Deep-Hole Consolidation Grouting Construction Technology for Tunnel and Shaft Structures in Pumped-Storage Power Stations (Postprint)

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Abstract

Pumped-storage power stations feature numerous tall shaft structures; conventionally, consolidation grouting for vertical shafts employs horizontally divergent holes arranged around the shaft walls, but this method presents various disadvantages in actual construction, including safety, schedule, and environmental protection concerns. Through engineering practice, modifying the horizontally divergent consolidation grouting for vertical shaft structures to vertical deep-hole consolidation grouting constructed around the shaft collar can effectively resolve these issues. This paper further summarizes the construction technology for the production trial of deep-hole consolidation grouting of the gate shaft at the water intake/outlet of the lower reservoir at Hunan Pingjiang Pumped-Storage Power Station, providing a reference for similar deep-hole consolidation grouting construction in future pumped-storage power stations.

Full Text

Construction Technology of Deep-Hole Consolidation Grouting for Shaft Structures in Pumped Storage Power Stations

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Abstract

Pumped storage power stations contain numerous large-scale shaft structures. Traditionally, consolidation grouting for vertical shafts employs horizontally divergent holes drilled around the shaft perimeter. However, this method entails significant disadvantages in practice, including safety risks, construction delays,

and environmental impacts. Engineering practice has demonstrated that transitioning to vertically deep-hole consolidation grouting around the shaft collar effectively mitigates these issues. This paper presents a comprehensive summary of the construction technology used in the production-scale trial of deep-hole consolidation grouting for the gate shaft at the lower reservoir intake/outlet of the Hunan Pingjiang Pumped Storage Power Station, offering a reference for similar applications in future projects.

Keywords: Deep-hole consolidation grouting; Pumped storage power station; Shaft

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