

浅埋松软地层开挖中管棚注浆法的加固机理及效果分析

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摘要 管棚注浆法是地下结构工程浅埋暗挖时通常采用的一种超前支护技术。首先对管棚注浆法在浅埋松软地层开挖中的加固机理进行了研究, 然后以某双连拱隧道出口段浅埋破碎带为例, 采用快速拉格朗日有限差分法分别模拟了不采用和采用管棚注浆时围岩的应力场、位移场情况, 定量分析了管棚注浆法的加固效果, 说明采用管棚注浆法能显著抑制松软地层的变形, 减少隧道支护结构的变形和受力, 避免浅埋松软地层开挖中塌方现象的产生。因此, 管棚注浆法是一种行之有效的超前支护技术。

关键词 [隧道工程](#); [管棚](#); [注浆](#); [浅埋松软地层](#); [加固机理](#)

分类号

STUDY OF SUPPORT MECHANISM AND EFFECT OF SHED-PIPE GROUTING TECHNOLOGY FOR TUNNELING CONSTRUCTION IN SHALLOW-BURIED SOFT STRATUM

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Abstract

Shed-pipe combined with grouting technology, one of the advanced support patterns in underground engineering, is often used in the excavation of tunnel by shallow-underground cut method. However, papers about the support mechanism and quantitative analysis of the support effect of shed-pipe and grouting technology are scarce. First, efforts are made to explore the support mechanism of the shed-pipe and grouting technology in the excavation of shallow-buried and surrounding soft rock. Then, examples of tunneling construction of the weathering and crushed zone of the exit of certain double-arch tunnels are presented. By the fast language analysis of continua (FLAC) simulating of the stress field, the displacement field of the surrounding rock, and support structure in two conditions (without and with shed-pipe grouting), the papers present a quantitative analysis of the support effect of the sheet pile grouting technology. Finally, the conclusions are obtained as following: (1) shed-pipe grouting technology can considerably improve the stability of the surrounding rock; (2) it can dramatically reduce the deformation

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and load of the support structure of the tunnel; and (3) it can avoid cave while excavating in shallow-buried and soft ground, as a good advanced support technique.

Key words [tunneling engineering](#); [shed-pipe](#); [grouting](#); [shallow-buried and soft stratum](#); [support mechanism](#)

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