کارگاه‌های آموزشی مرکز اطلاعات علمی

آموزش مهارت های کاربردی در تدوین و چاپ مقاله

اصول تنظیم قراردادها

مقاله نویسی علوم انسانی

WAVE LOADING ON PILE SUPPORTED QUADRANT FRONT FACE BREAKWATERS

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ABSTRACT

Due to advancement in technology and ever increasing demand in Marine traffic, different types of breakwaters are being developed worldwide to form harbors. Considerable amount of research has been done in the past on pile supported breakwater. Semi circular breakwater is relatively a new concept and such breakwater exists in Miyazaki Port, Japan. It was decided to combine the advantages of these two types of breakwaters, that is, the structure considered is a quadrant front face supported on closely spaced piles. The advantages of this type of structure are free passage of sediments, attenuation of currents and waves, the lee ward side of the structure can be utilized for berthing of vessels and enhancement of scenery compared to conventional rubble mound breakwaters. A detailed experimental program to investigate the hydrodynamic characteristics of the pile supported quadrant front face breakwater was carried out in a 2m wide,72.5m long wave flume in Ocean Engineering Centre, Indian Institute of Technology Madras, India. The model was rigidly fixed to a six component force balance to measure the total forces. The central portion of the quadrant front face was fixed with a run up meter to measure the run up due to waves. The tests were carried out in three water depths of 0.8m, 0.9m and 1.0m.

For each water depth, the model was subjected to the action of random waves derived from Pierson-Moskowitz spectrum. The significant wave height ranging from 0.05m to 0.19m in intervals of 0.02m and peak period ranging from 1.0 to 2.0sec were adopted for the tests. The reflection, K_r transmission, K_t and loss coefficients, K_L as well as the dimensionless run up were evaluated from the measurements and is reported as a function of wave steepness (defined by significant wave height and peak period) for different range of relative water depths, d/L. The coefficients, K_r ,K_t ,K_L were found to range from 0.3 to 0.9, 0.05 to0.25 and 0.45 to 0.55 respectively. The maximum wave run up on the quadrant front face was found to be about one and half times the mean run up. In addition, the dimensionless total horizontal and vertical forces are also presented as a function of wave steepeness and relative water depth. The vertical force was found to be four to five times the horizontal force. The details of the model, experimental setup, procedure, analysis and discussion of the results are presented and discussed in this paper.

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