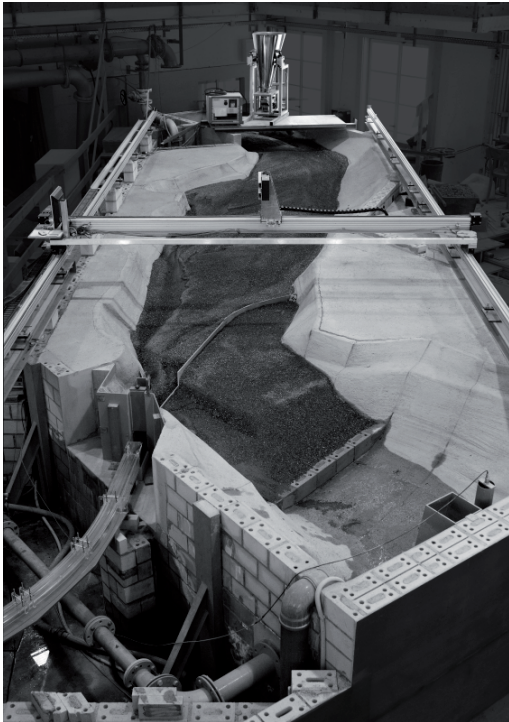
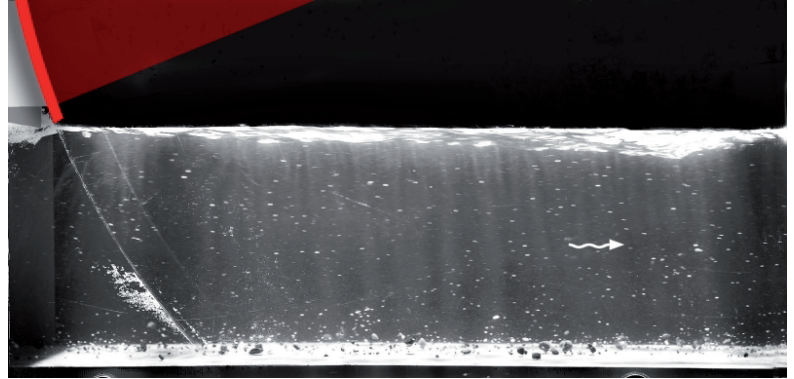


Sediment Bypass Tunnel in the Solis Reservoir (2010)



hydraulic model overview



free surface flow behind the tainter gate



sediment transport in the bypass tunnel

The Solis reservoir is located in the Alps in Grisons, Switzerland and is operated by the electric power company of Zurich (ewz).

Since its construction in 1986, high sediment input during flood events has led to major aggradations in the reservoir. Up to date, nearly half of the original reservoir volume has been filled with sediments from upstream mountain torrents. The deltaic deposition starts extending into the active water volume. Therefore, ewz plans a sediment bypass tunnel to flush the incoming bedload around the dam to the downstream reach. In a first step the reservoir level during flood events is lowered to the minimum operation level. The delta is subjected to free surface flow and the bedload is transported over the delta and deposited further downstream. This sediment relocation decreases the delta volume within the active storage. During further flood events, the incoming sediment is led to the bypass tunnel intake using a guiding structure and flushed through the tunnel. If the flood exceeds the capacity of the bypass tunnel, the surplus flow passes the tunnel intake towards the bottom outlets with the bedload still being flushed through the tunnel. A skimming wall located upstream from the tunnel intake prevents driftwood blocking by leading it to the reservoir front where it can be safely removed. The flushing through the bypass tunnel is investigated and optimized in a hydraulic model at the Laboratory of Hydraulics, Hydrology and Glaciology (VAW).

All tests were carried out in a small scale hydraulic model. The relevant reservoir section was rebuilt with a scaling factor λ of 45.

Keywords:	Sediment Bypass Tunnel, Reservoir Sedimentation
Commissioned by:	Electric Power Company of Zurich (ewz)
Project status:	Completed 2010

