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On the benefits of switching from lime to dololime fines injection in electric arc furnace

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The successful implementation of switching from lime to dololime fines injection in an electric arc furnace owned by the company United Steel in Kuwait is here discussed from technical and economical points of view. This need arises from the generation of excessive dololime fines (particles less than 10 mm) and insufficient lime fines (particles between 5-15 mm) at the lime and dololime plant owned by the same company that supplies the raw materials to the steelmaking plant. This size disparity presents operational challenges within the steelmaking process, like the need to externally supply the deficit of lime fines meanwhile briquetting the dololime fines to reach lump-like size. Thus, an innovative strategy was implemented to overcome these issues and optimize material utilization. The solution involves replacing the whole lime fines injection with the available dololime fines injection while increasing the amount of lime lumps and consequently reducing the use of dololime lumps to keep the required mass balance in comparison to the original practice. Tests were carried out on 106 heats before (53 heats) and after (53 heats) the changes in the process and hypothesis testing was used to statistically evaluate the variation in flux, energy, oxygen and carbon consumptions. The implemented strategy results in several key improvements, namely a reduction of 3.2 kg/tsteel and 0.6 kg/tsteel of lime and dololime consumption, respectively, while keeping constat the other process parameters. The economic benefits are significant, too. By eliminating the need for external briquetting of dololime fines and reducing purchased lime fines quantities, the solution generates annual cost savings of approximately USD 350,000.

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