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Study on the oblique perforation of thin steel pates by flat and ogival projectiles ZITAO GUO, School of Civil engineering urban construction, Jiujiang University, WEI ZHANG, PENG REN, Hypervelocity Impact Research Center, Harbin Institute of Technology, HYPERVELOCITY IMPACT RESEARCH CENTER COLLABORATION — This paper presents a numerical study on the oblique perforation of thin steel plates. Numerical simulations of 1 mm single A3 steel plates impacted by flat and ogival projectiles at 0, 15, 30, 45 and 60 angles over a range of velocities from 50 to 250 m/s were performed using the finite element code ABAQUS, where a modified versions of the J-C constitutive relation and fracture criterion based on a series of quasi-static and dynamic tensile tests with smooth and notched axisymmetric specimens were adopted to approximate behaviors of target material. Corresponding oblique perforation experiments were also conducted in order to be compared and calibrated. Initial-residual velocity curves and ballistic limits of targets under different angle impact were determined and compared, and the effects of projectile nose shape and obliquity on the ballistic resistance and failure models of targets were investigated. Results show that the nose shape of the projectile and oblique angles severely affected both the energy absorption and the failure mode of the target plate during perforation. Good agreement is found between the numerical simulations and experimental results.

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