

# Recent advances in railway noise and vibration simulation and measurement

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## Abstract

Railways considerably contribute to boosting transportation in metropolitan cities. However, its induced vibrations might cause serious problems in surrounding environments. In order to ensure the safety of building, residents and sensitive instruments, Finite Element Methods (FEM) simulations is usually implemented. The FEMs can give an interesting support on the prediction of vibrations induced by traffic and also on the design of mitigation countermeasures. The webinar focuses on the challenges and possibilities provided by numerical modelling on the prediction and mitigation of vibrations induced by railway traffic. Once very large domains need to be considered, the potentialities of 2.5D approaches for dealing with the problem are discussed. Moreover, the ability of this kind of models for dealing efficiently with the train track ground building dynamic interactions is highlighted.

After the discussion about the modelling strategies, their ability for dealing with real situations is evaluated through the comparison between predicted and measured results. A comprehensive discussion about the efficiency of various kind of solutions is performed, with focus on the potential impact that can be achieved on the vibration levels inside buildings close to the railway infrastructures.

## Highlights

- A review on the various approaches on the Noise and Vibration (N&V) simulation in railways
- Numerical modelling techniques
- The Road map to become a researcher in the field of N&V simulation
- Challenges and possibilities provided by numerical modelling
- 2D, 2.5D and 3D approaches
- How train--track--ground-building dynamic interactions is considered
- How accurate are simulation compared with real situations?
- Predicted and measured results
- Potentialities of the simulation techniques on the design of mitigation measures are explored
- Introduction to Noise and vibration measurement techniques

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