

论文

锦屏二级水电站施工排水洞岩爆数值模拟

徐奴文 唐春安 周济芳 唐烈先 梁正召

徐奴文, 唐春安, 梁正召: 大连理工大学土木水利学院, 辽宁 大连 116024; 周济芳: 二滩水电开发有限责任公司, 四川 成都 610021;

唐烈先: 大连力软科技有限公司, 辽宁 大连 116000

摘要:

岩爆是一种极为复杂的动力失稳现象.在深埋隧洞的勘察设计和施工过程中,高地应力及其诱发的频繁岩爆,是影响隧道洞室稳定的重要因素之一.作为四川雅砻江锦屏二级水电站的重要的临时工程,施工排水洞在进入埋深1600m后就发生多次岩爆,严重制约了工程的进展,为了研究岩爆发生机理与高地应力之间的关系以及更好地预测岩爆在隧洞内发生的位置,运用渐进破坏过程数值分析软件RFPA(realistic failure process analysis)对施工排水洞进行初步的应力分析,得出与现场实测相吻合的初始地应力拟合曲线.同时,隧洞开挖引起应力重分布而产生的围岩破坏的数值模拟也很好的印证了现场发生的岩爆情况,表明基于渐进破坏过程数值分析的RFPA可以真实地模拟高地应力下岩爆机理.

关键词: 锦屏二级水电站 围岩 岩爆 应力分布 数值模拟

Numerical simulation of rockburst on the drain tunnel in the Jinping Second Level Hydropower Station

XU Nu-Wen, TANG Chun-An, LIANG Zheng-Shao: Department of Civil and Hydraulic engineering, Dalian University of Technology, Dalian 116024, China; ZHOU Ji-Fang, : Ertan Hydropower Development Company, Chengdu 610021, China; TANG Lie-Xian, : Dalian Mechsoft Co., LTD, Dalian 116000, China

Abstract:

Rock-burst is a very complicated dynamical instability phenomenon. High ground stress and its induced frequent rockbursts are major influences of tunnel instability during the survey and design and construction stages. As an important and casual construction of the Jinping Second Level Hydropower Station on the Yalongjiang River, Sichuan Province, when the drain tunnel was excavated at the depth of 1600m, there frequently occurred plenty of rock bursts, which restricted the development of construction. Aiming to investigate the relationship between the rock-burst mechanism and high ground stress, and to effectively predict the location of rock-bursts in the drain tunnel, a progressive failure progress numerical analysis code-RFPA was used to analyze the stress, and the fitting curves of the initial stress were obtained corresponding to the site measurement. Meanwhile, on the basis of RFPA simulation, the disturbed zones in the surrounding rock mass induced by stress redistribution resulting from excavation agreed with the rock-burst fields, which indicated that RFPA can virtually simulate the mechanism of rock-burst.

Keywords: Jinping second level hydropower station surroundingrock rockburst stress distribution numerical simulation

收稿日期 2009-05-20 修回日期 网络版发布日期 2009-08-24

DOI:

基金项目:

国家重点基础研究发展规划(973计划)资助项目(2007CB209400);国家自然科学基金重点资助项目(40638040,10672028)

通讯作者:

作者简介: 徐奴文(1981-),男,湖北武汉人,博士研究生,主要研究方向为岩土工程稳定性分析及岩石破裂过程数值模拟.E-mail:nwxu@yahoo.cn

作者Email:

PDF Preview

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1576KB)
- ▶ 参考文献[PDF]
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 锦屏二级水电站
- ▶ 围岩
- ▶ 岩爆
- ▶ 应力分布
- ▶ 数值模拟

本文作者相关文章

- ▶ 徐奴文
- ▶ 唐春安
- ▶ 周济芳
- ▶ 唐烈先
- ▶ 梁正召

PubMed

- ▶ Article by Xu, N. W.
- ▶ Article by Tang, C. A.
- ▶ Article by Zhou, J. F.
- ▶ Article by Tang, L. X.
- ▶ Article by Liang, Z. S.

---

参考文献:

本刊中的类似文章

---

Copyright by 山东大学学报(工学版)