

New model predicts high-speed rail vibrations

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Scientists have developed a new model to predict how much a new high-speed railway would shake the ground around it, and the effect this could have on those living near the line.

New high-speed train lines are likely to be built as cities grow, but the environmental impact of these new lines needs to be carefully considered.

One problem planners have foreseen is vibrations in the ground caused by trains passing at speed. These vibrations can be transmitted into walls and through floors of buildings near the railway lines.

While these vibrations would probably be too small to damage buildings, they could disrupt the work of buildings such as a hospital by affecting

sensitive equipment.

Assessing the impact of a high-speed line requires expensive and impractical [vibration](#) tests, but scientists from Edinburgh and Belgium think they have found a way of taking accurate measurements for free.

'The big challenge in this area is that vibration assessment is a very slow process; it's very computationally demanding so previously some models took days or weeks. I was developing a new technique to predict this vibration,' explains Dr David Connolly of Heriot-Watt University, lead researcher on the project. 'My tool is instant.'

The new study, published in Soil Dynamics and Earthquake Engineering, used existing data on [soil properties](#) from NERC's British Geological Survey to build a computer model to predict how a new high speed line will affect the ground and surrounding buildings.

'The way I designed it is to use existing data. A big challenge with performing one of these vibration assessments is that you don't want to have to spend time and money investigating soil properties, so this tool can use historic or existing soil records and then build a picture of [soil](#) and use a machine learning approach to build a vibration report,' says Connolly.

The team tested their model on high-speed lines in Belgium and on HS1, the high-speed line running through the Channel Tunnel.

'Predicting vibrations is important because as high-speed lines become more prevalent they will begin to affect more people because they will begin to be planned through more densely populated areas,' Connolly concludes.

Provided by PlanetEarth Online

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