圆柱形空腔固结解析解及应用

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摘要　　基于圆柱形空腔扩张理论的初始超静孔隙水压力分布，采用分离变量法，在考虑空腔壁处任意排水条件下，求解得到圆柱形空腔扩张引起的超静孔隙水压力消散的一般弹性解析解。讨论分析了剪应力和不同排水条件对超静孔隙水压力初始分布及其消散的影响；同时，与现场固结试验实测的孔压消散曲线进行了对比分析，理论计算与实测结果相符合，表明了该解析解对现场测定土体固结系数和分析打桩引起的孔压消散具有一定的实用价值。

关键词　　土力学；圆柱形空腔扩张；剪应力；超静孔隙水压力；解析解

分类号

ANALYTICAL SOLUTION FOR CONSOLIDATION AROUND A CYLINDRICAL CAVITY AND ITS APPLICATION

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Abstract

Based on the distribution of initial excess pore water pressure due to the cylindrical cavity expansion，an analytical solution for the consolidation around a cylindrical cavity under arbitrary drainage boundary was obtained by using separation of variables. And the effect of different drainage conditions and shear stress on the initial excess pore water pressure and its dissipation during cavity expansion was discussed. Additionally，the comparison between calculated result and field curves of excess pore water pressure dissipation shows that the analytical solution was close to the in-situ consolidation tests；so the analytical solution is valuable for in-situ testing of consolidation coefficient of soils and for analyzing the dissipation of excess pore water pressure due to driving piles.

Key words　soil mechanics；expansion of cylindrical cavity；shear stress；excess pore water pressure；analytical solution

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