

Hydraulics of Horizontal Bar Rack - Bypass System: Field Study at HPP Stroppel

Hydropower plants (HPPs) and dams can block or delay up- and downstream fish migrations and thus cause a decline in species population. Downstream fish passage through turbines or over spillways may increase fish mortality during downstream migration periods. Therefore the implementation of protection systems stopping fish from entering turbine intakes in combination with a bypass as an alternative migration corridor across the dam has a high priority in regard to ecologically upgrading HPPs. For that reason, VAW conducts research on fish guidance structures (FGS) with horizontal bars to adapt and advance them as to safe fish passage and a successful economical implementation.

The goals of the study are to investigate the hydraulics of the Horizontal Bar Rack - Bypass System (HBR-BS, Fig.1a) installed at the case study HPP Stroppel on River Limmat and to link the results from fish monitoring campaigns to the hydraulics of the HBR-BS.

To reach the goals of the study, bathymetry and 3D velocity measurements will be conducted at the HPP under various discharge conditions using an Acoustic Doppler Current Profiler (ADCP) installed on a remote controlled boat (Fig. 1b). The results of the field investigation will be used to analyse the results from the fish monitoring campaigns conducted by Axpo. Overall, the present project will contribute to (i) the understanding of the interactions between fish and HBR-BS, and (ii) a hydraulically efficient and fish-friendly design of a HBR-BS.

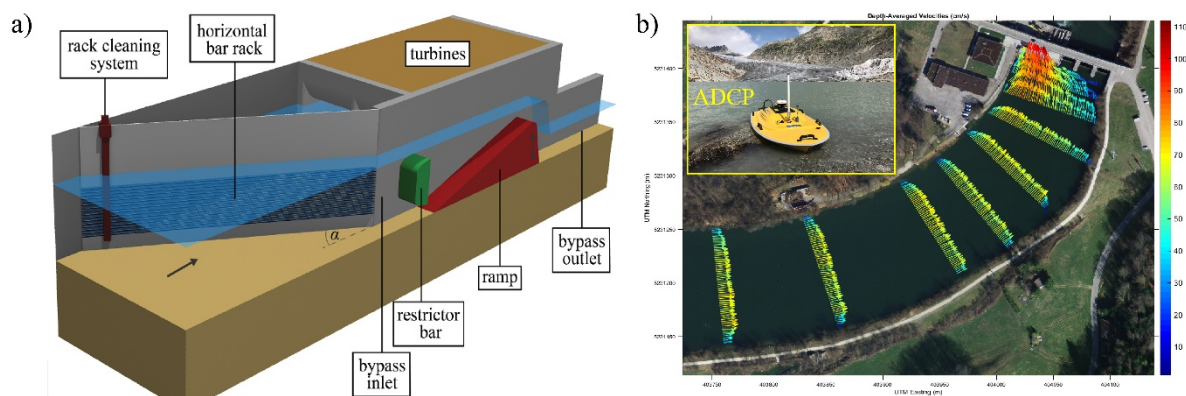


Fig. 1: (a) Horizontal Bar Rack – Bypass System (HBR-BS) and (b) exemplary velocity field at HPP Bannwil on River Aare measured with ADCP

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Particular information:
Experimental work with ADCP
Communication is in English,
Thesis can be written in German or English