



Toe Structures Management Manual

Project Summary SC070056/S

Coastal engineering specialists at Halcrow Group have worked with Environment Agency experts to produce practical guidance on how to determine, monitor, assess and mitigate for the effects of scour on toe structures. The manual will be used by those responsible for flood defences, coastal erosion protection structures and other coastal structures.

Scour can lead to partial damage, or in extreme cases, complete failure of coastal structures. Scour at the toe of structures represents the most prevalent and serious form of damage to seawalls in the UK. Toe scour is an expensive problem and emergency repairs can cost as much as £25,000 per metre. It is not limited to any particular environment or to any particular type of seawall.

The manual describes best practice in the assessment, management and design of the toe of coastal defence structures. The issues covered include:

- monitoring of beach levels and structure condition (including links to coastal monitoring programmes);
- trigger points for action during the life of the asset (including links to 'performance features');
- maintenance and replacement of elements of the asset or of the whole structure;
- environmental and sustainability issues surrounding scheme/structure planning, design and operation;
- inputs to the assessment and design processes (including relationship to defence fragility, both for asset management and new design);
- selection of mitigation options to enhance or prolong performance of the asset.

Two appendices detail the scour processes that control beach levels, how to assess the lowering of beaches at the toe of coastal defence structures and methods of predicting scour.

A further appendix contains 19 case studies from around the UK which illustrate different management approaches and highlight the lessons learnt.

The manual draws on many sources of information but is particularly guided by the reports resulting from the Environment Agency project. 'Understanding the

Lowering of Beaches in Front of Coastal Defence Structures' Phases 1 and 2 (projects FD1916 and FD1927). The manual has been developed from the findings of the Environment Agency's 'Toe Structures for Coastal Defences' project (SC070056) undertaken by HR Wallingford, which provided much of the research base for its contents.

The guidance given in this manual, together with examples of good practice in the case studies, will help Environment Agency staff, civil engineers and consultants to provide better advice to local authorities, other organisations and private owners of coastal frontages planning or implementing a scheme for improved management of toe structures.

This summary relates to information from the following output:

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