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Improving the Processes of Producing Concrete Fillers Based on Industrial Waste

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Abstract: In modern construction practice, the rational use of raw materials and the reduction of environmental pollution are among the most urgent issues. Various industrial enterprises generate large amounts of secondary products that are typically classified as industrial waste. However, many of these by-products possess physical and chemical properties suitable for use in the production of construction materials.

Considering that approximately 55% of construction materials are currently produced from natural raw materials, the introduction of industrial waste into the production of concrete fillers is of great scientific and practical importance. The use of such waste materials not only reduces the consumption of natural resources but also minimizes environmental pollution and contributes to sustainable development in the construction sector.

Keywords: Concrete, binding material, filler, porous filler, slag, industrial waste.

Today, not only energy-efficient building materials production projects are pushed. In addition to this, current ideas such as the effective use of secondary resources in the production processes of building materials can also be implemented on a large scale. Also, 60% of the building materials used in construction work are concrete structures. Concrete is a sunium stone material formed from the solidification of a mixture obtained from a rational mixture of binder, water, fine and large fillers. “In many cases, the secondary materials released in the processing of natural deposits are used as raw materials for them, and not as fillers suitable for concrete."[2] one of the main raw materials used for concrete is filler. Filler it is a natural or artificial stone material with a certain particle composition and is a building material that forms concrete in combination with cement and water. Concrete fillers are the main building materials. Their production is growing every day. The main issue in capital and construction in general is the improvement of the production and application of fillers, the improvement of their quality and the application of scientific and technical achievements in construction.

As a filler, mainly maxillary rocks and production waste (slags, etc.) are used. The use of such low-cost fillers makes the price of concrete cheaper, as the filler is 85-90% of the concrete and the cement is 10-15% of the volume. In later years, lightweight concrete made from porous artificial fillers is being used extensively in construction. Porous fillers reduce the density of concrete, which improves its heat retention property.

Nowadays, as concrete fillers are of such importance, it is important to evolutionize their production. The production of concrete fillers using secondary resources is necessary in order to save material resources and protect the environment. In the Metallurgical Industry, large amounts of domna slag are dumped annually in waste storage. That is, in addition to the main product, 0.5-1 T of slag comes out in the steel melt. In this, not by mass, but by volume, 2-3 times as much slag comes out. For this reason, slags are conditionally called waste. In fact, it is a valuable secondary product.

Improper use of metallurgical slag also affects the price of the main removable product, that is, the import of slag, burial in waste storage leads to excessive costs. The chemical composition of metallurgical slag is Turlich. Domna slag mainly consists of the following oxides: SaO - 3o-50%; SiO2 - 30 - 40%; Al2O3 - 10-30%; iron, magnetic and manganese compounds.

Domna slag is used in the cement industry. Part of it is used to obtain slag fiber and bulk products. Basically, a large amount of slag is used in the production of fillers.Domna slag-based Flint is divided into four marks according to the grinding factor in the cylinder: Dr45 - strength limit for concretions below 20mpa; Dr35 - strength limit for concretions of 20-30mpa; Dr25 - strength limit for concretions of 30-40mpa; Dr15 - strength limit is used for concretions of 40mpa and above. On the basis of Domna slag, high-strength concretions can be obtained from Flint for various structures. In areas with a developed metallurgical industry, slag Flint is relatively inexpensive compared to other natural stone-based Flint, and its application has a high economic effect.

However, the sulfur present in slags can cause the steel reinforcement to erode.For this reason, Special Research should be based on the application of slag Flint in reinforced concrete reinforced reinforced structures, if the otingugurt exceeds 2.5%, then research is carried out on concretions used for all types of structures. The housing density of slag Flint should not be less than 1000 kg/m3 for heavy concrete. It is dense and robust, black and dark-gray in color as a filler.

Granulated slag-liquid is obtained when processing heated metallurgical slag using water. In this case, separate small grains are obtained when quickly cooling the slag solution and granulating and grinding it. The structure of the grains - amorphous and vitreous. Granulated slag is suitable for large sand according to its granular composition: its grains measure 0.6-5mm, and its grains with a large size of 2.5 mm are 50% of the total composition. Large grains (10mm) are also found in small quantities.

Granulated slags have a hollow density of around 600-1200kg / m3. This can be explained by the fact that depending on the properties of the slag solution and the granulation technology, a dense or porous granulated slag can be obtained. The gap between grains of granulated slags is high, reaching 60-70%. The conglomerate from which concrete reclaimed fillers are obtained by processing and grinding concrete is now widely used in construction to make concrete (RCA). Until this time, RCA was not used in the nostructural concretions used on freeways and sidewalks. It will be necessary to expand the structural use of RCA.

To prevent a decrease in concrete strength, it will be necessary to use partially or completely natural sand instead of sand in old concrete. By using RCA, the recycling of new concrete is reduced by introducing the required amount of water, the demand for water increases by the given consistency, the immersion increases by the given water quantifier, as well as the creaminess modulus indicator decreases by the given water/cement ratio. These effects are the largest, when old concrete is used as a fine and large filler. The resistance of freshly poured concrete to freezing and melting directly depends on the strength of the old concrete and the properties of the new concrete. Chemical, air-absorbing and mineral additives that will be present in old concrete will not cause changes in the properties of new concrete. However, the high concentration of chlorine in old concrete causes the steel used in new concrete to corrode. Old concrete is considered unsuitable for use if it has been exposed to the above-mentioned aggressive mukhites, that is, if it has been exposed to high temperatures due to chemical or alkaline effects, fire and other reasons.

If the old concrete used to obtain new concrete is damaged by hazardous, toxic or radioactive substances, then it will be necessary to conduct an in-depth study or, if possible, not use it. Organic materials such as bitumen in old concrete worsen new concrete properties. In addition, metal inserts and paints and glass fragments on the outer surface cause an alkaline reaction of the filler. Determination of the composition of the RCA is given in BS 8500-2: 2002. Obtaining and using a suitable filler by recycling old concrete waste was regulated by the standard. At the same time, the Flint used in construction will contain a large amount of bricks, glass, plaster or chlorides, which have a negative effect. Proposals are still being developed to clean up construction waste from such adverse impacts. Proposals have been made by Gonzalez et al to recycle old concrete waste. It was also proposed by Rigan. As for other household waste, for example ash, black and non-ferrous metals produced by coal combustion can be ground to a powder State, mixed with clay to obtain granules and produce artificial fillers from them.

When complex use of raw material materials, industrial waste or abandoned unnecessary products can divide raw materials into another industrial production. Similarly, when foiling from raw materials, the current period makes sense to the development requirements of the national economy.

The axiom of complex use of raw materials can be considered in several different directions:

First of all, waste recycling allows for Environmental Protection, the disposal of valuable land areas from waste, including special places where waste is collected, waste and piles.

Secondly, industrial waste products to some extent satisfy the demand for high-quality raw materials, which are given initial technological processing (grinding, burning) in the production process of those in the processing industry.

Thirdly, when the complex use of raw materials, the capital cost per product property decreases relatively, the cost recovery periods are reduced, the placement of waste in the industry, reduces the cost for the construction of warehouses that store them, and the consumption of heat and electricity made to new products decreases due to the technological readiness of waste, the production capacity of

Using industrial waste efficiently, we can produce building materials in different HIL, which are designed to build buildings and structures. The production of building materials with industrial waste content is a reason for economic efficiency and savings in the reserve of Natural Resources.

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