

铺设保温材料的通风路基三维温度场数值分析

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摘要 通过瞬态温度场的导热微分方程, 采用伽辽金法推导出带相变的三维温度场有限元计算公式, 建立了通风路基温度场的空间计算模型。对青藏铁路中年平均气温在 -4.3°C , 地表年平均温度 -1°C 的路段, 考虑气候变暖, 根据预测在未来50 a气温上升 2.6°C 的情况下, 对铺设与不铺设保温材料的通风路基温度场进行了数值计算和对比分析, 为设计、施工部门提供了理论参考。

关键词 [道路工程](#); [青藏铁路](#); [冻土](#); [温度场](#); [数值分析](#)

分类号

NUMERICAL ANALYSIS OF THE VENTILATED EMBANKMENT WITH THERMAL INSULATION LAYER IN QINGHAI—TIBET RAILWAY

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Abstract

In order to prevent embankment from absorbing heat in hot season, the ventilated embankment with thermal insulation layer is proposed. The thickness of heat insulator is 20 mm and paved 20 cm above upper surface of ducts. The finite element formulae are derived from the differential equation of three-dimensional temperature fields involving phase change by Galekin method. The temperature distributions of the ventilated embankment with and without thermal insulation layer are calculated respectively under the case that the annual mean air temperature in Qinghai-Tibet Plateau will be warmed up by 2.6°C in the future 50 years and the mean annual temperature at the native surface is about -1°C . The results indicated that the insulation layer reduces little absorption of heat for permafrost under embankment in the case and the effect of heat insulation is not so good. The conclusions are given in term of the results of analysis and comparison.

Key words [road engineering](#); [Qinghai—Tibet railway](#); [frozen soil](#); [temperature fields](#); [numerical analysis](#)

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