

模拟高拱坝施工期横缝工作性态的接触 - 接缝复合单元

周伟¹, 常晓林¹, 解凌飞¹, 许文涛², 解敏², 向弘²

(1. 武汉大学 水资源与水电工程科学国家重点实验室, 湖北 武汉 430072;

2. 中国水电顾问集团 昆明勘测设计研究院, 云南 昆明 650051)

收稿日期 2005-10-18 修回日期 2005-12-21 网络版发布日期 2007-1-30 接受日期 2005-10-18

摘要 考虑施工期高拱坝横缝的真实工作性态以及影响横缝开合度的各种因素, 提出一种新的非线性接触 - 接缝复合单元, 该单元可以模拟横缝在灌浆过程中的变形和受力状态上的转化规律, 并导出横缝灌浆时刻复合单元的具体转化格式, 详细介绍接触 - 接缝复合单元的数值实施步骤, 编制数值程序。小湾高拱坝横缝开合度的数值仿真模拟计算结果表明了该复合单元的可行性和实用性。

关键词 [水利工程](#); [高拱坝](#); [横缝](#); [接触单元](#); [接缝单元](#); [接触 - 接缝复合单元](#)

分类号

CONTACT-JOINT MULTIPLE ELEMENT TO SIMULATE TRANSVERSE JOINT OF HIGH ARCH DAM DURING CONSTRUCTION

ZHOU Wei¹, CHANG Xiaolin¹, XIE Lingfei¹, XU Wentao², XIE Min², XIANG Hong²

(1. State Key Laboratory of Water Resources and Hydropower Engineering Science, Wuhan University, Wuhan, Hubei 430072, China; 2. Kunming Hydroelectric Investigation, Design and Research Institute, CHECC, Kunming, Yunnan 650051, China)

Abstract

A new contact-joint multiple element is presented to simulate transverse joints of high arch dam, which may simulate the transforming process of deformation and stress state of transverse joints during joint grouting construction. The mechanical character of transverse joint of arch dam can be simulated by a kind of contact element with function of separating and closing before grouting, and the one by joint element with certain thickness. During the real construction, the grouting will change the structure shape of transverse joint, but mechanical state will complete arch dam after grouting. So the transforming process of deformation and stress state of transverse joints need to be simulated truly, and the new contact-joint multiple element presented in this paper can solve this problem. The detailed transforming method and equation are derived for contact-joint multiple element. Numerical implementation process is described and finite element procedure of contact-joint multiple element is developed. The simulation results of developing process of transverse joints of Xiaowan high arch dam show that the transverse joints will be shrank to be above 0.5 mm for concrete temperature decreases resulted from water cooling of dam before grouting, except that the gaps of a few grouting zones are less than 0.5 mm which can't meet the requirement of common grouting. But the gap of those grouting zones may be larger than 0.5 mm by means of concrete supercooling about 2 °C-3 °C. In summary, the variety and transforming process of transverse joint of arch dam simulated by the contact-joint multiple element may reflect real constructing process, and the computing values of gap are also reasonable. The new contact-joint

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(246KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [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](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含](#)

[“水利工程; 高拱坝; 横缝; 接触单元; 接缝单元; 接触 - 接缝复合单元” 的 相关文章](#)

▶ [本文作者相关文章](#)

- [周伟](#)
- [常晓林](#)
- [解凌飞](#)
- [许文涛](#)
- [解敏](#)
- [向弘](#)

multiple element used in the analysis of high arch dam transverse joint gap is feasible and practicable.

Key words [hydraulic engineering](#); [high arch dam](#); [transverse joints](#); [contact element](#); [joint element](#); [contact-joint multiple element](#)

DOI:

通讯作者