Tidal phase:

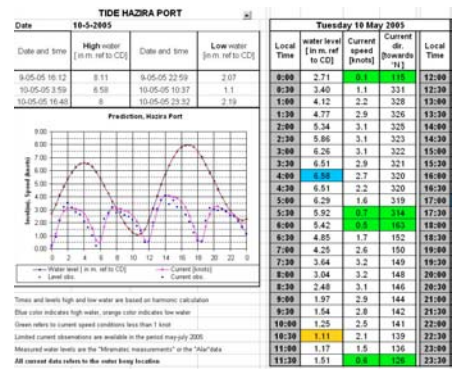Figure 1: FINEL2D Flood current pattern around existing port layout

Figure 2: Prediction currents and water levels near the harbour for any required day
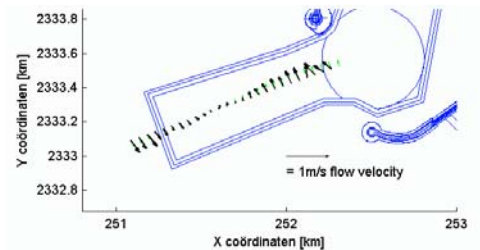

Figure 3: Verification FINEL2D currents (green arrows) with measured currents (black arrows)

LNG Terminal Hazira, India
Harmonic tidal analysis and flow, wave & morphological modelling

For the LNG/Multipurpose harbour at Hazira in the Gulf of Khambhat (India) studies have been carried out including the following aspects:

- Harmonic tidal analysis of updated data surveyed in 2005 by Svašek Hydraulics;
- Recalibration and verification of the FINEL2D model with the updated data;
- Prediction of current patterns for optimised port layouts;
- Prediction of wave penetration in the harbour basin for optimised port layouts;
- Prediction of morphological development.

The harmonic analysis of the updated tidal data is used to make predictions of the water level, current magnitude and direction near the harbour for any required day.

For the prediction of the current patterns the 2-dimensional flow model FINEL2D is used. The wave penetration in the harbour basin is determined using the 2-dimensional model HARES. HARES is based on the linear wave theory and makes use of the mild slope equation. Both FINEL2D and HARES are numerical models based on the finite elements method, which typically has triangular shaped grid cells.

The computed current patterns were used as input for a number of related issues:

- Optimisation of the port layout;
- Navigation fast-time simulation in the entrance channel and turning circle;
- Morphological development and maintenance dredging.

The morphological development of the area and maintenance dredging was analysed with a sediment transport module within FINEL2D called MORFIN. MORFIN can handle both sand and silt transportation.

Client
Hazira Port Private Limited
(HPPL)

Location
Hazira, India

Date
2005-2006

Services
Tidal analysis
Flow modelling (FINEL2D)
Morphological modelling (MORFIN)
Wave penetration (HARES)

SVASEK HYDRAULICS
COASTAL, HARBOUR AND RIVER CONSULTANTS