

개선된 참조 응력법을 이용한 비선형 파괴파라미터 예측  
Estimation of Non-Linear Fracture Parameter  
Using Enhanced Reference Stress Method

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요약

본 논문에서는 균열구조물에 대한 비선형 파괴역학해석시 필요한  $J$ -적분(혹은  $C^*$ )을 예측하기 위해 새로운 공학적 방법인 개선된 참조응력법을 제시하였다. 이 방법은 기존 방법에 비해 매우 정확하고, 단순하다. 본 연구에서는 이 방법을 관통균열배관이나 표면균열배관에 적용하였다. 유한요소해석으로부터 얻은  $J$ 와  $C^*$  모두 예측결과와 잘 일치하였으며, 이를 통해 제시한 방법의 타당성을 입증하였다.

Coolant Leakage from Lab Grown SCC Tubes and Operating Steam  
Generator Tubes

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Abstract

Primary water stress corrosion cracking of steam generator tubings occurs on many tubes in pressurized water reactors (PWRs), and they are repaired using sleeves or plugs. In order to develop proper repair criteria, it is necessary to know the leak behavior of the tubes. Out side diameter(OD) and inside diameter(ID) cracks were developed at room temperature, and leak rate and burst pressure were measured on the degraded tubes at room temperature and high temperature. 100 % through wall cracks did not show a leakage at 1560 psi, which is an operating pressure difference of pressurized water reactors (PWRs). In some tests, leak rates of the tubes increased with time at a constant internal water pressure. A test tube showed a very small amount of leakage at 2700 psi in high temperature pressure test at 282 °C, but it disappeared after the pressure increased slightly. Even cracks are 100 % through wall, they need to open in order to reach a certain amount of leak rate at the operating pressure difference. OD initiated crack showed lower leak pressure than that of ID initiated crack