

PRESSURE MEASUREMENTS IN AIR SHOCK WAVES FROM THE ABOVEGROUND EXPLOSION BY ISOLATED SUSPENDED GAUGES

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Abstract: Various factors are discussed that affect the measurement of the parameters of air shock waves (ASW). A novel method for obtaining the parameters of ASW from explosions of condensed explosive charges elevated above the surface is considered. It is shown that the use of suspended sensors isolated from the seismic wave in the ground makes it possible to avoid factors that deform the results of pressure traces. The vertical fields of the ASW parameters in the plane of symmetry for explosions of aboveground spherical charges are obtained, clearly demonstrating the zone of increased parameters along the surface, corresponding to the reflected shock wave. The obtained results can be used both for a quick assessment of the impact of blast wave and to verify the numerical modeling of the explosion above the surface.

Keywords: air shock wave; elevated charge; overhead sensors; shock wave pressure field

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Figure Captions

Figure 1 Experimental setup for measuring the parameters of ASW by pressure gauges isolated from the ground: 1 — pressure gauges; 2 — beam-pylon; 3 — wooden boom consisting of two beams connected by a transverse beam; 4 — brace cables; 5 — rack for charge suspension; and 6 — explosive charge

Figure 2 Comparison of pressure traces obtained from the explosion of the 0.5-kilogram spherical ammonite charge. Pressure gauge was mounted above the ground at the height of 1.1 m and at the distances from the explosive charges of 3.5 (1 and 2) and 4.5 m (3 and 4). The pressure gauges mounted on separate own support racks (1 and 4) and on the beam-pylon (2 and 3)

Figure 3 Maximum pressure and impulse of ASW fields obtained from the explosion of the 0.5-kilogram spherical ammonite charge elevated at the height of 1.6 m above the ground. The parameters fields cover an area from 0.1 to 2.1 m in the height above the ground and at the distances of 1–5.5 m from the explosive charge. The figure also contains the lines of equal pressures and impulses

Figure 4 Comparison of pressure traces obtained from the explosion of the 1-kilogram spherical ammonite charge. Pressure gauge was mounted above the ground at the height of 1.1 m and at the distances from the explosive charges of 3.5 (1 and 2) and 4.5 m (3 and 4). The pressure gauges were mounted on the horizontal rack (2 and 4) and on the beam-pylon (1 and 3)

Table Captions

Table 1 External conditions factors affecting the ASW parameter measurements accuracy by various authors

Table 2 Comparison of ASW pressures obtained in the experiments with the various design of pressure gauge mounting. The ASW pressures are determined by the pressure traces shown in Figs. 3 and 4

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