AN INVERSE METHOD FOR LOCAL STIFFNESS IDENTIFICATION BASED ON SCANNING LASER MEASUREMENTS

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Abstract. *The basic principle of inverse methods for the identification of material model parameters is to compare measured observations on a test specimen in a given test setup with virtual observations computed with a numerical model of the test specimen. The unknown parameters in the numerical model are updated until the computed observations match the measurements. Many inverse methods have already been proposed for the identification of uniform material properties in beamlike or plate like specimens based on a limited amount of observations. However, if the material properties in the specimens vary from point to point, more measured observation information is necessary. This paper presents an inverse method that can identify the local bending stiffness distribution in test beams based on the observation of the curvatures of vibration mode shapes. The test beams are freely suspended and the mode shapes are activated by acoustical excitation. The curvatures of the mode shapes are measured with a scanning laser and compared with curvatures computed with a finite element model of the test beams. The presentation will discuss the principle of the used inverse method, the experimental test set-up, the numerical model and give identified stiffness distributions results on composite material test beams. The presentation will end with some conclusions about the results and suggestions for future research.*

Keywords*:*