Geophysical Research Abstracts
Vol. 14, EGU2012-1422, 2012
EGU General Assembly 2012


# Wave basin model tests of technical-biological bank protection

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Sloped embankments of inland waterways are usually protected from erosion and other negative im-pacts of ship-induced hydraulic loads by technical revetments consisting of riprap. Concerning the dimensioning of such bank protection there are several design rules available, e.g. the “Principles for the Design of Bank and Bottom Protection for Inland Waterways” or the Code of Practice “Use of Standard Construction Methods for Bank and Bottom Protection on Waterways” issued by the BAW (Federal Waterways Engineering and Research Institute).

Since the European Water Framework Directive has been put into action special emphasis was put on natural banks. Therefore the application of technical-biological bank protection is favoured.
Currently design principles for technical-biological bank protection on inland waterways are missing. The existing experiences mainly refer to flowing waters with no or low ship-induced hydraulic loads on the banks.

Since 2004 the Federal Waterways Engineering and Research Institute has been tracking the re-search and development project “Alternative Technical-Biological Bank Protection on Inland Water-ways” in company with the Federal Institute of Hydrology. The investigation to date includes the ex-amination of waterway sections where technical- biological bank protection is applied locally. For the development of design rules for technical-biological bank protection investigations shall be carried out in a next step, considering the mechanics and resilience of technical-biological bank protection with special attention to ship-induced hydraulic loads.

The presentation gives a short introduction into hydraulic loads at inland waterways and their bank protection. More in detail model tests of a willow brush mattress as a technical-biological bank protec-tion in a wave basin are explained. Within the scope of these tests the brush mattresses were ex-posed to wave impacts to determine their resilience towards hydraulic loads. Since the developing pore water pressure is significant considering the slope stability under hydraulic load, particular atten-tion is paid to the interaction of willow roots and pore water pressure. Furthermore the occurring ero-sion is determined. The methods of measurements, test conditions and executions as well as first results will be presented.