GENERATION OF WASTES IN THE PRODUCTION OF BUILDING MATERIALS AND MEASURES FOR THEIR ELIMINATION

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Annotation. The types of generated waste during the production process, and the process of recycling bricks in Samarkandregion are described in this article. In addition, waste calculations are defined.

Key words: waste, utilization, morphological content, defective brick.

Introduction

Currently, the problem of processing solid industrial consumer waste (SICW) became a major constraint in the development of production. In most countries of Europe and North America, the management of SICWincludes a number of mandatory stages. To their number include: programs to reduce the volume of education forSICW widespread introduction of their secondary use, the use of appropriate fractions. [1]

SICW as a raw material for the main production processes, the utilization of the energy potential of the waste, the disposal of the remnants of the SICW that do not have any useful properties in environmentally neutral landfills In fact, the SICW treatment formula in developed countries embodies the principle of sustainable development and can be summarized as follows: - reduction, re-use, processing, energy extraction, disposal of residues. [7]

The main types of industrial waste relates to the construction industry in particular brick production. Mainly easily smooth clays of medium plasticity are usedfor the production of bricks, which contain up to 45-50% of sand without large inclusions of lime and stone. Loss during roasting of this clay is 3.3–13.3%, its linear shrinkage during drying is 5–12%, linear shrinkage when burning to 1000 ° C, 5–9%; water absorption after burning up to 1000 ° C8-12%. The clay extracted in the open-cast mine and delivered to the plant is amenable to processing.

At the same time, its natural structure disintegrates, it is evenly mixed with additives, it is moistened to the state of uniform dough. Now we will bring the average cost of raw materials on 1000 pieces of bricks:

- clay brick- ordinary plastic formation- 2.5 m,
- ordinary vacuum - 2.75 m3,
- with a vacuum of 40% - 1.5 m3. [4]

The dose of clay, sand, sawdust and other components produced inbox feeder, which evenly feeds mass into the next aggregates. Box feeder - open top rectangular box, bottom which forms a conveyor belt that consists of metal plates. The length of the drawer component depends on the height raising the shield. Box feeder performance is determined by belt speed and lifting height of the front shield. Performance feeder 10-35 m\h, that is, it can provide the release of 12 thousand solid brick in an hour.

Next to the discharge opening, it was installed with blades made of metallic fabric, which, turning at the back of the bath, rolls the mass from the tape into the discharge opening and break up large pieces. Further, the crushed raw material is processed on roller shredders, which are divided into

smooth, disintegrating, stone separating and gear. The disintegrating rolls device consists of 15 of a smooth shaft of large diameter, a ribbed shaft of small diameter and a receiving hopper for clay. The rotation speed of the large roll is 50-60 vole\min, the small shaft 500-600 vol\min. Clay blows knives ribbed shaft is cut into pieces and pressed under the action of the compressive forces of the rolls. (L.F. DolinaTechno ecology for builders) [5]

Clay with stony inclusions or mass enters the wet grinding runners, which consist of a bowl with a perforated bottom and two rollers. Clay is crushed by these rollers and pressed through a hole at the bottom of the bowl.In runners, the clay withstands compressive loads, periodically falls under the rink. Performance runners 10-28 tons per hour and more.The mass, which was processed on gross grinders, is directed to shafts, after which the mass goes to the clay mixer (a trough in which one or two shafts with blades rotate).

