

# Specific nature of TATB cylindrical charge detonation initiation and propagation

**Volodina N A, Erastov A V, Zabusov P V<sup>@</sup>, Kiryuhina M N, Panov K N, Titova V B and hirshova M O**

Federal State Unitary Enterprise “Russian Federal Nuclear Center—All-Russian Research Institute of Experimental Physics”, Mira Avenue 37, Sarov, Nizhniy Novgorod Region 607188, Russia

<sup>@</sup> zabusovpv@gmail.com

The process of detonation propagation in plasticized triaminotrinitrobenzene (TATB) semi-ring charges with steel sheathing inside, when initiating normal detonation in line on the charge outer surface, has been studied using x-ray radiography. The form of detonation front at several time points has been experimentally determined using x-ray radiography. The effect of hexogen-based plastic explosive layer placed on the base charge surface and having velocity of detonation which is by 10% higher than that of TATB has been experimentally recorded. Planar optics principles (Huygens' principle) are not applicable to describe the experimental position and form of the detonation front in cylindrical TATB charge due to specific nature of detonation initiation at the first stage and steel sheathing. Numerical simulation of the experiments has been carried out by LEGAK procedure using MK kinetics of detonation. A pattern of detonation initiation and propagation in TABT charge similar to the experiment has been obtained. Computational and theoretical analysis of the specific features of detonation propagation has been carried out.