

Abstract Submitted
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Modelling of the Pele Fragmentation Dynamics JIMMY VER-
REAULT, TNO — The Penetrator with Enhanced Lateral Effect (PELE) is a type
of explosive-free projectile that undergoes radial fragmentation upon an impact with
a target plate. This type of projectile is composed of a brittle cylindrical shell (the
jacket) filled in its core with a material characterized with a large Poisson's ratio.
Upon an impact with a target, the axial compression causes the filling to expand in
the radial direction. However, due to the brittleness of the jacket material, very little
radial deformation can occur which creates a radial stress between the two materi-
als and a hoop stress in the jacket. Fragmentation of the jacket occurs if the hoop
stress exceeds the material's ultimate stress. The PELE fragmentation dynamics is
explored via Finite-Element Method (FEM) simulations using the AUTODYN ex-
plicit dynamics hydrocode. The numerical results are compared with an analytical
model based on wave interactions, as well as with the experimental investigation of
Paulus and Schirm (1996). The comparison is based on the mechanical stress in
the filling, the resulting radial velocity of the fragments, the number of fragments
generated and their mass distribution.

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