UDC: 622.235.36

RESEARCH OF THE BASIC PARAMETERS OF MINE WATER AND THE SIZES OF HYDROGEL GRANULES FOR THE TIME OF SWELLING OF CARTRIDGED CASE USED IN UNDERGROUND MINING

F.T.Khudoiberdiev
K.S.Kalandarov
Kh.Sh.Toshpulatov
11TGTU named after I.Karimov, Alfraganusuniversity

Annotatsiya. *Portlash jarayoni va samarodorligiga ta'sir etuvchi omillardan biri bu-shpurlarni tiqinlashdir. Uning kattaligi va sifati asosan shpurlardan foydalanish koeffitsiyenti, massiv maydalanish darajasining bir xilligi, shuningdek portlash paytida kon atmosferasiga ajralib chiqadigan chang va zaharli gazlar miqdorini aniqlaydi. Gidrogellarning namlikni saqlash qobiliyati polimer zanjiri bo'ylab gidrofilik guruhlarning mavjudligi bilan bog'liq. Laboratoriya tadqiqotlari natijalariga ko'ra, yuqori haroratlarda va suvning past qattiqligida ishlab chiqarilgan gidrogel tiqinliri tezda tayyor holatga o'tishi va tiqin materiallariga bo'lgan talabni to'liq qondirishi, shuningdek, uni tayyorlash xarajatlarini kamaytirishi aniqlandi.*

Adstract. *One of the factors determining the conditions and efficiency of the explosion of explosive borehole charges is the internal stemming of boreholes. Its size and quality largely determine the utilization rate of boreholes, the uniformity of crushing of the massif, as well as the amount of dust and toxic gases entering the mine atmosphere during an explosion. The moisture-retaining ability of hydrogels is due to the presence of hydrophilic groups along the polymer chain. According to the results of laboratory studies, it was determined that, at high temperatures and low water hardness, the manufactured hydrogel stemmings quickly pass into the finished state and fully satisfy the requirement for stemming materials and also reduce its cost of preparation.*

Аннотация.*Одним из факторов, определяющим условия и эффективность взрыва шпуровых зарядовВВ, является внутренняя забойка шпуров. Ее величина и качество в значительной степениопределяют коэффициент использования шпуров (КИШ), равномерность дробления массива, атакже количество поступающих в рудничную атмосферу при взрыве пыли и ядовитых газов. Влагоудерживающая способность гидрогелей обусловлена наличием гидрофильных групп вдоль полимерной цепи. По результатам лабораторных исследований определено что, при высоких температурах и низких показателях жесткости воды изготовленные забойки из гидрогеля быстро проходят в готовое состояние ивполне удовлетворяет требование, предъявляемое к забоечным материалам а также снижает его себестоимость приготовления.*

Таянч сўзлар ва иборалар: *бурғилаш ва портлатиш ишлари, шпур, тиқин, гидрогель, шахта, температура, вақт, кон лаҳимлари.*

Key words: *drilling and blasting works, bore hole, stemming, hydrogel, pit, temperature, mine working*

Ключевые слова: *буровзрывные работы, шпур, забойка, гидрогель, шахта, температура, время, горная выработка.*

INTRODUCTION

Explosion as a means of destruction is of paramount importance in modern mining technology. Increasing the efficiency of an explosion is a pressing mining problem. The particular importance of the problem of explosion in mining is dictated by the ever-increasing volumes of mineral extraction associated with mining. Under these conditions, even a slight improvement in explosion performance or a reduction in labor costs per meter of mining excavation will save huge amounts and money. One of the factors that determines the conditions and efficiency of the explosion of blasthole explosive charges is the internal driving of the blastholes. Its size and quality largely determine the hole utilization rate (BUR), the uniformity of crushing of the massif, as well as the amount of dust and toxic gases entering the mine atmosphere during an explosion.

According to the physical and mechanical properties and the nature of the resistance that prevents the outflow of gaseous detonation products from the hole, all types of stopping currently used can be grouped as follows [1,2].

1.Stopping made of plastic materials (clay, sandy-clayey and loam stopping).

2.Stopping from bulk materials (sand and stopping from granulated blast furnace slag).

3.Liquid stopper.

4.Stopping holes with plugs made of hard materials.

5.Stopping holes with solutions of quick-hardening binders.

