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Frequency Shift During Mass Properties Testing Using Compound Pendulum Method

By Chris Regan

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 24 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. During mass properties testing on the X-48B Blended Wing Body aircraft (The Boeing Company, Chicago, Illinois) at the National Aeronautics and Space Administration Dryden Flight Research Center, Edwards, California, large inertia measurement errors were observed in results from compound pendulum swings when compared to analytical models. By comparing periods of oscillations as measured from an average over the test period versus the period of each oscillation, it was noticed that the frequency of oscillation was shifting significantly throughout the test. This phenomenon was only noticed during compound pendulum swings, and not during bifilar pendulum swings. The frequency shift was only visible upon extensive data analysis of the frequency for each oscillation, and did not appear in averaged frequency data over the test period. Multiple test articles, test techniques, and hardware setups were used in attempts to eliminate or identify the cause of the frequency shift. Plotting the frequency of oscillation revealed a region of minimal shift that corresponded to a larger amplitude range. This region of minimal shift provided the most accurate results compared to a known test article; however, the...



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