ABSTRACT:

Through an investigation of the field failure analysis and laboratory experiment, a study on (stress corrosion cracking) SCC behavior of steel and aluminum was performed. All samples were extracted from known operating conditions from the field failures. Similar but accelerated laboratory test was subsequently conducted in such a way as to mimic the field failures. The crack depth and behavior of the SCC were then analyzed after the laboratory test and the mechanism of stress corrosion cracking was studied. The results show that for the same given stress relative to ultimate tensile strength, the susceptibility to SCC is greatly influenced by heat treatment. Furthermore, it was also concluded that when expressed relative to the (ultimate tensile strength) UTS, aluminum has similar level of SCC susceptibility to that of steel, although with respect to the same absolute value of applied stress, aluminum is more susceptible to SCC in sodium hydroxide environment than steel.