

Horizontal Uniaxial Noncontact Positioning Control for a Magnetic Levitated Steel Plate (Basic Research during Conveyance)

by

Shinya HASEGAWA^{*1}, Yasuo OSHINOYA^{*2} and Kazuhisa ISHIBASHI^{*3}

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Abstract

In the thin steel plates which are used in many industrial products, including those of the automobile industry, flaws on the plate surface and peeling during the surface treatment process are induced due to the use of many rollers in the conveyance process. These lead to deterioration of the quality of the plate surface. In order to solve this problem, the authors proposed a magnetic levitation control method for rectangular thin steel plates, the circumference of which is not supported and which is most likely to generate elastic vibration, and reported the feasibility of the method. However, there is the risk that side slipping and dropping of the plate may occur due to inertial force, since there is no restraint in the horizontal direction when the plate is supported without contact only in the vertical direction. In this report, we examine the change in the levitation performance during conveyance, with the addition of positioning control in its horizontal direction.

Keywords: Electromagnetic Levitation Control, Steel Plate, Positioning Control, Elastic Vibration, Digital Control, Optimal Control, Sliding Mode Control.

* 1 : Graduate Student, Course of Mechanical Engineering.

* 2 : Associate Professor, Department of Prime Mover Engineering.

* 3 : Professor, Department of Mechanical Engineering, School of Engineering II .