Measures against the reservoir sedimentation of the Solis Dam (2008)

Dam crest of the 61 m high Solis Dam with the reservoir

View of hydraulic model of a scale factor of 1:45 at VAW: dam with the reservoir in the back and the bypass tunnel on the left side.

Reservoir sedimentation may strongly affect the economy of hydropower schemes. The estimated worldwide annual loss of reservoir volume by reservoir sedimentation is practically compensated by the newly built reservoir volume.

The storage capacity of the Solis scheme between Tiefencastel and Thusis, Eastern Switzerland taken into service in 1986, decreased to 75 % of its former volume within only 15 years of operation due to reservoir sedimentation. The current storage volume is still 1.46 ´10^6 m^3 and affords a medium annual power production of 317 GWh. To maintain the reservoir economy up to the year 2058, the electric power company of the city of Zurich (ewz) performed a study of alternatives to solve this hydraulic problem.

The relevant processes of two alternatives were studied using a hydraulic model of a scale factor of 1:45 at VAW. One approach was to convey the bed load as a pressurized flow through the bottom outlet once the delta front has reached the dam. The second alternative would provide a bypass tunnel to discharge the sediment directly into the tailwater downstream of the dam. Both alternatives were based on a controlled reservoir operation including a lowered reservoir water level during the flood period. By lowering the reservoir water level, the delta is exposed to sediment erosion entraining material that is deposited in the remaining reservoir dead storage zone.

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