

## 济南西客站站房基坑降水对京沪高铁路基沉降影响分析

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## ANALYSIS OF SUBGRADE SETTLEMENT OF BEIJING-SHANGHAI HIGH-SPEED RAILWAY DUE TO DEWATERING FOR FOUNDATION PIT AT JINAN RAILWAY STATION

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全文: PDF (5395 KB) HTML ( KB) 输出: BibTeX | EndNote (RIS) 背景资料

**摘要** 工程上通常用降水的方法来保证基坑开挖的顺利进行,但是基坑降水会改变基坑周围土的工程性质,所以基坑周围的建筑物必然会受到很大影响,如出现不均匀沉降、建筑物开裂等。济南西客站站房基坑施工降水对其附近的京沪高速铁路路基的沉降产生了很大影响。本文针对此问题,基于在宽站场条件下基坑降水对其周围的桩板复合地基沉降影响的理论尚未成熟,对基坑降水对复合地基沉降的影响进行了研究。本文选取济南西客站断面DK419+250作为研究对象,现场采用沉降板进行路基表面的沉降变化监测,采用分层沉降仪进行路基深层土层的沉降变化监测,采用剖面沉降管进行路基横断面的沉降变化监测,并将各监测结果整理得出站房基坑降水对高铁路基表面沉降的影响、对路基深度方向土层沉降的影响、对路基横断面方向沉降的影响;又根据现场的工况采用有限元软件进行数值模拟计算分析;最终将数值模拟计算结果与现场监测所得结果进行对比,总结了基坑降水对复合地基沉降的影响。通过对比分析结果得出以下结论:(1)复合地基的加固会使路基沉降受基坑降水的影响减小;(2)复合地基的变桩长区域受基坑降水影响较大;(3)基坑降水对路基加固区沉降的影响大于对下卧层沉降的影响。

**关键词:** 基坑降水 路基沉降 复合地基 高速铁路

**Abstract:** Dewatering for foundation pit excavation is usually used. This method can change the engineering properties of soils around the pit. Consequently, the buildings around the pit can be affected. Differential settlements and cracking in the buildings can occur. Dewatering at the pit of the West Railway Station in Jinan made significant effects to subgrade of the Beijing-Shanghai High-Speed Railway Line. This paper examines this problem. The effect of dewatering at the large station pit to its surroundings is not yet fully understood theoretically. This paper studies the effect of the foundation pit to the nearby composite foundation settlement. It uses the section DK419+250 Jinan West Railway Station. Settlement plates are used to monitor the settlement of the subgrade surface. Settlement devices at different ground depths are used to monitor the settlement of the subgrade at depths. The cross-sectional profile device is used to monitor the changes along the cross profile of the subgrade. The monitored results are used to examine the effects of the dewatering on the subgrade surface, its depth soils and its cross profiles. Furthermore, according to the site conditions, the paper uses the finite element analysis method to numerically simulate the on-site monitored results. The comparative studies have the following conclusions: (1)the improvement of the composite foundation can reduce the effect of the dewatering; (2)the area with variable pile foundation lengths can be largely affected by the dewatering; and (3)pit dewatering can have larger effect to the subgrade settlement than the sub-soils.

**Key words:** Ground dewatering Pit excavation Subgrade settlement Composite foundation High-speed railway

收稿日期: 2011-10-25;

基金资助: 京沪高速铁路深厚软土、松软土地段复合地基关键技术试验研究——管桩及CFG桩复合地基路基沉降试验研究(2008G032-A)

引用本文:

王连俊,朱孝笑,张光宗. 济南西客站站房基坑降水对京沪高铁路基沉降影响分析[J]. 工程地质学报, 2012, 20(3): 459-465.

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