

The Analysis of the Conditions of Flow in the Tundish Performed By a Numerical and Physical Method

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Abstract

The growing quality requirements for the steel final product, enforce continuation of the research for new technological solutions to improve steel metallurgical purity. These treatments are aimed at, among others, to eliminate the existing shortcomings continuous casting technology, in particular during the flow of steel through the tundish.

Studies of the liquid metal movement (hydrodynamic) in a real object are substantially precluded because of the objective difficulties (high temperature, opacity of the fluid and the size of metallurgical equipment), compared to their execution by the use of physical and numerical modeling. In presented study, two test methods for analyzing the flow and mixing of the liquid steel in the tundish was used. The calculation of fluid flow through the tundish was carried out using the program COMSOL Multiphysics.

Conducted experimental measurements and numerical calculations enable to estimate the steel flow field. The research was implemented by the RTD characteristics (Residence Time Distribution). Basing on such characteristics the percentage participation of dead volume flow, dispersed plug volume flow and well-mixed volume flow was calculated. Obtained results enable to evaluate in details the working conditions of the investigated object.

Figures used in the abstract

Figure 1

Figure 2



Figure 3



Figure 4