

ON THE EFFECT OF GAPS ON ACCELERATION DYNAMICS OF TWO-LAYER PLATE

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Unavoidable technological gaps between components are inevitably present in any composite product. They are due to tolerances when manufacturing parts, imperfect fit during assembly, and different thermal expansion of materials. The gap size affects the velocity of plates and pressure inside them under shock-driven acceleration.

The work presents the results of numerical simulation and experimental data on the gap size effect on the final velocity of a two-layer plate during plate acceleration initiated by explosive and shock loading. Explosive experiments were conducted at RFNC-VNIITF in-house range [1, 2] and on the LGU44 ballistic light-gas gun [3, 4] with registration of free surface velocity of a sample surface using the multi-channel PDV method [5–7]. The experimental data is compared with the calculation results obtained using program complexes [8].

In the work, the size effect of a gap between the plates on peak and final velocities was investigated as well as on pressure near the probed surface at shock wave arrival. The phenomenon of shock wave interference at the interface between the plates for a certain gap size was obtained.

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