

Dynamic identification method for determining the plastic properties of the material used as a front layer of impact shields

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Abstract: Impact shields are now being built from several layers of materials with various mechanical properties. Substantially the first protective layer (front one) is made of lightweight materials with plastic or plastic-elastic properties, while the next layer is remarkably elastic (e.g., armored steel). The above makes it necessary to analyze the phenomenon of piercing using a model in the form of a dynamic Maxwell-type system, and to determine its parameters. This paper presents the original method of determining the parameters characterizing the plastic properties of the front layer. In the Maxwell model it was assumed that these properties describe two rheological elements. These are a linear silencer in a parallel connection with a Coulomb friction element. The components occur next to a linear elastic part. However, the next layer appearing in the model has elastic properties. In the development of the identification method, the method of energy balance for harmonic excitation was used.

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