Robotic Solutions for Inspecting Unpiggable Pipelines

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In this submission, we discuss how robotic inspection crawlers can offer remote visual inspection in unpiggable pipes. As industry develops, provision is made to make assets more accessible for inspection and condition monitoring purposes. This has not always been the case, and although pigging is a key inspection technique for many pipelines, there are a number of inline inspection tasks or historic pipelines where internal barriers and complex geometry mean a pig is unable to meet the demands of the inspection. Pigs have the benefit of being able to operate over longer distances of pipelines, but their downfall comes when a pipeline changes diameter or has multiple bends over a short area. In addition, pigs require a launcher and receiver setup as well as heavy pressure to overcome friction and drive, unable to stop at regions of interest for a more in-depth look. These combined limitations do not exist for robotic crawlers. When you consider that almost 75% of gas pipelines in the US alone were not built with inline inspection (ILI) in mind, pigs often don't stand a chance against internal barriers and complex geometry commonly found in pipelines across the petrochemical, oil and gas, nuclear, and related industrial sectors. This paper introduces proven robotic solutions for performing remote visual inspection inside unpiggable pipelines including successful use cases and opportunities for NDE sensor integration for smarter inspection.