

# INCREASING TECHNICAL PRODUCTIVE CAPACITY OF MODERN MINING MACHINES AND COMPLEXES USED IN CONDITIONS OF MINES DANGEROUS IN GAS FACTOR

**A.Z. TAHO-GODI**

*Don State Agrarian University, Rostov region, October district, settlement Persianovskiy,  
e-mail: dongau@mail.ru.*

*Possible solution of the problem of increasing mining machine technical productive capacity used in conditions of mines dangerous in gas factor is presented hereafter. The basis of the solution is the reduction of their forced stoppage periods under the raised methane concentration by a way of supplying these machines with additional system of watering mining layers and adjoining surfaces with water solution of fast drying mixtures.*

***The keywords:** mining machines, technical productive capacity, system of watering, fast drying mixtures.*

In conditions of coal mines dangerous in gas factor productive capacities of mining machinery are not used completely. The main reason of it is a high intensity of methane escape under conducting mining work; it forces to stop mining machinery and be idle for rather a long time until the concentration of methane increasing with the beginning of conducting mining work won't fall to upper and safe concentration limits under the influence of ventilation [1,2]. Forced idle time of this high productivity machinery ranges up to more than 50% of the duration of a working shift. It was earlier established [1,2] that the character of going on gas-dynamics processes depends on the influence of gas accumulated in the worked out space (up to 70%), on the methane escape from the transported coal (up to 10%) and on the adjoining surface of mining workings (up to 20%). So we made an attempt to reduce the intensity of methane escape from these sources significantly. It is suggested to use watering of the walls being worked out as well as transported dug out matter with the solution of fast drying mixtures, capable to form strong enough protective films, hermetically sealing (for a definite period of time) micro-cracks of a coal layer and rocks, through which gas releases into the atmosphere of mining workings. For undertaking investigations we used some solutions (as satisfying safety requirements), such as water solution of PVA glue, liquid glass, cement-sand solution, water solution of PVA glue with cement in different proportions, liquid glass without fillers and with fillers in the form of fine dispersed powder of sodium glass and cement. The experimental investigations were carried out under conditions of three starting-up mining workings of the coal mine "Southern 2", October district, Rostov region. The thickness of an applied layer of watering mixtures varied within 2,5 - 3,0 mm. Specific expenditure of the mixtures for watering varied within 1,5 - 2,0 l/m<sup>2</sup>. As a result it was stated that on the second day after applying water solution of PVA glue the intensity of methane escape had already lowered to 34,8%, with liquid glass application - to 48%, with the solution of liquid glass in mixture with cement application - to 59% [3]. An example of mining machinery modernization is a variant of additional equipping of the mining combine 1GKPS with the system of fast drying mixtures watering (Fig.1). The realization of the given method suggests the accommodation of an additional capacity for watering on the combine (approximately to 0,7 m<sup>3</sup>), a pipe line from a pumping station of low pressure (up to 20 MPa) and pulverizing means 1 and 2 mounted upon the working organ of the combine and under its boom over the paw of a loading device.

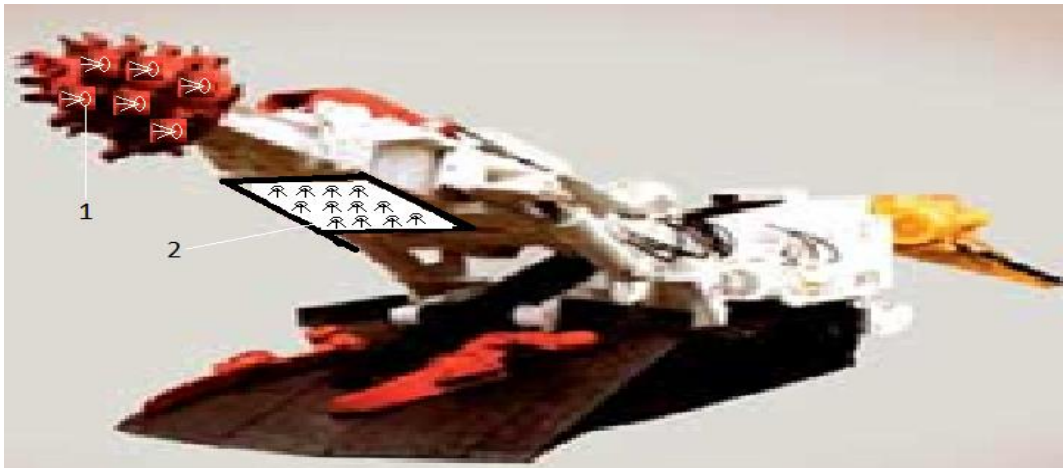


Fig.1. A possible variant of accommodation the system of watering of fastdrying mixtures on mining combine 1GKPS

- 1-jet of watering mounted upon an active part of the working organ;
- 2-jet of watering mounted over loading device of the paw type.

#### **Literature**

1. Abramov F.A., Feldman L.P., Svyatnyy V.A., Lapko V.V. On mathematical modeling of transitional air-gas-dynamics processes at mining areas // Izvestiya vuzov.- Mining journal. №3.- 1967.- P.57-61.
2. Osipov S.N. Methane escape under mining of sloping coal layers - M.: Nedra.- 1964. - 256 p.
3. Taho-Godi A.Z. The way of improving gas dynamics of mining areas of gas-bearing coal mines for the solution of a problem of synthesis of efficient system of ventilation management. The Patent of RF to the invention № 2435963. Published 10.12.2011. Bulletin of the inventions № 34.