Análisis numérico del crecimiento de grieta por fatiga del CPVC: efecto de la temperatura y frecuencia de carga [

2019

text (article)

Analítica

An analysis of combined effect of temperature and load frequency on the fatigue crack growth rate and cracking velocity for Chlorinated Polyvinyl Chloride (CPVC) is presented in this paper. CPVC is a thermoplastic material used for piping systems where higher temperature and chemical resistance are important, becoming in a good alternative to metals. The Dual Boundary Element Method (DBEM) is used to determine three- dimensional states of stresses and strains at each increment of crack. Stress intensity factors at the crack tip are determined using the J-integral and the crack growth direction is defined by the maximum principal stress criteria. A mathematical model proposed by Kim & Wang in 1994 based on experimental results, is applied to predict cracking velocity. In this work, a specimen with lateral crack using temperature values between 23 and 70 ºC and frequencies between 0.1 and 10 Hz, is evaluated. The results show that cracking velocity increases with temperature increase and with frequency diminution. These results are compared to Paris & Erdogan model showing good agreement which show DBEM could be an accurate tool to investigate the prediction of crack growth in polymers
An analysis of combined effect of temperature and load frequency on the fatigue crack growth rate and cracking velocity for Chlorinated Polyvinyl Chloride (CPVC) is presented in this paper. CPVC is a thermoplastic material used for piping systems where higher temperature and chemical resistance are important, becoming in a good alternative to metals. The Dual Boundary Element Method (DBEM) is used to determine three- dimensional states of stresses and strains at each increment of crack. Stress intensity factors at the crack tip are determined using the J-integral and the crack growth direction is defined by the maximum principal stress criteria. A mathematical model proposed by Kim & Wang in 1994 based on experimental results, is applied to predict cracking velocity. In this work, a specimen with lateral crack using temperature values between 23 and 70 ºC and frequencies between 0.1 and 10 Hz, is evaluated. The results show that cracking velocity increases with temperature increase and with frequency diminution. These results are compared to Paris & Erdogan model showing good agreement which show DBEM could be an accurate tool to investigate the prediction of crack growth in polymers

Título: Análisis numérico del crecimiento de grieta por fatiga del CPVC: efecto de la temperatura y frecuencia de carga electronic resource]

Editorial: 2019

Documento fuente: Revista UIS Ingenierías, ISSN 1657-4583, Vol. 18, Nº. 1, 2019 (Ejemplar dedicado a: Revista UIS Ingenierías), pags. 177-186

Nota general: application/pdf

Lengua: Spanish

Enlace a fuente de información: Revista UIS Ingenierías, ISSN 1657-4583, Vol. 18, Nº. 1, 2019 (Ejemplar dedicado a: Revista UIS Ingenierías), pags. 177-186
