SUBSTANTIATION OF THE PARAMETERS FOR THE FORMATION OF A FILLING MASS FROM METALLURGICAL SLAGS IN OPEN PIT VOIDS

FILONENKO Oleksandr[1]
[1]*PJSC «Ilyich Iron and Steel Works»*

Purpose. Substantiation of rational parameters for the formation of a filling mass of metallurgical slags on the basis of a complex of laboratory studies and physical modeling for the reclamation of technologically disturbed lands.

Methodology. An integrated methodological approach was used, including sampling, microscopic and X-ray fluorescence analyzes, particle size analysis, laboratory studies of the products of interaction between slags and water, physical modeling of the filling massif, laboratory determination of the physical properties of slags, and numerical modeling of the deformations of the filling massif.

Findings. The proposed and scientifically substantiated method for the formation of the filling mass, based on the formation of the layering of the filling massif with certain physical and mechanical properties.

The dependences of the change in the concentration of pollutants of the products of interaction between slags and water and on their percentage and interaction time, showing the safety of the filling material, have been established. The optimal compositions of the filling mixtures have been substantiated, at which the best properties are achieved. The forecast of the development of deformations in the filling mass from the composition of the filling mixture and the parameters of the layers has been carried out, and the parameters of a stable filling mass have been substantiated. The study solves two main tasks – the return of land areas to economic use based on filling open pit voids and preventing the development of deformations and erosion processes; safe disposal of large-capacity industrial waste.

These studies were carried out in accordance with the «Regional Program for the management of industrial waste in the Donetsk region for 2018-2020».

Key words: quarry voids, filling material, reclamation, metallurgical slags, deformation, disposal.

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