

Waste at metallurgical plants (scrap of ferrous metals)

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Abstract: *In this article, the author, having studied the situation with the waste of metallurgical enterprises, makes a comparative characteristic with the existing technologies for the processing and recycling of waste.*

Key words: *metallurgical waste, enterprises, slag, secondary raw materials, processing.*

A significant amount of industrial waste in the CIS countries is accounted for by metallurgical slags. Dumps and landfills occupy huge useful areas, not to mention the load on the environment. The main way to reduce the volume of waste storage is their secondary use. Recycled waste is the most valuable material and in a number of areas is already successfully used in the production of non-metallic building materials, road construction, metallurgy, and agriculture [1]. The processing of metallurgical slags, unlike the extraction of ore from rocks, does not require the cost of drilling and blasting and transportation, and the resulting crushed stone replaces natural crushed stone and is sometimes more profitable for road construction. For example, in many countries, the share of natural crushed stone has already been replaced by crushed stone from slag. The conducted studies also confirm that the use of crushed stone of slag origin fractions up to 70 mm in the base of roads allows you to get a monolithic durable roadbed. A number of large metallurgical plants already have some experience in processing slags. The incentive is both the tightening of the legal framework in terms of waste storage, and the economic factor. Most of the plants today are forced to work on ore with a metal content of about 22 %, at a time when the metal content in the slag dumps accumulated on their territory reaches 17 %. According to the estimates of the metallurgists themselves, the involvement in the production of secondary metal stored in slag dumps allows them to work only on their own raw materials for up to a year [2, 3].

The main technological processes in the processing of metallurgical slags are disassembly with preliminary sorting and separation of scrap; crushing of slag, including metal-containing; separation of metal released during processing; intermediate and final sorting; transportation. For crushing in the vast majority of cases today, jaw crushers with complex cheek movement are used. In the sorting of crushing products - three-tier screens. After each stage of processing that exposes the

metal, metal-separating devices (electromagnetic separators, self-unloading iron separators) are installed. The lines are loaded by a vibrating feeder. In the last decade, in the areas of disassembly and pre-sorting, grate screens have been used to increase the efficiency of the use of crushers, and galtovochnye drums, mechanizing manual labor for exposing and separating scrap from slags going to processing. A typical solution for waste recycling, allows you to organize almost waste-free production in metallurgy. This scheme can be modified to meet individual needs, which allows you to get the maximum benefit. The equipment is supplied in the form of units, which greatly simplifies and reduces the cost of preparing the site for installation (no heavy foundations are required), the units are structurally and technologically linked, have electrical equipment (including electrical equipment cabinets, control panels, cable products), and service platforms. High availability for installation reduces the time of putting the equipment into operation [4]. This is an electric steelmaking department consisting of three 25-ton electric arc furnaces, two bucket-furnace units, a three-hand continuous steel casting unit with a billet section from 100x100 to 150x150 mm, as well as a long-range rolling department, including a linear medium-grade mill 500, a continuous small-grade mill 300 and a ball rolling mill MS-64.

Waste from the production of non-ferrous, ferrous metallurgy and gold mining industries amounts to 14 billion tons and occupies 50 thousand hectares. Thus, 5.2 billion tons of waste from processing and metallurgical processing alone have been accumulated. With an annual output of industrial waste of 1 billion tons, no more than 100 million tons are usefully used. More than 60 thousand hectares of land are being alienated due to landfills, quarry dumps, drilling wells, and storage facilities. The areas occupied by the storage of non-ferrous metallurgy waste are about 15 thousand hectares, of which the rock dumps occupy 8 thousand hectares, the tailings of processing plants – about 6 thousand. hectares and dumps of metallurgical plants – more than 500 hectares. Constantly increasing volumes of stored waste form new man-made landscapes, negatively affecting the environment, polluting the atmosphere, soils, surface and underground water with toxic components (mercury, arsenic, antimony, etc.) With the growth of the height of dumps and waste piles of rocks, they become more and more intensive sources of dust formation. A large amount of waste is accumulated directly at the enterprises.

From the above, the dynamics of the growth of waste from the metallurgical complex can be traced. It is necessary to think about what this situation, which we see today, will lead to. Currently, there is a tendency to tighten the requirements for the process of low-waste or non-waste production. The only correct solution is the secondary use of waste from metallurgical enterprises.

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