Vibration isolation control of electromagnetic levitation system for thin steel plate (Basic research on rigid steel plate)

by

Shinya HASEGAWA[*1], Yasuo OSHINOYA[*2] and Kazuhisa ISHIBASHI[*3]

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Abstract

In thin steel plates used in many industrial products, flaws on the plate surface and peeling during a surface treatment process are induced due to the use of many rollers in the conveyance process. These lead to the deterioration of the quality of the plate surface. Electromagnetic levitation techniques can solve many problems in the conveyance modes of sheet steel. The authors have proposed a magnetic levitation control system for maintaining the relative distance of the plate surface and the electromagnet, and carried out an experiment on digital control. In this study, the equipment was designed so that electromagnets, which are used for the magnetic levitation of a steel plate, vibrate vertically. For basic research, a controlled object was assumed to be a single-degree-of-freedom model and PD control was used as the control method. The vibration isolation effect observed in the steel plate was confirmed by experimentation and simulation.

Keywords: Steel plate, electromagnetic levitation, vibration isolation, rigid body, PD 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