

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Effect of Flow Rate Controller on Liquid Steel Flow in Continuous Casting Mold using Numerical Modeling**<sup>1</sup> KADIR ALI GURSOY, MEHMET METIN YAVUZ, Middle East Technical University — In continuous casting operation of steel, the flow through tundish to the mold can be controlled by different flow rate control systems including stopper rod and slide-gate. Ladle changes in continuous casting machines result in liquid steel level changes in tundishes. During this transient event of production, the flow rate controller opening is increased to reduce the pressure drop across the opening which helps to keep the mass flow rate at the desired level for the reduced liquid steel level in tundish. In the present study, computational fluid dynamic (CFD) models are developed to investigate the effect of flow rate controller on mold flow structure, and particularly to understand the effect of flow controller opening on meniscus flow. First, a detailed validation of the CFD models is conducted using available experimental data and the performances of different turbulence models are compared. Then, the constant throughput casting operations for different flow rate controller openings are simulated to quantify the opening effect on meniscus region. The results indicate that the meniscus velocities are significantly affected by the flow rate controller and its opening level. The steady state operations, specified as constant throughput casting, do not provide the same mold flow if the controller opening is altered. Thus, for quality and castability purposes, adjusting the flow controller opening to obtain the fixed mold flow structure is proposed.

<sup>1</sup>Supported by Middle East Technical University (METU) BAP (Scientific Research Projects) Coordination

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Date submitted: 01 Aug 2014

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