

论文

隧道中墙承载模型与稳定性判据研究及其应用

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摘要:

如何确定连拱隧道和小净距隧道中墙的合理宽度是隧道设计中的难题.建立了中墙承载应力与隧道跨度、中墙宽度和隧道埋深之间的关系,应用数值方法计算了不同中墙宽度、不同隧道埋深情况下中墙内的垂直应力,采用回归的方法确定了中墙承载的修正系数K与隧道跨度和中墙宽度的关系,从而建立了连拱和小净距隧道中墙的承载模型.将单轴抗压强度作为连拱隧道混凝土中墙的极限强度,根据极限平衡理论建立了小净距隧道原岩中墙加锚支护的极限强度,最后分别给出了连拱隧道和小净距隧道中墙的稳定性判据.举例说明了中墙稳定性判据在设计中的应用,并采用弹塑性损伤有限元计算结果验证了判据的可用性.

关键词: 隧道中墙 承载模型 稳定性判据 连拱隧道 小净距隧道

Tunnel middle wall bearing weight model and stability criterion and its application

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Abstract:

Conforming a reasonable middle wall of a multi-type tunnel and neighborhood tunnel is a difficult problem in tunnel design. The relation between middle wall stress and tunnel span, and middle wall width and tunnel depth was discussed. The stress in a middle wall under different middle wall widths and different tunnel depths was gained by a numerical method. The middle wall bearing weight correction coefficient K was confirmed by the recursive method. Therefore, a tunnel middle wall bearing weight model was set up. For the concrete middle wall of a multi-type tunnel, the uniaxial pressure intensity is its limited intensity. For a neighborhood tunnel, the limited intensity of the middle wall rock reinforced by pre stress bolts was deduced on the basis of limit equilibrium condition. According to middle wall stress and limit intension, middle wall stability criterion was presented, of which its application in tunnel middle wall design was illustrated and validated by elasto plastic FEM result.

Keywords: tunnel middle wall bearing weight model stability criterion multi-type tunnel neighborhood tunnel

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