

**MODEL-BASED HEALTH MONITORING OF STRUCTURES
- APPLICATION TO THE I40-HIGHWAY-BRIDGE**

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ABSTRACT

The paper investigates the capabilities of model-based damage detection and health-monitoring with respect to a large scale structure. The goal is to locate and quantify the damage from measured vibration test data. The damage detection procedure is basically an identification approach using modal data. The resulting inverse problem usually is ill-posed, so that regularization methods must be used to obtain a reliable solution. Due to the high number of parameters, special attention is paid to the reduction to a much smaller parameter subset for which the problem finally is solved. The method is applied to the I40-highway bridge in New Mexico which was experimentally investigated in undamaged and damaged state by a research team from the Los Alamos National Laboratory, NM, USA. It is shown that the method presented here is able to localize and quantify the damage successfully.