**A finite element model updating application based on experimental vibration data**

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**Abstract.**

This paper proposes a Finite Element (FE) model updating application using experimental vibration data. The method is performed on a slab bridge. The FE bridge is modelled in Matlab, taking into account the minimum number of support points for boundary conditions as well as the maximum meshed element size. The prototype of the slab bridge is set up in the laboratory. The experimental vibration data is collected using fifteen accelerometers, National Instruments (NI) equipment, and a laptop. The dynamic characteristics of the experimental slab bridge such as natural frequencies and mode shapes are analysed using vibration data and used as an objective goal for updating the FE model. The updating approach is based on novel optimization techniques such as Particle Swarm Optimization (PSO), Genetic Algorithm (GA), Cuckoo search, etc. The modulus of elasticity, support distances, and plate dimensions are considered to be updated parameters. The experimental results indicate that the updated parameters are reasonable and have a clear physical meaning.

**Keywords:** Model updating; Elastic modulus; FEM; Experimental Analysis; Accelerometers, SHM.