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Melt Shop Production Management with Comprehensive Raw Material Optimization

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The transition towards more sustainable steel production implies also huge challenges regarding raw material procurement and usage. Production management for liquid steelmaking has to optimize the raw material input, especially regarding hot metal, DRI/HBI, scrap, alloy and slag former materials. Forecasts of the expected raw material demands in production planning and scheduling support their procurement and inventory management. The optimized mix of raw materials for a heat has to consider all its charging and alloying steps of primary and secondary steelmaking with their respective logistic and metallurgical constraints as well as related energy consumptions and CO_2 emissions. Thus, an integrated multi-parameter raw material optimization based on comprehensive modelling of the underlying liquid steelmaking processes enhances planning, scheduling and execution functions of a melt shop production management system. The presented solution also comprises a hybrid prediction model for scrap attributes such as chemical analysis including contents of tramp elements, metallic yield and specific electric energy consumption, which in general have high uncertainties. This scrap characterization model increases the accuracy of the optimization calculations and thereby reduces the costs of resulting raw material mixes as well as the number of out-of-specification heats.

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