

论文

深厚覆盖层在水库蓄水后渗流场变化情况下稳定性分析

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摘要:

渗流场对深厚覆盖层的影响主要表现在渗水对覆盖层的物理化学以及力学方面的作用。本文以金沙江鲁地拉水电站库岸典型地段的深厚覆盖层在蓄水后的稳定性为研究实例。在现场深入调查,查明地质结构、深厚覆盖层的物质组成、分层特征、粒度组成、物理力学性质及渗透参数的基础上,利用三维有限元程序对覆盖层的变形破坏进行了计算,分析水库蓄水后渗流场的变化对深厚覆盖层的影响。分析结果表明,江水抬高5m后,渗流场发生变化。受渗透压力的作用,覆盖层在平行河流和垂直河流方向变形位移不同,平行河流方向最大变形量为50cm,垂直河流方向的最大变形量为133cm,地面最大沉降量为188cm,如此大的变形将会造成覆盖层的变形破坏,进而影响其上部建筑物和公路的安全。

关键词: 深厚覆盖层,渗流场,有限元法,非线性

STABILITY AND DEFORMATION OF DEEP AND THICK OVERBURDEN DUE TO CHANGED SEEPAGE CONDITIONS AFTER RESERVOIR IMPOUNDING

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Abstract:

The impact of seepage field on deep and thick overburden mainly manifests in the physical,chemical and mechanical aspects of the ground. In this paper,a deep and thick overburden in typical place of Lu dila hydropower reservoir banks on Jinsha River is used as examples of stability analysis after reservoir impounding. The site has a detailed ground investigation. The ground investigation includes geological structure,material composition,hierarchical feature,physical and mechanical properties,grain composition and infiltration parameters. Using those data,the deformation of deep and thick overburden is computed with a three dimensional finite element program. The seepage aspect to the deep overburden is analyzed. The results show that after the river water level elevates 5 meters,the seepage changes. Under the effect of osmotic pressure,the deformations on the parallel and perpendicular direction to the river are different. The largest deformation on the parallel direction to the river is 50 cm. The largest deformation on the perpendicular direction to the river is 133 cm. The largest decrease in production is 188 cm. Such a large deformation can cause deep overburden damage,thereby affect its upper buildings and road safety.

Keywords: Deep and thick overburden Seepage field Finite elements Non linear Reservoir impounding

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