Advanced Data Mining for Process Optimizations and Use of AI to Predict Refractory Wear and to Analyze Refractory Behavior

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INTRODUCTION

The full digitization of industry promises significant efficiency gains. This development has started to have an impact on the operation in steel plants, when decisions are made based on traceable data.

This paper presents an approach to discover patterns in big data sets and applying methods of artificial intelligence (AI) for interpretation. The paper will present the use of AI to identify the main refractory wear mechanism in the hot spots and the use of AI to predict the refractory behavior. Further, we applied this intelligent system to analyze and compare different maintenance philosophies.

As example of the impact on daily operations in steel plants, we present the Daily Report, which provides all necessary key information when a refractory related decision is to be made.

The paper also examines and discusses the operational impact and future applications.

DISCUSSION

Industry 4.0

Definition

The three industrial revolutions of the past were all triggered by technical innovations: the introduction of water and steam powered mechanical manufacturing at the end of the 18th century, the division of labor at the beginning of the 20th century and introduction of programmable logic controllers (PLC) for automation purposes in manufacturing in the 1970s[1].