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

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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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