening could be limited to these sections.

The inspection target for GW screening is to identify large external and/or internal corrosion patches (small pits cannot be identified). Acoustic Emission enables to screen the pipe for identification of leaks, cracks and/or external corrosion.

Using AE the range could be longer than GW depending on the target, due to the passive operation mode of this approach.

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Monitoring Solutions

Monitoring is a solution that could be particularly suitable for buried pipes both for technical and economical considerations. The largest cost to inspect a buried pipeline is normally the excavation and if a robust monitoring system is left in place at the time of excavation, future excavation costs would be avoided. Technically, an approach where a specific target is addressed is possible using a specific technology

When multiple issues are possible a hybrid monitoring approach is recommended. Below you can see a table describing the different monitoring technologies available and their specific detection target.

Monitoring also enables to identify relevant threats that could not be identified in screening mode (due sensitivity improvement using monitoring) and reduce the overall cost of inspection over the years with a relatively small initial investment.

U	AE	LR	CP	U+CP	AE+CP
Internal corrosion	Cracks	External corrosion	Coating condition	Integrated pipeline integrity monitoring for internal corrosion and coating condition	Third party damage
Erosion	Leaks	Internal corrosion			Theft detection
Substitute corrosion coupons	Corrosion