Numerical study of the influence of the high-strength striker rotation on its failure and interaction with the metal barrier upon impact

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The influence of rotation on the destruction of an ogival high-strength steel striker during high-velocity interaction with a steel barrier of finite thickness is studied. The range of interaction angles from 0 to 75 degrees is considered. The initial velocity of the striker was 1000 m/s. The striker rotation frequency around the longitudinal axis varied from 0 to 10000 rpm. The behavior of the striker and barrier materials is described by an elastoplastic model. The limiting value of the intensity of plastic deformations is used as a failure criterion. Modeling is carried out in a three-dimensional setting by the finite element method using the author's algorithm and the EFES 2.0 software package, which allows modeling the fragmentation of interacting bodies with the formation of new contact and free surfaces, erosion destruction of materials. It has been established that the rotation of the striker has a significant effect on the destruction of interacting bodies and the kinematics of the striker:
-rotation leads to intensification of the plastic deformation of the striker in the contact area and erosion destruction of the striker;
-the presence of rotation of the drummer contributes to its rebound, i.e. leads to a decrease in the interaction angle at which a rebound occurs.

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