Camacho, G. T.; **Ortiz, M.**

Adaptive Lagrangian modelling of ballistic penetration of metallic targets. (English)

Zbl 0892.73056
Comput. Methods Appl. Mech. Eng. 142, No. 3-4, 269-301 (1997).

Summary: A Lagrangian finite element model of ductile penetration is developed. Adaptive meshing is accorded a key role in following the large deformations which develop during penetration. An explicit contact/friction algorithm is used to treat the multi-body dynamics. Rate-dependent plasticity, heat conduction and thermal coupling are also accounted for in the calculations. The properties and predictive ability of the model are exhibited in several applications: copper rod impact, perforation of aluminum plates by conical-nosed projectiles and penetration of high-strength steel targets by WHA long rods. The simulation show close agreement with experimental observations and numerical results.

MSC:

74S05 Finite element methods applied to problems in solid mechanics
74M20 Impact in solid mechanics
80A20 Heat and mass transfer, heat flow (MSC2010)

Keywords:

rate-dependent plasticity; ductile penetration; large deformations; explicit contact/friction algorithm; multi-body dynamics; thermal coupling; copper rod impact; perforation of aluminum plates by conical-nosed projectiles

Software:

LS-DYNA; DYNA3D; PRONTO 2D

Full Text: DOI

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