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Characteristic analysis of mold level fluctuation in continuous casting Based on Wavelet Transform

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The mold level fluctuation plays an important role in controlling the quality of the slab. Abnormal fluctuations can easily increase the frequency of entrainment slag, directly affecting the proportion of defects in hot-rolled and cold-rolled steel sheets. In addition, it will affect the uniform growth of the shell of hypo-peritectic steel and raise the incidence of center segregation and internal cracks.
As a popular signal processing technique in the communication industry, the wavelet transform offers special benefits when processing non-stationary signals. The wavelet transform can perform accurate time-frequency analysis on mold level fluctuation with multiple influencing and complex instantaneous factors. The feasibility of the proposed method has been verified using a water model and compared with traditional analysis methods (significant wave height, Fourier transform). The industrial data of the mold level fluctuation was analyzed using wavelet transform. It was discovered that abnormal fluctuations would be caused by clogging on the submerged entry nozzle, biased molten steel flow, and abrupt changes in the stopper rod position and casting speed in the continuous casting of the IF steel. This information is difficult to identify using traditional methods. Moreover, the bulging can be quickly identified using the wavelet transform method in the mold level fluctuation of the peritectic steel. Thus, it is possible to precisely identify sources of abnormal fluctuations and thereby control them by using the wavelet transform in the analysis of mold level fluctuation.
Furthermore, it is also expected to be used for online prediction of abnormal fluctuations and quality prediction of slabs from the characteristics of mold level fluctuation based on the wavelet transform method.

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