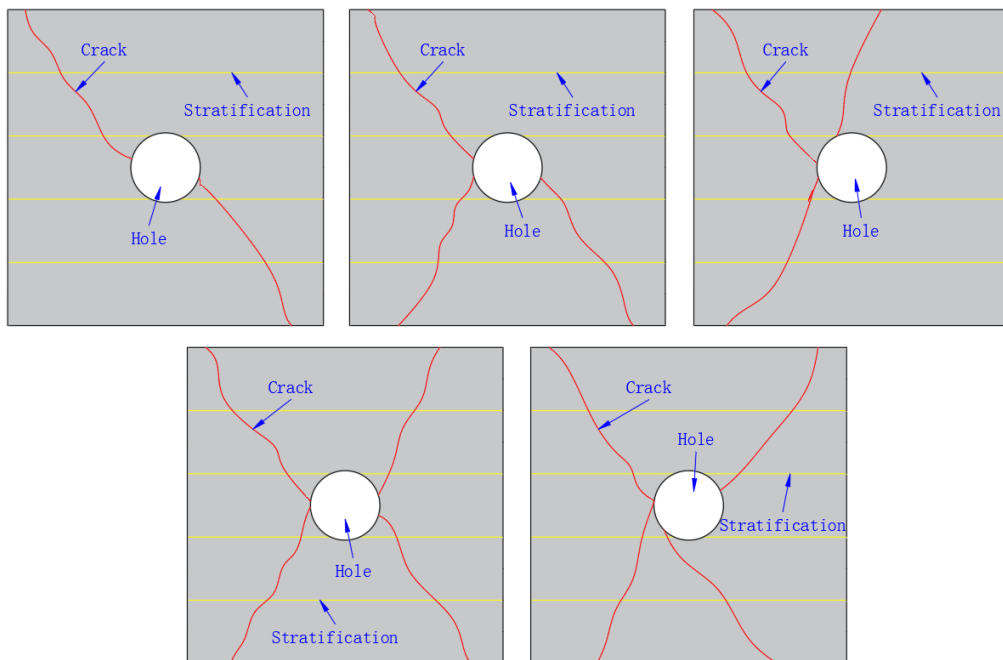
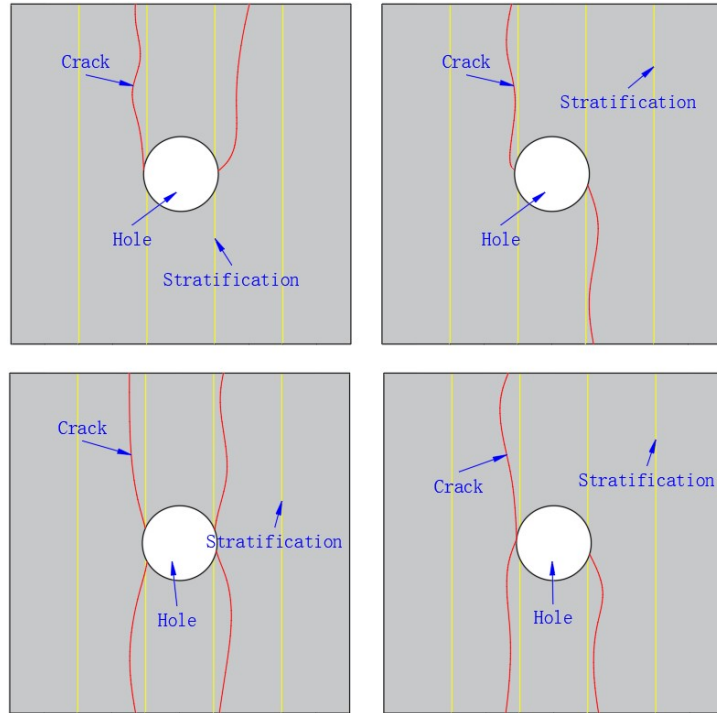


Fig.1 Test material fabrication process and dimension diagram (unit:cm)



