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中文题名	水轮发电机组图档管理系统和虚拟装配系统研究
英文题名	Drawing Document Management and Virtual Assembly System for Turbine-Generator Sets
中文关键词	软件;图档管理;虚拟装配;三维造型;三维动态模拟
英文关键词	Software;Drawings and Documents Management;Virtual Assembly;Three-dimensional Model;Three-dimensional Dynamic Simulation
中文文摘	摘要水电站涉及电气、水工、机械、厂房等众多的工业图纸,采用传统的依靠人工管理的方法来储存、分类、查阅以及修改等费时费力,效率很低。另外水电站需要经常检修,这些过程中的很多处理经验及技术培训问题也都希望由图档管理系统来电子化管理,提高图纸使用与机组拆装培训的效率。本论文引入了技术数据管理系统(Technical Data Management, TDM)的概念,对万家寨水电站的图档管理系统进行了开发研究。论文详细分析了水电站各部门日常业务流程的特定需求,以图纸管理为核心,设计了TDM系统的体系结构。采用Visual.Net作为开发环境,利用嵌入Volo View Express和对AutoCAD的二次开发,将图纸的查询、阅读、设计、授权等功能集成到技术数据管理系统中,通过使用SQL Server2000,建立TDM系统的数据库管理系统,完成对电站检修和日常维护需要的有效管理。软件开发中还引入了基于用户角色的权限管理机制以确保系统的安全性。装配是产品生命周期中最复杂、最具影响力的环节之一,对产品的成本和质量有着重大的影响。虚拟装配作为虚拟制造的一个关键技术,为装配技术的研究提供了新的突破口。虚拟装配(Virtual Assembly, VA)是通过计算机对产品的零部件进行预装配,从而实现对产品装配过程、装配结果的分析和评价。采用基于UG三维造型和OpenGL三维动态模拟的虚拟装配技术完成水轮发电机组的虚拟装配过程,为水电站工作人员实现水轮发电机组的高效安装检修提供了一个可靠的培训手段。论文完成了水电站技术数据管理系统和水轮发电机组仿真安装检修的软件开发,并成功应用于万家寨水电站中。
外文文摘	AbstractThe drawings and documents of the hydropower station deal with various departments such as electric, hydraulic structure, mechanism, plant house and so on, It is very time-consuming, hard sledding and inefficient to adopt traditional approach depending manual method to storage, classify, browse and modify these drawings. Moreover, the hydropower station needs usual checking and repair. A lot of operation experience and technique training problems during the process also need information-based management to enhance the efficiency of the drawing usage and the training of disassembly and assembly of the turbine-generator. Technical Data Management (TDM) system was introduced for research and development of the Wanjiashai hydropower station Drawings and Documents Management System. The special requirements of daily management of various departments in different power stations were analyzed. Focusing on the drawing management, the system frame was designed as the auxiliary system of TDM. The software was developed by using Visual.Net as a development platform, Volo View Express, AutoCAD and SQLServer2000 as developing tools. TDM has developed various functions, such as querying, reading and designing of drawings and the limits of authority for various users. Consequently, TDM can manage all the necessary information of drawings and parts efficiently to fulfill examine and daily maintenance in the power stations. The security of the system was ensured by limiting customers' authorities. Assembly, which is one of the most important steps in the lifecycle of a product, has a significant influence on the product's cost and quality. Virtual assembly, which is a cutting edge technology, has essentially changed the traditional mode of product development, and is of great research significance. Virtual Assembly (Virtual Assembly, VA) is to analyze and evaluate the product assembly process and assembly results through pre-assembling the product components by computers. Because the virtual assembly can be carried out during the product design process, it can effectively reduce the product development cycle, and save a great amount of research funding. Therefore, to a certain extent it can replace the real test technology research, at least be able to play a role in guiding. The procedure of the turbine-generator disassembly and assembly is completed,

	based on UG 3D modeling and Open GL 3D dynamic simulation. It is a credible method of the turbine-generator assembly and maintenance training.This subject completed the software development of the Technical Data Management (TDM) system and the emulational disassembly and assembly. It has successfully used in Wanjiazhai hydropower station.
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