

Analysis of splashing in Basic Oxygen Furnace through systematic modelling

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Abstract: The Basic Oxygen Furnace (BOF) is studied in this paper. BOF is a sub process in a blast furnace based steel making process, in which most of carbon is burned away from the pig iron. The carbon is burned away by using pure oxygen, which is blown through a lance into the mixture of pig iron and recycled steel.

Previously the splashing in BOF has been mainly qualitatively analysed (Ruuska 2012). In this study, the process is further analysed in a systematic way in order to obtain more knowledge about the reasons leading to splashing. The analysis also aims to obtaining quantitative information about the relationship between the studied input variables and splashing. This information can be used in operating and controlling the process in such a way to avoid excess splashing.

The modelling scheme applied in this paper is simple and includes the automatic selection of input variables followed by multivariable linear regression (MLR) model identification. The input variables are selected with the deterministic forward-selection algorithm. The selected variables are the ones that have influence on splashing while their regression coefficients give insight to the magnitude of their effect.

Keywords: steel making, basic oxygen furnace, splashing, control, variable selection, multivariable linear regression, forward-selection algorithm
