

# Analysis of the high-speed strain of the solid and volume-periodic samples of aluminum grade AK6, made under the additive technology within the range of rates $10^2$ – $10^3$ s<sup>-1</sup>

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The samples having both solid (homogeneous), and volume-periodic structure were studied during operation on the split Hopkinson pressure bars (SHPB) installation. Loading experiments using SHPB technique allow to obtain dynamic compression tensile diagrams within the range of strain rates  $\varepsilon = 10^2$ – $10^3$  s<sup>-1</sup>.

The work objective: investigation of dynamic properties of the samples made using additive technologies. Problem: obtaining of dynamic strength characteristics and the analysis of the experimental data resulting from the series of experiments on SHPB installation with three-dimensional (3D) samples of aluminum grade AK6 at the strain rates from  $5.5 \times 10^2$  to  $37.0 \times 10^2$  s<sup>-1</sup>.

Samples made of aluminum having the same chemical composition as alloy AK6, of the set volume-periodic structure were made by selective laser sintering of metal powder on industrial 3D printer.

More than 60 experiments were performed. Stress–strain diagrams and strain–strain rates within the range of impactor velocities from 7.14 to 31.2 m/s were obtained, thus own strain rates of samples were from  $8 \times 10^2$  to  $37 \times 10^2$  s<sup>-1</sup>.