



HARES (HARbour RESonance)

HARES is a numerical model for the determination of wave penetration in harbour basins. The model includes the effects of diffraction, refraction, reflection, shoaling and directional spreading. Wave breaking is not taken into account.

HARES is developed to compute the wave penetration in harbours and is especially useful in harbour and breakwater optimisation studies and to determine the natural frequencies of a harbour. HARES is a linear model and makes use of the finite element method. Typical for the finite element method is that the model area is divided into a number of triangles and/or quadrilaterals, the so called elements. The size and shape of these elements may vary within the modelling area. With the use of these variable element sizes and shapes, characteristic features of a harbour basin are easily incorporated in the model.

The input of the model consists of wave period, nearshore wave direction, depth just outside model area, bathymetry in model area, water level and reflection coefficients of structures and borders.

For a single harmonic incoming wave HARES calculates the amplitude and the phase for each point in the schematisation.

The most relevant model output is the so-called 'wave height multiplication factor' or K_D -factor. This K_D -factor is the ratio between the wave height in the model area (H) and the wave height at the boundary of the model area (H_0). $K_D = H/H_0$. At the boundary of the model $K_D = 1.0$. This K_D -ratio can be seen as the amplitude of the local wave climate.

Developer
Svašek Hydraulics

Main features
Wave propagation in and around structures and harbour basins, diffraction, refraction, reflection, shoaling and directional spreading

More information
<http://www.svasek.com>