Blast wave attenuation by rigid foam and detonation product absorption

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The method of attenuation of blast wave from ground explosion is considered. Well known techniques reduce the wave parameters at a certain distance from the charge, i.e. in fact, with a formed air shock wave. At the same time, there are approaches that make it possible to reduce the parameters of the shock wave at the stage of its formation, at the near zone from the charge. Results of experimental investigation on blast wave attenuation by rigid foam blocks of various volumes are presented. The new technique for damping blast waves by attenuation in the porous rigid foam with Zr-Al powder as detonation product absorber also presented. The results of the experiments where the blast wave from charges of various weights was attenuated by the proposed method are also considered. As a result, it is shown that new method it a way to reduce its parameters much more even than in the case of using known methods of explosion suppression at some distances from the charge because the mass of the required attenuating material is also lower than in known methods. It has been shown for the first time that zirconium-based intermetallic powders placed at the near zone from the HE charge can react intensively with the formation of condensed reaction products, thus reducing the amount of gases pushing the blast wave. Experiments have shown that the effect obtained scales well with an increase in the mass of the charge by an order of magnitude, with a proportional increase in the volume of the cap made of explosion-suppressing foam. It is found that the optimal size for polyurethane foam localizing block is a radius on the order of the expected shock wave length near the explosive charge.