Defra / Environment Agency
Flood and Coastal Defence R&D Programme

R&D Technical Summary W5A-069/TS/2

Manual on the use of timber in coastal and river engineering

Background to R&D project

Timber has traditionally been used to build groynes, jetties, walkways and bespoke structures as well as for river bank protection. It is an attractive choice of construction material because it is renewable, has a high strength/weight ratio, tolerates impact well, resists abrasion and is easy to use, repair and recycle. It is also visually attractive.

However, there are also some potential drawbacks. Timber is inherently of variable quality, there is a limited availability of the large section sizes needed for certain engineering applications, UK native timbers are rather vulnerable in the marine environment, and most suitable hardwood species are only renewable over relatively long timescales – with the associated concerns surrounding some logging operations.

As a renewable resource, however, timber has the potential to be an environmentally responsible choice of material - particularly if recycled or obtained from sustainably managed forests.

With wide support from the coastal and river engineering community for better guidance on the use of timber, HR Wallingford promoted an industry-wide project under the DTI Partners in Innovation (PII) Scheme with the following objectives:

- to provide guidance to industry on the use of timber in coastal and fluvial construction
- to disseminate currently undocumented best practice
- to promote best value by most appropriate use of available timber
- to enable life cycles of timber structures to be understood and costed
- to enhance sustainability by promoting environmental best practice, including re-use and recycling, especially with regard to tropical hardwoods

Results of R&D project

The research drew together existing guidance and technical information, including relevant experience and knowledge from over 20 organisations and individuals (contractors, design engineers, operating authorities, researchers). The results of an earlier National Rivers Authority project on the use of timber in sea defence which was carried out by TRADA in the 1990s and not previously published were reviewed and incorporated into the project

A significant element of the project was devoted to procurement issues, and how to identify whether timber supply is legal and sustainable it is essential to have verification of its source. This requires the 'chain of custody' to be recorded and verified through some form of independent auditing. The various factors to be taken into account have been presented in a decision-making framework for assisting with the procurement process.

R&D Outputs and their Use

The new manual addresses the principal issues surrounding the engineering use of timber. It includes:

- an introduction to the use of timber in coastal and river engineering
- a summary of some of the relevant natural characteristics of wood
- properties of processed timber
- a framework for responsible selection and procurement of timber materials (including recycled timber)

- discussion of design and construction issues
- guidance specific to different types of timber structures.
- guidance on monitoring and assessment of existing timber structures
- details on maintenance, repair and enhancement of timber structures, including maintenance practices.

Useful Appendices to the manual are:
- one page summaries of properties for each of 76 potential timber species
- a model construction specification

This R&D Technical Summary relates to R&D Project W5A-069 and the following R&D outputs:

- **Manual on the use of timber in coastal and river engineering**, Matt Crossman and Jonathan Simm. ISBN: 0-7277-3283-8 Published by Thomas Telford Ltd, September 2004

The lead funder for this collaborative project was DTI under its Partners in Innovation (PII) scheme. The Environment Agency, British Waterways, HR Wallingford, TRADA Technology and SCOPAC also contributed cash funding.

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The above outputs are available on the Defra / Environment Agency webpages for the Joint Flood and Coastal Erosion Risk Management R&D Programme. These are currently at www.environment-agency.gov.uk/floodresearch, and will be incorporated into the new Defra-hosted webpages at www.defra.gov.uk/environ/fcd/research (use the search tool located on the project information and publications page).

Copies are held by the EA Information Centre but otherwise printed copies of this output is available through Thomas Telford Books (www.thomastelford.com/books/) – see Water and Coastal Engineering catalogue.

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