Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Versuchsanstalt für Wasserbau,
Hydrologie und Glaziologie

Project work or Master's thesis
Spring Semester 2021

Examiner: Prof. Dr. Robert Boes
Supervision: Dr. Isabella Schalko

Hydrodynamic processes due to 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, 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)

An analytical model to describe backwater rise due to logjams was derived based on channel-spanning logjams. In nature, logjams can exhibit various shapes, including partially spanning logjams (Fig. 1). The associated hydrodynamic processes have not been studied using flume experiments. Therefore, a series of experiments are to be conducted to study how the flow depth and flow velocity are altered by partially spanning logjams. The objectives are to (1) determine the required relative logjams spanning ratios to sufficiently increase flow heterogeneity and to (2) estimate the resulting backwater rise due to partially spanning logjams. The results will contribute to an improved process understanding of wood in rivers.

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Remarks:

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