

论文

基于Lade-Duncan准则的巷道围岩抗力系数

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摘要:

基于Lade-Duncan屈服准则, 合理考虑中主应力、剪胀特性以及塑性区真实弹性应变的综合影响, 推导出巷道围岩抗力系数表达式。结果表明: 与Mohr-Coulomb强度准则下的围岩抗力系数计算值对比, 考虑中主应力影响的Lade-Duncan准则能充分发挥围岩的强度潜能, 提高围岩抗力系数; 剪胀特性对围岩抗力系数影响不可忽视, 不考虑围岩剪胀特性, 将高估巷道围岩抗力系数, 设计偏危险; 另外, 假定塑性区的弹性应变为常数将高估围岩抗力系数, 在围岩剪胀性较强时误差更明显, 实际工程中应考虑围岩塑性区真实弹性应变。

关键词: Lade-Duncan准则; 抗力系数; 中主应力; 剪胀; 弹性应变

Rock resistant coefficient in tunnel based on Lade Duncan failure criterion

Abstract:

Based on Lade Duncan failure criterion and considering the comprehensive effect of intermediate principal stress, dilatancy property and the real elastic strains in the plastic zone, a formula of rock resistant coefficient was derived. The results show that compared with Mohr Coulomb failure criterion, Lade Duncan criterion can increase the rock resistant coefficient and develop the strength potentials of surrounding rock by considering the effect of intermediate principal stress. The effect of dilatancy property on rock resistance coefficient can not be ignored, and if the dilatancy property is not considered, it would overestimate the resistant coefficient of surrounding rock, in that way, the design will be very dangerous. The assumption that elastic strain in plastic zone is constant will also overestimate resistance coefficient of surrounding rock, the error will become more apparent with increasing the dilatancy property. In the practical engineering, the real elastic strains in the plastic zone of surrounding rock should be considered.

Keywords: Lade Duncan failure criterion; resistant coefficient; intermediate principal stress; dilatancy; elastic strain

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