

## 青藏铁路路基预制拼装式骨架护坡试验分析

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**摘要** 青藏高原强烈的环境温度变化和特定的地质条件会引起路堤边坡冻胀融沉, 使边坡表层土的强度下降而导致表层流坍甚至边坡滑塌。为保证高原冻土地区人工边坡在一定时期保持稳定, 在北麓河厚层地下冰段设计并开展了预制拼装式骨架护坡路基现场实体工程的试验研究。大面积的坡面被骨架护坡分成菱形窗格后, 形成的塌滑体的范围和厚度减小, 杆件与坡面牢固的连接为一体, 增强了边坡的整体性, 提高了土体的抗剪切能力, 从而加强了土体的抗冲刷能力。此外, 两节杆件垂直于坡面搭接, 组成菱形窗格的一条边, 垂直于坡面方向可以有少许的位移, 适当释放窗格内土体的冻胀力。锚杆、杆件实现了以点带线、以线带面的平面防护形式。分析观测资料表明, 路堤骨架变形呈现寒季冻胀、暖季融沉的一般特点, 且融沉和冻胀变形逐年趋于稳定, 骨架护坡对维持边坡坡面稳定起到了较好的作用。

**关键词** [铁道工程](#); [青藏铁路](#); [冻胀](#); [护坡](#); [变形](#)

分类号

## EXPERIMENTAL ANALYSIS OF EMBANKMENT WITH PREFAB FRAMEWORK SLOPE PROTECTION OF QINGHAI—TIBET RAILWAY

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### Abstract

The severe environmental temperature variation and special geological condition in Qinghai—Tibet plateau would induce frost heave and thawing settlement in embankment slope, leading to collapse of slope face due to soil strength decreasing. To ensure man-made slope stability in certain period in permafrost region in plateau, in-situ experiments of embankment with prefab assemble framework slope protection were designed and carried out in Beiluhe, an area with thick ice in ground. The prefab assemble framework divides large area of embankment slope face into many rhombic pane structures, which decreases the scope and thickness of slope soil collapse. The firm connection of prefab framework with slope face strengthens slope integrity. In the meantime, the soil shear resistance and soil anti-scour ability of embankment slope all increases much. In addition, the two connected assemble frameworks, as one side of rhombic pane, being perpendicular to slope face, allows little displacement which can release frost heaving force of soil in rhombic pane. The anchor-hold and framework connection realizes the plane protection style with lines joining up with points and planes joining up with lines. The observed data show that embankment with framework froze heave in winter and thaws with settlement in summer. The deformation of thaw settlement and frost heaving tends to be steady year after year. Thus, framework slope protection has good effect for maintaining slope face stability.

**Key words** [railway engineering](#); [Qinghai—Tibet Railway](#); [frost heave](#); [slope protection](#); [deformation](#)

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