

Discussion on Plastic Material Models Used in Finite Element Analysis for
Computing Residual Stress of Dissimilar Metal Multi-Pass Weld(101.07.30-
101.08.3)

Cheng Hsien Kuo, YaoLong Tsai, 范德威, ChaoJen Li, HanJou Chang, Chang-Pin Chou
Civil Engineering
College of Architecture and Design
dfan@chu.edu.tw

Abstract

The cracks appearing within dissimilar metal weld are very common and important issues in nuclear power plants. Weld-induced residual stress is a main factor for crack growth, and hence the exact estimation of welding residual stress is quite important for the reliable operation of plants. Moreover, the employed elastoplastic constitutive law of each reactor constituent is closely linked to the calculation results of residual stress. Based on the commercial finite element program ANSYS, in this paper the authors will implement a case about the EU mock-up nozzle to discuss how the plastic material models, e.g. perfectly/bilinear plastic model and isotropic/kinematic hardening, affect the residual stress in the dissimilar metal weld and provide several useful suggestions in finite element analysis.

Keyword : Residual Stress, Finite Element Analysis, Dissimilar Metal Weld