Kinetics of strain aging behavior of api 5l x65 and api 5l b steel types on long-term operations

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Abstrak

The kinetics of strain aging behavior of API 5L X65 and API 5L B steel types on long-term operations were studied. Pre-strain was applied to the two steel types and the process was continued with the aging process at various temperatures and over various time periods. Mechanical properties data were used to determine activation energy levels. The results showed that API 5L B steel has a lower activation energy level than API 5L X65 steel through the identification of yield strength value, which is 13.7 kJ compared to 24.87 kJ, which means that API 5L B steel is more susceptible to strain aging than API 5L X65 steel. Predictions of long-term mechanical properties which are verified through tensile testing showed that the appropriate parameters to observe and predict the strain-aging behavior are implemented by evaluating the changes in yield strength, which gives the minimum value for the average margin of error for API 5L X65 steel and API 5L B steel, i.e. 0.3% and 0.45%, respectively. On the other hand, prediction value parameters, such as elongation, toughness and the Vickers hardness have an average margin of error range between 2.6 to 5.06%.