Conclusions

This paper summarizes different ways to alter the flow pattern in the steel continuous casting mold using electromagnetic forces, and the computational methods used to study them. Computational models always require rigorous validation with plant measurements before extending their predictions to meaningful parametric studies. To this end, nailboard velocity measurement and oscillation marks for free-surface profiling are simple but powerful practical ways to measure, the surface flow pattern. Due to the transient nature of turbulent flow, such measurements should be repeated many times for reliability.

Electromagnetic forces are just one of several parameters which control the flow pattern. Nozzle geometry, gas injection, and MHD must all be optimized together for a given speed and section size, so there is no universal best field configuration.

An accurate, validated computational model is a powerful and inexpensive tool to assist in designing MHD to help control the flow pattern in steel continuous casting. The RANS approach with MHD can be effectively used to predict and optimize the effect of magnetic field on transient velocity and level fluctuations in the mold to produce high quality steel.

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