

Master Thesis HS 2019 or Project Thesis HS 2019



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Drift wood clogging at fish guidance structures

Vertical fish guidance structures can protect and guide fish at run-of-river hydropower plants. These bar racks with typical bar spacings of 25...100 mm do not represent a physical barrier for small fish, but function as a behavioural barrier. The bars, which are angled to the approach flow, deflect the flow in front of the rack. The resulting hydraulic cues are sensed and avoided by the approaching fish. Since these fish guidance structures lead to high hydraulic head losses and unfavourable turbine admission flow, power plant operators in Europe remain hesitant to use these bar racks for fish protection. The Laboratory of Hydraulics, Hydrology and Glaciology (VAW) therefore developed new, streamlined bar shapes for vertical bar racks, which lead to significantly reduced head losses. The operational aspects such as the processes of driftwood clogging at these fish guidance structures are crucial for the hydropower plant operators. However, the knowledge on these aspects is still very limited.



Left: Fish guidance structure with vertical bars. Right: Investigation of drift wood clogging in a laboratory flume at VAW

In this master or project thesis, the clogging probabilities and processes at fish guidance structures with vertical bars are investigated and possible counter-measures are assessed. The physical model experiments will be conducted in a laboratory flume. The student will identify the governing parameters leading to high clogging probabilities and investigate them systematically. Finally, recommendations will be given to power plant operators regarding the operation of the power plant, the bypass and the rack cleaning machine, and possible counter-measures will be discussed.

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Remarks:	Single Master Thesis or Project Thesis
	Thesis in English or German