

VEHICLE-BRIDGE INTERACTION DYNAMICS

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ABSTRACT

Starting from the mid-1990s,¹ the subject on vehicle-bridge interaction dynamics has been booming, partly due to the widespread construction of highspeed railways in the world. Major concerns in this area include: (1) efficient simulation of the interaction between the moving vehicle and bridge for the purpose of analysis, (2) optimal design of span length for highspeed railway bridges to reduce the bridge vibration, (3) riding comfort of passengers during the movement of the highspeed trains, (4) safety of the vehicle-bridge system under the external shaking of earthquakes and winds, (5) effect of infrastructure such as ballast, sleepers and fasteners on the track system, (6) detection of dynamic properties of the sustaining bridge by moving test vehicle, and so on. Particularly, the technique of using a moving a test vehicle to detect the dynamic properties (frequencies, mode shapes, damping ratios, damages, etc.) of sustaining bridges has become an interesting topic of research most useful to highway bridges,³ as well as on railway bridges. Such a technique has been referred to as the indirect method for bridge measurement, since it does not require the vibration sensors to be mounted on the bridge, but only a small number of sensors on the test vehicle. It was also renamed as the vehicle scanning method for bridges for its straight conveyance of the meaning involved.^{2,3} In this mini-symposium, we welcome all researches on the vibration and detection aspects of both highway and railways bridges, but not restricted to the items mentioned above.

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