

Life begins at 70

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ABSTRACT

Thermal cracks at critical locations of turbine rotors are causes of rotor instability and could lead to rotor failure. The work of stress analysts is to determine when and where an incipient crack would occur before its actual initiation. Whereas the work of rotor dynamics and fracture mechanics is to locate and assess the crack after its initiation.

For safety reasons stress analysts consider rotor life to end at 70 (% of total creep and fatigue life), whereupon rotor dynamics take over to monitor rotor stability and to check for crack initiation and propagation. Rehabilitation by skin-cut can restore new life to the rotor.

This paper presents from the stress analyst's standpoint simplified procedures to establish life-expenditure curves, which plant engineers can adopt for existing rotors which are not provided by manufacturers with on-line life monitoring equipment.

Keywords: Life-expenditure charts, rotor, steam turbine.