

Abstract

The modal identification algorithm in extraction structural modal parameters from ambient response were investigated in this study. The random data from ambient load were processed first by the random decrement (RD) technique to yield free vibration responses. Then time domain modal identification can be performed by solving eigenvalue problem using Ibrahim time domain (ITD) method. Identification result from simulated ambient response of linear lumped mass models and actual ambient response of a steel bridge were discussed. This study also proposes some solutions to improve the identification results from constrained measurement problems.

The natural frequencies, modal damping ratios and mode shapes extracted from free vibration data were very accurate. The modal extraction from ambient responses required adequate number of data to give accurate natural frequencies. While modal damping ratios and mode shapes were acceptable for some modes only. The proposed methods for constrained measurement could give accurate results for first few modes.