Clay mixers have a length of 3–4 m, their capacity is up to 30 m3 / hour, which ensures the production of 10 thousand bricks per hour. The mass in the clay mixer is moistened with water or steam. As a result of moistening the clay with steam, ability of mass to form increases, and the drying qualities of the raw materials are improved. For steam humidification 1000 pieces.about100 kg of steam is spent with a pressure of 0.5 atm. In the brick industry also use sand, fireclay or hydrated clay. Hydrated clay is produced in circulating kilns, heating it to 600 ° C.(L.F. DolinaTechno ecology for builders) [2]

Brick formation is carried out on belt presses with a press pressure of 2 to 5 kg/cm2. The mass is loaded into the receiving watering press. In the cylinder continues processing mass. In the head and mouthpiece mass is compacted. The mouthpiece has the shape of a cut pyramid. The size of the original mouth of the mouthpiece takes into account the shrinkage of the raw during drying and burning. The capacity of the belt press is 4-5 thousand bricks per hour. To improve the formal properties of the masses, air is withdrawn from it, that is, they are evacuated, which provides more stable binding of clay particles to each other. (Munn R. E. Global environmental monitoring system.SCOPE, rep. 3.Toronto)[5]

After this, about 1% of air remains in the mass. The performance of vacuum belt presses is from 5 to 10 thousand bricks per hour and more. Starting from a belt press, a clay bar is cut into individual bricks using semi-automatic or automatic cutting machines. Then the drying process takes place. In this process, the resulting water is converted from a liquid to a vapor state and goes into the environment. Natural drying of products in the air, which occurs due to the heat energy of the sun, is cheaper, but artificial due to the heat, specially obtained in the respective installations, more efficiently.(Makhsimov. The V. I. Waste technology and recycling of solid waste production: the Abstract of lectures. 1975).[3]

Brick brands “100” and “150” are produced according to GOST 530-95at Chimbayde brick factory. The basis of the technological scheme adopted plastic method for the production of bricks. During the operation of brick production, the following types of waste from the main production will be formed: overburden, defective brick of the molding department, defective brick of the drying department, defective burnt brick, waste of coal ash.

Methods

To neutralize solid waste, a method of encapsulation is often adopted, consisting in enveloping the toxic waste with an inert film. The method used for remitting waste is to burn out harmful components, consumer properties. The most common method of fixing waste –cementing-is used for waste containing water. The disadvantage of the method is an increase in the volume of waste and possible hydration of cement at low pH. It is used for inorganic waste, especially heavy metals, as well as radioactive substances.

For fixation using organic polymer materials, a mixture of waste with appropriate resins or monomers is prepared, then a catalyst is introduced that provides polymerization and creates a volume of the fixed material. (V. G. Kalygin. Industrial ecology.Studies'.benefits for students. high. studies'. institutions'. Moscow: publishingcenter "Academy", 2004-432 pages)

Results and discussion.

Waste overburden is formed on the site of an industrial open cast mine in the process of removing the surface layer. The bulk of the waste 60% loam, 40% plant roots. For the year 3141m3 of the soil and vegetation layer is removed. The density of the layer is p = 1.61 t/m3. The quantity of the waste rate is:

m = v*p=3141*1,61 = 5047t/year. The specific indicator of waste formation in relation to the products is equal to:

n_1 = M / N = n_1 = 5047/15000 = 0.337t / thousand pieces of brick.

The waste of defective brick molding department, The waste is formed by the production of bricks in the molding process. The waste consists of nonstandard and broken raw bricks. Calculation of the amount of waste. The number of defects does not exceed 2% and amounts to 3000000 pieces of defective bricks. The whole of one brick, on average, is 4.0 kg. Consequently, the amount of waste generation will be: M = 4,0*3,000,000=1,200,000 kg or 1,200 tons/year. The specific indicator of waste formation in relation to the products is equal to:

n_2 = 1200000/15000 = 80 kg /thousand pieces of brick.

Waste the defective brick of the drying compartment, is formed by the production of bricks in the drying process. The waste consists of defective and broken raw bricks. The number of defects does not exceed 2% and amounts to 300,000 pieces of defective bricks. The whole of one brick, on average, is 3,6kg. Consequently, the amount of waste generation is: M = 3,6 * 300000 = 1080000 kg or 1080 tons/year. The specific indicator of waste formation in relation to the products is equal to:

n_3 = 1080000/15000 = 72 kg /thousand pieces of brick.

