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Experimental-Industrial Testsand Industrial Implementation Of The Developed Design Of The Locking Hole Of Explosive Charges When Passing Underground Mining Works

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ABSTRACT

The report presents the design of a locking stemming, which allows increasing the efficiency of driving underground mine workings and increasing the rate of use of a borehole, and also gives the results of pilot tests and industrial implementation of the developed design of a locking stemming of explosive charges when driving underground mine workings.

KEYWORDS

Stemming, Borehole, Borehole Utilization Rate, Explosives, Wedge, Retainer, Borehole, Oversized, Lumpiness Of Rocks.

INTRODUCTION

In accordance with the developed "Methodology and research program for the action of blast-hole charges of explosives with a locking stem", pilot tests and industrial implementation of the developed design of locking blast-hole charges of explosive chargeswere carried out when driving horizontal underground mine workings.

The developed and proposed design of a locking stem for borehole charges of explosives, characterized by the fact that when conducting drilling and blasting operations with borehole or borehole charges of explosives, the loading method includes;

- Insertion of an explosive charge and detonating agents into a borehole or borehole;
- Then the hammer sends the locking stem, the connected unit,

The wedge-retainer and fixing it with a sharp jolt in the borehole.

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The location of the wedge-retainer device in the borehole is carried out with a retainer to the explosive and a wedge to the mouth of the borehole. The wedge-retainer includes a retainer with sliding cylindrical cheeks and a wedge interacting with them, made with a cylindrical base. On the outer surface of the cylindrical cheeks, grooves are formed for electric wires or means of non-electric initiation SINV, Rionel (depending on the method of blasting).

On the wedge, ribs are made for fixing and disassembling the structure, and on the retainer, serrated protrusions are made, by means of which the wedge is pre-fixed with a retainer.

The ribs of the wedge are positioned longitudinally on the transverse flanges of the wedge on the outside and on the side of the wedge, and the serrated protrusions of the retainer are made on the sliding cheeks of the inner part of the retainer. The developed stemming provides resistance to the explosion energy of the general structure of the wedge-retainer in the borehole.

The developed method of blasting operations with the use of a locking stem for borehole and borehole charges of explosive substances can be used when driving underground mine workings to destroy rocks of various strengths.

Features of the advantages of a wedge-fixer product for fixing cartridge, granular and emulsion explosives in a borehole or borehole is, a wide temperature range of application from +40 to -30C °, complete independence from moisture, the presence of water, quick fixation in a borehole, 5-10 seconds , low weight 75 grams (± 2%) and low cost due to the use of polymeric materials. The developed design of the locking stem is shown in Fig. 1, and the formation of a borehole charge in Fig. 2.

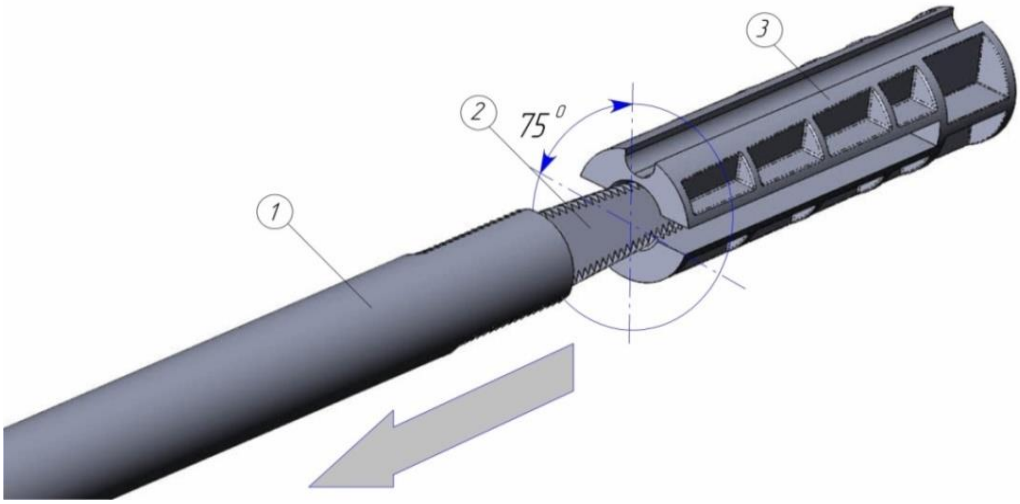

Fig. 1. Locking stem design.
1- key, 2- wedge, 3-retainer.

