
Explosive charge projectile action during initiating and detonating wave propagation

© S.G. Andreev¹, M.M. Boyko¹, V.Yu. Klimenko²

¹Bauman Moscow State Technical University, Moscow, 105005, Russia

²Research institute Geodesy, Krasnoarmeysk, 119991, Russia

The article deals with the influence of factors (including dispersed aluminium addition presence) causing initial shock wave evolution in the charges of standard explosives on the charge projectile action characteristics. We carry out the mathematical modeling of characteristic features of aluminium addition to the poor-porous charges in the acceleration effect under the conditions of normal methods of defining the projectile ability as well as under the conditions of shell-forming charges operation. The study shows a possibility of improving the acceleration effect of the shell-forming charges when the standard explosives are replaced by poor-porous aluminum-backed composition such as PAX-30.

Keywords: explosive acceleration, initial shock wave, detonation, secondary reaction, aluminium.

REFERENCES

- [1] Makhov M.N. *Gorenie i vzryv — Combustion and explosion*. Moscow, Torus press Publ., 2013, no. 6, pp. 293–296.
 - [2] Okhitin V.N., Menshakov S.S. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2013, no. 1. Available at: <http://engjournal.ru/catalog/machin/blasting/561.html>
 - [3] Kulikov V.N., Osavchuk A.N., Imkhovik R.A., Odintsov V.A. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2013, no. 1. Available at: <http://engjournal.ru/catalog/machin/blasting/564.html>
 - [4] Yashin V.B., Alekseyev V.V., Khodyrev S.P., Malkin A.V., Imkhovik A.N., Selivanov V.V., Simonov A.K. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2013, no. 1. Available at: <http://engjournal.ru/catalog/machin/blasting/566.html>
 - [5] Andreyev S.G., Boyko M.M., Klimenko V.Yu. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2013, no. 1. Available at: <http://engjournal.ru/catalog/machin/blasting/568.html>
 - [6] Andreyev S.G., Shestakov M.A. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2015, no. 7. Available at: <http://engjournal.ru/catalog/mech/mlgp/1401.html>
 - [7] Davydov V.Yu., Grishkin A.M., Muryshv E.Yu. *Fizika goreniya i vzryva — Physics of Combustion and Explosion*, 1993, vol. 29, no 2, pp. 109–115.
 - [8] Gogulya M.F., Brazhnikov M.A., Makhov M.N., Dolgoborodov A.Yu., Lyubimov A.E., Sokolova I.L. *Khimicheskaya fizika — Chemical physics*, 2012, vol. 31, no. 11, pp. 33–47.
 - [9] Orlenko L.P., ed. *Fizika vzryva [Physics of explosion]*. Moscow, FIZMATLIT Publ., 2002, vol. 1, 824 p.
 - [10] Balas W., Nicolich S., Capellos C., Hatch R. and Braithwaite P2006 *IM/EM Symposium*. Bristol, UK, 2006. Available at: http://www.imemg.org/res/imemts2006_Hatch_1.ppt.pdf
 - [11] Baker E.L., Balas W., Stiel L.I., Capellos C., Pincay J. Theory and Detonation Products Equations of State for a New Generation of Combined Effects
-

Explosives. *2007 Insensitive Munitions and Energetic Materials Technology Symposium*. Miami, USA, 2007. Available at: www.dtic.mil/ndia/2007im_em/BBriefs/4Baker.pdf

- [12] Klimenko V.Yu. *Mezhdunarodnaya konferentsiya. Udarniye volny v kondensirovannikh sredakh — International conference. Shock waves in condensed medium*. Kiev, Ukraina, Interpress LTD Publ., 2012, pp.135–143.

Andreev S.G. (b.1944) graduated from Bauman Moscow Higher Technical School in 1969. Cand. Sci. (Eng.), Assoc. Professor of the Department of High-Precision Airborne Devices, Bauman Moscow State Technical University. Corresponding Member of the Russian Academy of Sciences. Author of more than 100 publications in the field of physics of processes of combustion and explosion. e-mail: andreeff2007@mail.ru

Boyko M.M. (b.1946) graduated from Bauman Moscow Higher Technical School in 1970. Assoc. Professor of the Department of High-Precision Airborne Devices, Senior Research Scientist, Bauman Moscow State Technical University. Author of more than 100 publications in the field of physics of processes of combustion and explosion. e-mail: sm4-2009@mail.ru

Klimenko V.Yu. (b.1949) graduated from Lomonosov Moscow State University in 1971. Cand. Sci. (Phys.-Math.), Leading Researcher, Research institute Geodesy. Author of more than 100 publications in the field of chemical physics of detonation processes and computer simulation of shock wave processes. e-mail: klimenko@center_chph.ras.ru
