Numerical Simulation of the Detonation Propagation in Silicon Carbide Shell IGOR BALAGANSKY, ANTON TERECHOV, Novosibirsk State Technical University — Last years it was experimentally shown that in condensed high explosive charges (HE) placed in silicon carbide shell with sound velocity greater than the detonation velocity in HE, there may be observed interesting phenomena. Depending on the conditions, as an increase or decrease of the detonation velocity and pressure on the detonation front can be observed. There is also the distortion of the detonation front until the formation of a concave front. For a detailed explanation of the physical nature of the phenomenon we have provided numerical simulation of detonation wave propagation in Composition B HE charge, which was placed in silicon carbide shell. Modeling was performed with Ansys Autodyn in 2D-axis symmetry posting on an Eulerian mesh. Special attention was paid to selection of the parameters values in Lee-Tarver kinetic equation for HE and choice of constants to describe behavior of the ceramics. For comparison, also we have carried out the modeling of propagation of detonation in a completely similar assembly with brass shell. The simulation results agree well with the experimental data. In particular, in silicon carbide shell distortion of the detonation front was observed. A characteristic feature of the process is the pressure waves propagating in the direction of the axis of symmetry on the back surface of the detonation front.

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