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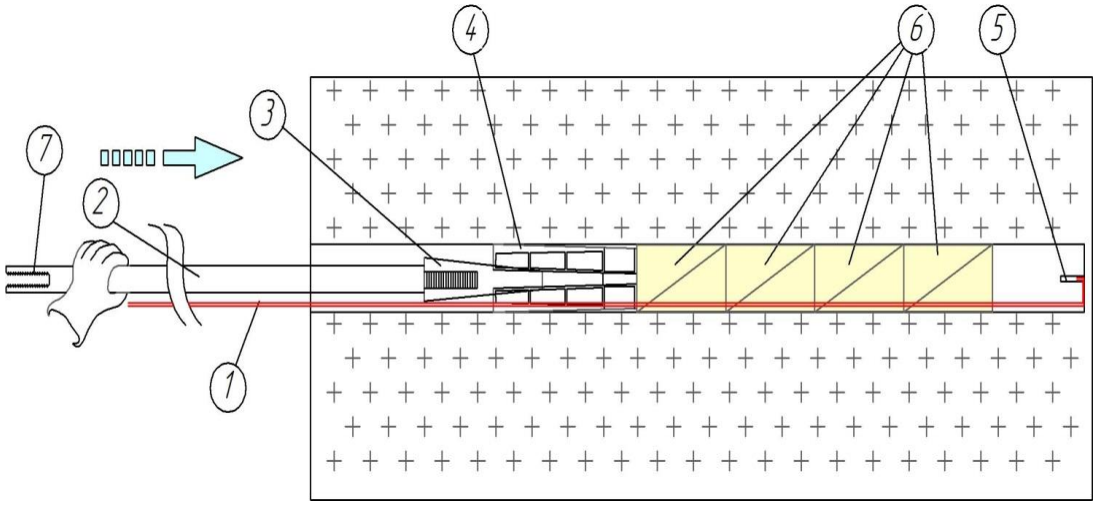

Fig. 1. Developed design of a borehole charge from a locking stem.
1- detonating cord, 2- hammer, 3-wedge, 4-retainer, 5-gunner, 6-explosive, 7-key.

The developed design of the prototype of the locking stem has been tested by conducting experimental research and industrial implementation in the excavation of underground exploration horizontal mine workings of the Zarmitan field geological exploration expedition and Zarafshan field geological exploration expedition of Samarkandgeologiya joint-stock company.

The purpose of the experimental research was:

- Testing the technical applicability and efficiency of the developed design of the locking stem;
- Determination of the change in borehole utilization rate during experimental studies;
- On the basis of the developed methodology "Investigation of the action of blasthole charges of explosives with locking stemming" to determine the design parameters of the wedge-retainer, the possibility of quickly removing the locking stemming (retainer wedge), then explosive chargesand the fighter's cartridge in case of an unexpected failure of the explosive network or in a separate blasthole charge;

It has been established by industrial experimental studies on the basis of virgin blasthole passports and the introduction of the developed design of the locking stem [8.9].

- Industrial experimental explosions were carried out in horizontal underground mine workings with sections from 5.5 m2 to 6.5 m2 in cut and auxiliary boreholes;
- When using the developed stemming in cut holes, according to the results obtained, it was revealed that the depth of the additional exposed surface and the volume of the main outgoing rock mass at the bottom of the face increases by 4-6% per cycle;
- When using the developed design of a borehole charge on all boreholes used by the current blasthole passport, according to the results obtained, it was revealed that

the movement of the bottom per cycle increases by 6-8%;

- When using the developed design of a borehole charge with a locking stemming, the utilization rate of the borehole (BUR) increases to 8%.

- At the same time, the quality of crushing of rocks after the explosion with the used structure of the locking dam improves, the output of oversized pieces of rock was not observed;

- The results of measuring the air composition of the mine atmosphere according to the ventilation passports comply with the established standards.

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