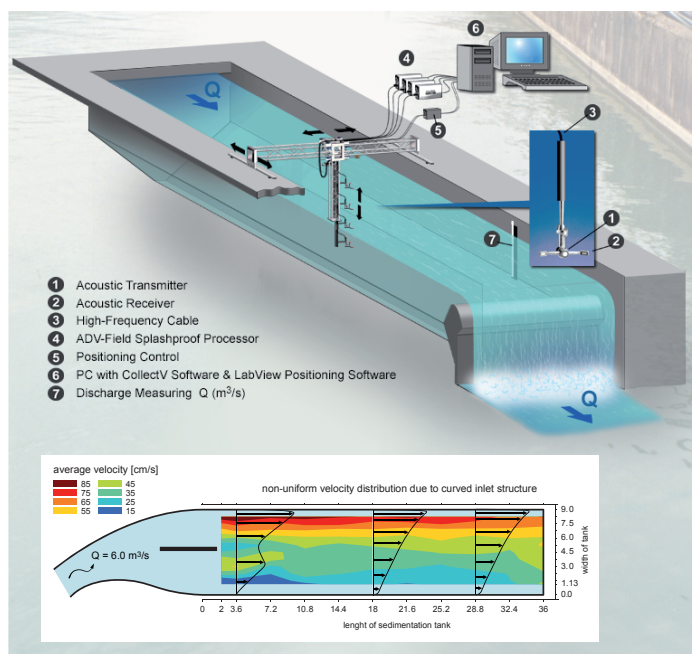


PhD - Desilting basins of hydro power plants (2006)

Considered are desilting chambers and sand traps constructed behind a water intake of a hydroelectric power plant. Water collected from natural rivers mostly contains a certain amount of suspended sediment particles which might be deposited in zones of subcritical flow velocities. These particles are removed in case of increasing water discharge and finally interact with guide vanes, Pelton Needles or runner blades of the power plant. The resulting abrasion erosion is an undesired fact and connected with high expenses due to renovations and operating restrictions.



This PSEL research project rises the question of how to improve the efficiency of a desilting equipment. The research strategy is based on systematic experiments and on previous results collected by VAW during the past 3 decades. Experiments are conducted in situ at three different desilting chambers (L x W x H; 28.1m, 36.0m, 60.0m x 4.5m, 9.0m, 7.5m x 6.61, 2.76, 6.89) at variable discharges. Different sediment flushing systems are considered.

The collected data allow for analyzing the 3-D flow-field in general and the impact of different chamber geometries, inlet structures and flow calming racks in particular. Based on the VAW results proposals will be formulated to achieve a more ideal, i.e. less turbulent flow field, and consequently a more efficient sedimentation of undesired particles.

Main goals of the VAW and PSEL Project:

- documentation of the existing desilting chambers and sand traps of the Swiss hydro power plants
- measuring 3-D velocity profiles at different basins in situ
- studying the influence of the intake boundary conditions on the flow field in silting chambers of different geometry
- development of a new design formula which also accounts for economical aspects.

Keywords:	desilting chamber, desanding chamber, efficient grain size; acoustic doppler velocimeter
Commissioned by:	PSEL project nr. 235, Fund for Projects and Studies of the Swiss Electric Utilities
Project status:	Completed 2006

