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论文

高速钢复合轧辊连铸复合过程温度场的数值模拟 II. 铜结晶器法

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摘要： 以Fluent 6.3为计算平台, 采用数值模拟的方法研究了铜结晶器下浇注温度和拉坯速度等参数对高速钢复合轧辊连铸坯内温度分布的影响, 探求了适宜的连铸工艺条件, 在此基础上进行了拉坯实验. 结果表明, 拉坯速度和浇注温度是决定铜结晶器下辊坯能否顺利拉出和界面结合质量好坏的两个重要参数. 提高浇注温度和增大拉坯速度都利于实现两种金属之间的冶金结合. 但随着高速钢浇注温度的提高和拉坯速度的增大, 辊坯的液穴深度逐渐增长, 离开结晶器时的坯壳减薄, 拉漏的几率增大.拉坯速度和浇注温度之间存在着严格的匹配关, 适宜的浇注温度位于 1873---1923 K之间, 适宜的拉坯速度位于0.3-0.5 m/min之间. 数值模拟和实验结果都表明, 在参数匹配得当的情况下, 采用铜结晶器连铸法可以制备出高速钢复合轧辊.

关键词： 高速钢复合轧辊　连铸复合　温度场　复合界面

NUMERICAL SIMULATION ON TEMPERATURE FIELD IN HIGH SPEED STEEL COMPOSITE ROLL DURING CONTINUOUS POURING PROCESS FOR CLADDING
II. Copper Mould Method

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Abstract: The effects of pouring temperature and casting speed on temperature field in high speed steel composite roll billet under copper mold and the selection of optimistic continuous casting technique parameters were studied by use of numerical simulation method based on Fluent 6.3 software. At the same time, the pouring billets experiment was also executed based on the simulation results. The results indicate that the casting speed and pouring temperature are the most important parameters to determine that a high speed steel composite roll billet can be well poured or not and the quality of interface of bimetal composite is better or not. Increases in pouring temperature and casting speed are conducive to metallurgical bond between the two metals, but their moreincreasing will make the depth of melting zone increase, the thickness of solidifying shell decrease and the feasibility of breakout increase. The simulated appropriate pulling temperature and casting speed are about 1873—1923 K and 0.3—0.5 m/min, respectively, which are proved by experiment results.

Keywords: high speed steel composite roll continuous pouring process for cladding temperature field interface of bimetal composite

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