

Probabilistic Assessment of Fracture Mechanics of Low Pressure Turbine

Disk Keyway

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Abstract

This study presents the development of a fracture mechanics-based probability analysis which can be used to estimate the remaining life of the low pressure turbine against unstable fracture in the rotor disk keyway. Analysis focuses on the stability of crack growth of a semi-elliptical flaw in the rotor disk keyway. The crack stability is judged on the basis of the linear elastic fracture mechanics. Then the Monte Carlo technique is introduced to deal with several random variables. Based on the evaluation results, the probability of failure of observed crack indications can be determined. The inspection interval could be justified.

Keyword : Monte Carlo simulation, probabilistic fracture mechanics, stress corrosion cracking, fracture appearance transition temperature