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Cover Photo:

The austenite of duplex stainless steels is always considered to undergo nearly no precipitation/phase transformation upon annealing, whereas the ferrite is considered the active transforming phase. Here, it is shown that when deformed duplex stainless steels are annealed between 900 and 1050 °C, the ferrite will undergo nearly no phase precipitation, and the austenite phase becomes the transforming phase. More details can be found in the article by Kin Ho Lo on page 1571.

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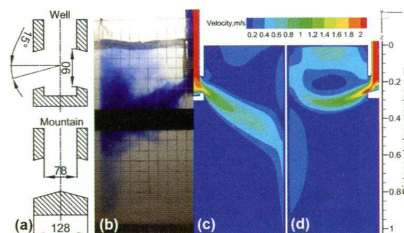
Contents

Full Paper

L. Li,* X. Wang, X. Deng, X. Wang,
Y. Qin, and C. Ji

**Application of High Speed
Continuous Casting on Low Carbon
Conventional Slab in SGJT**

1490

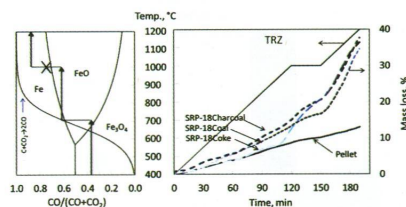


Comparison of fluid flow pattern between well and mountain-bottom SEN is developed by water model and mathematical simulation at 2.3 m min^{-1} . Due to a weaker upward recirculation, the well-bottom SEN is more suitable for the sound high speed continuous casting.

P. Kowitzarankul,* A. Babich, and
D. Senk

**Reduction Behavior of Self-Reducing
Pellet (SRP) for Low Height Blast
Furnace**

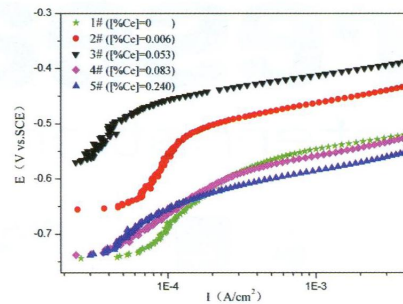
1501



The reduction behaviors of self-reducing pellets (SRPs) under the thermal reserve zone (TRZ) simulated conditions have been investigated with the context of their possible use in the small BF. The crushing strengths and properties of SRPs after both methods of hardening, fire-hardening, and cement-bonded curing, were investigated as well.

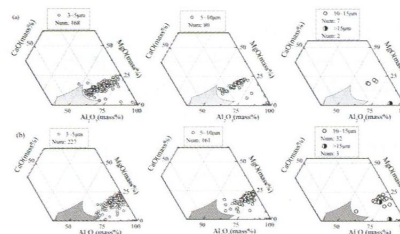
Contents

Y.-Q. Liu, L.-J. Wang,* and K. C. Chou
Effects of Cerium on Resistance to Pitting Corrosion of Spring Steel Used in Fasteners of High-Speed Railway
 _____ 1510



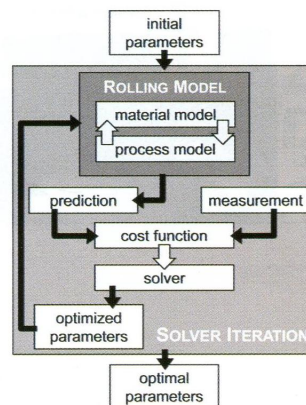
The potentiodynamic polarization test was employed to investigate the effects of rare earth addition on the resistance to pitting corrosion of spring steel. The resistance to pitting corrosion was improved by decreasing the initiation of the pitting corrosion. However, excessive amount of Ce would result in the decrease of resistance to pitting corrosion. The optimal composition of Ce in this study was 0.053%.

D. Yang,* X. Wang, G. Yang, P. Wei, and J. He
Inclusion Evolution and Estimation during Secondary Refining in Calcium Treated Aluminum Killed Steels
 _____ 1517



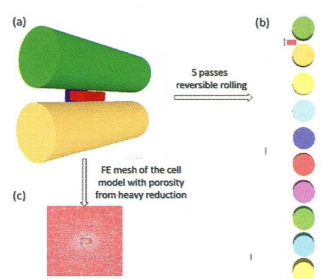
The present research aims at the industrial investigation of inclusions in ladle furnace treatment. It is expected that a clear idea about evolution of inclusions in the liquid steel during secondary refining can be provided to plant for producing high cleanliness LCAK steels. A thermodynamic model that predicts the composition of inclusions in calcium treated, aluminum killed steels is also presented.