Experimental part. Hydrophilic polymers with large volumes of water absorption and storage are known as hydrogel, or super absorbents. The hydrogel is a three-dimensionally cross-linked and swollen polymer in water, the ion does not dissolve in it. The water-holding capacity of hydrogels is due to the presence of hydrophilic groups along the polymer chain, such as OH, -CONH, -CONH2, -COOH. Biodiversity of hydrogels is important. Many natural materials absorb water, but their ability to swell and retain moisture is weaker than that of synthetic hydrogels. Swelling usually begins when polymers interact with solvents. The swelling process is the absorption of a solvent by a substance, the volume and mass of which thereby increase. Swelling is most characteristic of high-molecular compounds. As a result of swelling, their volume and weight can increase by 10-15 times [3].

The degree of swelling is determined by the mass of liquid absorbed per unit mass of a substance at a given stage of swelling at a certain temperature:

$$\alpha = \frac{m - m_0}{m_0} \cdot 100\%$$

where m0,m is the mass of the substance before and after swelling, respectively.

Results and their discussion. At the laboratories of Tashkent State Technical University and the Tashkent Scientific Research Institute of Chemical Technology, many laboratory studies were carried out to determine the rational parameters of the hydrogel for use in

as a stopper when carrying out mining using the drill-and-blast method and to determine the factors influencing the swelling time in the manufacture of cartridge hydrogel stope under different conditions. The studies were carried out under different temperature conditions and in different mines. Before starting the experiments, the hydrogel granules were divided into groups depending on the size of the fraction: 2-3 mm; 1-2 mm and up to 1 mm.

The results are shown in Table 1 and Fig. 1-3.

Table 1.

Results of chemical analysis of mine water for the manufacture of cartridge hydrogel stoping for pH and hardness

.n	Mine name	pH	Hardness, mEq/l		
			general	removable	irremovable
.	Red-apple	7,74	16,6	2,52	14,08
.	Kochbulak	2,69	38,93	1,72	37,21
.	Handiza	8,46	12,23	1,56	10,67
.	Kaulda	8,14	27,74	0,72	27,02
.	Exploration	8,18	15,36	3,72	11,64
.	Shargun	7,4	17,8	2,9	14,9
.	Chadak, Guzaksay section	8,19	12,27	2,28	9,89

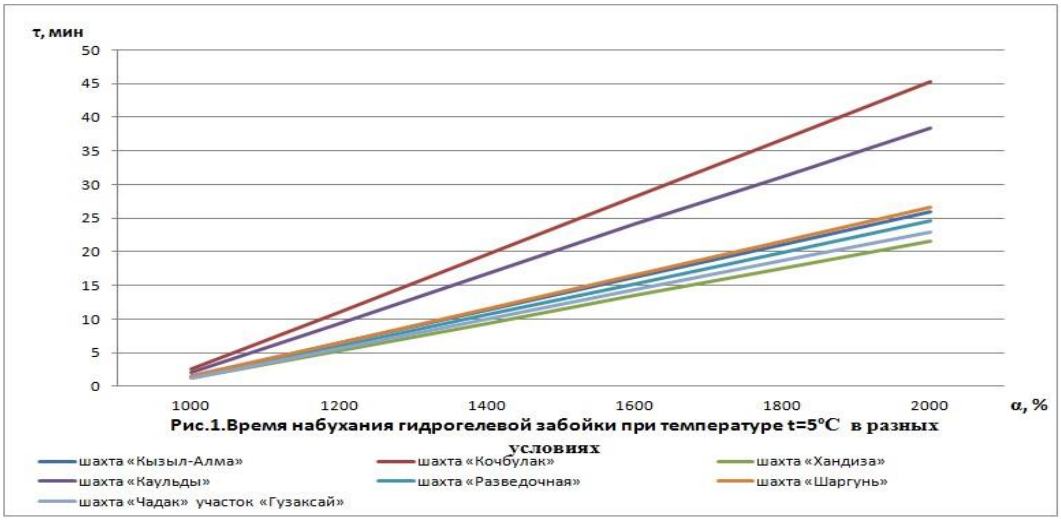

Рис.1.Время набухания гидрогелевой забойки при температуре t=5°С в разных условиях

