The interaction forces in magnetic suspension systems of vertical type (MSVT)

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In this article, the vertical and horizontal forces of interaction of permanent magnets in a magnetic suspension (support) system of vertical type (MSVT) are considered. The magnetic support system contains multi-row magnetic strips, which have alternating polarity.

The magnetization vector, $\vec{M}$, is directed horizontally, as opposed to classical support systems where $\vec{M}$ is directed vertically. The results of the comparison of the vertical and lateral forces for the classic magnetic system of horizontal type (MSHT) and the MSVT are presented too. An effectiveness factor, $\mu_{eff} = f_z / mg$, is adopted (where mg is the weight of the magnets per unit length) and is used as the principle criterion for comparison [1]. In this paper, it is shown that when using an MSVT, when the vertical displacement of the moving part of the support system causes the vertical force, f_z , to reach its maximum, the corresponding destabilizing lateral force f_y is at its minimum.

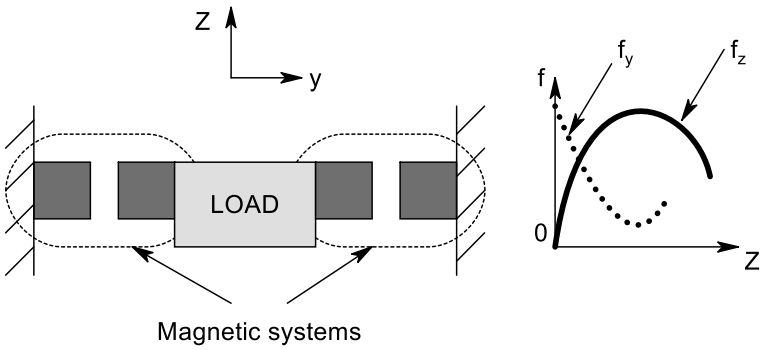

Figure 1. The scheme of vertical type of magnetic suspension (MSVT)

[1]. Frishman E. A Stepped Magnetic Suspension System (SMSS). The Applied Computational Electromagnetics Society Journal. Vol.32 No. 8, p.731-735.