

Modelling of Width Control for Hot Strip Mill with FEM Analysis

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ABSTRACT

In hot strip mill, large width reduction has been required due to the reduction in the number of standard width size of continuous casting slab. Roughing stand deforms a slab to width direction by vertical edger. Also to thickness direction by horizontal mill. Width control by vertical edger rolling is important process for improving width accuracy and reducing width fluctuation by unsteady deformation in head and tail part of the slab etc.. However, large width reduction only with vertical edger is difficult to achieve because width rolling by vertical edger is ordinary applied only at forward passes in roughing stand. One of the way to achieve the large width reduction only with vertical edger is to reduce width not only at forward passes but also at reverse passes. This is called VVH rolling because of the order of the rolling (vertical edger rolling at reverse pass, vertical edger rolling at forward pass, then horizontal mill rolling). However, behaviour of width deformation in the VVH rolling is different from ordinal width rolling.

Thus, three-dimensional width deformation of a slab in the VVH rolling was analysed by FEM (Finite Element Method). The influence of various conditions such as slab width, slab thickness, distribution pattern of width draft between forward and reverse passes were investigated and their deformation phenomena were studied. As an analysis result, the distribution pattern of width draft which width draft at forward pass equals to that at reverse pass is better for the width at head and tail part while the VVH rolling. Furthermore, we compared analysed results with actual rolling results. The optimal distribution pattern of width draft between forward and reverse passes in analysis result was evaluated.

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