Studi laju korosi internal pada pipa standar api 5 L Grade B dengan metoda polarisasi tahanan yang dipengaruhi oleh kondisi temperatur, kecepatan pengadukan larutan dan volume aliran gas CO2

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Abstrak

Baja jenis paduan rendah banyak digunakan didalam industri minyak dan gas bumi sebagai pipa penyalur, karena mempunyai sifat mekanik, pengelasan yang baik serta ekonomis. Namun masih mengalami serangan korosi, seperti korosi internal akibat media yang bersifat korosif antara lain garam-garam terlarut, oksigen dan gas CO2. Disamping itu dipengaruhi oleh temperatur dan kecepatan alir cairan.

Pada studi ini dilakukan pengujian secara laboratorium terhadap spesimen pipa baja standar API 5 L Grade B berdiameter 1,3 cm² menggunakan perangkat lunak CMS 100 dengan metoda Polarisasi Tahanan dengan standar ASTM G 59-78. Kondisi pengujian adalah temperatur (Ti = 27 °C, T2 = 60 °C dan T3 = 80 °C), kecepatan pengadukan larutan (VI = 600 rpm, V2 = 800 rpm, V3 = 1000 rpm) dan volume aliran gas CO2 (Q1 = 10 ml/ dt, Q2 = 18 ml/ dt, Q3 = 26 ml/ dt). Larutan uji diambil dari air 'Lapangan Melibur' dan 'Lapangan Selatan' di suatu perusahaan minyak dan gas bumi yang terletak di Kabupaten Bengkalis. Propinsi Riau Sumatera.

Hasil penelitian ini, diperoleh data laju korosi yang dapat digunakan untuk menganalisa umur pipa. Laju korosi tertinggi 88,656 mpy. dari media lapangan Selatan pada temperatur 27 °C dengan kondisi kecepatan pengadukan larutan 800 rpm, dan volume aliran gas CO2 =10,043 ml/ dt. Pengujian terhadap larutan lapangan Melibur diperoleh laju korosi tertinggi 72,735 mpy., pada temperatur 60 °C dengan kondisi kecepatan pengadukan larutan 800 rpm., serta volume aliran gas CO2 =18,108 ml/ dt.
<hr><i>The metals especially low alloy steels are used in many oil and natural gas industries, because it has good mechanically and good weldabily, also good economics but in otherwise the problem of corrosion is still attach like internal pipe corrosion, as cause media corrosive as among other dissolved salts, oxygen and CO2 gas. Beside of that is affected by temperature, velocity of fluid.

On this study was performed by testing in the laboratory for specimen of steel pipe which has API 5 L Grade B standard. The specimen has 1,3 cm² diameter that was exposed in electrochemical cell where linked by CMS 100 software. The testing used Resistance Polarization methods that refer to ASTM G 59-78. Objective of testing to know the factor which most affection of corrosion. The condition of testing are temperature, (TI = 27 °C, T2 = 60 °C, T3 = 80 °C), Velocity of solution (VI = 600 rpm, V2 = 800 rpm, V3 = 1000 rpm), and volume of CO2 gas flow (QI = 5 ml/dt, Q2 = 10 ml/dt, Q3 = 15 ml/dt). Solution test sample was taken from 'Melibur field' and 'Selatan field' in the oil and gas company that is located in Bengkalis District, Riau Islands Sumatra Province.

Results of this research would be got the corrosion rate data which can used for pipe live analysis. The highest corrosion rate was 88,656 mpy which was found in Selatan field solution by condition on 27°C

temperature and 800 rpm velocity and colume od CO2 gas flow = 10,043 ml/dt. Even testing on Melibur field solution was acquired the highest corrosion rate was 72,735 mpy by condition on 60°C temperature and 800 rpm velocity and volume of CO2 gas flow = 18,108 ml/dt.</i>