



Basal Reinforced Piled Embankments

The Design Guideline

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Design Guideline Basal Reinforced Piled Embankments

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Preface

Publication ‘CUR 226 Design Guideline for Basal Reinforced Piled Embankment Systems’ (‘CUR 226:2010’) appeared in March 2010. More recent insight has made it necessary to amend ‘CUR 226’ on a number of points.

This design guideline (‘CUR226:2016’) has been completely revised and this document is a translation of the greater part of this revised text into English. The primary changes with respect to the 2010 version are:

- A new, improved design model has been incorporated for the design of the geosynthetic reinforcement: the Concentric Arches model (Chapter 4).
- For this new design model, a new set of factors has been determined: partial safety factors and a model factor (Chapters 2.6 and 2.7).
- The traffic loads have been adopted in accordance with the Eurocode (Chapter 2.3).
- Extensive calculation examples have been added for the design of the geosynthetic reinforcement (Chapter 5).
- The instructions for conducting the numerical calculations have been updated (Chapter 6).

The Dutch language version of this design guideline also contains extensive chapters about pile and pile cap design. These have been condensed for this English version because they are of less interest to the non-Dutch reader. Moreover, Chapters 7 to 9 have been condensed for this translation. With this revised version of the Basal Reinforced Piled Embankment Design Guideline, engineers have available a guideline that includes the state-of-the-art knowledge and experience with this type of embankment construction which has also been validated by means of practical experience and measurements.

The provisions in this design guideline are expressed in sentences in which the principal auxiliary verb is “should”.

An excel file containing the basic equations of the Concentric Arches model is available for download at www.piledembankments.com or at www.crcpress.com/9789053676240.

We would appreciate your comments on, suggestions for or experience with this design guideline. Please share them with us at suzanne.vanEEKelen@deltares.nl.

The editors

Summary

A basal reinforced piled embankment consists of a reinforced embankment on a pile foundation. The reinforcement consists of one or more horizontal layers of geosynthetic reinforcement installed at the base of the embankment.

A basal reinforced piled embankment can be used for the construction of a road or a railway when a traditional construction method would require too much construction time, affect vulnerable objects nearby or give too much residual settlement, making frequent maintenance necessary.

This publication is a guideline for the design of basal reinforced piled embankments. The guideline covers the following subjects: a survey of the requirements and the basic principles for the structure as a whole; some instructions for the pile foundation and the pile caps; design rules for the embankment with the basal geosynthetic reinforcement; extensive calculation examples; numerical modelling; construction details and management and maintenance of the piled embankment. The guideline includes many practical tips. The design guideline is based on state-of-the-art Dutch research, which was conducted in co-operation with many researchers from different countries.

In the preparation of this Basal Reinforced Piled Embankment Design Guideline, the composition of CUR Committee 1693 was as follows:

* dr. Suzanne J.M. van Eekelen	Deltares	Chairperson and editor. Concentric Arches design model for the geosynthetic reinforcement, calculation examples.
* Marijn H.A. Brugman	Arthe Civil & Structure	Editor.
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Robbert Drieman / Fred Jonker	SBRCURnet	Project managers.

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