SUMMARY

Mound breakwaters usually have concrete crown walls to reduce overtopping. The stability of the crown wall is necessary to develop the different operations involved in port activities, sliding being the major failure mode. This paper focuses on sliding failure, using existing formulae to estimate wave forces on crown walls, e.g. Jensen (1984), Pedersen (1996), Martín et al. (1999), Berenguer and Baonza (2006), etc.

Physical model tests were carried out using two different armour units: cubic blocks and Cubipods. The model was attacked with regular and irregular waves, measuring pressure values of the wave impacts. The analysed formulae do not accurately represent the horizontal and up-lift forces at the same time, so a new method is proposed: estimating the maximum horizontal force and maximum up-lift force associated with the wave that generated the largest horizontal force.

After defining the variables that influence the phenomenon, test data were treated with pruned neural networks and statistical t-student analysis to obtain the new formulae to calculate the horizontal and up-lift forces. It was observed in the tests that these forces are most critical in more than 70 % of the cases. The main advantages of this method are simplicity and robustness, because the formulae were obtained applying linear regressions.