

Effect of Linear Thermal Gradient on Steady-State Creep Behavior of Isotropic Rotating Disc

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Abstract : The present paper investigates the effect of linear thermal gradient on the steady-state creep behavior of rotating isotropic disc using threshold stress based Sherby's creep law. The composite discs made of aluminum matrix reinforced with silicon carbide particulate has been taken for analysis. The stress and strain rate distributions have been calculated for discs rotating at linear thermal gradation using von Mises' yield criterion. The material parameters have been estimated by regression fit of the available experimental data. The results are displayed and compared graphically in designer friendly format for the above said temperature profile with the disc operating under uniform temperature profile. It is observed that radial and tangential stresses show minor variation and the strain rates vary significantly in the presence of thermal gradation as compared to disc having uniform temperature.

Keywords : creep, isotropic, steady-state, thermal gradient

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