

Application of Adaptive Neuro Fuzzy Inference Systems Technique for Modeling of Postweld Heat Treatment Process of Pressure Vessel Steel AASTM A516 Grade 70

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Abstract : The ASTM A516 Grade 70 steel is a suitable material used for the fabrication of boiler pressure vessels working in moderate and lower temperature services, and it has good weldability and excellent notch toughness. The post-weld heat treatment (PWHT) or stress-relieving heat treatment has significant effects on avoiding the martensite transformation and resulting in high hardness, which can lead to cracking in the heat-affected zone (HAZ). An adaptive neuro-fuzzy inference system (ANFIS) was implemented to predict the material tensile strength of post-weld heat treatment (PWHT) experiments. The ANFIS models presented excellent predictions, and the comparison was carried out based on the mean absolute percentage error between the predicted values and the experimental values. The ANFIS model gave a Mean Absolute Percentage Error of 0.556 %, which confirms the high accuracy of the model.

Keywords : prediction, post-weld heat treatment, adaptive neuro-fuzzy inference system, mean absolute percentage error

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