
The experimental research of energy characteristics of high velocity interaction between a metal firing pin and a wall

© M.K. Marakhtanov, V.A. Veldanov, D.V. Dukhopelnikov,
A.S. Karneychik, M.A. Maksimov

Bauman Moscow State Technical University, Moscow, 105005, Russia

Since 1930–1940 data on the lead bullets armour-piercing effect and on a high efficiency of metal explosion products have been published. The experimental data of that time were obtained by shooting the light lead bullet that blasted an armour of 12,8 mm thickness at a velocity of 1700 m/c. It is not known exactly till nowadays whether the armour-piercing effect will occur at lower velocities. The paper reveals that the armour-piercing effect of a medium hard plate with a 35 mm thickness occurs at lower bullet velocities $v = 667\text{--}760$ m/s. This value is close to the theoretically predicted velocity which is equal to $v_{cr} = 702$ m/s.

Keywords: *projectile, cavity, high-velocity penetration, kinetic energy, explosive failure, shock wave, calorimetry.*

Marakhtanov M.K. (b. 1940) graduated from Bauman Moscow Higher Technical School in 1964. Dr. Sci. (Eng.), Head of the Plasma Power plants Department of Bauman Moscow State Technical University. Author of more than 200 publications in electric propulsion thrusters, ion-plasma technologies, solid state physics. e-mail: mkm@power.bmstu.ru

Veldanov V.A. (b. 1945) graduated from Bauman Moscow Higher Technical School in 1968. Ph.D., Assoc. Professor of the High-Precision Flying Vehicles Department of Bauman Moscow State Technical University. Author of more than 200 publications in the field of terminal ballistics and mechanics of deformable solid body. e-mail: vevladi@mail.ru

Dukhopelnikov D.V. (b. 1962) graduated from Bauman Moscow Higher Technical School in 1986. Ph.D., Assoc. Professor of the Plasma Power Plants Department of Bauman Moscow State Technical University. Author of more than 50 publications in electric propulsion thrusters, ion-plasma technologies.

Karneychik A.S. (b. 1948) graduated from the Kuibyshev Polytechnic Institute in 1972. Ph.D., Assoc. Professor of the Rocket and Pulse Systems Department of Bauman Moscow State Technical University. Author of more than 80 scientific publications in the field of armaments, special ballistic instruments and gun systems design.

Maksimov M.A. (b.1955) graduated from Bauman Moscow Higher Technical School in 1978. Head of the sector of the Special Design and Technological Bureau of Applied Robotics. Author of more than 30 publications in the field of dynamics and mechanics of continua.
