Hit of a Body into a Plate at a Continuous Action of an Additional Outer Force

S. Karapetrova

Dept of Mechanics, Technical University of Sofia
1000 Sofia, Bulgaria

I. Altaparmakov

Faculty of Applied Mathematics and Informatics, Technical University of Sofia
1000 Sofia, Bulgaria

T. Penchev

Dept of of Material Science and Material Processing Technology, Technical University of Sofia
1000 Sofia, Bulgaria

This paper discusses the case of the fall of a body with mass m from a height h on an absolutely rigid plate. At the very first moment of impact a constant outer force P_r begins action on that body. The value of rebound after the hit depends on the ratio between the force of rebound P_1 (which is a function of the mass m and the speed of the hit V_0) and P_r. From the basic equation of mechanics differential equations have been derived and solving them makes it possible to define V_0 for various resistances of the medium R for the case when this resistance starts to act after the passing of the distance h_* from the initial point of falling of the body. The formula to calculate the force $P_1(m, V_0, P_r)_R$ was derived based on those estimations. This is connected to the study on the value of the rebound of production machines with hammer action, propelled by a new type of engine. That engine can work during the vertical movement of the body (when we get acceleration of the falling parts up to $V_0 = 40$ m/s), and during and after the impact. Depending on the ratio between P_1 and P_r one can get various values of the rebound ('guided' or 'combined' hit) or no rebound ('sticking' hit).

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