1. **Yu.N. Muravyov, A.V. Treshchalin, M.A. Druzhevsky.** The introduction of HTS technologies at foundries in Russia and Russian equipment for HTS processes

Summary. The article shows the dynamics of the increase in the use of No-bake process at foundries in Russia, the advantages of the technology and the equipment used are indicated. An analysis of the current situation in the market for the supply of foundry equipment was carried out and examples of modern Russian equipment manufactured by Rodonit (St. Petersburg) were given.

Keywords: No-bake process, moulding equipment, reclamation plants, pneumo conveying systems.

2. **A.I. Pokrovsky, S.V. Grigor'ev.** Sprecific of distribution of chemical elements in graphite inclusions in as-cast and deformed ductile cast iron

Summary. The knowledge about distribution of chemical elements in graphite is crucial for understanding the mechanism of nucleation and growth of graphite inclusions during high-temperature crystallization of a cast iron melt. It is also important for understanding the mechanisms of subsequent plastic deformation of cast iron. The specificity of the electron probe microanalysis (EPMA) of spherical graphite inclusions in cast iron, which is connected with a selection of the specimen's cross-section to be studied, is described. The most reliable and informative results are obtained when the graphite inclusion is cut by a plane of the metallographic section exactly in the middle. Comparative EPMA is performed of the profiles of chemical elements over a cross-section of graphite inclusions in the as-cast and deformed (by hot extrusion) ductile iron. It is found that in the ascast state, the center of inclusions, in addition to the main element (carbon), features anomalies in the concentration profiles of a number of elements. Magnesium, silicon, sulfur, oxygen and sometimes iron exhibit increased content in the center. This can be attributed to the presence of oxide, sulfides and oxysulfide microparticles in the cast iron melt during crystallization (or inclusions of silicon-containing ferrite) on which graphite inclusions subsequently grow. In the deformed cast iron, anomalies in the concentration distribution of elements in the inclusions are largely eliminated and their distribution becomes more uniform. The higher the reduction ratio, the larger is the homogeneity of the chemical composition. To some extent, the heterogeneity of the composition distribution is still found in the longitudinal section at deformation with the reduction ratio of 60 %. For the reduction ratio of 80 %, in cross section the inclusion becomes almost completely homogeneous in chemical composition over the in cross section.

Keywords: ductile cast iron, graphite inclusions, concentration profile of elements, electron probe microanalysis

3. **D.A. Lyubomirov, I.O. Leushin, A. Gerasimov.** Improvement of the production of steel casting for responsible purposes with the use of additive technologies

Abstract. In this article, the authors consider methods for obtaining steel castings for responsible purposes and problems associated with the use of additive technologies in foundry production. In particular, the use of CHM (cold-hardening mixtures) and cores made by 3D printing for the production of steel parts of complex configuration is considered. The factors influencing the formation of defects in 3D printing of cores are also described, and recommendations are offered to prevent these defects.

Keywords: defects, additive technologies, cores, steel, casting

4. **B.M. Nemenenok, O.G. Devoyno, P.E. Lushchik, I.V. Rafalski, A.D. Rulenkov.** Laser deposition of aluminum and magnesium-based alloys for repair and surface restoration of components

Abstract. The results of studying the processes of laser deposition of aluminum and magnesium-based alloys, the features of the structure of deposited layers using electron microscopy and X-ray computed tomography data, measurements of microhardness after laser deposition of aluminum and magnesium alloys are presented. Modeling of the stress-strain state of flat components during laser deposition of an aluminummagnesium alloy containing 0.6—0.95 % magnesium, 0.7—1.0 silicon, up to 0.3 titanium, up to 0.5 zinc, and up to 0.4 % manganese was performed. The nature of the distribution of deformations and stresses during the use of various technological schemes of laser deposition during surface treatment of aluminummagnesium alloys by laser deposition methods is established.

Keywords: laser deposition, aluminum-based alloys, magnesium-based alloys, structure, properties, modeling, deformation and stress distribution.

5. **S.A. Kulikov, F.I. Rudnickij, V.A. Shumigaj.** Combined use of kaolin and bentonite molding clays

Abstract. The article compares the properties of kaolin and bentonite clays. It has been shown that kaolin clays have high fire resistance, and bentonites have high astringent properties. The experience of specialists from OJSC «MTW» in the joint use of various types of clays is considered. The combination of kaolin and bentonite in the suspension made it possible to increase the strength of the molding sand while maintaining moisture levels. The disadvantage of kaolin clay suspensions is that the moisture content increases with increasing dosage. When preparing bentonite suspensions, their short shelf life should be taken into account.

Keywords: clay, kaolin, bentonite, suspension

6. **V.I. Chechukha, M.A. Sadokha, S.V. Kareniuhin.** The practice of using chill vents in construction injection molding forms

Abstract. Options for improving the quality of castings during injection molding are considered. The variants of the design and placement of the chill vents in the mold are presented. The practical experience of using chill vents in order to improve the ventilation system of the mold to ensure a reduction in the defect of the gas sink molds and porosity is described.

Keywords: high-pressure casting, casting, casting defects, gas sinks, gas porosity, casting quality, mold, mold design, mold ventilation system, CAD.