

Incompressible flow of the molten powder in meniscus zone of continuous casting mold

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Abstract - The aim of this work is to propose a mathematical model for describing the lubrication by the molten powder of the mold-strand gap in the vicinity of the meniscus. The molten powder is considered an incompressible, viscous fluid and the flow is modelled by the Reynolds equation. We study here the simplified case when the surface between the powder and the steel is supposed to be rigid. Some existence and uniqueness results are then established using the variational formulation of the problem. Finally, we analyze the pressure distribution of the molten powder film and we study the effect of the powder viscosity on the powder film pressure. We also discuss the relation between the molten powder and the solidifying shell of the strand.

Key words and phrases : molten powder, continuous casting mold, Reynolds equation, variational formulation, pressure distribution

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