

Steady State Creep Behavior of Functionally Graded Thick Cylinder

Authors : Tejeet Singh, Harmanjit Singh

Abstract : Creep behavior of thick-walled functionally graded cylinder consisting of AlSiC and subjected to internal pressure and high temperature has been analyzed. The functional relationship between strain rate with stress can be described by the well-known threshold stress based creep law with a stress exponent of five. The effect of imposing non-linear particle gradient on the distribution of creep stresses in the thick-walled functionally graded composite cylinder has been investigated. The study revealed that for the assumed non-linear particle distribution, the radial stress decreases throughout the cylinder, whereas the tangential, axial and effective stresses have averaging effect. The strain rates in the functionally graded composite cylinder could be reduced to significant extent by employing non-linear gradient in the distribution of reinforcement.

Keywords : functionally graded material, pressure, steady state creep, thick-cylinder

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