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Mechanisms For Determining The Parameters Of The Grinder

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Abstract. The issue of crushing and collecting waste is very important, firstly, it will reduce the number of vehicles involved in the collection and transportation of solid waste and save fuel and lubricants, and waste collection and transportation will be energy efficient, and secondly, land allocated for waste storage saves resources. In addition, it will be possible to separate useful components for further use in the crushing and recycling of solid waste.

Keywords: crushing, solid waste, transportation, energy, returns plates, material.

Introduction.

One of the most pressing issues is the recycling of solid waste in urban and rural areas of developed and developing countries. Today, the collection and recycling of solid waste remains one of the major issues in many cities around the world. Decisions on solid waste management should be financially sustainable, technically feasible, sociologically and legally sound, and environmentally friendly. The issue of solid waste is the biggest problem for large and similarly small municipalities.

If we look at the entire household waste recycling chain, according to the Ministry of Ecology, the approximate per capita structure is as follows: 31% of municipal waste is sent for incineration, of which 31% is sent to other process chains for ashing and subsequent road leveling and so on. 26% of the waste is recycled and reused for use and 26% of the waste is transported to landfills, only 1% is simply incinerated.

In parallel with the increase in the number of retail chains (supermarkets, hypermarkets, etc.), the increase in national income per capita will increase the purchasing power of the population and increase the purchase of packaged products, which will increase the accumulation of solid waste.

Urbanization (the process of increasing the role of cities in the development of society) affects the accumulation of waste, with the urban population producing more waste than the rural population.

Material and Methods.

The working efficiency of the crushers is determined by a series of operations such as material breakage and migration to the outlet hole. In addition to the rotor hammers, the process involves the return plates, the sharpened part of the rotor, and the blades welded to the inside of the chamber.

The operating conditions of the crusher are significantly affected by the conditions of transfer of the raw material and its size. The crusher will operate at maximum efficiency if a constant amount of raw material, the "cap" of the raw material is provided on top of the rotor. This ensures a high density of material, interacting with the hammers and participating in each stroke of the hammer.

Various formulas have been proposed by researchers and many scientists in determining the performance of hammer crushers when crushing medium and low strength materials.

A generalized formula has been proposed by the All-Russian Research Institute of Construction and Road Engineering to determine maximum work efficiency.

$$Q_{\max} = 1390 \frac{L_P D_P}{\vartheta_P^m z^q} K_\beta K_D K_S K_\sigma$$

here $m = 0{,}35$; $q = 0{,}5$; when $0 \langle \beta \langle 90^0$ function $K_\beta = 1 - 0{,}45 \sin\beta + 4{,}7 \sin^2\beta$;

The efficiency of closed-grid hammer crushers is determined by the capacity of the grids. Experimental studies show that the efficiency of the grid Q (m^3 / s) is proportional to its "light" surface (the sum of the surface area of the holes).

$$Q = 573 F_C$$

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where F_C – the surface of the "light" surface of the grate is, m^2

This formula is recommended for hammer crushers with the following design and technological parameters: transfer of raw material to sector 1 of the rotor; the installation angle of the receiving groove is the ratio of the installation angle of $\varphi = 20 - 30^0$; the limit return plate to $\beta = 90^0$; the mass of the largest piece of the hammer mass around 20; rotor speed $\vartheta_P = 15 \div 50$ m / s; the gap between the columns $S_K = 5 \div 50$ mm; annular groove between hammers and chisels $S_M = S_K$.

The volumetric efficiency of hammer crushers is also determined by the following formulas

$Q = 100 D^2 Ln$: $D \rangle L$

$Q = 100 DL^2 n$: $D \langle L$

D – rotor diameter, m; L – length of rotor, m; n – rotor speed, rpm

The energy consumption in crushing depends on many necessary parameters such as work efficiency, degree of crushing and appearance of the material being processed.

The existing formulas and instructions for determining the installed power of electric motors of crushers of different levels take into account the design, technological parameters and performance of the machine.

The choice of the size of the fine fractions is determined by the size of the fraction. It is recommended to take the size of small fractions 0-7 mm in large grinding and 0-0.25 mm in small grinding. It should be noted that the determination of the content of fine fractions is somewhat difficult due to their significant pollination.

Conclusion.

1. The development of criteria for evaluating the efficiency of hammer crushers requires a comprehensive approach that includes technical, economic, social and environmental quality criteria.

2. Based on the specifics of the problem to be solved, it is expedient to optimize the energy capacity, material capacity and other similar technical and economic parameters of the designed machine by the first integral method in determining the efficiency criteria. Therefore, the assessment of efficiency and technical level on the basis of the stated costs requires that the values of the b_0^1, b_1, b_2 coefficients be known in advance, which complicates the evaluation process.

3. It is not possible to describe the solution of the allowed options, which fully takes into account all the purposes of processing and the creation of a mechanical system, which brings the problem to one criterion.

Given that solid household waste is not homogeneous and is an anisotropic environment, the above assumptions are only valid for the established calculation.

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