

失稳加筋土挡土墙加固方案及技术评价

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摘要 加筋土挡土墙是国内外广泛采用的挡土墙建设技术。由于交通荷载的急剧增加和该类挡土墙的固有缺陷, 国内有多处加筋土挡土墙产生变形甚至倒塌。以山东省菏泽市人民路立交桥加筋土挡土墙失稳为例, 对其失稳的内在根源和力学机制进行分析。通过多种加固方案对比, 确定以压力注浆、双向斜拉预应力锚固、挂网喷射混凝土等技术为主的综合加固治理方案; 运用数值模拟层次分析方法, 分别对实施不同技术措施所产生的加固效果进行分析。研究表明, 斜拉预应力锚杆抑制失稳加筋土挡土墙上部的纵向开裂和墙趾剪切破坏带的塑性滑移, 并提供较高的抗拉强度、刚度和较快的增阻速度; 混凝土喷层使墙面弧形外鼓得到约束。经现场实施综合加固方案, 监测结果显示加固工程取得预期效果, 表明该技术方案对类似问题具有推广应用价值。

关键词 [土力学](#); [加筋土挡土墙](#); [失稳](#); [压力注浆](#); [预应力锚固](#); [喷射混凝土](#); [数值模拟](#)

分类号

REINFORCEMENT SCHEME OF FAILURE REINFORCED EARTH RETAINING WALL AND ITS TECHNICAL ASSESSMENT

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Abstract

Reinforced earth retaining wall is a widely used construction technique of retaining walls. Because of the rapid increase in traffic loads and the inherent defects associated with such a kind of reinforced earth retaining wall, many of them fail after operation for a period of time in China. A case study is carried out based on a failed reinforced earth retaining wall in overpass along Renmin road, Heze City of Shandong Province. The reasons of failure and its mechanical mechanism have been analyzed through numerical simulation. By comparison of a few reinforcement means, a comprehensive reinforcement scheme is determined, which frames the pressure grouting, the double directions and inclined applied prestressed anchorage, and the shotcrete with the wire mesh reinforcement. The reinforcement effects given by different techniques have been analyzed by using numerical step analysis method. The results indicate that the inclined applied prestressed anchorage restrains the vertical fractures developed in the upper part of the wall and shear band in the foot corners, providing a higher tensile strength, stiffness and a faster increase in resistance velocity as well. Meanwhile, the

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convex deformation in the side wall has been controlled by the shotcrete.

The application of the reinforcement in site achieves the expectation regarding to the monitored results. It proves that the comprehensive reinforcement scheme has an extent value to the similar engineering.

Key words [soil mechanics](#); [reinforced earth retaining wall](#); [failure](#); [pressure grouting](#); [prestressed anchorage](#); [shotcrete](#); [numerical simulation](#)

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