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Theoretical model of extreme waves reflection from the partly-permeable constructions

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The results of the theoretical research concerning water-waves action having large amplitude on the wave-protective construction are presented. The construction consists of the partly emerged into the water vertical front wall, back sidewall of the full profile and upper edge. The internal volume is partly filled by the concrete blocks or stone. It is assumed that the construction has a rectangular shape.

A simple theoretical model of the wave-structure interaction is proposed. The fluid is assumed as inviscid and incompressible, and its motion is potential. The loss of wave energy takes place inside the construction. All the fluid area is divided to three subareas: semiinfinite strip and two rectangular interiors: one containing the fill and the other placed over the latter. For each of the subareas the velocity potential is derived. The velocity and pressure continuity conditions subject to porosity and fluid friction are considered at the boundaries of the subareas.

The reflected waves and wave action parameters are specified. The theoretical data are compared with the laboratory data, and its coincidence is quite satisfactory.