IMPROVED EVALUATION OF SLIDING STABILITY OF A CAISSON BY EMPLOYMENT OF A DOUBLY-TRUNCATED NORMAL DISTRIBUTION

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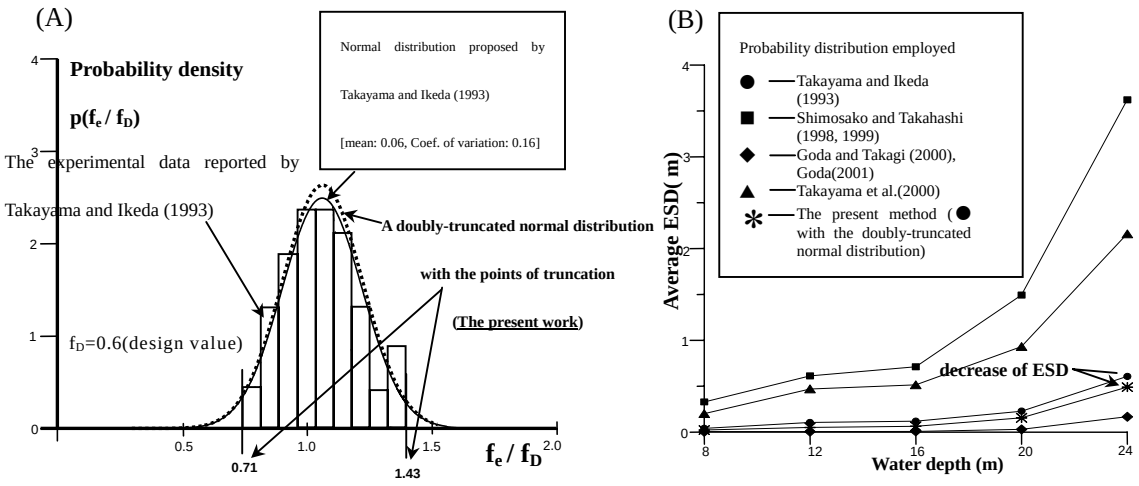
1. Introduction

The reliability design method (level III) of caisson-type breakwaters has two sub-frameworks largely. One is reliability analysis of expected sliding distance (ESD), as a stability index of sliding failure, by means of Monte-Carlo simulation (MCS), and the other is an optimal design using the ESD. The present work is focused on the former, and we introduced the doubly-truncated normal distribution, instead of original normal one, into the reliability design method for improved evaluation of ESD because though the original normal distribution is defined in the region from $-\infty$ to ∞, the experimental or observed values (x_e) distribute not in the defined region but in the restricted one. The present work shows the necessity and validity of employment of the doubly-truncated normal distribution for accurate reliability analysis of ESD.

2. The employed example of a doubly-truncated normal distribution (A), and results (B)



3. Concluding remarks

The simulation results for the original normal distribution cause very large ESD because the random variables of uncertain factors (*e.g.* wave force and friction factor) in means of MCS have some values outside the region where experimental data are valid. For more effective reliability design of caisson-breakwater, a doubly-truncated normal distribution should be employed. Consequently, the evaluation of ESD (or sliding stability) can be improved by using the doubly-truncated normal distribution.