Short communication

Transfer function between wave height and wave pressure for progressive waves: reply to the comments of A. Baquerizo and M.A. Losada

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It is clear that the form of the transfer function TF between wave height and wave pressure

$$TF = a\exp\left[-b\frac{\omega^2 Z_1}{g} \right] \tag{1}$$

can be obtained easily from the pressure response factor K_p

$$K_p = \frac{\cosh k(D - Z_1)}{\cosh kD} \tag{2}$$

for $a = b = 1$. This has already been discussed during the review of our paper (Kuo and Chiu, 1994). However, we still like to use the dimensional analysis to discuss the equation form on the basis of a broad or general definition. In addition, according to the derivation of TF from K_p suggested by Baquerizo and Losada (1995), TF is rather a function of kZ_1 than of $\omega^2 Z_1/g$. However, we could not find a definite relationship between TF and kZ_1 from our experimental data. Thus, we think that the "true" transfer function TF is not simply K_p.

On the other hand, from the experimental data in our paper, we found the constant $b \neq 1$, so that Eq. (1) cannot be simplified to be

$$TF = \frac{K_p}{N} \tag{3}$$

From many previous studies and our experimental data, we cannot obtain a constant value of N for intermediate and deep water. Therefore, we think that the description in the last paragraph of the comments is not true. For example, in Fig. 1, taken from Bishop and Donelan (1987), it can be seen that there exist different interpretations of N values, and a consistent expression for evaluating the N value cannot be obtained.
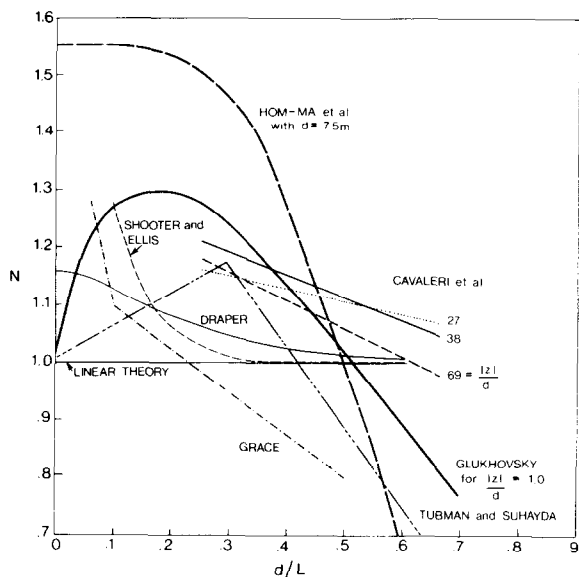
Fig. 1. Relationship between correction factor N and relative water depth (d/L) from previous work (from Bishop and Donelan, 1987).

We agreed that f_1 and f_2 may be a function of $\omega^2 D/g$ for shallow water ($kD \ll 1$) in our paper, but this topic is beyond the discussion of our paper.

References

Baquerizo, A. and Losada, M.A., 1995. Transfer function between wave height and wave pressure for progressive waves, by Y.-Y. Kuo and J.-F. Chiu: comments. Coastal Eng., 24: CENG 643.

Bishop, C.T. and Donelan, M.A., 1987. Measuring waves with pressure transducers. Coastal Eng., 11: 309–328.

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