

Analisis Spesifikasi Alat Inspeksi Pipa In-Line Pipe Inspection Robot (IPIR) Berdasarkan Standar Inspeksi Pipa dan Persyaratan Lainnya = Analysis of the Specifications of the Pipe Inspection Tool In-Line Pipe Inspection Robot (IPIR) Based on Pipe Inspection Standards and Other Requirements

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Abstrak

In-Line Inspection (ILI) merupakan salah satu metode asesmen pipa dalam manajemen integritas pipa di industri minyak dan gas (migas) menggunakan alat ILI Pipeline Inspection Gauge (PIG). Akan tetapi, persiapan dan operasi PIG sangat mahal dan rumit, serta jaringan pipa yang bisa dilewati terbatas karena sistem gerak yang dimiliki. In-Line Pipe Inspection Robot (IPIR) adalah perkembangan terbaru alat ILI dengan mengimplementasikan teknologi robot kepada sistem gerak dan teknologi inspeksi alat untuk mengurangi kelemahan PIG. Karena IPIR merupakan teknologi yang relatif baru perkembangan yang diberikan belum dipertimbangkan mengikuti standar inspeksi pipa sehingga belum diketahui bisa menjadi alternatif PIG yang dapat digunakan dalam industri migas. Oleh karena itu, penelitian ini menelusuri standar dan persyaratan lain aspek industri yang dapat dikaitkan dengan IPIR termasuk standar ILI, persyaratan desain dan operasi pipa yang merupakan tempat operasi alat ILI, dan peran IPIR sebagai kendaraan otomatis pembawa beban yaitu teknologi inspeksi dalam pipa. Hasil penelusuran standar berupa daftar spesifikasi IPIR termasuk persyaratan kapabilitas alat dalam melakukan inspeksi kondisi pipa dan persyaratan desain dan operasi alat dalam melakukan operasi dalam pipa.

In-Line Inspection (ILI) is one of the pipeline assessment methods in pipeline integrity management in the oil and gas industry using the ILI tool Pipeline Inspection Gauge (PIG). However, the preparation and operation of PIG is extremely costly and complex, and the type of pipeline that can be passed is limited due to its locomotion system. In-Line Pipe Inspection Robot (IPIR) is the latest development of ILI tool by implementing robot technology to the motion system and inspection tool technology to reduce the weakness of the PIG. Because IPIR is a relatively new technology, its development has not been considered to follow pipe inspection standards, so it is not yet acknowledged to be an alternative PIG that can be utilized in the oil and gas industry. This study therefore explores the standards and other requirements that can be related to IPIR including standards for ILI, design and operation requirements for the pipeline where the ILI tool operates, and the role of IPIR as a load-carrying automated vehicle with the pipeline inspection technology instrument as the load. The results of this exploration of standards are a list of IPIR specifications including the tool capability requirements in performing pipeline condition inspections and the tool design and operation requirements in conducting operations inside a pipeline.