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Heterogeneous deformation of metals (copper, tantalum, uranium, titanium) at convergence of cylindrical apertures having small diameters under effect of shock waves MALYSHEV ANDREY, ZAMOTAEV DMITRIY, IGNATOVA OLGA, TKACHENKO MICHAIL, SHEPELEV ERICH, TYUPANOVA OLGA, PODURETS ALEKSEY, BALANDINA ANNA, KONDROKHINA IRINA, None — Construction metals undergo loadings of various types during high-velocity deformation. As a result, there are different structural changes and, in particular, varying of mechanical properties. One of these complex structural changes is the process of formation of heterogeneous localized shear bands (LSB) of the twinning nature and the associated temporal decrease of dynamic strength in strong shock waves. The earlier investigations in this area point to the fact that the process of LSB formation has the threshold character, and pressure is the main criterion. So, it is shown in work that LSB formation occurs in coarse-grained copper after effect of shock wave with the amplitude 28-30 GPa. In this work, within the investigation of convergence of cylindrical channels having small diameters under effect of planar shock waves, it is shown that LSB can be formed in metals, and flow stops being homogeneous at rather low loading level (up to 10 GPa). In this case, the level of plastic strain and its rate are the main factors, which are responsible for heterogeneous deformation. The authors present results of experimental and metallographic researches for some metals, which are copper with various grain sizes, tantalum, uranium, and titanium alloys.

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