

Turbidity offshore platform

CFD MODELING TURBIDITY PLUME FROM FILLING GRAVITY BASED STRUCTURE

When filling a Gravity Based Structure (GBS) a turbidity plume can develop from the release of overflowing sediment spill. Svašek Hydraulics has conducted detailed 3D CFD simulations to determine the turbulent mixing of this turbidity plume near the legs of a GBS. Based on the CFD simulations the location and manner of release has been optimized.

Local detailed 3D CFD simulations with TUDFlow3D have been conducted with 3-4 million grid cells with a size in the order of two decimeter. These simulations run efficiently on the Svašek Hydraulics in-house computational cluster on 12 core machines with less than a day computational time.

The influence of sediment on the density is accurately taken into account by solving the variable-density fully non hydrostatic Navier Stokes equations. Different sediment fractions are allowed to settle at different settling velocities by a slip velocity approach.

Turbulence is captured by the Large Eddy Simulation technique in which each large individual turbulent eddy is solved directly on the grid in combination with a sub-

grid-scale model for the impact of smaller turbulent eddies.

The influence of different release strategies and vertical locations either with or without air entrainment on the development of the plume has been studied. Special attention has been paid to the generation of a turbid plume near the water surface and the amount and location of deposition at the seabed. Especially the amount of entrained air is of paramount importance for the surface plume generation.

Based on the CFD results the location and manner of release of the sediment spill from ballasting has been optimized for a minimal environmental impact and minimal deposition of sediment in the bed protection next to the GBS.

CLIENT

Boskalis

LOCATION

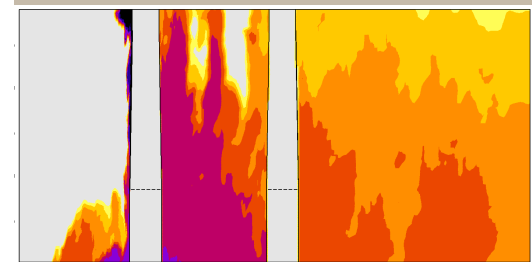
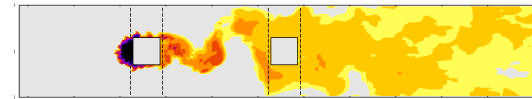
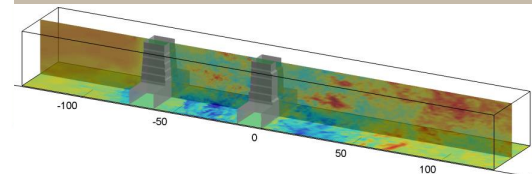
Netherlands

DATE

2015

SERVICES

CFD modeling 3D turbulent turbidity Assessment influence release location and air entrainment on environmental impact and deposition



SVASEK
HYDRAULICS
COASTAL, HARBOUR AND RIVER CONSULTANTS

Svasek Hydraulics
Schiehaven 13G
3024 EC Rotterdam
the Netherlands

Phone: +31 10 467 13 61
Internet: www.svasek.com
E-mail: info@svasek.com