

Identification Research of Modal Parameters and Internal Load for in-Flight Rocket

Abstract: After a rocket have been destroyed in a flight, it was strongly required to carry out full-scale model testing to understand better the low frequency vibration of the rocket. These vibration data were used to assess the modal properties and to identify the internal load of the new (modified) structure. In this presentation, first, a new modal identification method based on vibration displacement is suggested. The displacements of the measured points in the beam (rocket) are obtained by the integration of the low-frequency vibration accelerations during free flight test. For comparison, several methods are used to extract the modal frequencies of the investigated beam. In terms of the results of standard deviation of identified frequencies, it is believed that the displacement modal identification method is best suited for identification for similar problems. Using the displacements data, a method for identifying the transverse load of the beam is introduced. Based on the example of measured acceleration data, the transverse bending moments are identified and verified, proving that such a method is a new way in load identification for similar problems.