Advantages of New Slope Protection Technology - Pre-Force Rock Bolt and Connection System

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Abstract:

With the rise of global climate change and increased awareness of environmental protection. This study conducted an in-depth analysis of shallow slope failures along roadways. An innovative wireless sensing model for monitoring soil layer responses was proposed. This model revolutionizes the traditional empirical approach that relies on rainfall monitoring. aiming to enhance the accuracy and timeliness of slope failure early warning systems. The study integrates a rigorous mechanical model with slope stability analysis methods. and designed a wireless monitoring system capable of measuring shallow soil layer responses ,and predicted the time-dependent response of slopes through numerical analysis, thereby providing a reference for the deployment of wireless soil response monitoring modules and the establishment of warning thresholds, The wireless sensing module adopts a microcomputer-based early warning system, Combined with wireless communication technology, It integrates monitoring functions for surface geology, soil moisture, temperature, and other parameters, It forms a sensor network that covers the shallow soil layers, As a reference for disaster prevention activation, Through the analysis of practical cases, This study presents recommendations for optimizing construction methods and material selection. and emphasizes the importance of post-construction monitoring of slopes. Utilizing remote monitoring systems to provide data support. to ensure the safety and stability of the slopes. This study provides practical guidance and theoretical foundation for the future application of slope early warning technology.

Keywords:

Slope failure Wireless sensing technology, Shallow soil layer response, Early warning system, Remote monitoring.