

# CORRECTION TECHNIQUES OF MASS-LOADING EFFECTS OF TRANSDUCERS IN MODAL TESTING

Guoyi Ji<sup>1</sup>, Won-Jee Chung<sup>2,#</sup>, Choon-Man Lee<sup>2</sup> and Dong-Keun Park<sup>2</sup>

<sup>1</sup> Institute of Vibration Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, P. R. China

<sup>2</sup> Machine Tool Research Center, Changwon National University, Changwon, Korea

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## ABSTRACT

Modal testing and analysis is a primary tool for obtaining reliable models to represent the dynamics of structures. When a structure is tested in order to collect measured data in modal testing, we usually use attached accelerometers to pick up the response data. Change in modal parameters due to the mass of transducers in modal testing is a well-known problem. The disadvantages are the shift of measured modal frequencies and the change of modal shapes, which can cause inaccurate results in further analysis. Modal analysis methods in frequency domain are based on a set of measured frequency response functions (FRF). This paper reveals the relationship between the measured FRFs with extraneous mass of transducers and the accurate FRFs with no extraneous mass when multi-transducers are mounted on the structure. The relationship between the measured FRF and the exact FRF depends on the extraneous masses of transducers, a row of exact FRFs and a column of measured FRFs. The methods of mass cancellation in the test of moving hammer or moving transducer are proposed. We also give a solution to cancel the mass effects of multi-transducers. Digital simulations show that the methods of mass cancellation to FRF proposed in this paper can reach good results near resonance frequencies.

Figure 1 shows the correction results compared with measured and theoretical FRF using correction equation proposed in this paper.

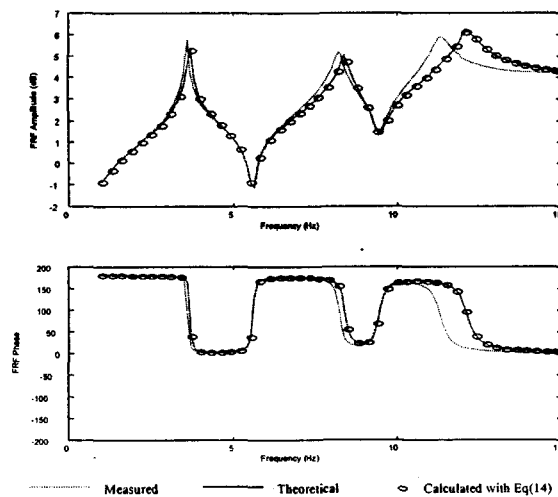


Figure 1 Correction results using the methods proposed in this paper