

## Corrosion behavior of AH-36 steel in seawater

© Nguyen Van Chi,<sup>1\*</sup> Cao Nhat Linh,<sup>1+</sup> Dong Van Kien,<sup>1</sup> Le Hong Quan,<sup>1</sup>  
Mai Van Minh,<sup>1</sup> Nong Quoc Quang,<sup>1</sup> and Alexander N. Zyablov<sup>2</sup>

<sup>1</sup> Coastal Branch. Vietnam-Russia Tropical Centre. Nguyen Thien Thuat, 30. Nha Trang, Khanh Hoa 57127.  
Vietnam. Phone: +84 (2583) 52-54-36. E-mail: nguyenvanchirvtc@gmail.com

<sup>2</sup> Department of Analytical Chemistry. Voronezh State University. University St., 1. Voronezh, 394018.  
Voronezh Region. Russia. Phone: +7 (9056) 50-63-63.

\*Supervising author; +Corresponding author

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### Abstract

In the present work, the corrosion behavior of AH-36 steel in 3% NaCl aqueous solution and natural seawater was studied using a three-electrode cell, Autolab PGSTAT 204N, and Nova 2.0 software by electrochemical methods. It has been established that after contact of the steel with chloride-containing media, the open circuit potential of steel shifts sharply to the negative region, which indicates a decrease in the corrosion resistance of steel in chloride-containing media. In seawater, the stabilization of the open circuit potential is observed within 60 min, and in NaCl solution – 120 min. The constant value of the open circuit potential of steel in seawater is in a more negative range compared to the constant value of the open circuit potential of steel in NaCl solution. In order to study the kinetics of the corrosion process of steel, polarization curves were obtained in the potentiostatic mode. It is shown that the corrosion potentials and currents of the samples decrease over time and tend to constant values. In all cases, the corrosion process in seawater occurs and stabilizes (within 20 min) faster than in NaCl solution. The anode Tafel coefficient takes a value in the range of 0.1-0.2 V, which may indicate the same mechanism of the anodic process. As a result of full-scale tests (Nha Trang, Vietnam), it can be seen that the steel samples are strongly susceptible to corrosion at the initial stage and over time the corrosion rate decreases and tends to a constant value (0.27 g/m<sup>2</sup>h). This is due to the sample surface passivation during corrosion tests.

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