The waste of defective baked brick is formed in the kiln department of brick production in the firing process. The waste consists of defective and broken burned bricks. The number of rejects does not exceed 3% and amounts to 450000 pieces of defective bricks. The whole of one brick on average is 3,1kg. Therefore, the amount of waste formation will be:

M = 3,1* 450000 = 1395000 kg or 1395tons/year.

The specific indicator of waste formation in relation to the manufactured products is equal to:

n_4 = 139500/15000 = 93 kg / thousand units of brick.

Determination of the specific indicator of waste formation. The specific rate of education waste in relation to the weight of the product is equal to:

n_4 = 23,4/15000 = 0,0016 kg / m^3 loess species.

Waste from coal ash literary data remaining after burning the corner, and has the following morphological composition:

silica (SiO2) -56.7%;

Alumina (Al2O3) -22.4%;

iron oxides (Fe2O3) -7.3%;

- lime (CaO) -4.82%;

magnesium oxide (MgO) -17.3%;

-calcium fluorine (CaF2) -1.84%;

Alkaline- (Na2O or K2O) -0.58% or 1.17%;

- titanium oxide (TiO2) -0.93%. [5]

According to the normative document, the ash content of Angren angle used is 22%. The amount of coal consumed is 5400 tons, for the year the weight quantity of waste will be 1188 tons. Waste ash will be partially (250t) is introduced into the batch as a plasticizer additive. The residual volume of waste will be 938 tons. The specific rate of waste formation in relation to the amount of coal used is equal to:

P_{ut} = 938/5400 = 0.174tons/t coal.

Firing of a brick is made by natural coal. The standard consumption of coal per 1000 pieces of brick is 360kg. Based on the performance of 15mln. PCs. specific consumption of coal will be 5400t. When coal is burned, ash waste is formed. In the process of brick firing, the following substances will enter the atmosphere: soot - msum-22.95 t/year, MSR-0.8855 g/sec, carbon oxide-Msum-35.74 t/year, MSR-1.38 g/sec, nitrogen dioxide - Msum-7.405 t/year, MSR-0.2857 g/sec, sulfur dioxide - Msum-134.14 t/year, MSR-5.18 g/sec, Benz(a)pyrene - msum-0,000043 t/year, MSR-0,0000017 G/sec.During operation the production of bricks will form the following types of waste primary production: overburden, defective brick mounding Department, a defective brick drying Department, defective burnt bricks of waste coal ash.Coal ash meets the above requirement, as many cement plants use ash as an additive in clinker grinding. (V. F. Maximov, I.V. Wolf. Cleaning and recovery of industrial emissions.Moscow. "Lenna industry" 1981.The use of waste power plants allowed to increase the production of bricks grades 125 and 100, significantly improve its presentation and 30% reduce the amount of marriage. (Chistyakov B. Z. the use of industrial waste in construction. L., 1977. 142c.)Improving the efficiency of industry it is necessary to consume unconventional energy. Solar energy the direction of non-traditional energy, based on the direct use of solar radiation to produce energy in any form.

Conclusion.

The use of waste power plants allowed to increase the production of bricks grades 125 and 100, significantly improve its presentation and 30% reduce the amount of marriage. For temporary storage of waste in the territory of brick production special platforms are provided. Production wastes belong to 2, and 4 classes of danger, their storage conditions are such that the waste will not have a negative impact on the environment and working personnel.The company will dispose of 4 types of waste in the amount of 7337,033 tons/year (75,8%). The resulting waste can be disposed of enterprise building for the production of building materials. [9]

Therefore, from the above it can be concluded that the operation of the enterprise for the production of ceramic bricks in compliance with the technology of loess extraction, molding of raw bricks and its firing in the ring furnace will not lead to irreversible environmental consequences. The use of solar panels in the production of bricks reduces the emission of waste coal ash and emissions of harmful substances into the atmosphere. Minimizesenvironmentalpollution.

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