基于静载试验的土石混填路基压实度检测新方法

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摘要　 针对现有路基压实度检测方法的局限性与不足，首先，利用土石混填路基在受载前后岩土颗粒体积不变的特性，建立出土石混填路基孔隙率的变化模型，导出土石混填路基变形模量的变化关系；其次，将土石混填路基视为半无限弹性空间，并考虑路基在荷载作用下变形模量发生变化的特征，引进分级加载的思想，导出基于布辛奈斯克解的土石混填路基在竖向荷载作用下的变形或沉降计算方法；然后，将土石混填路基初始孔隙率与荷载－位移曲线建立关系，从而提出基于静载试验的土石混填路基压实度检测新方法；最后，将现场试验数据与基于理论公式进行拟合分析，其结果与传统方法较为接近，新方法具有可行性与合理性。

关键词　 岩土力学；土石混填路基；孔隙率；压实度；静载试验；变形模量

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NEW METHOD FOR CHECKING COMPACTNESS OF SOIL-ROCK MIXTURE SUBGRADE BASED ON STATIC LOAD TEST

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Abstract
  Some limitations and insufficiencies still could be found in the detection methods used to check compactness of filled subgrade，so a new method is put forward. Firstly，in view of the characteristic that the solid(soil and rock) volume will not change in the soil-rock mixture subgrade when it is loaded，a model which describes the change of porosity in the soil-rock mixture subgrade is established，moreover，the changing regularity of the deformation modulus of soil-rock mixture subgrade is also deduced. Then，the soil-rock mixture subgrade is regarded as a semi-infinite elastic space，and the changing regularity of its deformation modulus under the action of load is taken into account. A method for calculating the deformation or settlement of soil-rock mixture subgrade under the vertical surface load is brought forward based on Boussinesq¢s solution by adopting the idea of step loadings. Afterwards，the relationship between the initial porosity ratio of soil-rock mixture subgrade and load-displacement curves is established，and the new method for detecting the compactness of soil-rock mixture subgrade is set up based on static load test curves. Finally，the site test data are fitted based on the theory. The analysis shows that the results of the new method are close to those of the conventional indicating the feasibility and rationality of the new method.

Key words rock and soil mechanics；soil-rock mixture subgrade；porosity ratio；compactness；static load test；deformation modulus

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