Contribution ID: **757** Contribution code: **WED-PO2-510-05** Type: **Poster**

Influence of Traction Rod on the Dynamic Performance of High-temperature Superconducting Maglev Vehicle

Wednesday, 17 November 2021 10:30 (20 minutes)

Abstract: High temperature superconducting (HTS) maglev, which uses the magnetic flux pinning effect to realize the suspension and guidance, has attracted wide attention in the field of transportation due to its advantages of self-stabilizing suspension, high efficiency, and energy saving. As the connection components between the bogie and car body, and the transmission components of traction and brake power, traction rods not only satisfy the relative motion between car body and the bogie, but withstand the pounding of bogie relative to body as well. There is a great need to study the influence of traction rod parameters on its dynamic performance, includes its length, stiffness and arrangement, which can prolong the life of the traction device and running stability. In this paper, a rigid-flexible coupled dynamics model of the maglev vehicle, considering the traction rod as a flexible body, is established by means of multi-body dynamics software Universal Mechanism (UM). And the influence of the traction bar on the dynamic performance of the vehicle on straight line and curve line is analyzed. The analysis results provide a theoretical basis for improving the arrangement form and parameter selection scheme of the traction rod.

Key Words: HTS Maglev ; traction rod ; rigid-flexible coupled simulation ; dynamic performance ; curve passing performance

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Session Classification: WED-PO2-510 Maglev and Levitation II