(a) a bedding angle of 0°



(b) a bedding angle of 90°

Fig.2 Failure fracture simplified graph of test specimen

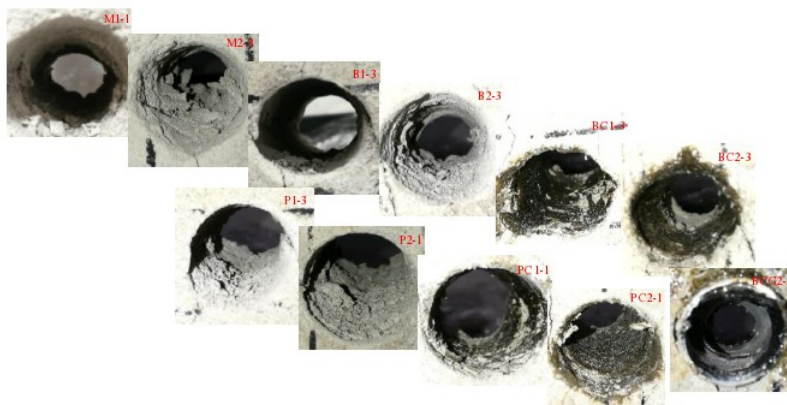


Fig.3 Hole inwall damage-failure condition of reinforced rock with hole

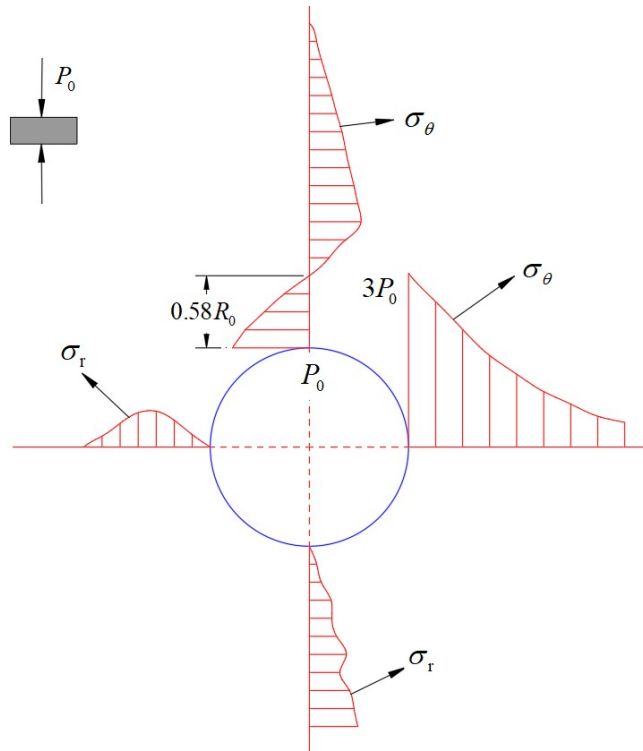


Fig.4 Graph of horizontal and vertical stress distribution along with hole

