RESULTS OF X-RAY EXPERIMENTS WITH LOADING SEALED ASSEMBLIES TO STUDY MATERIALS USING HIGH-CURRENT ELECTROPHYSICAL FACILITY

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The development of an experimental data system on dynamic properties of structural materials in a wide range of loading pressures to calibrate equations of state has been a key experimental task over the decades. A search for precision methods to set up high-rate deformation conditions to study material properties, investigation and implementation of such methods are also undoubtedly relevant. The use of plane impactors or cylindrical shells (flyers) accelerated by magnetic field generated by high-current electrophysical facilities is a way to form high-intensity loading pulses [1, 2].

The primary goal of this study is to refine the sealed assembly design with the ability to achieve symmetry, i. e. homogeneity of loading field and acceleration of plane and cylindrical flyers to ensure precision recording of flyer–impactor system parameters to study shock compressibility and hydrodynamic effects near the free surface of loaded metal samples. In the course of the studies, the sealed assembly is being tailored to the experiments using the diagnostics complex based on independent methods (laser and X-ray) relying on different physical principles to increase the information value of the experimental results and to validate them.

The paper presents the results of the initial research stage including experimental testing of the developed sealed assembly with X-ray support of the initial and final stages of experiments using the electrophysical facility with energy content of 250 kJ.

References

1. **Dulov, A. V.** Research in dynamic behavior of materials using GNUV-P facility [Text] / A. V. Dulov, E. I. Karnaukhov, A. V. Pavlenko et al. // 15th International Conference on Megagauss Magnetic Field Generation, Portugal, 18–22 september 2016.

2. **Pavlenko, A. V.** Study of properties of aluminum matrix composites (AMC) under high-rate deformation by magnetic field [Text] / A. V. Pavlenko, A. V. Petrovtsev, V. T. Gromov et al. // XVII Scientific and Technical Conference on Experimental Physics, Snezhinsk, 2005.