

应变局部化带追踪模拟的复合单元方法与应用

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摘要 利用复合单元技术考虑应变局部化带的影响, 提出一种新的追踪应变局部化带发展的算法。通过直接降低材料参数来体现应变局部化带内软化的影响, 对所有可能发生的应变局部化带的位置和方向进行记录与模拟; 借用节理裂隙的统计方法拟合局部化带, 得到破坏通道; 然后重新对该破坏通道和原有网格信息进行复合单元的拓扑信息生成, 并在此基础上重新进行计算, 对局部化带发展追踪过程进行复核。该算法不要求追踪路径的连续性, 并可充分考虑各局部化带间的相互影响。边坡算例证实所提出方法的可行性和可靠性, 宝珠寺大坝的数值计算与模型试验的对比分析则说明提出的方法已具备解决实际工程问题的能力。

关键词 [边坡工程](#); [应变局部化](#); [追踪](#); [复合单元方法](#); [边坡](#); [大坝](#)

分类号

COMPOSITE ELEMENT METHOD AND APPLICATION OF TRACE SIMULATION FOR STRAIN LOCALIZATION BANDS

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Abstract

The composite element method (CEM) is used to simulate the effects of strain localization bands, based on which a new trace algorithm of the propagation of strain localization bands is proposed. The softening effects within the strain localization bands are illustrated as the decrease of the material parameters, the locations and directions of all the potential strain localization bands are logged and simulated. With the rock fracture statistics technology, the failure passage can be fitted; the messages of this failure passage together with the messages of the initial grid are then used to generate the topology messages of composite elements, based on which the calculation is repeated to check the trace procedure of the strain localization propagation. The trace algorithm proposed does not request the continuity of strain localization propagation paths, and the interaction among localization band segments can be taken into account. The feasibility and reliability of the algorithm are verified by a slope example. The expectation of the algorithm in engineering practices is shown by the comparative study of the Baozhusi gravity dam project.

Key words [slope engineering](#); [strain localization](#); [trace](#); [composite element method](#); [slope](#); [dam](#)

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