Corrosion Cases 12 Years Apart Reveal Milestones in Pipeline Engineering Digital Integration

The Oil and Gas business is conservative by nature. Given a choice, companies would prefer to stick with well-established practices. However, in recent years, change has forced its way into the methods and standards of the industry. The agents driving this evolution are the opposing forces of competition and a strict regulatory regime. Additionally, the accelerating pace of innovation makes the investment in change ever more urgent. The result is a continuous search for new methods and commercial advantages.

The need to address corrosion is a significant factor throughout the pipeline lifecycle, either to prevent it or to find remedies when it appears. Mitigation approaches present excellent examples of how new digital capabilities have transformed the industry. The tools for AC mitigation have not changed drastically in the past decade, but the growing interconnectedness of assets has shifted the advantage in favor of aggressive data integration strategies.

If you are not paying attention to the pace of change, the data automation tools of a decade ago might seem like state-of-the-art technology. However, the potential gains that operators can achieve through Digital Oilfield integration show that there is no room to be complacent. This case study draws on the findings of a recent technical paper by Joe Pikas, the Integrity Engineering Subject Matter Expert for Technical Toolboxes and consultant Ernest Klechka. The paper offers an example of how pipeline engineering solutions have evolved in the last decade.

Two AC Mitigation Cases Twelve Years Apart

Pikas and Klechka discussed AC mitigation and the limitations of pipeline modeling as part of a corrosion investigation. Two areas of corrosion on one 8 ⅝ inch pipe (Case 1 and Case 2), detected by a smart pig, twelve years apart (Pikas and Klechka). While there were some differences in the soil characteristics, the mitigation prescriptions chosen as treatments in each case were similar in principle but tailored to the particulars of the corrosion incidents and were based on the modeling capabilities available to the engineers at the time. When the pipeline was inspected in Case 1, the engineers had excellent tools with which to analyze the data, such as PRCI RSTRENG® and the PRCI AC Mitigation Toolbox. They also had intelligent inspection tools, also known as smart pigs. It was a significant development over legacy practices.

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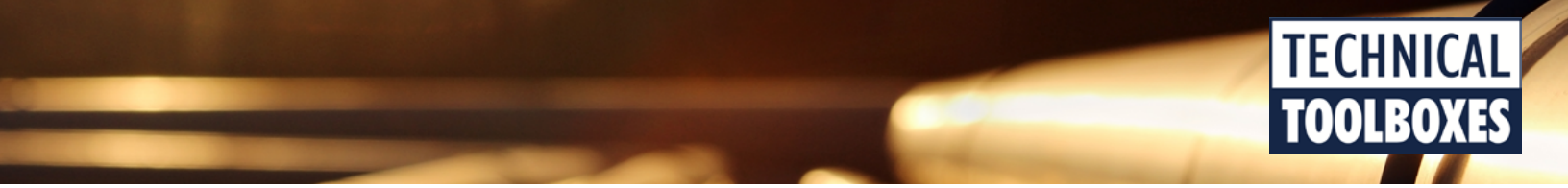

Midstream oil and gas engineering traditionally measured corrosion by physical inspection, recorded data with pencil-and-paper, and stored it in binders and filing cabinets. Information was a scarce resource. Analyzing pipelines for integrity and remaining strength determinations meant digging them up. Records and asset histories were obscure and lacked any sense of the big picture. As information technology has evolved, pipeline engineers have moved with the times. New hardware such as smart pigs simplified integrity inspections. Spreadsheets and PDFs digitized records and calculations. However, there were limitations: information systems lacked reference structures and could not easily be shared with other teams.

Engineers seek to simplify human efforts, and the state of the art in Information Technology moves swiftly (Smith). If you wish to remain competitive and operate efficiently, there can no longer be any tolerance for data duplication, for disparate databases that do not share data, for non-standard storage formats and unstructured repositories. Even in a mature industry like oil and gas, software users can reasonably expect continuous improvement from their digital resource providers. The new standard is to gather data remotely and qualify it in real-time. The digital oilfield concept applies to upstream oilfield assets and midstream pipelines. It leverages the new capabilities of sensors at critical points on the equipment in the field. The Pipeline Hub (HUB^{PL}) platform from Technical Toolboxes draws in multiple asset data sources and facilitates communications between software applications. It provides the platform for modeling in a holistic approach to data analysis and reporting.

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From Asset Data Automation to Integration

So, how did technology transform in the last decade? The most significant changes are in the way that software applications can communicate seamlessly on one platform. Engineers have more versatile and efficient “Digital Oilfield” tools to gather and integrate asset histories into an organization-wide repository and present it to users in a unified dashboard format. It means having data and analyses available immediately for review on one display. The most tangible benefits are better communications between teams, fewer investigative digs, and lower risk of leakage so you can avoid multi-million dollar expeditions and clean-up costs. With integrated platforms, one engineer can handle the workload that would once have required a team of six. So, you can redeploy your valuable personnel to discover and develop new opportunities for your business.

The HUB[PL] enables engineers to overlay GIS data about extended lengths of corrosion on pipeline maps. Users can import soil data and use multiple algorithms that would previously be siloed separately. Using a smart pig to assess and mitigate AC corrosion on a pipeline requires modeling to interpret the data. Digital Oilfield provides a new basis for modeling the vast quantities of data that can be gathered. The HUB[PL] platform is unmatched in the current marketplace due to the sheer magnitude of applications and functionalities available to organizations worldwide (Smith).

Conclusions

The conclusion put forward by Pikas and Klechka was that the critical factor is how you leverage key asset data to model solutions (Pikas and Klechka). The data integration transformation made possible by Digital Oilfield gives you many more leverageable formats with which to model integrity and mitigation solutions. The ability to integrate it into actionable business intelligence now matches the capability to gather vast quantities of data from geographically dispersed assets. In the case of corrosion in oil and gas pipelines, that means automating data gathering and qualification and including it in a structured database repository available to all users. It means combining information from many different sources, pinpointing corrosion with GIS data, and putting it on the map. It is a virtual model of the pipeline network that reflects the state of your assets in real-time (Lafleur).

Technical Toolboxes is an authorized agent for PRCI. We set the industry standard for solutions. Now, we have new and unprecedented capabilities in automation and data integration with the HUB[PL], PRCI AC Mitigation Toolbox, and PRCI RSTRENG+®. Integrate these cloud-based tools and others, such as Pipeline Toolbox, to put all of your decision-making information for an asset on one HUB[PL] Canvas. If you haven't looked at corrosion modeling solutions lately, or you haven't explored what Technical Toolboxes has to offer, take a look at what we are doing and book a free trial to experience the difference for yourselves.

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