

Effect of shore-parallel breakwaters in tidal conditions on coastal morphology (LEACOAST)

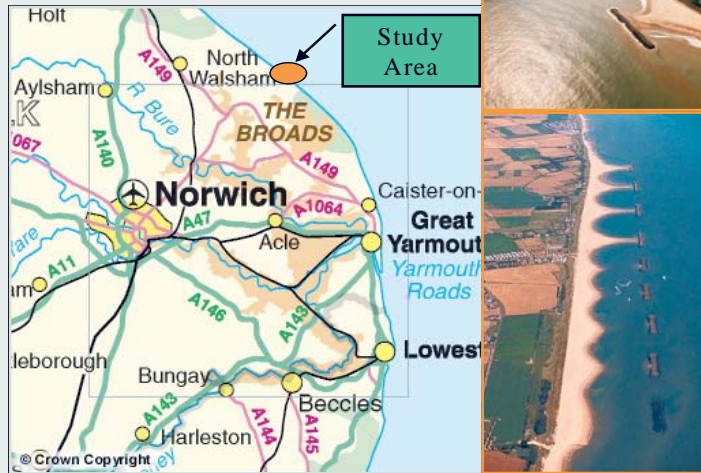
OBJECTIVES

This is a collaborative project between the University of Liverpool (LU) and the University of East Anglia (UEA). The main objective of the project is to evaluate the storm-scale effect of shore-parallel breakwaters in tidal conditions on coastal morphology using a combination of LU's Q3D morphological computer modelling, which will be enhanced by including the effect of overtopping and reflective porous structures, and new hydrodynamic and morphological data gathered from the Sea Palling site in Norfolk by UEA, as well as some existing data from previously EPSRC funded UKCRF tests on the Elmer breakwaters. The project aims to improve understanding of interactive coastal processes and morphology changes produced by construction of shore-parallel breakwaters in UK tidal conditions.



STUDY AREA

The proposed study area is at the Sea Palling in Norfolk, where 9 shore-parallel segmented breakwaters have resulted in the formation of low-water tombolos and salients, as well as impacts on both down- and up-drift beaches.



INVESTIGATORS

- Emeritus Professor Brian O'Connor, Department of Civil Engineering, The University of Liverpool
- Dr Shunqi Pan, Department of Civil Engineering, The University of Liverpool
- Professor Chris Vincent, School of Environmental Sciences, University of East Anglia

PROJECT DURATION

1 April 2002—31 March 2005 (36 Months)

METHODOLOGY

- Incorporate wave-overtopping, porosity and reflection into the Q3D model and test against existing data from the UKCRF collected in the LUPY project.
- Model themorphodynamic changes in an embayment of the Sea Palling breakwater during individual winter storms using Q3D, a combined hydrodynamic and morphodynamic model.
- Measure hydrodynamics (waves, tides and currents) in an embayment during two winter seasons to capture storm events.
- Survey the beach and bathymetry around the breakwaters immediately following storms events.
- Evaluate the efficacy of the Q3D and evaluate its usefulness in modelling storm-scale changes around breakwaters.
- Use the Q3D model to evaluate and extend existing design criteria.

COLLABORATORS

- Steve Huntington, HR Wallingford
- Ben Hamer, Halcrow Group Ltd
- Jane Rawson/Steve Hayman, Environment Agency

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Summary

The collaborative Project aims to improve understanding of interactive coastal processes and morphology changes produced by construction of shore-parallel breakwaters in UK tidal conditions. The Project will focus on modelling and measuring the hydrodynamics and morphological changes during storm-events. Use will be made of an existing Liverpool Q3D morphological computer model, which will be enhanced to include the effect of over-topping and reflective porous structures. Field data will be gathered from two typical (but different) embayments (one per winter season) at Sea Palling in Norfolk, UK where 9 shore-parallel segmented breakwaters have resulted in the formation of low-water tombolos and salients, as well as impacts on the beaches down-drift. Existing data on waves, currents and transient bathymetric changes collected from a central embayment in the UKCRF by earlier EPSRC-sponsored research (LUPY Project) will also be used in the modelling component.

EPSRC PROJECT



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