ADVANTAGES OF ALLOYING CAST IRON AND STEELS WITH INDUSTRIAL WASTE

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Alloying of cast irons and steels allows to obtain metallic materials of a given chemical composition and structure with certain chemical, physical and mechanical properties. To increase the service characteristics of structural steel, while economical consumption of expensive alloying elements, attention is also paid to microalloying.

The introduction of alloying elements into cast irons and steels allows to change their properties: plasticity, viscosity, strength, electrical conductivity, magnetic characteristics, radiation resistance and corrosion resistance in various environments, etc. The main alloying elements are: nickel, chromium, manganese, silicon, tungsten, molybdenum, vanadium, titanium, aluminum, copper, niobium and boron [1]. In Ukraine, there are no deposits of many of the listed metals, or they are found in small quantities.

At the enterprises of metallurgical and machine-building profile a certain amount of solid waste containing compounds of nickel, cobalt, chromium, molybdenum, tungsten, etc. has accumulated. The imperfection of technologies for the complete utilization of these wastes leads to the loss of valuable components, as well as environmental pollution [2]. The waste contains compounds of non-ferrous metals that can dissolve in water and, under the influence of natural factors, enter the soil. Many of these compounds have toxic properties, which leads to soil pollution.

Obtaining secondary raw materials by reducing metal oxides contained in wastes accumulated at machine-building and metallurgical enterprises will allow obtaining alloying additives [3]. The obtained alloying additives can be used in the smelting of alloyed cast irons and steels instead of using primary raw materials. At the same time, this will also solve the environmental problem: reduce the negative impact on the environment.

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