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桩承式路堤中土拱效应的改进Hewlett算法

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摘要 桩承式路堤的承载机制即路堤在路堤荷载以及外部荷载的共同作用下, 路堤内部力的传递与分布情况, 而土拱效应是路堤承载特性与各组成部分相互作用的综合反映, 因此分析桩承式路堤的承载机制, 最重要的就是研究其土拱效应。在对Hewlett的平面和空间土拱效应计算方法作必要阐述基础上, 对Hewlett空间土拱效应下塑性点出现在桩顶时的边界条件作了改进, 得到改进后的桩土荷载分担比计算式。并用改进后的计算方法、Hewlett的方法分析桩土荷载分担比随桩帽宽与桩心距之比、桩心距与路堤高度之比、路堤填料内摩擦角的变化规律, 并进行比较分析。最后通过与实测数据和数值分析结果的对比, 验证该改进算法的可靠性与可行性, 可供工程设计时参考。

关键词 [桩基工程; 路堤; 土拱效应; 计算方法; 桩土荷载分担比](#)

分类号

AN IMPROVED SOLUTION OF HEWLETT'S METHOD FOR SOIL ARCHING EFFECT ON PILED EMBANKMENTS

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Abstract

The bearing mechanism of piled embankments, i. e. stress transfer and distribution in the embankments under the interior and exterior loads, can be represented by soil arching effect. Based on Hewlett's soil arching analysis, a more rational boundary condition is assumed when the plastic point begins at the top of the pile cap; an improved analysis method of three-dimensional soil arching effect in piled embankments is proposed; and an analytical solution for pile efficacy is obtained. General expressions are developed giving the load, distribution ratio of pile cap to soil between piles in terms of pile cap size and centerline space, height of the embankment, the friction angle of the granular fill which forms the embankment, and so on. The results of load distribution ratio of piles obtained from Hewlett's solution and the improved method are compared in detail. Finally, a practical case is analyzed to verify the feasibility of the improved method.

Key words [pile foundations; embankment; soil arching effect; computation method; load distribution ratio of pile to soil](#)

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