The Solitary Wave Interaction with a Partially Submerged Stationary Structure

Vasily Maximov (1,2), Gayaz Khakimzyanov (3), Igor Nudner (1,4), Efim Pelinovsky (5), and Konstantin Semenov (1)

(1) Branch of the OJSC "The 26th Research Institute", St. Petersburg, Russia, (2) Saint-Petersburg State University, St. Petersburg, Russia, (3) Institute of Computational Technoligies, Novosibirsk, Russia, (4) Baltic State Technical University "VOENMEH", St. Petersburg, Russia, (5) Institute of Applied Physics, Nizhny Novgorod, Russia

The results are presented of laboratory experiments and numerical modeling of the interaction between a solitary wave and a fixed partially submerged body of rectangular shape, located on a flat slope. The questions concerning the boundary conditions at the corner points of the obstacle are discussed.

The experiments were fulfilled at the hydro flume having 45 m length, 1.0 m width, and 1.2 m height. The solitary wave was generated by vacuum wavemaker. The horizontal part of the bottom is 10 m length. The slope with a scale 1:50 is 35 m length. The depth of the uniform bottom varied has the values 40, 50, and 55 cm. The wave height has the value from 10 to 30 cm.

Carried out research allowed to determine the magnitude of run-up on the body and the wave pressure on it, depending on the amplitude of the oncoming wave, the length of the body and its immersion, the angle of the slope.