Elevation
(m)

	Above -11.125
	-11.375 to -11.125
	-11.625 to -11.375
	-11.875 to -11.625
	-12.125 to -11.875
	-12.375 to -12.125
	-12.625 to -12.375
	-12.875 to -12.625
	-13.125 to -12.875
	-13.375 to -13.125
	-13.625 to -13.375
	-13.875 to -13.625
	Below -13.875

CLIENT

CTC Marine Ltd.
Stockton-on-Tees, UK

LOCATION

Adriatic Sea

DATE

2007

PROJECT DESCRIPTION

In support of CTC Marine's deployment of *Maersk Advancer* for seabed ploughing and pipeline laying operations in the Adriatic Sea, Coldwater Consulting Ltd's Prop-Wash and PTM models were used to estimate flows and scour generated at the seabed due to a combination of operating depths and bollard pulls.

Coldwater's PropWash model computes the three-dimensional velocity fields produced by the propeller wash from manoeuvring vessels. The model is based on a jet model controlled by empirical relationships specifically developed for propellers. The Particle Transport Model (PTM) model is a sediment transport and morphology model with Lagrangian and Eulerian components developed by Coldwater for the US Army Corps of Engineers. The two models were dynamically coupled for this project.

PropWash-PTM is used to evaluate erosion and deposition for non-cohesive materials (e.g. sands and gravels) using total suspended and bed sediment load under the combined effects of waves and currents (in this particular case, the current fields produced by the PropWash model were the driving hydrodynamic force). For cohesive materials, the model assumed that downcutting occurs once the critical shear stress for erosion has been exceeded, in which case the vertical downcutting rate is linearly proportional to the amount by which the critical shear stress is exceeded. Eroded cohesive material is not deposited.

PROJECT APPROACH

We performed the following services:

- Simulation of three-dimensional flows generated by the *Maersk Advancer* over a range of test conditions
- Development of relationships to allow CTC staff to estimate near-bed velocities as a function of water depth and bollard pull
- Simulation of scour patterns generated by the *Maersk Advancer* over a range of test conditions
- Development of relationships to allow CTC staff to estimate scour growth as a function of water depth, bollard pull, vessel speed and bed material

Coldwater
Consulting Ltd