Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Laboratory of Hydraulics,
Hydrology and Glaciology

Master's Thesis or Project Work
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Riverbed morphologies around engineered logjams: physical modelling

The implementation of wood in rivers has been recently re-evaluated as a useful tool for river restoration projects. Macro-roughness elements like rootwads or engineered logjams can enhance flow heterogeneity and riverbed morphologies, increasing diversity of habitats for aquatic species. On the other hand, such structures alter flow dynamics and hence sediment transport, making it difficult to predict their development under flood conditions. As Switzerland is targeting to restore 4000 km of river reaches by 2090 (Swiss Waters Protection Act 2011), further research is needed on this topic.

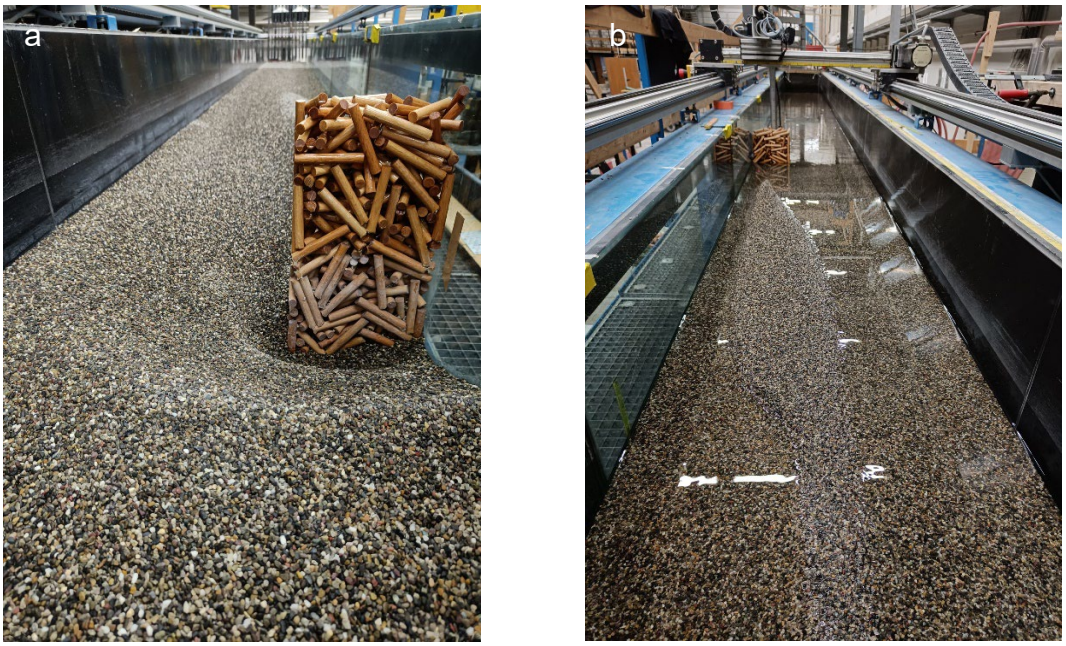

Fig. 1: (a) Scour upstream and around a scaled model of an engineered logjam in the Flussbaurinne, VAW. (b) Bar formation downstream of the engineered logjam.

This Master's thesis focuses on the interaction between logjams and sediment transport in physical experiments (Fig. 1). Different grain size distributions are tested as mobile beds in a hydraulic flume under steady state conditions. Scaled models of engineered logjams are investigated, with different porosity and width. Conditions of low and high flows are tested, until equilibrium with the riverbed is reached. The objectives are 1) to measure the flow conditions and the riverbed morphologies around the structure, and 2) to infer these results with possible different scenarios. Results will help river practitioners to better understand the behavior of engineered logjams in rivers.

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Remarks: Laboratory experiments;
Project language: English
1 student for Master's thesis or up to 2 students for project work