MODEL INVESTIGATIONS INTO THE INFLUENCE OF RENATURALIZATION ON SEDIMENT TRANSPORT

W. Bechteler, H.-J. Vollmers, S. Wieprecht
Institut für Wasserwesen
Universität der Bundeswehr München
D - 85577 Neubiberg

Abstract

Efforts have recently been made to renaturalize the Weiβach River which had previously been regulated in a schematic, monotonous manner. During the last flood period an agglomeration of sediment occurred, which may provoke an overtopping of the dams. In a hydraulic model with movable bed (scale 1:20) the existing conditions and possible improvements were studied in order to prevent agglomerations. Furthermore, fundamental investigations were made with regard to the influence of constructional steps on sediment transport and water levels.

1. Introduction
1.1 General Remarks

Most natural rivers are in a sensitive state of hydraulic-sedimentological balance, which is defined by mutual influences of water and solids. Lowland rivers show in general a "continuous" transport behaviour throughout the year. Depending on the discharge, more or less material is being transported.
In the case of alpine rivers the transport behaviour is characterized by different factors of influence. As the bed material consists of rather coarse grain diameters bed load transport will only start at great bed shear velocities. In order to set the bed material into motion high discharges are necessary, i.e. only flood events are actual transport events. Up to 80 or 90 % of the total annual transport volume may be transported in the course of a single flood wave.

1.2 Problem Description

Recently the attempt has been made to renaturalize the last section of the Weissach River before it flows into Lake Tegernsee. This part had been previously regulated in a schematic monotonous way. During the last flood period an agglomeration of sediment has occurred, which may provoke an overtopping of the dams. In a hydraulic model with movable bed (scale 1:20) the existing conditions and possible improvements were studied in order to prevent agglomerations. Furthermore fundamental investigations were made about the influence of obstructions on sediment transport and water levels.

2. Similarity Considerations
2.1 General Remarks

The knowledge of the physical basis of sediment transport is still so fragmentary that it is not possible to develop a generally acceptable calculation approach. Owing to the practical importance of the phenomenon, however, there are quite a number of more or less empirical formulas, whose bases and ranges of application differ from each other. Therefore their calculation results may also differ considerably.