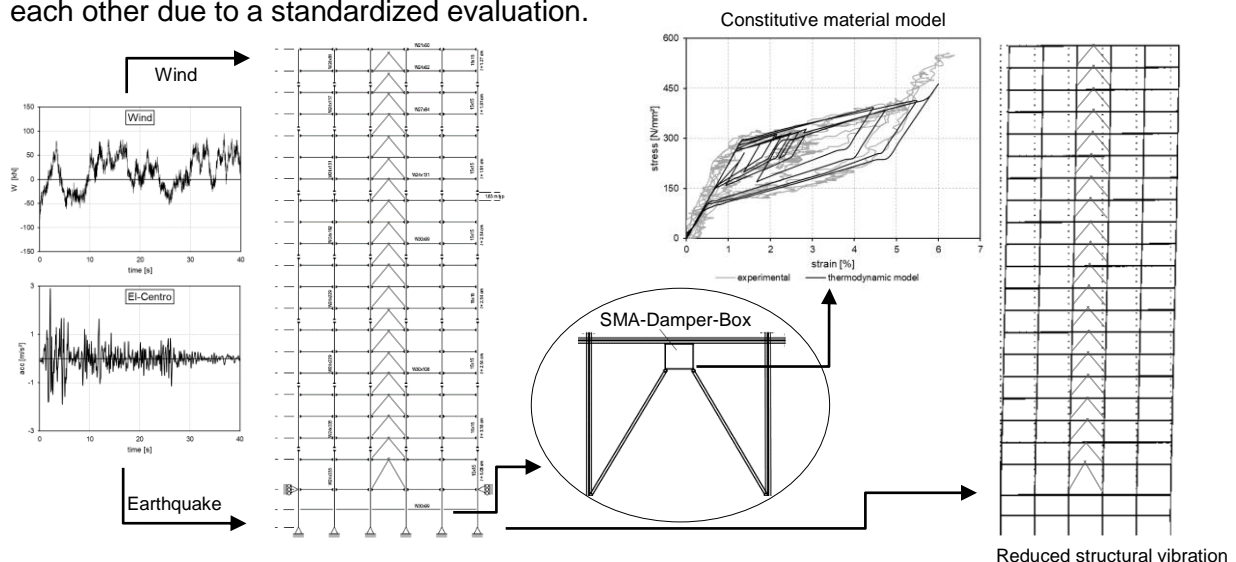


Master Thesis

Effects of Shape-Memory-Alloy Dampers on structural vibrations

Background

Shape memory alloys (SMAs) are metallic smart materials with the special ability to recover their original shape without any residual elongation after stress induced deformation, with even over 8% strain. Conventional anti-seismic devices, such as metallic steel dampers, need to be replaced after each strong dynamic excitation caused by the non-residual plastic deformation. In contrast, SMA dampers can recover their shape and remain operative for further structural vibration. In the scope of a current DFG funded research project, in collaboration with the Tsinghua University (Peking, CN), a constitutive macro-model for SMAs is being developed to simulate the dynamic material behaviour. The effect of dampers on structural vibrations can be assessed numerically by implementing the material model into benchmark building models. The purpose of the benchmark buildings is to compare different kinds of damping systems with each other due to a standardized evaluation.



Aim

The main task of this work is the numerical implementation of the developed constitutive model for SMAs into given nonlinear benchmark buildings and the execution of optimization calculations using the MATLAB-Simulink program software.

Contact