

Design guidelines for artificial step-pool sequences in mountain streams

Steep mountain streams pose a high flood risk to the villages in the valleys below. In the past decades, mainly concrete check dams have been used to stabilize the bed of steep streams. However, these bed stabilization works have high construction and refurbishment costs, they may fail instantaneously in an overload scenario, and have ecological disadvantages. A promising approach is to replace these concrete check dams by artificial step-pool sequences, which imitate the natural step-pool morphology of steep mountain streams. Ideally, step-pool systems do not need maintenance, fail gradually during an overload scenario, and are more valuable from an ecological point of view. However, only little is known about the design criteria, stability, and failure mechanisms of such artificial step-pool systems until now.



Fig. 1: Side view of the experimental flume (flow direction from left to right)

The aim of the Master thesis / Project based research work is to conduct **physical flume experiments** to investigate the scour development, stability, and failure mechanisms of artificial step-pool sequences. The student will be testing the effect of channel width, bed slope, and block size and optimizes the arrangement of the step-forming blocks. The results of this thesis contribute to the development of design guidelines for practitioners.

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Particularities:

1 student for a Master's Thesis / Project
based research work

Report in English or German