Corrosion and Erosion Monitoring Made Easy

Sensorlink deliver high precision wall thickness monitoring equipment to the international oil and gas industry. Through decades of experience Sensorlink have fine-tuned the technology to deliver unparalleled repeatability, enabling clients world-wide to make quick and accurate decisions based on accurate data and integrate this into their integrity management systems.

In the oil and gas sector corrosion and erosion are serious problems. Internal corrosion in pipelines in the oil and gas industry is generally caused by water, carbon dioxide (CO2) and hydrogen sulfide (H2S). Corrosion can also be aggravated by microbiological activity. Erosion is generally caused by particles in the flow causing wear and tear on the inner pipe-wall. This internal corrosion and erosion need to be controlled and monitored. Sensorlink provides tools that will be useful in these operations.

All Sensorlink's corrosion and erosion monitoring systems are based on ultrasonic pulse-echo method. Ultrasonic pulse-echo measurement is a well-established method for measuring wall thickness and detecting defects in the oil and gas industry. The technology is well known and this makes the measured values from Sensorlink's systems easy to verify by the client. When it comes to erosion and corrosion monitoring, ultrasound has distinct advantages compared to other available techniques. It is non-intrusive and measures the metal thickness directly and is not dependent on indicators like for example probes and coupons.

Special processing methods have been developed for such instrumentation giving high resolution and accuracy measurements for monitoring wall loss.

Our careful and committed technology development has resulted in Sensorlink

PipeMonit® Swarm for topside applications and Sensorlink UltraMonit® for subsea applications – giving you the best wall thickness monitoring option both under and over water.

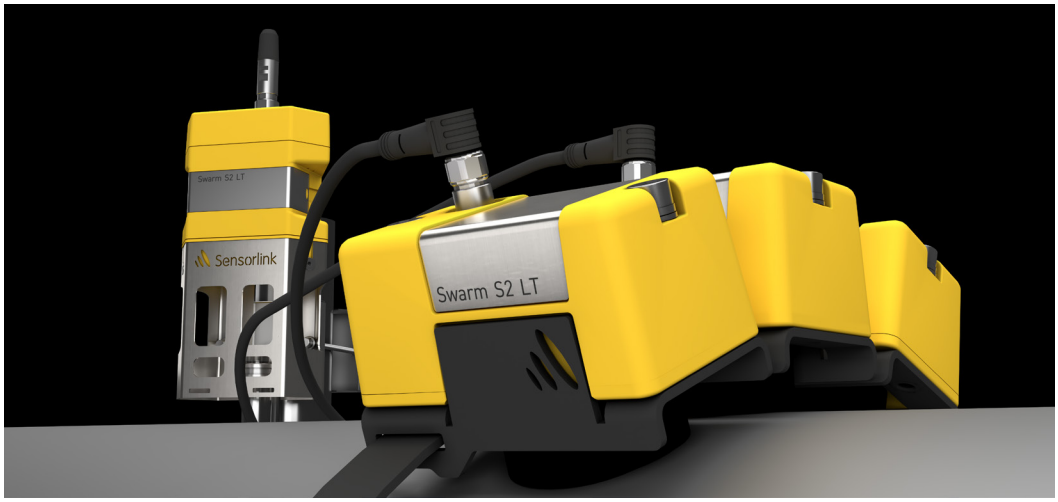
Both the topside systems, PipeMonit® Swarm, and subsea system, UltraMonit® are non- intrusive, meaning that the integrity of the pressure system in maintained

The Sensorlink technology is capable of measuring changes in the wall thickness with greater accuracy, thus avoiding the uncertainty caused by inadequate instruments or unskilled operators. Wall thickness can be measured to a very high accuracy by repeating measurements at the same spot over time with permanently installed instrumentation.

The main considerations when planning to install a corrosion monitoring tool are related to the physical factors concerning the pipe and the pipe condition.

The current technology allows for normal homogeneous coatings to be left on, typically one may leave FBE and 3LPE/LPP coatings on.

When planning an installation of a monitoring tool, data management and usage should be addressed. The amount of data that can be pulled out of a monitoring tool is large and an application process should be in place to maximise the benefit of the information gained from monitoring.



Benefits of retrofit UT monitoring tools.

The general benefit of monitoring vs inspecting is that one can observe changes in wall loss or corrosion rate more accurate. Not only can one determine the actual corrosion rate much faster, but with a historical trend of the corrosion rate one can correlate the corrosion rate with other operational parameters like flow temperature, flow rate, chemical composition etc. This gives rise to much more insight into how the process parameters influence the corrosion rate and how the degradation of an asset develops over time. This is very valuable information to be used in life-time assessment of an asset. Improving decisions related to safe operational life and major maintenance or modification actions. This is particularly relevant for pipelines close to the well, as the well chemistry varies substantially over the life of the well, and often rather quickly as well.

Sensorlink's retrofittable tools are flexible in the sense that they can be installed at most locations on a pipe including installation in bends in addition to straight pipe.

The fact that a retrofit tool also can be moved between different monitoring locations adds to the flexibility of these tools. This can be effective in situations where one does not observe corrosion in the location one first thought was critical. One may then move the tools to another location. In this case the first location will be rated as not critical and the corrosion model may be updated to reflect this new knowledge.

Users tend to have some main drivers to install monitoring tools. One strong driver is to validate the effect of chemical inhibitors. With the performance of the current technology this is feasible as the response time is in matter of days and weeks. One of the other main drivers is to follow the development of known defects or critical areas. More generally one wants to validate the corrosion rate, and the estimated wall loss from manual inspection.

Monitoring as part of an asset integrity strategy

Monitoring should be part of a well-balanced asset management strategy. In general, an asset management framework will contain a risk assessment, determining which are part of the pipe that has the highest potential for integrity fails. Based on this, an inspection strategy and frequency are put in place to validate the risk assessment and to follow the development of the degradation. Depending on the degradation phenomena one can enhance the inspection strategy through monitoring. The valuable aspect of using non-intrusive approach to monitoring is that if the risk assessment change over the life of the asset one may relocate the monitoring. With intrusive techniques like coupons, probes, ring pair and FSM this is not feasible.

If the asset degradation is influenced by variations in process parameters, the asset management strategy should move to more monitoring rather than solely rely on inspection.This is purely due to the more accurate data available in a monitoring regime than a pure inspection regime.

If the corrosion/erosion phenomena are very localised and unevenly distributed along the pipe one may apply monitoring of these known defects. This will determine any change in the development of these defects, and thus make it possible to adjust the inspection frequency, being it ILI or manual.

Throughout the history of Sensorlink we have delivered more than 200 systems for topside monitoring and over 35 systems for subsea monitoring. Permanent monitoring of corrosion and erosion will be a valuable addition to your integrity management. •

If you would like to know more about how Sensorlink AS can help your company and its operations with corrosion and erosion monitoring, please contact them at:

Sensorlink AS

W: www.sensorlink.no

E: mail@sensorlink.no

T: +47 735 38 050