Steelmaking Process: Neural Models Improve End-Point Predictions

CUNHA, A. P.; PACIANOTTO, T. A.; FRATTINI FILETI, A. M.

Cia. Siderúrgica Nacional
Rua 10, no. 21, Vila Santa Cecilia -Volta Redonda – RJ – Brasil, CEP 27900-000

DESQ/FEQ - Universidade Estadual de Campinas
Cx.Postal 6066 - Campinas – SP – Brasil - CEP13083-970

Abstract
The basic oxygen steelmaking (BOS) is a transient process, highly complex and is also subject to oscillations in raw material composition. A robust model is essential to adjust end-blow oxygen and coolant requirements to match with the targets of end-point temperature and carbon percentage in liquid steel. This paper describes the development of neural models and the industrial application to the BOS plant of the Cia. Siderúrgica Nacional (CSN-Volta Redonda/Brazil). The inverse neural model is responsible for end-blow process adjustments. At the end of 40 industrial runs, it was obtained 82.5% of simultaneous agreement with the targets, against 66% obtained from the commercial model currently used at CSN’s plant. End-point temperature goal was achieved in 97.5% of the cases through the neural model corrections. The performance improvement shows that the neural model is a potential tool to automatically control the BOS process.

Keywords: steelmaking, neural network, modeling, LD converter