

Dynamic responses of railway suspension bridges under moving trains

Xia, H., Xu, Y.L., Chan, T.H.T., Zakeri, J.A.

This paper describes a numerical simulation technique that is used to investigate a dynamic train-long suspension bridge interaction. A three-dimensional finite element model is used to represent a long suspension bridge. Each vehicle of the train is modeled by a γ -degrees-of-freedom dynamic system, including two bogies with four wheel-sets. By applying a mode superposition technique to the bridge and taking the measured wheel and track irregularities as known quantities, the degrees of freedom of the bridge-train system are significantly reduced and the coupled equations of motion are efficiently solved. The proposed formulation and the associated computer program are then applied to a real long suspension bridge. The dynamic responses of the bridge and the train vehicles are computed and compared with the limited measured data and the results are satisfactory. © Sharif University of Technology.