J. Lohmar,* M. Bambach, G. Hirt, T. Kiefer, and D. Kotliba
The Precise Prediction of Rolling Forces in Heavy Plate Rolling Based on Inverse Modeling Techniques
 _____ 1525



The aim of this paper is to obtain valid material parameters for semi-empirical material models directly from industrial rolling operations. The principle idea here is to use inverse modeling techniques. Sound roll force predictions thus can be enabled without conducting time and cost intensive laboratory tests. The validity of the proposed concept is demonstrated using demanding test cases.

X. K. Zhao, J. M. Zhang,* S. W. Lei, and Y. N. Wang
Finite-Element Analysis of Porosity Closure by Heavy Reduction Process Combined with Ultra-Heavy Plates Rolling
 _____ 1533



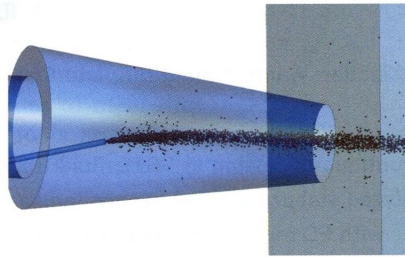
In this paper, a two-step strategy is preceded using THERCAST3D to obtain the information of solidification firstly. Then, a software FORGE3D is used to simulate the heavy reduction and ultra-heavy plates rolling. The aim is to find out the closing behavior of porosity voids in slabs in the process of heavy reduction combined with low compression ratio rolling.

Contents

A. Vuokila,* M. Riihimäki, and E. Muurinen

CFD-Modeling of Heavy Oil Injection into Blast Furnace –Atomization and Mixing in Raceway-Tuyere Area

1544

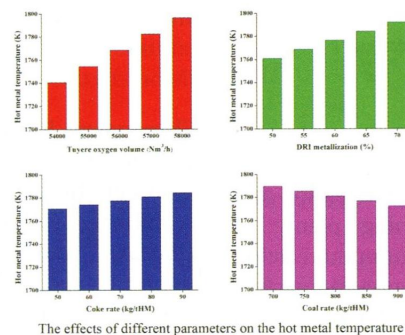


Auxiliary fuel injection into the blast furnace has many benefits in blast furnace operation. Increase of oil injection levels has proven challenging. CFD model is developed to study injection of heavy oil in terms of atomization and mixing. Properly designed nozzle is shown to improve mixing significantly allowing higher injection levels.

S.-L. Wu, M.-Y. Kou,* J. Sun, W. Shen, and K.-P. Du

Analysis of Operation Parameters Affecting Hot Metal Temperature in COREX Process

1552

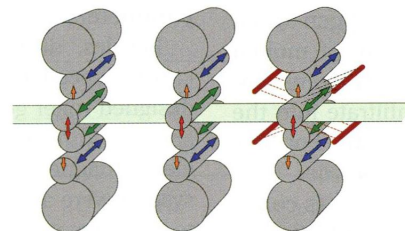


A calculation model has been developed to study the relationship between parameters and hot metal temperature. The results show that for every 10K increase in hot metal temperature, the tuyere oxygen volume, metallization, fuel rate, and coke rate should increase by 714.3 m³h⁻¹, 6.4%, 90.9 kg tHM⁻¹, and 29.4 kg tHM⁻¹, respectively, while the coal rate should decrease by 115.7 kg tHM⁻¹.

X.-C. Wang,* Q. Yang, Z.-Y. Jiang, and J.-W. Xu

Research on the Improvement Effect of High Tension on Flatness Deviation in Cold Strip Rolling

1560



A roll-strip-tension coupling model with both accuracy and efficiency is established for cold rolling process with tension. Then the self-correction effect of front tension and the attenuation effect of back tension on flatness deviation are analyzed by the calculation results of the model, and corresponding quantitative correction coefficient and attenuation coefficient are obtained.

K. H. Lo

Deformation-Induced Role Switching Between Ferrite and Austenite in the Precipitation of Carbides at High Temperatures in Duplex Stainless Steels

1571



The austenite phase of duplex stainless steels (DSSs) is always considered to undergo nearly no phase transformation or precipitation upon annealing. The ferrite phase, on the other hand, is always regarded as the active transforming/precipitating phase. However, it's been found that if DSSs are plastically deformation and annealed between 900 and 1050°C, then the situation will be totally opposite.