

Design rules for technical-biological bank protection on non-tidal, navigable waterways

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I. INTRODUCTION

Navigating ships generate a specific pattern of bank-directed surface waves, resulting in specific hydraulic loads acting on the bank protection. Traditionally, river bank revetments are made of conventional, merely technology-based ‘hard’ protection materials like concrete, riprap, etc. Nowadays, within the framework of an integrated water management approach, design is directed to more ecologically sound, ‘soft’ engineering bank protections.

This study focuses on the refinement and extension of design rules for the application of more ‘nature friendly’ bank protections on non-tidal waterways subject to heavy shipping traffic. For that purpose, the response of a technical-biological bank protection to the prevailing ship wave climate is investigated using field measurements.

II. STUDY SITE

A technical-biological bank protection consisting of off-bank timber piling in combination with reed vegetation, was installed by the Flemish waterway administration (W&Z) in some sections along the navigable river Lys.

A site in Zulte (Belgium), southwest of the city of Deinze, met all selection criteria and hence, is opted for as measurement location.

III. EXPERIMENTAL TEST SETUP

To determine and evaluate the ship-induced forcing, we designed an on-site prototype monitoring system to continuously acquire

data of the impact of the ship wave climate on the bank protection (Figure 1) [1].

In addition, a periodic field survey took place to quantify the response of the bank protection (July 2009-September 2010).



Figure 1. On-site prototype monitoring system

IV. PRELIMINARY RESULTS

Next to the development of the monitoring system (in operation since April 2010), a methodology for data (pre)-processing and data analysis of the ship wave parameters is worked out and implemented in Labview (National Instruments) [2].

V. FUTURE WORK

While data acquisition continues; a first, comprehensive analysis of the recorded ship wave data and surveyed bank geometry will be carried out.

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