

# 冻土上限下移条件下高温冻土桩基承载力分析

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**摘要** 在全球升温的背景下, 同时考虑人为施工扰动的影响, 针对青藏铁路早桥桩基稳定性问题, 进行数值模拟研究和物理模拟试验。研究在冻土上限变化条件下早桥桩基的承载力特性, 获得单桩竖向承载力以及冻土上限变化对桩基稳定性的影响规律。桩基的极限承载力随着冻土上限的下移而急剧降低; 随着冻土上限下移, 桩侧摩阻力不断减小, 桩基的侧摩阻力占总承载力的比重也越小, 此时桩端阻力发挥主要作用; 物理模拟试验和数值模拟结果同时说明冻土上限下降的严重后果, 尤其对于极为敏感的高温冻土, 需要加强对桩周冻土的保护, 避免冻土退化。此研究为预测青藏铁路早桥桩基稳定以及高温多年冻土桩基的设计与施工提供参考依据。

**关键词** [土力学](#); [多年冻土上限](#); [高温冻土](#); [桩基](#); [承载力](#); [模拟试验](#); [数值模拟](#)

分类号

## ANALYSIS OF BEARING CAPACITY OF PILE FOUNDATION IN HIGH TEMPERATURE PERMAFROST REGIONS WITH PERMAFROST TABLE DESCENDING

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### Abstract

Based on Qinghai—Tibet Railway engineering, considering construction heat disturbance and global climate warming, aiming at the problem of pile foundation stability in high temperature permafrost regions with permafrost table descending, numerical simulation research and physical simulation tests have been carried out. The bearing capacity characteristics of land bridge are studied under the condition of permafrost table descending. Vertical bearing capacity of single pile as well as the influence rules of pile foundation with permafrost table descending are obtained. Ultimate bearing capacity of pile foundation reduces sharply with the permafrost table descending; and the side resistance of the

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pile foundation has the similar regulation with the permafrost table descending, which becomes smaller in the vertical bearing capacity of single pile. Simultaneity, bottom resistance takes on more and more important effect. The bad aftermath of the permafrost table descending can be illuminated by both numerical simulation research and physical simulation tests. So, the protection of frozen soil around the pile foundation needs to be strengthened, which can avoid frozen soil to degenerate, especially in the soundly sensitive high temperature permafrost regions. Reference basis is provided for the stability of land bridge along Qinghai—Tibet Railway and the design and construction of pile foundation in high temperature permafrost regions.

**Key words** [soil mechanics](#); [permafrost table](#); [high temperature permafrost](#); [pile foundation](#); [bearing capacity](#); [simulation test](#); [numerical simulation](#)

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