Numerical calculation of backfilling of scour holes - DTU Orbit (16/12/2018)

Numerical calculation of backfilling of scour holes
A fully-coupled hydrodynamic and morphologic CFD model is presented for simulating backfilling processes around structures. The hydrodynamic model is based on Reynolds-averaged Navier-Stokes equations, coupled with two-equation k-ω turbulence closure. The sediment transport model consists of separate bed and suspended load descriptions, the latter based on a turbulent diffusion equation coupled with a reference concentration function near the sea bed boundary. Bed morphology is based on the sediment continuity (Exner) equation. The present simulations have utilized continuous morphologic updating in time, both the hydrodynamic and morphologic solutions being advanced with the same time increment. In this way, the simulations illustrate the ability to simulate fully-coupled hydrodynamic and morphologic developments based on continuous feedback. The model has been implemented for two kinds of structures: piles, and pipelines. Initial scour holes are generated by the same model. The numerical results appear to be in accord with the existing experimental information.

General information
State: Published
Organisations: Department of Mechanical Engineering, Fluid Mechanics, Coastal and Maritime Engineering
Contributors: Sumer, B. M., Baykal, C., Fuhrman, D. R., Jacobsen, N. G., Fredsøe, J.
Pages: 633-642
Publication date: 2014

Host publication information
Title of host publication: Scour and Erosion
Publisher: CRC Press
Editors: Cheng, L., Draper, S., An, H.
ISBN (Print): 978-1-138-02732-9
Source: PublicationPreSubmission
Source-ID: 103489423
Research output: Research - peer-review \ Article in proceedings – Annual report year: 2014