

1. **E.N. Budanov.** Import substitution of castings.

Modern foundry production is basis and a condition of competitiveness for all branches of mechanical engineering in Russia. The article deals with strategic approaches of foundry production development in Russia, existing problems, mistakes and ways of their solution. The experience of effective foundry production in economically developed countries of the world is analyzed and the potential of opportunities for domestic foundry production is shown.

**Keywords:** strategy of foundry production development, production modernization, import substitution of castings, international experience, modern structure of foundry branch of mechanical engineering, localization of cast automotive components in Russia.

2. **D.M. Levin, G.D. Petrushin, A.G. Petrushina.** Forecasting of damping capacity and normal modules of elasticity of cast irons on the basis of quantitative estimations of parameters of graphite inclusions.

The article is devoted to the actual problem connected with the development of statistical models that establish the relationship between the elastic and damping properties of graphitized cast irons with the parameters of graphite inclusions.

**Keywords:** graphitized cast iron, form factor, morphology of graphite inclusions, elastic modulus, damping capacity.

3. **M.V. Baranov, R.K. Mysik, S.V. Brusnitsyn, A.V. Sulitsin.** Modification of aluminum melt by small additions.

This article is devoted to modification of aluminum melt by zirconium, titanium and boron addition. Addition effect on the macrostructure and mechanical characteristics was studied. It was determined that titanium has a much more modifying effect in the examined range of concentration. Its influence is saved up to 0.2 wt. %. Boron and zirconium have less modifying effect. Test results of mechanical characteristics demonstrated that titanium addition into melted aluminum increases greatly the tensile strength level. Boron and zirconium have minor influence. Furthermore the combined modifying additions were added into aluminum melt and their influence on the macrostructure and mechanical properties of aluminum was studied. It was established that the complex titanium/boron modifying addition has significant influence on the macrostructure and mechanical properties of aluminum. It was found the much less amount of combined addition is required to grain size refinement than when one element (Ti, Zr or B) is used.

**Keywords:** aluminum, melt, modification, macrostructure, mechanical properties.

4. **K.N. Vdovin, O.A. Nikitenko, N.A. Feoktistov, D.A. Gorlenko.** Study of the influence of nitrated ferrovandium on the parameters of microstructure castings of gadfild steel.

In the presented work presents the results of studies of the microstructure of high-manganese steel microalloyed with nitrated ferrovandium. The joint influence of the thermal conditions of crystallization and cooling of the casting, as well as nitrated ferrovandium on the austenite grain size, its anisotropy is considered. In addition, the influence of these two factors on the microhardness of austenite is considered.

**Keywords:** high-manganese steel, nitrated ferrovandium, austenite, anisotropy coefficient, heat treatment.

5. **E.S. Gamow, V.A. Kukushkina. Theoretical and technological prerequisites additive (digital) methods of casting.**

The prerequisites of additive technologies are determined. The foundations of additive (digital) methods of casting based on research results, scientific and practical work in the field of «Scientific and technological fundamentals of the casting of metallic materials» are developed within the framework of the discipline «Fundamentals of artistic processing of materials by types of materials» in the conditions of the Lipetsk State Technical University.

An analog (prototype) of additive industrial technologies in the field of foundry production is established — electroslag casting. The hypothesis about the similarity of the mechanism of the proceeding processes of forming the structure and properties of cast products in both electroslag casting and in 3D printing is suggested. A classification of additive technologies for foundry production is proposed.

**Keywords:** casting, additive technologies, patent, design project, 3D-model, 3D-printing.

6. **M.R. Khairullin, R.D. Farisov. Development of a technique for preventing the occurrence of defects in iron casting at the Foundry Plant of JSC KAMAZ using quality tools.**

A technique for determination of defects formation reasons and methods of their elimination has been developed and realized at Foundry plant of JSC KAMAZ. The technique was worked out on «Brake drum» casting using statistical methods of quality management. The application of technique allowed to increase the production of quality castings by 15% during iron casting at Foundry plant JSC KAMAZ by conducting preventive measures.

**Keywords:** Statistical methods, technique, castings defects, defects reasons.

**Evgeny Nikolaevich Budanov (The 60th anniversary of birth)**

