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Widening of Gravity Stowing Application Field

Mining causes irreversible damage on the environment, which are characterized underworking earth's surface and stockpiling of waste rock in the dumps. The ecological situation is gone down dramatically: dustiness of air basin, water pollution, flooding areas, surface subsidence.

Growing coal production, increasing of mining depth, involving in operation of thin and very thin coal seams, as well as a significant number the seams which have dirt beds increases the amount of issue waste rocks from the mines. In Ukraine`s mines the output volume of waste rock with respect to coal production compounds about 30-40%, subject to coal processing it`s up to 80%. For the environmental protection in the liquidation consequences the activity of coal enterprises is spent a considerable amount of money. However, none of the means let do away completely all negative consequences, as most of them are irreversible.

One of ways to solve these problems is leaving waste rocks in the mine. The stowing technologies are well known in the world. The basic kinds of stowing which are used in underground mining enterprises are gravity, mechanical, hydraulic and pneumatic. Nevertheless, most of them have limited use, basically due to the high cost, pure technical equipment, and operation complexity. Relatively cheap and technically simple method is gravity stowing, which not requires addition mechanization, human and material resources.

However, the field of application of this method is limited steep and steep-slope seams. This is due to the fact that the friction force limits of movement stowing material under its own weight. The most important factors influencing on the rate of friction force and amenable to some regulation is condition of friction face, grain composition and moisture of stowing material. For efficient operation the dip angle must be greater than the equilibrium angle on 5-10 °.

Widening of gravity stowing application field at incline and flat seams requires a corresponding reduction in friction forces. Today this can be achieved using as transporting surfaces: metal sheets, enameled pans, etc. Using these means can provide a widening of this technology at seams with dip angel up to 20-25 °.

Nowadays, Underground mining department of National Mining University is carried out research aimed on applying gravity stowing at flat seams. Implementation of new stowing technology with minimal labor and material costs will allow solving the problems of leaving rock in the mine and environmental protection.

Leaving rocks in the mine will not only reduce the pollution of the environment, but at the same time the complex of engineering problems such as the creation of safe working conditions of coal extraction under protected objects can also be solved. The stowing of goaf by waste rocks will favorably influence on the minimizing process of rock mass displacement, and maintenance of buildings and structures.