

Effects of tailwater depth on spillway aeration

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Abstract

Hydraulic structures such as spillways or weirs with their water-air controlling mechanisms are not only important for their structural properties but also for their effects on downstream ecology. Tailwater depth is an important factor affecting dissolved oxygen transfer and aeration rates of spillways. In this study, effects of tailwater depths and discharge values on the aeration efficiencies of laboratory-model smooth and stepped spillways were investigated. Changes of tailwater depths affect the dissolved oxygen transfer rates and aeration efficiencies are affected more than 100%, resulting in supersaturated dissolved oxygen concentrations. Tailwater depth is a significant parameter in the design of the spillway and the stilling basin of dams. Therefore, this value should be estimated correctly.

Keywords: Aeration, tailwater depth, dissolved oxygen, spillway, supersaturated