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溢流拱坝反拱型水垫塘性能的原型观测与模型试验研究

Prototype observation and model test on performances of counter arch floor plunge pools for overflow arch dams

中文关键词:反拱型水垫塘性能 水工模型 原型观测 数值分析

英文关键词:performance of counter arch plunge pool hydraulic model tests prototype observation numerical computation

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中文摘要:

对长潭岗水电站反拱型水垫塘的动水荷载、底板扬压力、锚固钢筋应力、拱端推力等进行了原体观测，并与水工模型试验结果相验证。结果表明反拱型水垫塘可较好地协调地形、结构和水流条件，曲线形状可使水流平顺；由于采用了拱型结构，底板由抗浮稳定转为抗轴向力，从而改善了底板的受力条件。为了预估不同工况条件下水垫塘的工作特性和进一步完善反拱水垫塘设计理论，还对反拱型水垫塘三维流场进行了数值模拟和进一步的水工模型试验。

英文摘要:

The prototype observation of the energy dissipater in Changtangang Hydro Power Station was carried out, in which the plunge pool floor with counter arch structure was applied. The observation items cover the hydrodynamic load, uplift pressure of floor, anchor stress and thrusts of arch abutments, etc. The observation results verify that this type of plunge pool can well accommodate the local valley configuration and the counter arch structure can improve the loading conditions of plunge pool and stabilize the arch abutments. At the same time the flow pattern in the plunge pool is improved and the impacting forces of spillway jet acting on the floor is reduced. In order to perfect the design method of the counter arch plunge pool and predict its performance at different conditions, the flow characteristics and the anchor stress of the plunge pool are also studied by using numerical computations and hydraulic model test.

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