MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1298** Type: **Poster Presentation**

Thu-Mo-Po4.13-04 [100]: Dynamic Response Analysis of Superconducting EDS Train Based on Vehicle/Guideway Coupling Dynamics

Thursday, 26 September 2019 08:45 (2 hours)

As a promising candidate for future high-speed transportation, the electrodynamic suspension (EDS) train has drawn considerable attention. The dynamic response of EDS train to eternal excitations could make a great difference on its operating performance, especially in high speed range. Thus this paper focuses on the vehicle dynamics of EDS train, which is separated into two subsystems i.e., train subsystem including superconducting magnets and guideway subsystem including modular function units of the guideway. The emphasis of this paper is therefore to build a dynamic model that can accurately simulate above two subsystems and the interaction between them. The EDS train was modeled as a multibody system with 99 degrees of freedom in which three vehicles are connected by two articulated bogies. The force–gap model with a proportional-derivative controller was adopted to simulate the interaction between superconducting magnets and modular function units. It is confirmed that the proposed model could duly reproduce the dynamic interaction between the train subsystem and guideway subsystem. In addition, the application of proposed model to investigate the effect of track irregularity on EDS system is also reported. The results of this paper could be used for the evaluation and optimization of the dynamic performances of a high-speed superconducting EDS system.

Keywords: EDS train; dynamic response; coupling dynamics

- List item

Primary author: Dr YAN, Zhaoying (Southwest Jiaotong University)

Co-authors: Dr YANG, Wenjiao (Southwest Jiaotong University); Ms LI, Gang (Southwest Jiaotong University); CAI, Yao (Southwest Jiaotong University); Ms WANG, Yiyu (Southwest Jiaotong University); MA, Guangtong (Southwest Jiaotong University)

Presenter: Dr YAN, Zhaoying (Southwest Jiaotong University)

Session Classification: Thu-Mo-Po4.13 - Levitation and Magnetic Bearings III