

Viscoplastic constitutive model of P92 steel coupled with creep-fatigue damage

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Abstract

A new constitutive model within the framework of Chaboche model was developed by improving the nonlinear isotropic hardening law and kinematic hardening law with cyclic characteristic parameters. Strain controlled creep-fatigue experiment of P92 steel with various strain amplitudes and holding time were conducted under 600. The feature of the cycle softening and stress relaxation were studied under the creep-fatigue condition. The result shows that the effect of strain amplitude on cyclic softening and stress relaxation behavior is negligible, however the holding time has a greater impact on both. According to the experimental data, the constitutive model of P92 under creep-fatigue interaction was deduced, and the reliability of the model was also verified, in which the cycle characteristics of P92 steel under creep-fatigue was finely described.

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