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EFFECT OF TYPE OF EXPLOSIVES AND PHYSICAL-MECHANICAL PROPERTIES OF EXPLOSIVE ROCKS ON FORMATION OF TOXIC GASES IN ATMOSPHERE OF SHAFTS

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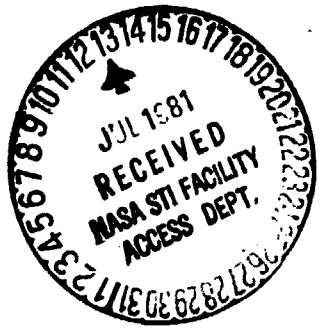
Translation of "Vliyaniye tipa VV i fiziko-mekhanicheskikh svoystv vzryvayemykh porod na obrazovaniye yadovitykh gazov v atmosfere vyrabotok", Vzryvnoye Delo, 72, 1973, pp 147-150



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EFFECT OF TYPE OF EXPLOSIVES AND PHYSICAL-MECHANICAL PROPERTIES OF EXPLOSIVE ROCKS ON FORMATION OF TOXIC GASES IN ATMOSPHERE OF SHAFTS

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The quantity of toxic gases formed during explosive work in /147* underground shafts depends upon the type of explosives and the conditions of explosion.

In studying the nature of the effect of explosion conditions on the formation of toxic gases the type of explosives and the rocks were altered, all the remaining conditions were maintained the same (sandy-argillaceous stemming, electrical method of explosion, diameter of blast holes 42-43mm, direct triggering of charges).

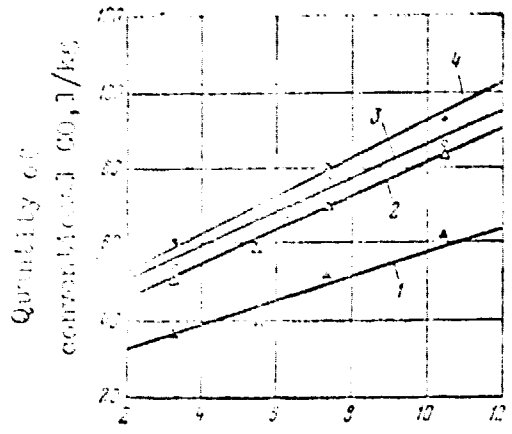
Depending on the strength all rocks were conditionally divided into four groups, in each of which an analysis was made of the gas content of the most widespread explosives in the Donets

*Number in margin indicates pagination in original foreign text.

Coal Basin (hard ammonite no. ., detonite 10A, ammonite no. 6ZhV and PZhV-20).

The study technique provided for determination of the total quantity of toxic gases released into the mining atmosphere both at the moment of the explosion of the explosive, and in the process of loading the rock. A total of 96 experiments were conducted which made it possible to establish the actual gas content of different explosives during explosion under the same conditions (Table 1) and the effect of the strength of rocks on the gas content of individual explosives (Table 2).

It is apparent from the tables that the maximum difference in specific quantities of toxic gases formed during explosion of different explosives in one group of rocks reaches 42.6 percent, and with the use of one explosive in different rocks 49.1 percent.



Effect of coefficient of rock strength on formation of toxic gases during explosion: 1 - ammonite PZhV-20; 2 - hard ammonite no. 1; 3 - detonite 10A; 4 - ammonite no. 6ZhV.

The figure shows the effect of /14 mining-geological conditions on the gas content: With an increase in the coefficient of rock strength the specific quantity of toxic gases increases.

Table 1

Explosives	Coefficient of Rock Strength According to Scale of M. M. Protod'yakonova	Number of Experiments	Average Quantity of Toxic Gases, l/kg		
			CO	$NO+NO_2$	Total
Hard Ammonite No. 1	3-4	7	34,2	2,7	51,5
Detonite 10A		5	30,2	3,8	55,0
Ammonite No. 6ZhV		6	35,4	3,9	60,7
Ammonite PZhV-20		7	20,4	2,6	37,2
Hard Ammonite No. 1	5-6	10	41,1	2,9	59,8
Detonite 10A		5	39,4	4,3	67,
Ammonite No. 6ZhV		5	42,2	4,1	68,8
Ammonite PZhV-20		9	22,0	2,7	39,5
Hard Ammonite No. 1	7-8	7	48,4	3,3	69,7
Detonite 10A		5	48,3	4,5	77,5
Ammonite No. 6ZhV		5	50,7	4,7	81,2
Ammonite PZhV-20		5	32,0	3,0	51,5
Hard Ammonite No. 1	9-12	6	63,5	3,4	85,6
Detonite 10A		5	61,0	4,9	92,2
Ammonite No. 6ZhV		4	66,5	5,6	102,5
Ammonite PZhV-20		5	39,4	2,9	60,0

Table 2

Explosives	Coefficient of Rock Strength According to Scale of M. M. Protod'yakonova	Number of Experiments	Average Quantity of Toxic Gases, l/kg		
			CO	$NO+NO_2$	Total
Hard Ammonite No. 1	3-4	7	34,2	2,7	51,5
	5-6	10	41,1	2,9	59,8
	7-8	7	48,4	3,3	69,7
	9-12	6	63,5	3,4	85,6
Detonite 10A	3-4	5	30,2	3,8	55,0
	5-6	5	39,4	4,3	67,
	7-8	5	48,3	4,5	77,
	9-12	5	61,0	4,9	92,
Ammonite No. 6ZhV	3-4	6	35,4	3,9	60,7
	5-6	5	42,2	4,1	68,8
	7-8	5	50,7	4,7	81,2
	9-12	4	66,5	5,6	102,5
Ammonite PZhV-20	3-4	7	20,4	2,6	37,2
	5-6	9	22,0	2,7	39,5
	7-8	5	32,0	3,0	51,5
	9-12	5	39,4	2,9	60,0

2. The average quantity of toxic gases during explosion with respect to rocks under conditions of the Donets Coal Basin mines is 66.3 l/kg.

3. The specific quantity of toxic gases during explosion of different explosives in one group of rocks is altered the maximum by 42.6 percent, and during explosion of one explosive in different rocks -- by 49.1 percent.

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