

# Extensions of OpenSees for Bridge Management Applications

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## Abstract

The open source finite element software framework OpenSees, developed specifically for earthquake simulation, is extended with features that enable the framework to be used for highway bridge management. At the core of the bridge management system are scripts, written in the Tcl programming language, that simulate bridge response due to live loading of vehicle traffic. Additional Tcl scripts are developed for rating calculations in order to assess and prioritize deteriorating bridges for rehabilitation or replacement. The network programming features of Tcl give the system access to databases for conducting internet-based simulation. The open source environment of OpenSees is ideal for experimenting with and developing advanced bridge rating methodologies based on state of the art structural analysis and reliability methods.