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DRAG MEASUREMENTS OF LONG CABLES IN THE OCEAN

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Abstract:

Concern about the high coefficients of drag measured on short-length vibrating cables by various investigators initiated a joint NAVAIRDEVCCEN-MIT effort to measure coefficients of drag on long cables in the ocean environment. The experiments were conducted in December 1983 in deep waters just north of St. Croix, USVI. Top angle and tension measurements of the suspended cables were made and acceleration measurements using orthogonal pairs of accelerometers attached to the cables at various locations were recorded. The current environment was measured using current meters suspended from the test platform and expendable current profilers. Tension and inclination measurements were compared to computer simulations of the experiment to determine effective cable drag coefficients. The acceleration data were integrated to determine strumming amplitudes from which local coefficients of drag could be derived. The two methods of evaluating drag were compared and found to yield comparable results. Acceleration spectra were tested for correlation between vibration at separated locations on the cable and were generally found to be uncorrelated. The data support the argument that in realistic ocean currents, long cables exhibit lower coefficients of drag than their shorter counterparts in the uniform flow conditions of the laboratory experiments and that strumming is not correlated along the entire cable length.

PRELIMINARY