# 应用双剪滑移线理论计算桩端端阻力

鲁燕儿，郑俊杰，陈保国

(华中科技大学 岩土与地下工程研究所，湖北 武汉 430074)

摘要　基于Mohr-Coulomb理论计算得到的桩端端阻力，由于没有考虑中间主应力的影响而与实际结果相差比较大。为此，应用双剪强度理论，借鉴A. Serrano和C. Olalla研究桩端位于岩石中的端阻力计算方法，并基于一定的假设和滑移线模式，建立滑移线场，充分考虑岩土材料的拉伸强度和压缩强度的不等性，得到边界1上的应力圆，通过滑移线的传递公式，得到边界2上的应力，最终推导出考虑中间主应力的桩端端阻力公式。根据武汉地区的实际工程数据，分别按Mohr-Coulomb准则和双剪强度理论求得桩端土为砂土时的端阻力，通过对比分析可知，由于考虑中间主应力的影响，应用双剪强度理论得到的结果更接近实际情况，应用该方法计算桩端端阻力，具有较好的实际应用价值。

关键词　土力学；双剪强度；滑移线理论；承载力

分类号

# DETERMINATION OF END BEARING CAPACITY OF PILE WITH DOUBLE-SHEAR SLIP-LINE THEORY

LU Yaner，ZHENG Junjie，CHEN Baoguo

(Institute of Geotechnical and Underground Engineering，Huazhong University of Science and Technology，
Wuhan，Hubei 430074，China)

**Abstract**

The end bearing capacity of pile based on Mohr-Coulomb strength criterion does not consider the effect of intermediate principal stress，so that the calculated bearing capacity may be rather different from practical data. This paper recommended a method to determine the end bearing capacity of pile in sandy clay by double-shear slip-line theory，which can consider the difference between the tension strength and compression strength of soil material. The effect of intermediate principal stress was included in the formula，which was based on some reasonable hypotheses. It was developed in a way similar to that proposed by A. Serrano and C. Olalla in the determination of end bearing capacity of pile in rock foundation according to the theory of plasticity. In the calculation process，the plastic area was analyzed as a two-dimensional medium using the slip-line method. The overburden pressure，which was assumed to be uniformly distributed，exerted on the virtual surface(boundary 1)，together with the potential external loads that are rested upon it. And then，the stress on boundary 2 was obtained from the stress on boundary 1 by using transferring formula of slip-line. Analyses of the project data collected in the area of Wuhan City were carried out with Mohr-Coulomb strength criterion and the recommended method separately. The results show that the recommended method，in which the effect of intermediate principal stress was considered，was closer to the actual projects. So this method for calculating the end bearing capacity is found to be more useful.

**Key words**　soil mechanics；double-shear strength；slip-line theory；bearing capacity

通讯作者