

ABAQUS

Version 6.6 Documentation

ABAQUS Analysis User's Manual

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18.2.2 Models for metals subjected to cyclic loading

Products: ABAQUS/Standard ABAQUS/Explicit ABAQUS/CAE

References

- ["Material library: overview," Section 16.1.1](#)
- ["Inelastic behavior," Section 18.1.1](#)
- ["Anisotropic yield/creep," Section 18.2.6](#)
- ["UHARD," Section 1.1.26 of the ABAQUS User Subroutines Reference Manual](#)
- [*CYCLIC HARDENING](#)
- [*PLASTIC](#)
- [*POTENTIAL](#)

Overview

The kinematic hardening models:

- are used to simulate the inelastic behavior of materials that are subjected to cyclic loading;
- include a linear kinematic hardening model and a nonlinear isotropic/kinematic hardening model;
- can be used in any procedure that uses elements with displacement degrees of freedom;
- in ABAQUS/Standard cannot be used in adiabatic analyses, and the nonlinear isotropic/kinematic hardening model cannot be used in coupled temperature-displacement analyses;
- can be used to model rate-dependent yield;
- can be used with creep and swelling in ABAQUS/Standard; and
- require the use of the linear elasticity material model to define the elastic part of the response.

Yield surfaces

The kinematic hardening models used to model the behavior of metals subjected to cyclic loading are pressure-independent plasticity models; in other words, yielding of the metals is independent of the equivalent pressure stress. These models are suited for most metals subjected to cyclic loading conditions, except voided metals. The linear kinematic hardening model can be used with the Mises or Hill yield surface. The nonlinear isotropic/kinematic model can be used only with the Mises yield surface in

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Hibbitt, Karlsson and Sorensen



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ABAQUS/CAE User's Manual Hibbitt, Karlsson and Sorensen,2001 **ABAQUS/standard** ,1995 ABAQUS/CAE User's Manual ABAQUS (firm),2003 *ABAQUS* ,2000 ABAQUS Analysis User's Manual ,2008 **ABAQUS.** Hibbitt, Karlsson and Sorensen,1987 **User's Manual Band 1** ABAQUS,1998 ABAQUS ,2004 ABAQUS ,2003 **Abaqus Analysis User's Manual** ,2004

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