

OMA testing by SLDV for FEM Updating

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ABSTRACT

Operational Modal Analysis (OMA) is a technique for identification of modal parameters by measurement of only the system's response. On many lightweight structures, such as load-speaker cones and disk drive read/write heads, is impossible or impractical to measure the input forces. Another characteristic of lightweight structure is their sensitivity to mass loading from sensors. The Scanning Laser Doppler Vibrometry (SLDV) allows response measurements to be taken without mass loading. One disadvantage of OMA testing compared to tradition input output modal testing is the OMA mode shapes are un-scaled. This means that the mode shape obtained from an OMA test can not used for analytical structural modification studies. However, the un-scaled mode shapes from an OMA test can be used to update a Finite Element Model (FEM). The updated FEM can then be used to analytically predict the effect of structural modifications. This paper will present the results of an OMA test performed on a simple plate and motor in operating conditions. The un-scaled mode shapes from this test will be used to update a FEM model of the system. The updated FEM model will be then be used to predict the effect of attaching a mass to the plate. The shapes predicted by the FEM for the modified system will be compared to a second OMA test on the modified system