

عنوان مقاله:

Influence of Porosity and Material Ductility on Fracture Process Zone: A Numerical Study

محل انتشار:

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خلاصه مقاله:

A bonded particle model is used to study the fracture process zone in mode I fracture of quasi-brittle materials. The simulated materials are tested in three-point bending tests. A notch is cut through the sample mid-span to encourage the development of the damaged zone. Five different beam sizes of 20×60, 40×120, 80×240, 160×240, and 320×960 mm² were tested. The ductility of the material was controlled by changing the slope of the load-displacement curve in the post peak behavior of the contact points between the material grains or particles. To change the porosity, some particles were deleted from the domain of analysis. It is shown that both porosity and ductility affect the size of the process zone in mode I fracture. While for more brittle materials, the increase in porosity leads to a greater fracture process zone, this is not the case for more ductile materials. In this latter case, the process zone can shrink in size with the increase in porosity

کلمات کلیدی:

Fracture process zone, Porosity, Ductility, Bonded particle simulation

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