

Advancing sediment management of reservoirs: Sensor evaluation for real-time monitoring

Sedimentation in reservoirs leads to a loss of storage capacity and compromises the functionality and operational safety of intakes and outlet works. A strategy to counter the sedimentation of hydropower reservoirs is the systematic venting of fine sediments via the power waterway of the connected hydropower plant (HPP). The increased fine sediment load poses a challenge in terms of hydro-abrasive erosion of the turbines, reducing their efficiency and leading to lower electricity production. To effectively monitor and manage the fine sediment venting, quantifying the sediment load in real-time is key, necessitating the deployment of advanced monitoring techniques.

This thesis addresses this critical need by evaluating the suitability and effectiveness of optical and acoustic sensors in providing reliable measurements of suspended sediment mass concentration and particle size distribution. The study will explore such sensors under laboratory conditions in a customized laboratory setup (Fig. 1) to assess their performance against manufacturer specifications, as well as the impact of particle size and shape on their readings.

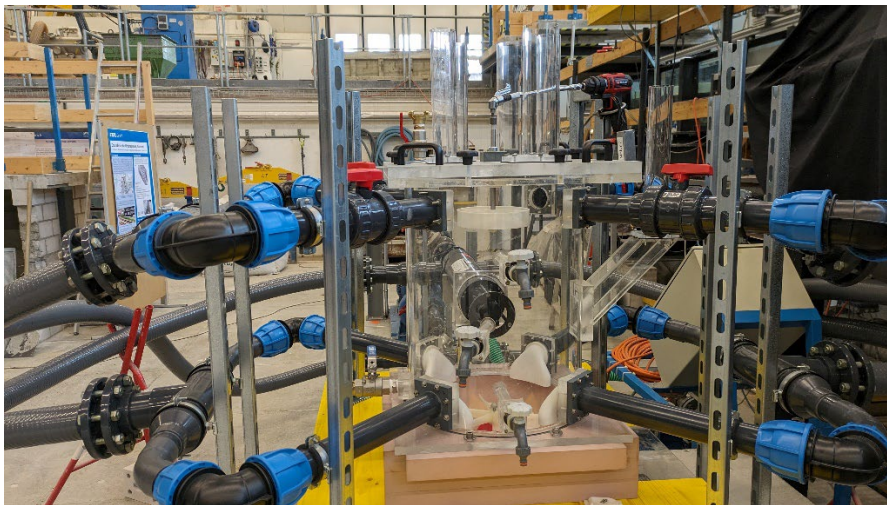


Fig. 1: Photo of customized laboratory setup for sensor evaluation (C. Friz, 2023)

This study is related to [SedVent](#), an ongoing research project on sediment management at a storage HPP in Austria. There might be the opportunity for fieldwork and hands-on experience at the case study site. The findings of the laboratory study will contribute to the evaluation of sensor data recorded at the HPP in the upcoming years. Hence, the study supports the operational efficiency and sustainability of HPPs.

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Remarks: research-oriented thesis; visit of study HPP in Austria possible
Project can be continued with a follow-up project as part of the Master's thesis [if chosen as a Project Work] (possible for Civil Engineers only)