



产品类成果

水轮机全系列水力模型

【创新性】

在国内率先开展水轮机内部流态观测与研究，建立水轮机水力稳定性表征形式，形成全新的水轮机特性评价体系；自主开发水力优化软件设计系统，具备多约束多目标优化设计能力；建立混流式、轴流式和贯流式水轮机全系列水力模型库及个性化定制体系，多项成果填补国内空白；创建混流式水轮机“丰枯水期双转轮配置”专利技术，攻克了径流式水电站丰枯水期流量差别大、水轮机难以兼顾运行的技术难题；系统总结归纳了水电站技术改造的特征，为老旧电站水轮机错综复杂的运行问题提供适用的全方位解决方案。

【影响力】

全新的水轮机特性评价体系已纳入大中型水轮机招标文件；反击式水轮机水力模型已基本覆盖全水头范围，部分性能指标达到国际领先水平；成果已应用于国内 20 多个省的 200 多座水电站和国外 10 多个国家的数十座水电站；近 200 个增效扩容改造项目全部成功；产品成果被国内水轮机制造企业广泛采用，推动了行业的技术进步。取得了巨大社会效益。葛洲坝 ZZ500 转轮填补了我国水轮机系列型谱的空白，有关成果获得国家科技进步特等奖 1 项、国家重大技术装备成果奖 1 项、大禹水利科学技术一等奖 1 项。

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受奖单位：中水科技

【 Innovation 】

The Institute has initially conducted the observation and research of the internal flow pattern of hydraulic turbines in China, established representation modes for hydraulic stability of hydraulic turbines, and created an all-new evaluation system for the characteristics of hydraulic turbines; independently developed the software design system for hydraulic optimization, and possessed the design capability of multi-constrained and multi-objective optimization; established a full range of hydraulic model base, including Francis type, axial-flow type and tubular hydraulic turbines, as well as the personalized customization system, and various achievements have filled in the domestic blank; developed patent technology of “dual wheel configuration in the wet and dry seasons” for Francis turbines, which has overcome the technical difficulty in which there is a big difference in the flow rate of run-of-river hydropower stations between the wet and dry seasons, making it hard for hydraulic turbines to operate smoothly; systematically summarized the characteristics of technical renovation for hydropower stations, and provided all-around applicable solutions for the complicated operational issues of hydraulic turbines at old power stations.



【 Influence 】

The all-new hydraulic turbine characteristics evaluation system has been incorporated into the bidding documents of medium and large sized hydraulic turbines; the hydraulic models of reaction-type hydraulic turbines have basically covered a full range of waterhead, and some performance indicators have even reached the international advanced level; the achievements have been applied in more than 200 hydropower stations across 20 provinces in China as well as a few dozen hydropower stations in more than 10 foreign countries; nearly 200 efficiency increase and capacity expansion renovation projects have been completed; the product achievements have been widely used by Chinese hydraulic turbine manufacturers, which has boosted the technical progress of the industry; achieved great social and economic benefits. The ZZ500 Kaplan turbine of the Gezhouba hydropower station has filled

in the bank of hydraulic turbine type-spectrums in China, and relevant achievements have won one special prize of the National Science and Technology Progress Award, one prize of the national major technical equipment achievement awards, and one first prize of Dayu Hydraulic Science and Technology Award.

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Award-winning Unit : BITC

A FULL RANGE OF HYDRAULIC MODELS FOR HYDRAULIC TURBINES