

Modeling hazards related to large wood in rivers



Close-to-prototype-scale experiments on resulting backwater rise Δh (a) without and (b) with 15% organic fine material

During flood events, transported large wood (LW) accumulates at river infrastructures or is retained intentionally at LW retention structures. In both cases, the accumulation results in an upstream backwater rise and may lead to flooding of the nearby area. Therefore, engineering measures are necessary to mitigate LW accumulation risks.

The number of investigations on the role of LW during flood events has considerably increased within the last decade. At the Laboratory of Hydraulics, Hydrology, and Glaciology (VAW) of ETH Zurich, several studies were conducted on LW accumulation probability and rate. Formulae to estimate the resulting backwater rise already exist, but the governing parameters are still contradictory. The influence of bridge piers and a moveable river bed on LW accumulation probability have not been accounted for so far.

The **main goals** of this doctoral research project can be described as follows:

1. Quantify the LW accumulation probability at bridge piers
2. Estimate the LW accumulation characteristics during a flood event
3. Apply a 2D numerical model to simulate LW accumulation probability
4. Identify potential measures for risk reduction at bridges

The overall objective of this doctoral research project is the estimation of LW accumulation characteristics to improve flood safety and risk assessment. It is commissioned by the Swiss Federal Office for the Environment (FOEN) and part of the joint research project WoodFlow “Large wood management in rivers – a practice-oriented research project in Switzerland”.

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