عنوان مقاله:

Fitness for Service Approach (FFS) in Fatigue Life Prediction for a Spherical Pressure Vessel Containing Cracks

محل انتشار:

فصلنامه مکانیک جامد, دوره 12, شماره 4 (سال: 1399)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

During the pressure vessels' operating life several flaws are likely to grow in long term operations under cyclic loading. It is therefore essential to take practical and predictive measures to prevent catastrophic events to take place. Fitness for service (FFS) is one safety procedure that is used to deal with maintenance of components in the petroleum industry. In this method, proposed in Codes of practices such as API ۵۷۹ and BSI ۷۹۱۰, in certain cases, an overly conservative safety prediction is obtained when applied to the operation of pressure vessel containing surface fatigue crack growth. By using improved analytical techniques as well as nonlinear finite element methods critical cracks lengths may be derived more accurately thus reducing conservatism. In this paper, a specific pressure vessel analyzed for fitness for service which sees fatigue crack growth rate is assessed using analytical and numerical stress intensity factors. The estimated fatigue life is compared with both methods. It is found that both approaches give similar predictions within a range of scatter assuming that the fatigue properties used are the same in both cases. However, it can be said that the numerical approach gave the more conservative predictions suggesting a detailed .analysis is always preferable in FFS examinations

کلمات کلیدی:

Pressure vessel, Fatigue life assessment, Fitness for service