Numerical Analysis of the Flow Structure in the Continuous Casting Two-strand Tundish

M. Warzecha[1], J. Jowsa[1], A. M. Hutny[1], P. Warzecha[1], T. Merder[2]

[1]Czestochowa University of Technology, Czestochowa, Poland
[2]Silesian University of Technology, Katowice, Poland

Abstract

The increasing requirements of steel purity (defined by the number, size, distribution and composition of non-metallic inclusions) necessitate the reduction of inclusions in the steel product. Since during production processes the inclusions are lifted by the liquid steel, therefore it is necessary to analyze the structure of liquid steel flow, which is responsible for the transport and separation of non-metallic particles.

Since the experimental research performed on real plant during normal working conditions are limited due to the high temperatures and opacity of the system, the fluid flow structure has been analyzed based on the research done with mathematical modeling. To perform simulations of the fluid flow through the tundish, calculations were done by commercial code COMSOL Multiphysics.

Calculations were carried out for the water model of the investigated tundish, represented on a scale 1:3. Numerical calculations enable to estimate the fluid flow velocities, pahtlines and other parameters. Calculations were done for two different grids. Based on the results, the flow structure in the investigated tundish was obtained.

Figures used in the abstract

Figure 1

Figure 2

Figure 3

Figure 4