COMPARISON OF PRESSURE TRANSFER FUNCTIONS

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ABSTRACT

Measurement of surface water waves with subsurface pressure transducer has been employed over the last five decades. However, adequate pressure transfer function relating wave and pressure amplitudes is required to yield accurate results. Previous formulas of pressure transfer function are reviewed first in this paper and important characteristics of pressure transfer function are delineated. Among these characteristics, we show a strong dependency of pressure transfer function on the frequency parameter and also on pressure transducer submergence parameter, i.e., the pressure transfer function is a function of both relative depth and transducer submergence parameter. This is contrary to the conclusion of Kuo and Chiu (1994) where the empirical formula for the pressure transfer function is independent of transducer submergence parameter.

Alternative noise correction method are also studied in this paper in order to avoid excess high-frequency wave spectrum components when converting from the pressure spectrum. Field pressure data are then used to calculate the wave spectrum using linear and nonlinear transfer functions, linear transfer function with correction factor, and empirical formula of Kuo and Chiu (1994). Considerable and unreasonable difference exists between empirical formula and the other three theoretical formulations. We therefore recommend that the empirical transfer function should be grouped in small range of transducer submergence parameter as suggested by Baqerizo and Losada (1995).

Key Words: wave pressure, transfer function