## **3D Dynamic Response Of Short Stator Maglev Train-Track-Bridge System:** Verification Of Numerical Modelling Using Monitoring Data

## Yang LU, Su-Mei WANG, Shuo HAO, Gaofeng JIANG, Qi ZHU, Yi-Qing NI

The desired suspension gap of the short stator maglev train is between 8 and 10mm. With that limited gap, the slight vibration of the train body and the displacement of the track system may lead failure of suspension. So, the study of the dynamic characteristics of the maglev train-track-bridge system is becoming particularly vital. In this paper, an online monitoring system as-sociated with a 3D numerical model was used to analyze the dynamic inter-action of short stator maglev train-track-bridge system. The online monitoring system was designed and installed on a maglev testing line in Shanghai, from which the acceleration data of train body, maglev bogie, track and bridge at different operating speeds was collected. In the numerical model, a 3D multi-degree-of-freedom (MDOF) maglev model considering proportion-al-integral-derivative (PID) control algorithm was developed. The model was built by ANSYS and UM with a train body supported by the bogie system using spring-dashpot unit, while the guideway was considered as a simply supported beam with F-shape rail. The numerical model was firstly verified by comparing with the monitoring data. It shows that the simulation model is able to accurately predict the dynamic response of maglev system. Subsequently, both the monitoring data and the simulation results are presented to analyze the dynamic interaction of maglev train-track-bridge system. The results show that the dynamic response of train-track-bridge-system will be more violent with the increase of train speed.