GIN Grouting Method and Intelligent Grouting System: Research and Application (Postprint)

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Date: 2025-08-20T00:00:00+00:00

Abstract

This paper investigates the integrated application of the GIN grouting method and intelligent grouting system in rock mass grouting, utilizing the Lesotho Polihali Dam project as a case study. Aimed at addressing the issues of difficult control, low efficiency, and significant quality fluctuations associated with conventional grouting methods under complex geological conditions, this study adopts the GIN grouting method with grouting energy as its control core, and introduces an intelligent grouting system equipped with real-time data acquisition, parameter adjustment, and intelligent grout stop capabilities to achieve full-process automated control of the grouting operation. Through comparative analysis with traditional grouting techniques, the research demonstrates that this integrated technology offers significant advantages in grout diffusion control, construction efficiency improvement, and grouting quality assurance, thereby validating its feasibility and superiority in similar projects with complex geological conditions.

Full Text

Research and Application of GIN Grouting Method and Intelligent Grouting System

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Abstract

This paper investigates the integrated application of the GIN (Grouting Intensity Number) grouting method and intelligent grouting system in rock mass grouting, using the Polihali Dam project in Lesotho as a case study. To address

the challenges of difficult control, low efficiency, and significant quality fluctuations inherent in conventional grouting methods under complex geological conditions, this research employs the GIN method, which uses grouting energy as its control core, coupled with an intelligent grouting system featuring real-time data acquisition, parameter adjustment, and intelligent slurry stopping capabilities for full-process automation control. Through comparative analysis with traditional grouting techniques, the study demonstrates that this integrated technology offers significant advantages in slurry diffusion control, construction efficiency, and grouting quality assurance, thereby validating its feasibility and superiority for similar projects in complex geological conditions.

Keywords: GIN grouting method; intelligent grouting technology; grouting control

Note: Figure translations are in progress. See original paper for figures.