Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Versuchsanstalt für Wasserbau,
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Master's or Project Thesis
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Hydrodynamic processes due to a series of partially spanning logjams

Wood is a relevant part of a river ecosystem and affects both flow conditions and morphological structures. Transported wood in rivers may lead to accumulations (logjams) at shallow water areas or natural and artificial obstructions. Such logjams generate important riverine habitat by increasing the upstream water surface elevation, i.e., backwater rise, and creating an upstream pool with slower, deepened water. Depending on the number of transported logs and the flow conditions, the resulting backwater rise can provoke a flood hazard. Therefore, the prediction of backwater rise due to logjams is required to inform river restoration as well as flood hazard assessment efforts.

Fig. 1: Partially spanning logjam at Beaver Creek (Colorado, USA; photo: I. Schalko)

In nature, logjams can exhibit various shapes, including partially spanning logjams (Fig. 1). First experiments at VAW focused on individual partially spanning logjams but neglected the interaction of partial logjams positioned in series. In this thesis, flume experiments are to be conducted to study how the flow depth and flow velocity are altered by partially spanning logjams positioned in series. The objectives are to (1) determine the required number of logjams to sufficiently increase flow heterogeneity and (2) estimate the resulting backwater rise due to partially spanning logjams positioned in series. The results will contribute to an improved process understanding of wood in rivers.

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Remarks:

Hydraulic laboratory experiments;
Project language: English or German
1 student for Master's or up to 2 students for project thesis