



工程力学

ENGINEERING MECHANICS

ISSN 1000-4750

CN 11-2595/O3

CODEN GOLIEB

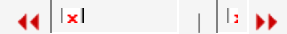
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工程力学 » 2012, Vol. 29 » Issue (9): 112-116,132 DOI: 10.6052/j.issn.1000-4750.2011.01.0016

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基于虚拟裂缝模型的混凝土断裂过程区研究

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STUDY OF CONCRETE FRACTURE PROCESS ZONE BASED ON FICTITIOUS CRACK MODEL

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- 摘要
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摘要

利用虚拟裂缝模型对混凝土断裂过程区进行了研究. 以无限大板中心拉伸裂缝模型为例, 将过程区裂缝张开位移采用多项式级数形式表示, 求得了断裂过程区上的位移分布和粘聚力分布. 进而分析了材料参数对断裂过程区上的位移、粘聚力、断裂过程区长度以及峰值外荷载的影响. 结果表明: 断裂过程区上的位移和粘聚力均为非线性分布. 断裂过程区长度随骨料最大粒径增大而逐渐增大, 随抗压强度增大而逐渐减小. 峰值外荷载随骨料最大粒径和抗压强度增大均逐渐增大.

关键词: 混凝土 虚拟裂缝模型 断裂过程区 拉伸软化曲线 裂缝张开位移

Abstract:

Based on the fictitious crack model, fracture process of concrete is studied in this paper. Taking the tensile fracture model for the center of an infinite plate for an example, and by expressing the opening displacement in fracture process zone in a polynomial, the distributions of displacement and cohesive stress in the fracture process zone are obtained. Furthermore, effects of the material parameters on different physical variables are analyzed, including the distribution of displacement and cohesive stress, length of fracture process zone and peak load. The results show that the stress and the displacement of the fracture process zone are both in nonlinear distributions. The length of fracture process zone gradually increases with the maximum aggregate size and decreases with the compressive strength. The peak load increases with both the maximum aggregate size and the compressive strength.

Key words: concrete fictitious crack model fracture process zone softening curve crack opening displacement

收稿日期: 2011-01-11; 出版日期: 2012-05-28

PACS: TU528

O346

基金资助:

国家自然科学基金项目(90715041); 十一五支撑计划项目(2008BAB29B05)

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引用本文:
卿龙邦,李庆斌,管俊峰等. 基于虚拟裂缝模型的混凝土断裂过程区研究[J]. 工程力学, 2012, 29(9): 112-116,132.

QING Long-bang,LI Qing-bin,GUAN Jun-feng et al. STUDY OF CONCRETE FRACTURE PROCESS ZONE BASED ON FICTITIOUS CRACK MODEL[J]. Engineering Mechanics, 2012, 29(9): 112-116,132.

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