Analisa Perilaku Korosi Baja ASTM A36 dengan Fungsi Tegangan Tarik Menggunakan Metode Electrochemical Impedance Spectroscopy (EIS) dan X-Ray Diffraction (XRD) = Analysis of ASTM A36 Low Carbon Steel Corrosion Behavior with Tensile Stress Function Using Electrochemical Impedance Spectroscopy (EIS) and X-Ray Diffraction (XRD) Methods

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Abstrak

Baja karbon rendah ASTM A36 umum digunakan pada aplikasi konstruksi, perminyakan, dan struktur kapal. Ketiga aplikasi tersebut memungkinkan adanya tegangan tarik pada saat pemasangan maupun penggunaan. Perilaku korosi baja ASTM A36 dengan fungsi tegangan tarik diamati menggunakan metode Electrochemical Impedance Spectroscopy (EIS) dan X-Ray Diffractometer (XRD). Baja ASTM A36 dilakukan perendaman pada larutan NaCl 3,5% dengan variasi tegangan tarik 0, 100, dan 200 MPa dan variasi waktu perendaman 1 jam, 4 jam, 8 jam, 24 jam, dan 72 jam. Hasilnya menunjukkan bahwa semakin besar tegangan tarik dapat menurunkan ketahanan baja terhadap korosi. Semakin besar tegangan, resistansi logam terhadap serangan korosi semakin menurun serta memungkinkan terbentuknya lubang korosi sumuran yang lebih besar akibat adanya tegangan pada batas butir yang terkorosi. Hasil analisa XRD pada permukaan baja setelah proses korosi menunjukkan adanya fasa berupa Fe, magnetit (Fe3O4), dan NaCl. .....ASTM A36 low carbon steel is commonly used in construction, petroleum, and ship structure applications. These three applications allow for tensile stress during installation and use. The corrosion behavior of ASTM A36 steel with tensile stress function was observed using Electrochemical Impedance Spectroscopy (EIS) and X-Ray Diffractometer (XRD) methods. ASTM A36 steel was immersed in 3.5% NaCl solution with variations in tensile stress of 0, 100, and 200 MPa and immersion time variations of 1 hour, 4 hours, 8 hours, 24 hours, and 72 hours. The results show that the greater the tensile stress, the lower the steel's resistance to corrosion. The greater the stress, the lower the metal's resistance to corrosion attack and allows the formation of larger pits due to stress at the corroded grain boundaries. The results of XRD analysis on the ASTM A36 low carbon steel surface after the corrosion process showed the presence of Fe, magnetite (Fe3O4), and NaCl phases.