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Numerical Analysis on the Head-Shape Effect for Long-Rod Normally Penetrating Concrete Target ZHONG-CHENG MU, WEI ZHANG, ZONG-SHENG CAO, Hypervelocity Impact Center, Harbin Institute of Technology — The deep penetration of long rods into thick target has been the focus for many decades in the terminal ballistic. Especially the study on long rods penetrating concrete targets arouses more and more attention. But the investigations of the head-shape effect to the high velocity penetration of long rod are few. In this paper, the penetration process of long rod with different head-shapes is analyzed through a series of numerical simulations. The impact velocity from subsonic velocity on the order of 10^2 m/s to hypervelocity on the order of 10^3 m/s is used. The penetration target is high strength concrete. Numerical model of concrete target adopts typical dynamic concrete damage model-RHT. The model has shown promising results for prediction of penetration depth. The projectile material is 4340 steel, Johnson-Cook model is chosen. In all the simulations presented here the material properties of projectiles and targets doesn't change. The flat-head and the ogive-head projectile are chosen. The effect of the CRH of ogive-head projectile on penetration depth is analyzed. Difference and similarity are described by the time history of penetrating velocity, acceleration and the head deformation.

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