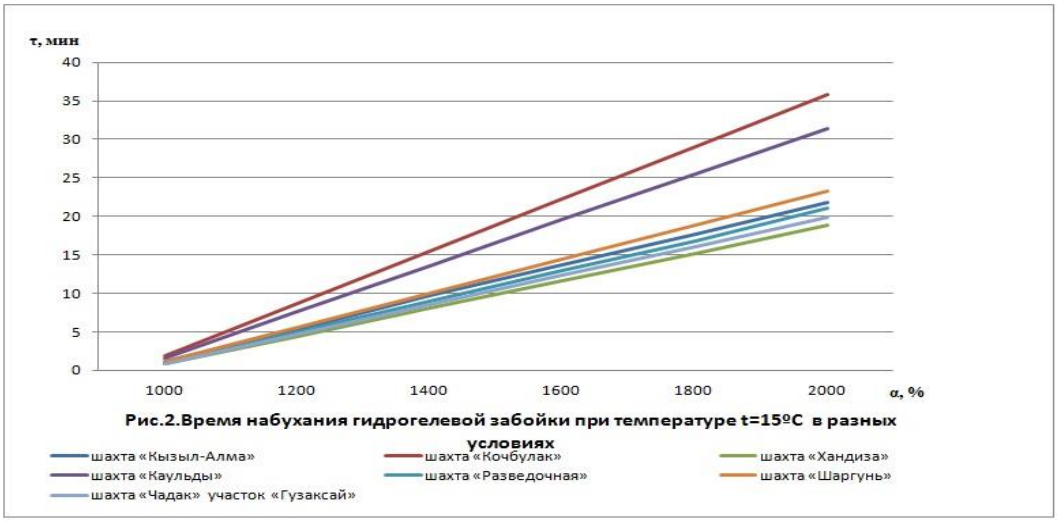

Рис.2.Время набухания гидрогелевой забойки при температуре t=15ºС в разных условиях

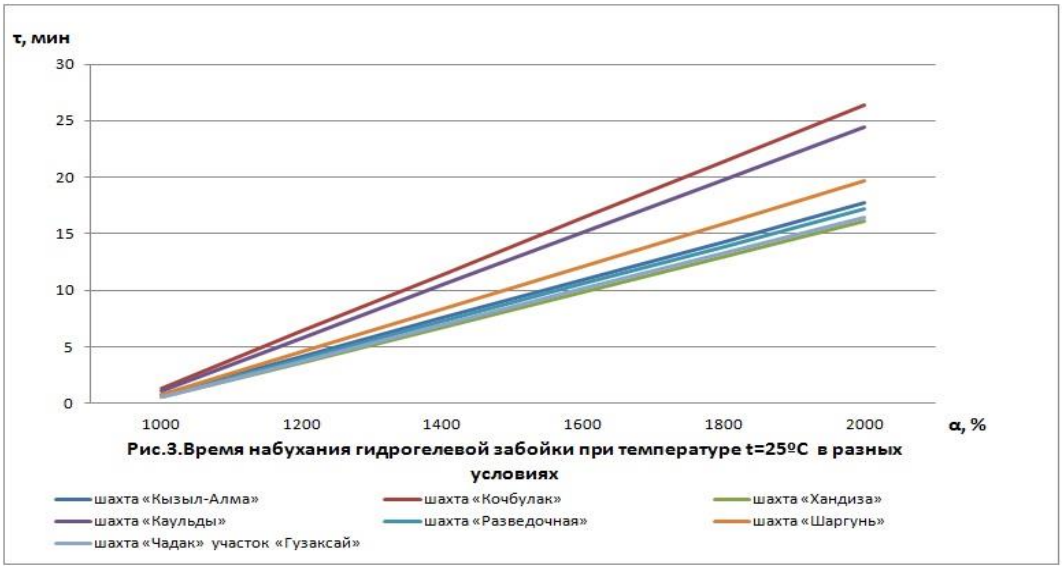

Рис.3.Время набухания гидрогелевой забойки при температуре t=25ºС в разных условиях

From the above table and graphs it is clear that, at high temperatures and low water hardness, stopes made from hydrogel quickly reach the finished state.

Conclusions. The results of preliminary experiments showed that, except for fractions up to 1 mm in size, they do not combine into one whole mass. From Fig. 1-3 it is clear that hydrogel granules with dimensions < 1.0 mm quickly come to a ready-made state. In addition, with a hydrogel/water ratio of 1/20, it fully satisfies the requirements

for stopping materials and reduces its cost of preparation, which, from an economic point of view, satisfies its use.

LITERATURE:

1. Миндели О.Э., Демчук П.А., Александров В.Е. Забойка шпуров. Москва. Недра.1967 г.

2. Худойбердиев Ф.Т., Махмудов Д.Р. Исследование параметров гидрогеля для использования в качестве забойки шпуров при проведении горных выработок буровзрывным способом // Материалы Республиканской научно-практической конференции «Роль интеллектуальной молодежи в развитии науки и техники». Ташкент 2021 г. с.360-361

3. Ширинов Ш.Д., Джалилов А.Т. Исследование кинетики набухания синтезированных гидрогелейна основе гидролизованного полиакрилонитрила// Научный журнал «Universium»Химия и биология. 2018 №3 с. 20-22