APPROACH BY SIMULATION AND EXPERIMENT TO SCATTERING PROCESSES OF ROCK DUMPING IN COASTAL ENGINEERING

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The engineering task of rock placement in coastal engineering and port construction is in practice done by dumping, involving the danger of rock size segregation. The main threat to the structure's stability is the bulk rock material's tendency to segregate during its fall through the water.

Horizontal spreading and segregation of the rock material is caused by horizontal deviation. Experimental surveys of vertical separation and horizontal spreading of bulk rock material were conducted at IWAWI and were accompanied by the development of two random-walk simulation schemes which are presented in this paper. The necessity of both physical experiments and numerical simulations for the proper treatment of a task of high physical complexity in engineering hydraulics is stressed.

For the simulation of scattering processes a simulation scheme was developed.

The simulation scheme itself will merely be outlined to the extent necessary for the discussion of the key issue of this paper: the necessity of both physical experiments and numerical simulations for the proper treatment of a task of high physical complexity in engineering hydraulics.

The simulation model is based on a random-walk core, which provides the stochastic character of the processes. The general approach was, to adapt the significant parameters to enable the simulation program to reproduce laboratory scattering experiments.

Two different random-walk core models were developed and tested: the "Angle-of-Inclination (AOI) Model" and the "Rotation (R) Model". The simulated spreading results were plotted in column graphs. The experimental results are indicated with a line. Comparison shows that the results are quite close.

The two-way approach of experimental research and numerical modelling is clearly stressed as a effective means of effective problem solving in hydraulic engineering.

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