Modeling of an Elastic Sphere Hit on an Elastic-plastic Plate under a Continuing Action of an Outer Force

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Modeling of hitting processes at various properties of the colliding bodies is of particular theoretical and practical interest e.g. for modelling of plastic deformation processes. Best results regarding the parameters of the hitting processes (forces, tensions, deformations, duration of contact, etc.) are obtained by the final elements method (FEM).

This paper presents the results of FEM modeling of the hitting process after a free fall of a sphere on an elastic-plastic plate with specific dimensions with the added action of an outer force.

Two cases are described: of the action of an outer force only during the time of contact of the hitting bodies and during the whole time of movement of the sphere.

Correlations were obtained for the change of the strength of the hit, the tensions and deformations in time for the sphere and the plate. The deformations of the plate were defined for various values of the outer force. These results allow us to define the conditions, necessary to perform the so called 'Combined Hit.' This results in a significant change of the conditions in which the deformation processes flow in.

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