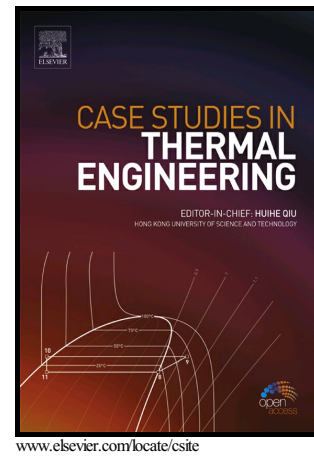


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# Bree's diagram of a functionally graded thick-walled cylinder under thermo-mechanical loading considering nonlinear kinematic hardening

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## Abstract

In this paper, elasto-plastic analysis of a thick-walled cylinder made of functionally graded materials (FGMs) subjected to constant internal pressure and cyclic temperature gradient loading is carried out using MATLAB. The material is assumed to be isotropic and independent of temperature with constant Poisson's ratio and the material properties vary radially based on a power law volume function relation. The Von Mises' yield criterion and the Armstrong-Frederick nonlinear kinematic hardening model were implemented in this investigation. To obtain the incremental plastic strain, return mapping algorithm (RMA) was used. At the end, the Bree's interaction diagram is plotted in terms of non-dimensional pressure and temperature which represents an engineering index for optimum design under thermo-mechanical loading.

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