ENRICHMENT OF THE CHEMICAL COMPOSITION OF CEMENT USING FOUNDRY WASTE

Otaqo'ziyev A.
Andijan Mechanical Engineering Institute, intern-researcher

Axunjonov A.
Leading expert of Andijon Energamash Unitary enterprise

Today, scrap has become a very valuable secondary raw material in light of the ever-decreasing availability of metal raw materials, achievable product quality and technological process efficiency, and is primarily the starting material for electric steel ingots for the production of high-quality steel products. In 2019, about 40% of secondary metal waste was used to produce 1875 million tons of steel in the world.

You can't produce steel or cast iron without secondary waste - it's proven to be both economically and environmentally beneficial.

Today, waste recycling is used in all fields because sustainability, resource efficiency, recycling and environmental balance are inseparable problems with socio-economic aspects in the production of materials and products due to their impact on people and the environment. Steel or cast iron, which is the most widely used and universal material in the world, has leading indicators here [1].

Slag (also known as iron slag as a general term) always occurs as a residue in pig iron or steel production processes.

They consist of mixtures of glassy or crystalline non-metallic substances consisting of basic and acidic oxides.

Figure 1. Slag waste from Andijon Energamash Unitary enterprise

Slags perform important functions in metallurgical processes, such as bonding non-metallic components with additives, coating the surfaces of melting baths, thereby protecting or preventing re-oxidation of steel melts. Based on this, the formation of fine slag as possible is enriched with the targeted addition of additives. Depending on the production, there are slags, steelmaking slags, electric furnace slags and secondary metallurgical slags. It is called slag from electric furnaces and secondary metallurgy in electric steel mills for the production of stainless steel[2].

The slag formed in the liquid state floats on the surface of the melting bath due to its low density, and the cast iron and steel melts can be easily separated or removed.

After the slag is removed from the surface of liquid steel and cast iron, further cooling and processing takes place. As a result of rapid cooling of slag in water, granular slag (glass-like, in the form of sand) appears.

Slag is a valuable raw material for various purposes. For example, depending on their composition, slags are used in the form of finely ground sand as an additive for cement, used as a stone fraction in road and road construction, used in the production of fertilizers, as slag stones for pavements, heat can be used as slag fiber for insulation.

In cement production, the content of slag is 5-6% SiO_2, 10-15% Fe_2O_3, 4-5% Al_2O_3, and it is effective for waste processing, to overcome cold, heat, air humidity, and to increase the resistance of the cement composition to aggressive environments.

References:

1. Joachim Schlegel The World of Steel On the History, Production and Use of a Basic Material 372-378 p
2. Vijay Keshav Joshi. Effect of base course properties on performance of slag pavements 31-p