土木工程学科

考虑非达西渗流的成层地基一维固结半解析解

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SEMI-ANALYTICAL SOLUTION FOR ONE-DIMENSIONAL CONSOLIDATION OF LAYERED-SOIL WITH NON-DARCIAN FLOW

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摘要

在土中渗流遵从Hansbo非达西渗流的前提下，考虑实际工程中的变荷载，利用解析与数值相结合的半解析方法，对成层地基一维固结问题进行数值求解。将基于Hansbo非达西渗流的双层地基一维固结半解析解与相应的差分数值解进行对比，验证了半解析方法计算基于Hansbo非达西渗流下成层地基一维固结问题的可靠性。最后，对某三层地基考虑Hansbo非达西渗流的一维固结实例进行计算分析，结果表明：基于Hansbo非达西渗流下成层地基的沉降发展速率与超孔隙水压力的消散速率是不一致的。

关键词: 成层地基   非达西渗流   半解析解   变荷载   一维固结

Abstract：

Based on the non-Darcian flow law proposed by Hansbo in layered-soil, the numerical solutions for one-dimensional consolidation of layered-soil was obtained under time-dependent loading by a semi-analytical method. The reliability of the semi-analytical solution for one-dimensional consolidation of layered-soil with non-Darcian flow was verified by comparing the results of double-layered soil with non-Darcian flow law by semi-analytical method with that by finite difference method. Finally, a calculation case of one-dimensional consolidation of triple-layered soil with non-Darcian flow law was analyzed. The results show that the rate of excess pore water pressure dissipation is different from that of the settlement during the consolidation of layered-soil with non-Darcian flow.

Key words： layered-soil   non-Darcian flow   semi-analytical solution   time-dependent loading   one-dimensional consolidation

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