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Development of an Optimized Strand-EMS for Improved Microstructure and Reduced Segregation in Continuous Casting

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In recent years, there has been increasing interest in enhancing the efficiency and product quality of the continuous casting process in the steel industry. The formation of coarse columnar grains and macrosegregation during continuous casting negatively affects the mechanical and physical properties of the final product. Therefore, developing techniques to control the microstructure and maintain a uniform composition distribution is essential. In this study, Strand Electromagnetic Stirring (S-EMS) technology was applied to improve the solidification behavior and refine the microstructure in the continuous casting process. The results showed that increasing the S-EMS current enhanced the formation of equiaxed grains and reduced grain size. However, a tendency for increased local macrosegregation was also observed. As a result, this study identified the optimal S-EMS application conditions to maximize equiaxed grain formation and grain refinement while minimizing compositional segregation.

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