Improving the accuracy of Seismic Ground Motion Estimation along Railways by Integrating Observed and Estimated Data

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In the event of an occurrence of earthquake, railway companies suspend trains as soon as possible, considering the seismic intensity. Subsequently, if necessary, they inspect railway facilities based on seismic ground motion (SGM), which is spatially discrete, observed along the railways. In some cases, time required for safety inspections may be considerable depending on the circumstances. Estimating spatially continuous SGMs is one of the key technologies for reducing inspection time, since the early resumption of train operations after earthquakes has become a significant issue recently. In this study, we first describe differences in SGM between measured data and true data in conventional systems and then propose a method to estimate spatially continuous SGMs by integrating observed data and estimated data. Furthermore, a case study is presented in which the proposed method is employed to estimate SGMs along a virtual railway, assuming additional data observed by seismometers along a railway.