

Preface

Natural rock is a complicated geological medium that usually contains all kinds of fissures with unequal scales. Under an applied load, new cracks are readily initiated at the tips of nearby pre-existing fissures, and these new cracks propagate along the direction of axial stress in the rock, resulting in an unstable failure due to crack initiation, propagation and coalescence. With the increase of engineering scales and depths, strength failure and crack coalescence behaviour of rock material have become more and more important. In order to understand deeply the fracture mechanism of rock mass containing intermittent structures, in this book, a lot of experimental and numerical investigations are carried out for all kinds of rock materials containing different fissure geometries, such as a single fissure, two fissures and three fissures.

This book includes nine chapters. Chapter 1 summarises the crack evolution behaviour of rocklike materials and real rocks from the experimental and numerical viewpoint. Chapters 2–4 deal with the strength failure and crack coalescence behaviour of brittle sandstone specimen containing a single fissure, two fissures and three fissures, respectively. Chapters 5 and 6 summarise a systematical analysis on fracture coalescence behaviour of red sandstone containing two unparallel fissures under uniaxial compression by the experimental and numerical simulation. Chapters 7 and 8 summarise the experimental analysis of the effect of high-temperature heat treatments and confining pressure on the strength failure and crack evolution behaviour of pre-fissured rock material. Chapter 9 deals with a numerical investigation on the failure mechanical behaviour of red sandstone containing two coplanar fissures under conventional triaxial compression.

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