Analisa korosi dan pemilihan material hasil inspeksi berdasarkan resiko pada perpipaan kilang = Analysis of corrosion and material selection as a result of risk based inspection on plant piping

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Abstrak

Kegagalan material karena korosi berpengaruh pada operasi kilang sehingga diperlukan analisa dan pemilihan material untuk menjamin kehandalannya. Pelaksanaan Inspeksi Berdasarkan Resiko memerlukan data korosi dan identifikasi material terutama untuk menentukan nilai kemungkinan kegagalan (probability of failure). Terdapat korelasi yang berarti (significant) antara korosi material dengan inspeksi berdasarkan resiko. Pengujian material baja karbon Pipa ASTM A 106 Grade B, Pipa ASTM A 53 Grade B, Pipa KI-R 410 W, Grade P265 GH, Pipa SA 335 Grade P5, dan Pipa ASTM A516 Grade 70 menghasikan laju korosi dan sifat mekanis sebagai acuan pemilihan material.
Dari hasil penelitian diperoleh laju korosi terbesar adalah pipa ASTM A 106 Grade B sebesar 1.1649 mpy. Optimalisasi pemilihan material terhadap kelima sampel diperoleh material terbaik adalah pipa KI-R 410 W, diikuti pipa ASTM A 53 Grade B, pipa 516 Grade 70, pipa SA-335 Grade P5 dan terakhir pipa ASTM A 106 Grade B. Pemilihan material yang optimal meningkatkan kehandalan kilang.
<hr>Material Failure due to corrosion has a significant role in a plant operation, therefore material has to be analyzed and selected properly to guarantee plant reliability in their operation. Implementations of Risk Based Inspection need some data of corrosion in order to determine the probability of failure. We found a significant correlation between materials failure due to corrosion in Risk Based Inspection. More corrosive material will increase the probability of failure. Experiment on Pipe materials ASTM A 106 Grade B, ASTM A 53 Grade B, Pipe KI-R 410 W Grade P65 GH, Pipe ASTM SA 335 Grade B and Pipe A 516 Grade 70, conclude that corrosion rate, service life and mechanical properties can be used as a basic for materials selections.
From the experiment we found the biggest corrosion rate is ASTM A 106 Grade B with 1.1649 mill per year. From the material selection we found the best material is Pipe KI-R 410 W, and than ASTM A 53 grade B, Pipe 516 Grade 70, Pipe SA 335 Grade P5 and Pipe ASTM A 106 Grade B. The correct material selection will increase the reliability of plant.