

## GFRP锚杆拉拔时效模型研究

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## PHYSICAL MODELLING OF TIME DEPENDENT PULLOUT BEHAVIOR ASSOCIATED WITH GFRP ANCHOR

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- 摘要
- 参考文献
- 相关文章

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摘要 近年来GFRP锚杆因耐腐蚀性好、强度重量比高等优点而逐渐应用于边坡等岩土体的支护,但其时效力学特性却对加固的岩土体造成了潜在的威胁。本文在分析GFRP锚杆拉拔机理的基础上,引入Merchant流变模型,建立了反映GFRP锚杆拉拔时效特性的黏弹性流变模型。根据推导出的控制方程,运用有限差分方法得到了锚杆轴力、剪应力和位移沿杆长的分布,及其随时间变化的规律。在该模型的基础上,对影响GFRP锚杆拉拔时效特性的主要因素进行了一系列的参数研究,并得到了一些关于GFRP锚杆加固机理的结论。

关键词: 锚杆 玻璃纤维增强复合材料 拉拔 流变

Abstract: The GFRP anchors have advantages over the steel anchors in terms of better corrosion resistance, higher strength-to-weight ratio and so forth, in recent years, they have been gradually utilized to stabilize slopes and other geo-structures. However, stability condition of these geo-structures may be significantly affected by the time-dependent mechanical characteristics of GFRP anchors. According to the pullout mechanism of GFRP anchors, a visco-elastic model which is based on the Merchant rheological model, is proposed to describe the time dependent pullout behavior of GFRP anchors. The finite difference method is used to solve the third-order partial governing equation derived from the proposed model. The distributions of tensile force, shear stress, and displacement and their variations with time are calculated. Furthermore, a parametric study is conducted to study the influence of model parameters on the time-dependent pullout behavior of GFRP anchors. Conclusions relevant to the reinforcement mechanism of GFRP anchor are drawn subsequently.

Key words: Anchor Glass Fiber Reinforced Polymer(GFRP) Pullout Rheology

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