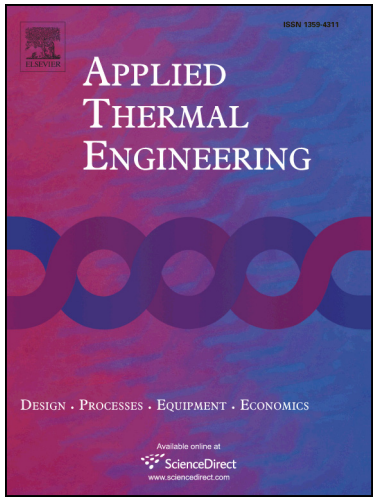

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An Energy Apportionment Model for a Reheating Furnace in a Hot Rolling Mill-A Case Study

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Abstract: To master the rules of energy consumption for different types of steel billet in a reheating furnace, this paper establishes an energy apportionment model based on the actual production performance and energy source data of a walking beam reheating furnace. And the cumulative energy segment is defined, and the time period, which spans from the billet loading time to the billet unloading time, is divided into *k* cumulative energy segments. The formula is discretized in integral form, and the energy allocation ratio is determined in every cumulative energy segment. A case study shows that the energy allocation is different due to differences in width of the billet, the production rhythm and steel grade. The higher the width and the slower the production rhythm are, the higher the energy allocation of the steel billet is, and vice versa. Meanwhile, the energy allocation is also different in individual steel grades. The results show that the energy allocation model has significant implications in the formulation of the steel billet loading plan, the control of the production rhythm and the energy assessment and can be used to achieve energy-lean operation.

Keywords: Reheating furnace; Energy consumption; Energy apportionment model; the cumulative energy segment

1 Introduction