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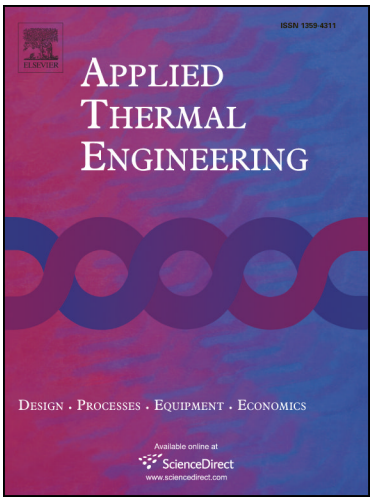

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Influence of process parameters on solidification length of twin-belt continuous casting

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Abstract

A temperature based Finite Element Model is developed to estimate the evolution of temperature, shell growth profiles and solidification length of a solidifying ingot in a twin-belt caster. The model is based on the 2-D slice which travels through the caster with time. A transient energy equation is solved with the incorporation of thermal boundary conditions which depends on the position of the slice. The latent heat released during the solidification is incorporated through the effective specific heat method. The convective heat flux due to the belts, and dam blocks inside the caster and from spray cooling outside the caster are applied as boundary conditions. The belt heat flux is estimated by incorporating thermal resistances of the cooling water, the belt, the coating, the interface between belt and ingot, the solidifying shell and the melt. At the interface between belt and ingot, the gap dependent heat transfer is considered which is based on the combined mode of radiation and conduction. The amount of gap is calculated iteratively by considering the thermal contraction of the solidifying ingot. The dam block heat flux is estimated by approximating it as a semi-infinite body. The model is applied to the state of the art industrial twin-belt contin-

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