Contribution to computerized modeling of swell and current interaction: case of sea disposal currents

Transformation of swell parameters and those of the flow in the discharging area of water intended for cooling the turbines of thermoelectric and nuclear power plants, disrupts their activity and significantly affects discharge conditions.

To better understand the mechanism of these phenomena and to predict their effects, a one-dimensional numerical code is proposed.

The spread of a wide range of simple swells from the deep-water areas to the site of discharge is first dealt with, while taking into account the Schoaling phenomenon and bathymetric breaking conditions.

Then, the impact of these swells on the kinematic structure of the flow in the discharge channels is highlighted through the digital resolution of Barré de Saint-Venant equations by a finite difference scheme. This numerical code is tested on laboratory measurements and the obtained results prove to be satisfactory. The separate influence of each parameter of the swell and the flow on interaction behavior is studied.

In addition, a real application on what relates to the behavior of simultaneous action of swells and currents in the discharge channel of Djen Djen thermoelectric plant (Jijel, Algeria) is considered, by dealing with various situations of the swell.