

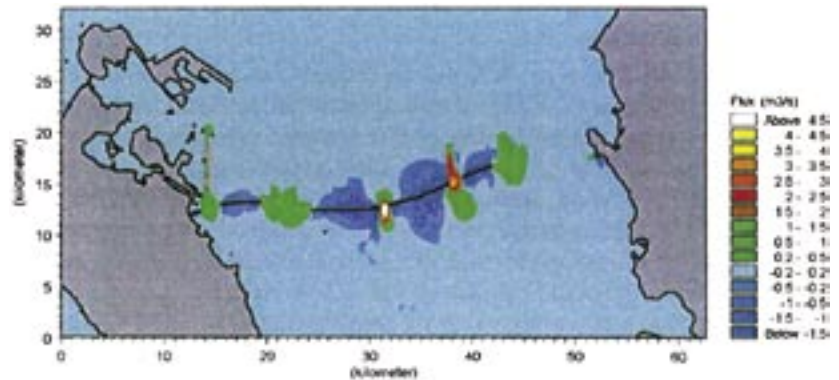
Modelling Studies for the Qatar-Bahrain Causeway Project, Qatar/Bahrain

Preliminary environmental and engineering investigations for the planned Qatar-Bahrain Causeway were made as part of Phase 1 of the project and involved collection of hydrographic and meteorological data, initialisation of a measuring programme of hydrographic parameters and of marine modelling studies.

The objective of the data collection was to provide hydrographic and meteorological design data to be used in the preliminary design and as boundary, calibration and verification data for the numerical modelling included in the marine studies.

The marine modelling studies for the Qatar-Bahrain Causeway project included modelling of current, sediment dispersion from dredging activities and waves using MIKE 21 - a comprehensive modelling system for 2D free-surface flows.

Results of extreme current simulations were used in the engineering design of the Causeway including scour protection. The modelling was also used to identify the location and



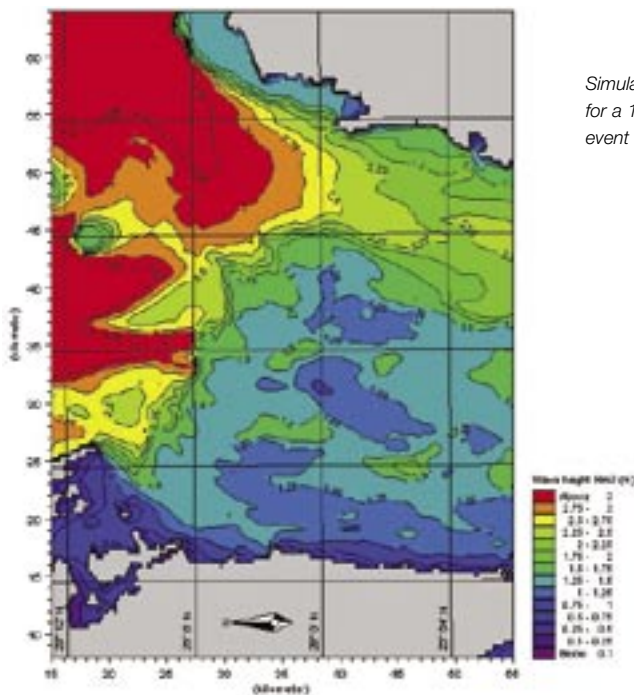
Simulated change in water flux due to introduction of causeway at maximum South going current.

the amount of material to be dredged, if the water exchange between the Gulf and Bay of Salwah was to remain unchanged, to describe the impact caused by the Causeway on water exchange and current velocity in sensitive areas (water intakes and shipping channels), and as input to the analysis of the overall blocking effect of the Causeway structures.

The tidal current results were used as input to the modelling of the sediment dispersion from dredging activi-

ties using a Lagrangian particle tracking model which computes the movement of individual particles in the water phase.

The wave climate along the alignment corridor was modelled including wave propagation over the very complicated bathymetry around the large shallow Fasht Azm Reef. The objective of the wave modelling was to assess the extreme wave climate, i.e. the 1 in 100, 2000, and 10000 years events.



Simulated wave heights for a 10,000 years wave event from North.

Services:

- Data collection and analysis
- Measuring programme
- Wave modelling
- Current modelling
- Modelling of sediment spill
- Extreme data analysis

Project period: 2001 - 2002

Client: Joint Technical Committee, Qatar-Bahrain Causeway, Qatar/Bahrain