Spectral Analysis of Ocean Wave Forces on Piling (Coastal Engineering Conference in Santa Barbara, California, October 1965)

by Leon Emry Borgman,

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Abstract:

A computational formula is developed for determining, from the sea-surface spectral density, the spectral density function of the force per unit length at a point on a vertical pile. An accurate and simple approximation for the formula is presented and used to explain the near proportionality between the spectral densities of force and sea surface measured in the ocean near Davenport, Calif. The computational formula and its approximation are extended to provide procedures for the determination of the spectral density of either total force or total overturning movement on a structure consisting of an array of vertical cylinders. The approximation leads to a particularly simple relationship in which the spectral density for the total structure is the spectral density for a single pile times a function which characterizes the geometry of the array. To illustrate the procedure, the total force spectral density is computed for a four-pile instrument platform in 49 ft of water.

Subject Headings: Ocean waves | Power spectral density | Piles | Approximation methods | Spectral analysis | Wave forces | Wave spectrum | Coastal engineering

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This database of spectral signatures will be used to analyze the properties of a slick thanks to hyperspectral imagery in the VNIR+SWIR domain and spectral matching techniques. The characterization of the hydrocarbons performed first in laboratory has been completed with a pool experiment. The obtained spectral signatures have been compared with the laboratory ones. Detection algorithms have been applied to the pool hypercubes in order to identify the pixels covered by the NOFO 2015 emulsion and a thickness assessment has been performed. The measurements of water attenuation is also affected by water wave facet reflectance as shown by Monte Carlo model results.