

MATHEMATICAL MODELING OF PROPERTIES OF FORMING MIXTURE USING BISCHOFITE

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Ukraine owns a developed universal foundry, which is capable of producing complex castings of any mass from all alloys used in mechanical engineering. The dominant technological process is the manufacture of castings in single sand molds in which 65-70% of castings are obtained. The manufacture of molds and cores from cold-hardening mixtures increases the accuracy of castings, minimizes losses from marriage due to faults of molds and cores, and reduces the complexity of production.

One of the main stages in the manufacture of castings is the stage of preparation of the molding mixture. Improving the quality of castings, cost-effectiveness and efficiency of their production largely depend on the composition and properties of molding mixtures at different stages of their preparation and use. To obtain high-quality castings, molding mixtures must have: strength – the ability to withstand external loads, gas permeability – the ability to pass gases and durability – the ability to maintain their qualities when reused.

Recently, to solve the problem of controlling the properties of molding compounds and their stabilization, the calculation and analytical method based on the planned experiment is widely used.

A mixture on quartz sand with the addition of magnesite and bischofite as a binder was chosen as the object of study. A planned experiment was carried out to simulate the properties of the mixture.

Independent variables were selected quantity: quartz sand, magnesite and bischofite. As the output parameters, we selected the main physic mechanical parameters of the properties of molding compounds: compressive strength, survivability, tensile strength, flaking, and gas permeability.

The obtained regression equations prove the functional relationship between the properties of the mixture with the use of magnesite and hardener - survivability, compressive strength, crumbling, gas permeability and tensile strength.

Suboptimal solutions were obtained in the form of ridge lines, which can be used as a nomogram to evaluate the ratio of the required properties of the mixture.

LITERATURE

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