

Scour protection calculations for an offshore energy island using detailed wave and CFD flow modeling

Authors: Floris de Wit¹, Eelco Bijl², Sam Bom¹, Yannick Steenman¹, Leen Baelus³, Koen Van Doorslaer⁴, Pierre-Yves Guillermin⁵

¹ Svašek Hydraulics, Rotterdam, The Netherlands

² CDR International, Amersfoort, The Netherlands

³ IMDC, Antwerp, Belgium

⁴ DEME nv, Zwijndrecht, Belgium

⁵ ELIA, Brussels, Belgium

Abstract

This paper presents a new and promising method for calculating the rock diameter required for scour protection systems. The methodology consists of performing detailed SWASH wave simulations and TUDflow3D flow simulations to accurately assess the combined bed-shear stress and movement for scour protection stones. The results of the numerical model are compared with measurements from 3D laboratory experiments. As a case study, the methodology is applied to the Princess Elisabeth Island project in the North Sea, 45 km off the Belgian coast. This methodology is well able to predict the areas that are most prone to rock movement under extreme conditions.

Keywords

Scour protection; Princess Elisabeth Island; Energy island; Waves; Currents; SWASH; TUDFlow.

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