

## 三峡库区某滑坡稳定性模型试验研究

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## STABILITY OF LANDSLIDE ON THREE-GORGES DAM RESERVIOR WITH PHYSICAL SIMULATI ON MODEL

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- 摘要
- 参考文献
- 相关文章

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**摘要** 三峡库区地质灾害严重而且多发,其中滑坡灾害问题尤为突出。开展滑坡的模型试验与理论研究对于防灾减灾以及滑坡预报具有重要的价值与意义。以塘角村1号滑坡为例,在充分认识其地质原型的基础上,在室内进行了大量土工试验及水理性质实验(包括野外取样实验及相似材料实验),并根据相似理论优选了该滑坡的相似材料,利用实验室自行研制的“地质环境模拟实验装置”建立了滑坡地质力学模型;在滑带土模拟问题上,采用土工模及聚乙烯薄膜取代使模型试验更能与野外相吻合。考虑降雨及地表水体造成滑坡体地下水位变化及控制面抗剪强度削减从而改变其稳定性的过程,设计了2种切合实际的模拟工况进行实验,结合电感调频式传感器结合无纸记录仪实时监测滑坡地表位移、孔隙水压力、土压力等指标的变化情况。结果显示,在暴雨 $220\text{mm} \cdot \text{d}^{-1}$ 持续3d后,在库水位下降至169m时,滑坡前缘失稳。最后对滑坡地表位移时间曲线的变形阶段进行划分,可看出滑坡体前缘可从稳定状态直接进入加速蠕变阶段。

**关键词:** 滑坡 相似材料 地质力学模型 变形阶段

**Abstract:** After construction of the Three-Gorges Dam, many geo-hazards happened on its Reservoir, The landslides are an outstanding issue. In order to take precautions against natural calamities effectively, adoption of the right technique methods to discuss the stability of landslides is essentially. This paper uses the setting of No.1 landslide at Tangjiaocun village as an example. A full prototype model is constructed in laboratory on the basis of the geology, groups of water and soil testing. Thus, in line with the similarity theory and the optimized similar materials for the landslide, the geological environment simulation test device is used to form a two dimensional geological mechanics model in laboratory. The polyethylene films and geomembrane are used to simulate the landslide soil. Rain and surface water can make the groundwater level change of landslide, to cause the shear strength reduction of landslide soil. So, they can change its stability. Two realistic simulation operations are designed. The model test uses inductance frequency modulation response device, ng notes machine without papers, and monitors the change of displacement and pore-water pressure and soil pressure of this landslide model continuously. The test results show that after rainfall(intensity is  $220\text{mm} \cdot \text{d}^{-1}$ , lasting 3d),while reservoir water level drops to 169m, the instability of landslide is at the leading edge. The deformation stages of the landslide curve of displacement with time can be divided to account the toe part of this landslide transferring from the static deformation stage into the accelerating creep stage directly.

**Key words:** Landslide Similar material Gogical mechanics model Deformation stages

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