Testing of calculation and experimental method of jet formation research under shock-wave impact on constructive inhomogeneities

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In some engineering constructions experiencing shock wave loading there are constructive inhomogeneities (for example, butt joints) from which material jets can be injected under the waves passage. These jets can affect other constructional workpieces which, in turn, will be subject to shock wave propagation. All this should be taken into account while product development and implementation. This paper is devoted to the test calculation and experimental description of such process using H-shaped coupling of three workpieces made of different materials (iron, copper, lead, and aluminum) as an example. HE charge was used as shock-wave generator. Three parameters defining the process of jet formation were calculated by two-dimensional calculations: jet angle, jet velocity and amplitude of the shock waves formed at jet collision with another workpiece. The effect of the workpiece material combination on the process under investigation and of the computational grid size at the description of such a delicate event phenomenon was demonstrated. In the experiments, the jets themselves and the disturbances on the workpiece back surface under high-velocity jet impact were diagnosed using laser interferometry. The experimental results have shown that the computing model correctly describes the jet for formation process in terms of quality, but calibration based on the results of test experiments is required for adequate quantitative prediction.