Maintaining pipeline integrity

Founded in 1980, Rosen is now a leading provider of high-tech products and support services for the pipeline and process industries worldwide. Due to the global tendency towards tighter pipeline integrity regulations, pipeline operators need to quantify an increasingly wide range of hazards. The main method used to determine such threats is in-line inspection (ILI). To help operators comply with the strict regulations, Rosen has developed a number of ILI tools and services.

One aspect which can give vital clues as to the condition of a pipeline are its geometric properties. Rosen's Geometry Inspection Tool with Extended Resolution RoGeo-Xt is based on an innovative hybrid concept: it combines a traditional mechanical caliper arm with an electronic distance measurement system, thereby optimizing measurement accuracy and providing 100 percent circumferential coverage. In addition to the inner geometry of the pipeline, the XYZ Mapping Tool records the three-dimensional geographical pipeline coordinates which can then be assigned to all flaws detected either by geometric or other types of inspection.

An important technology used to detect different types of defects in pipelines is magnetic flux leakage (MFL). In the presence of internal or external metal loss, the magnetic flux created as part of the MFL method 'leaks' out of the pipeline. Since this leakage is recorded by hall-effect sensors, the location of defects can be accurately inferred. Both ROSEN's Corrosion Detection Pig CDP and the Axial Flaw Detection Tool AFD make use of MFL. While the high-resolution CDP detects and measures metal loss flaws such as corrosion, erosion and gouges, the AFD identifies narrow longitudinal defects such as notches, fissures and channels.

> "Batching liquids can contaminate the pipeline and increase the probability of corrosion"

One problem that gas pipeline operators face is that the so-called batching liquids required to perform inspections can not only contaminate the pipeline, but they also increase the probability of corrosion and, thus, potentially lead to environmental concerns as well as high costs. Rosen's EMAT Crack Detection & Coating Disbondment RoCD2 overcomes this difficulty: the material inspected acts as its own transducer. Since this method eliminates the need for a liquid couplant completely, the RoCD2 can be used for reliable crack inspections in both liquid and gas pipelines. In contrast to MFL technology which measures deliberately induced magnetic leakage, ROSEN also provides tools for the detection of real leaks, i.e. loss of product from the pipeline. These leak detection pigs (LDP) use on-board electronics to record the flow rate and direction in pipelines thus revealing leaks as small as one liter per hour.

Whereas all the above in-line inspection devices provide highly accurate and reliable data, it can nevertheless be extremely useful to know what the inside of a pipeline actually looks like. For this purpose, Rosen has developed the Optical Observation Device OPD. Equipped with a high-quality camera and its own lighting support, the OPD allows the operator to ascertain the pipeline's cleanliness, the condition of pipeline installations, the quality of repairs already undertaken and the amount of water present. In addition to these ILI tools, Rosen also provides robotic inspection tools – i.e. remote-controlled devices for unpiggable lines – and a range of tools used in plants and facilities as opposed to pipelines.

Services

Based on a philosophy of close cooperation with the client, Rosen's support services complement the high-tech inspection tools described above. To accommodate the infinite number of different needs arising from the challenging task of managing complex facilities such as pipelines and storage tanks, Rosen has devised a modular system for combined in-line inspection – ILI Combo Technology. Our in-house engineers provide expert advice to help clients make optimal use of this modularity: choosing from a wide range of highly refined technologies, they can design their own individual tools. For example, the corrosion detection pig (CDP) can be combined with the EMAT Crack Detection and Coating Disbondment Tool RoCD2 as well as the hybrid-technology Geometry Inspection Tool RoGeo-Xt. Since up to three inspections can thus be performed in one run, ILI Combo Technology saves time and costs.

Thanks to ILI Combo Technology, even one single inspection run can produce an enormous amount of different types of data (information on corrosion, cracks, geometrical features, etc.). To facilitate the complex task of processing this surfeit of information, Rosen provides a comprehensive data service based on ROSOFT, a user-friendly and highly efficient group of programs for the management and presentation of data. Equipped with powerful functions for data integration, analysis, feature assessment as well as viewing and reporting, the software presents a clear picture of the pipeline's condition thereby assisting operators in planning maintenance and repair works. The ROSOFT data service would not be complete without Rosen's experienced support personnel who will be pleased to provide additional support.

Asset integrity management support: a combination of products and services

A comprehensive range of services to determine, optimize and document the condition of pipelines and related facilities throughout their life cycle, asset integrity management support (AIMS) can perhaps be seen as Rosen's most important service package. Due to the now extremely strict safety regulations and codes, periodic inspections are no longer sufficient to guarantee the safety and reliability of pipelines and related equipment. AIMS meets this need for an increasingly holistic approach to pipeline safety in that it covers all the different aspects of asset management from engineering considerations to business processes. As part of AIMS, all available data (most of it obtained through in-line inspection, ILI) is fed into the standardized pipeline data warehouse (SPDW), the central database to which all other software components are linked. The SPDW not only assesses all the different factors affecting the condition of a given asset but notably their numerous interactions with high accuracy. AIMS thus helps operators ensure that their assets operate within their required specifications throughout their lifecycle. Providing a wide variety of products and services to ensure the long-term integrity of oil and gas networks, ROSEN is the ideal partner for cost and environment-conscious operators worldwide. ■

Further information: **www.RosenInspection.net.**