Large wood retention at the overflow spillway of Ova Spin dam

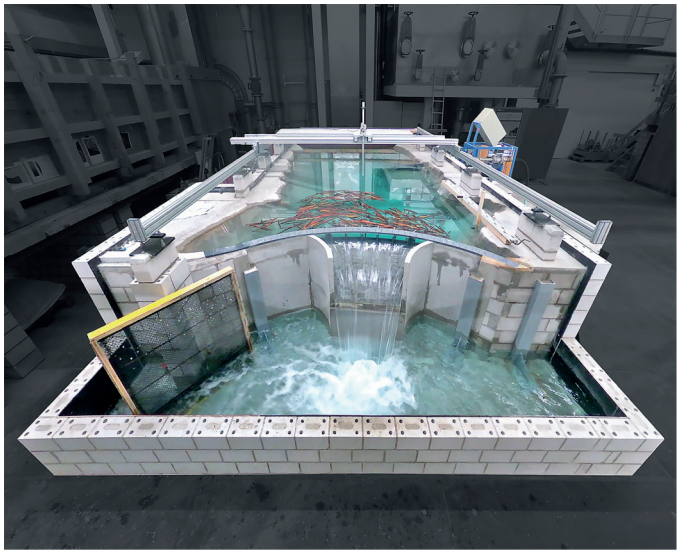

Fig. 1: Physical model at a scale of 1:30

The Engadiner Kraftwerke (EKW) operate a three-stage power plant group with the Ova Spin, Pradella and Martina central plants. The Ova Spin compensating reservoir, which is dammed by the Ova Spin arch dam, forms a hub for water management for energy production. Floods are released via a culvert integrated in the arch dam, a bottom outlet and an arch dam overflow.

On the occasion of the five-year inspection in September 2015 as part of the dam safety review, the Federal Office of Energy (BfE) requested an assessment of the large wood retention at the Ova Spin dam. It must be demonstrated that no inadmissible rise in water level results from the accumulation of large wood at the overflow spillway. Neither the clear width nor the clear height of the spillway openings are sufficient according to the BfE guidelines to safely pass the large wood that accumulates in the event of an incident. Due to the location of the catchment area in the national park, the only possible countermeasure is to safely retain the large wood in the reservoir. In order to be able to assess the resulting effects on dam safety, the EKW has commissioned the Laboratory for Hydraulic Engineering, Hydrology and Glaciology (VAW) of the Swiss Federal Institute of Technology (ETH) Zurich to investigate the large wood retention at the Ova Spin dam in a physical model at a scale of 1:30 (Fig. 1).

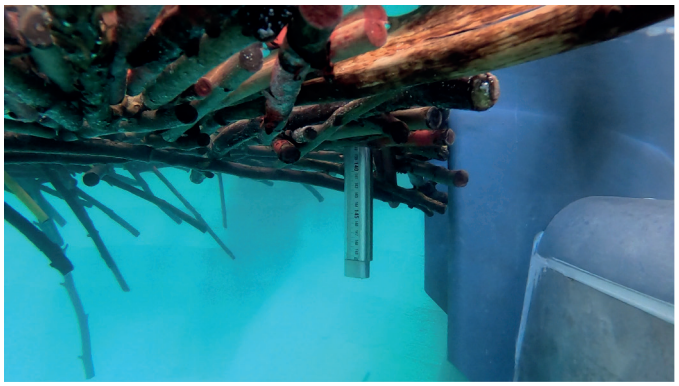

Fig. 2: Photo of a large wood accumulation at the protruding bridge pier of the overflow spillway

The tests with scaled wood have shown that the protruding bridge piers trigger an accumulation at the pier nose and thus take over the function of a large wood retention rack. The cross-section between weir crest and pier nose remains open (Fig.2). The piers reach far enough in the reservoir to ensure free flow. The largel wood retention shown in the model does not lead to an inadmissible water level rise, even in a safety flood. Further considerations on the basis of theoretical principles underline the fact that this ensures the safe retention of large wood at the Ova Spin dam overflow.

The existing physical model of the Ova Spin dam overflow spillway is now used for further fundamental investigations.The effects of a large wood accumulation at an overflow-spillway without protruding piers and the optimal pier length to minimize the water level rise will be investigated.

Keywords:	hydropower, arch dam, spillway, flood protection, large wood retention
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