OPTICAL METHOD FOR FAST ESTIMATION OF PARAMETERS OF THE SHOCK WAVE FROM LARGE SCALE GROUND EXPLOSION

P. V. Komissarov\textsuperscript{1,2}, G. N. Sokolov\textsuperscript{1}, and V. V. Lavrov\textsuperscript{3}

\textsuperscript{1}N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation
\textsuperscript{2}National Research Nuclear University MEPhI, 31 Kashirskoe Sh., Moscow 115409, Russian Federation
\textsuperscript{3}Institute of Problems of Chemical Physics, Russian Academy of Sciences, 1 Acad. Semenov Av., Chernogolovka, Moscow Region 142432, Russian Federation

Abstract: During the large-scale ground explosions, it is sometimes necessary to estimate the air pressure at the front of the shock wave at different points of the ground surface. This problem is important especially for nonideal explosions such as explosions of fuel-rich mixtures capable to react with ambient air. The paper proposes a simple method for such estimation based on the analysis of high-speed video of explosion, obtained by a relatively cheap camera with the possibility of high-speed shooting. Initial data for the analysis are the coordinates of the position of the shock wave at different points of surface in the camera frame. The front position was fixed as contrast line between the surface before the front and elevated dust or water behind the shock wave. As an example, the 15-ton explosion of ammonium nitrate charge was analyzed by the proposed method.

Keywords: shock wave; fast shock pressure estimation; ground explosion; high speed camera

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Contributors

**Komissarov Pavel V.** (b. 1974) — Candidate of Science in physics and mathematics, senior research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; National Research Nuclear University MEPhI, 31 Kashirskoe Sh., Moscow 115409, Russian Federation; kr899@yahoo.com

**Sokolov Georgiy N.** (b. 1983) — research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; sokolov_gn@inbox.ru

**Lavrov Vladimir V.** (b. 1958) — Candidate of Science in physics and mathematics, senior research scientist, Institute of Problems of Chemical Physics, Russian Academy of Sciences, 1 Acad. Semenov Av., Chernogolovka, Moscow Region 142432, Russia; lavr@ficp.ac.ru