

# Effect of Magnetic Force Applied to Edge of Steel Plate on Its Vertical Vibration

by

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## Abstract

In a factory, the continuous thin steel plate subjected to iron and steel processes supported by rolls tends to cause plate vibrations that lower the quality of the surface finish. In the plating process, the steel plate is conveyed 20-50 m in the vertical direction for drying, during which the steel plate is negligibly supported by rollers. Therefore, plating nonuniformity caused by vibration prevents the increase in productivity. To solve this problem, we have developed a noncontact guide system for parts of the steel plate at which its traveling direction changes by applying an electromagnetic force from the edge direction of the thin steel plate, and experimentally examined the effectiveness of the system. However, the theoretical examination has not been sufficiently carried out. In this paper, the effect of magnetic force to the edge direction of a steel plate by an electromagnet on planar direction vibration was examined using an one-degree-of-freedom system.

**Keywords:** Steel Plate, Noncontact Guide, Electromagnet, Magnetic Field, Spring Coefficient, Damping Coefficient.

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