

论文

基于GIS与数值模拟的三峡水库库首区诱发地震危险性评价

李雪平^{①②}, 李云安^②, 汪洋^②, 李恒^③

(^①中国地质大学(武汉)岩土钻掘与防护教育部工程研究中心 ■ 武汉 ■ 430074)

(^②中国地质大学(武汉)工程学院 ■ 武汉 ■ 430074)

(^③中国地震局武汉地震研究所 ■ 武汉 ■ 430071)

摘要:

采用GIS与数值模拟相结合的方法对三峡水库库首区诱发地震危险性进行评价。通过研究水库诱发地震的影响因素,建立模型进行数值模拟。在GIS平台上,综合数值模拟结果与诱发地震监测结果,建立危险性评价数据库。在GIS支持下,采用最大拉应变准则判别拉伸破坏,采用摩尔-库仑准则判别剪切破坏,对单元进行评价。利用诱发地震监测资料,以发生诱发地震单元的第一主应力、第三主应力、位移作为危险单元的标准,对单元进行二次评价。研究结果表明,建立同一GIS平台下的水库区地质环境、监测资料数据库是建立多因素综合评价模型的基础。采用地震评估模型对模拟结果进行评估,结合监测资料对评估成果进行修正,在三峡库首区水库诱发地震危险性评价中具有一定的可信度。

关键词: GIS, 数值模拟, 水库, 诱发地震, 危险性评价

GIS AND NUMERICAL SIMULATION TECHNIQUES BASED RISK ASSESSMENT OF INDUCED EARTHQUAKE IN THREE GORGE RESERVOIR HEAD AREA

LI Xueping^{①②}, LI Yun'an^②, WANG Yang^②, LI Heng^③

(^①Engineering Research Center of Rock Soil Drilling & Excavation and Protection, Ministry of Education | Wuhan ■ 430074)

(^②Engineering Faculty, China University of Geosciences, Wuhan ■ 430074)

(^③Institute of Seismology, CEA, Wuhan ■ 430071)

Abstract:

GIS and numerical simulation techniques are used to quantitative risk assessment of induced earthquake in the Three Gorge reservoir head area. The technical route is that the simulation model is set up through the analysis of affecting factors. The simulation result is obtained with FLAC 3D. The assessment database is set up by the result of simulation and monitoring data. Each unit is estimated with the maximum tensile strain criterion for judging rock tensile failure and the Mohr Coulomb criterion for judging rock shear failure. The unit is further estimated by comparing the first principal stress, the third principal stress and the displacement where the induced earthquake had taken place after impounding of the reservoir on a GIS platform. The result shows that building database containing various data based on the same GIS platform is the basement of integrated factor model. The result of risk assessment possesses the reliability in the Three Gorges reservoir head area. The simulation result is also calculated with the earthquake model and the calculated result is further modified with the monitored data.

Keywords: GIS Numerical simulation Reservoir Induced earthquake Risk assessment

收稿日期 修回日期 网络版发布日期

DOI:

基金项目:

通讯作者:

作者简介:

作者Email:

参考文献:

本刊中的类似文章

扩展功能

本文信息

Supporting info

PDF (3004KB)

[HTML全文]

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

GIS, 数值模拟, 水库, 诱发地震, 危险性评价

本文作者相关文章

PubMed

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="8575"/>