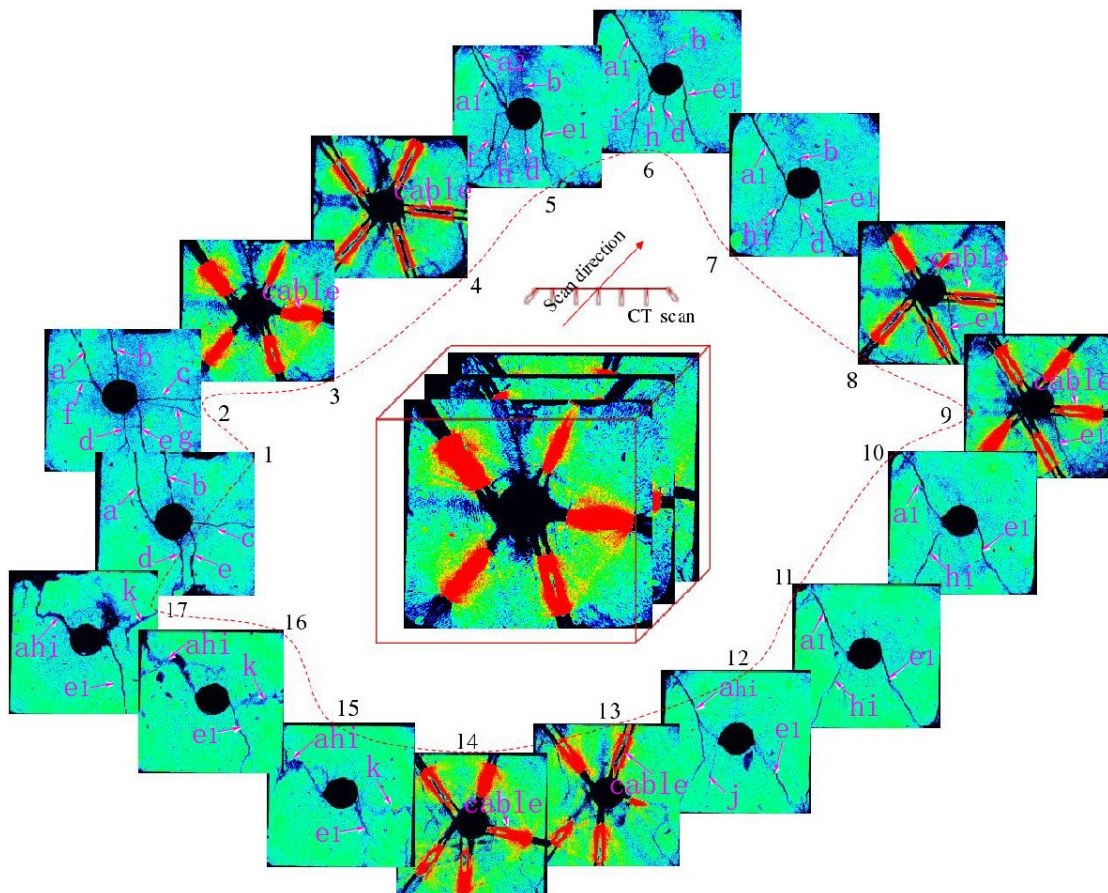


Fig.5 CT scanning fracture surface of reinforced rock with hole

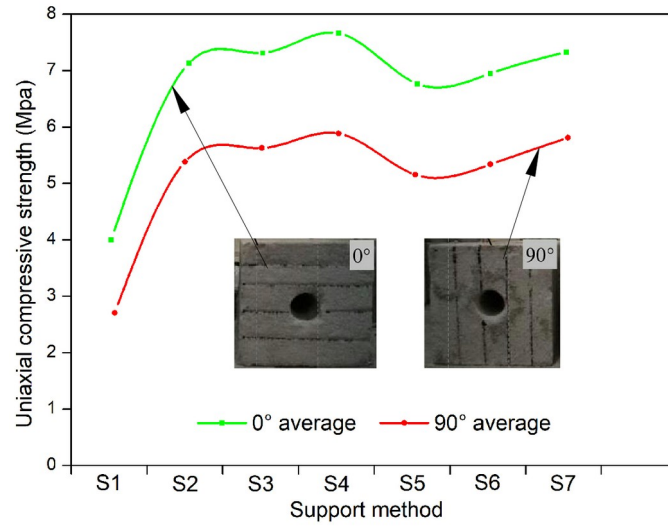


Fig.6 Uniaxial compressive strength diagram of reinforced anchor rock with holes

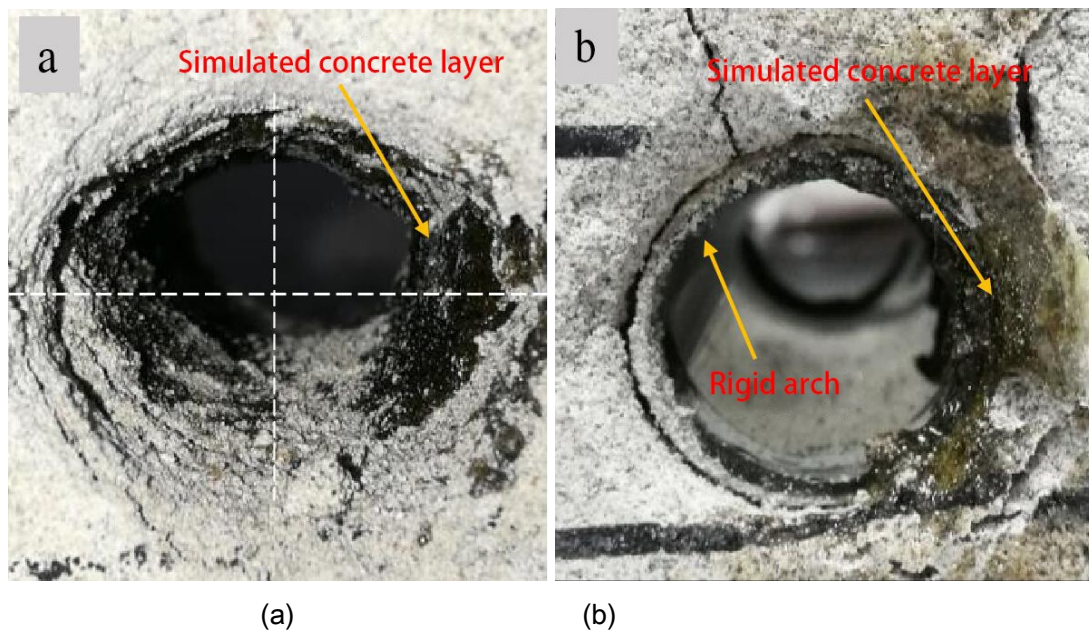


Fig.7 Deformation condition of holes and supporting structure

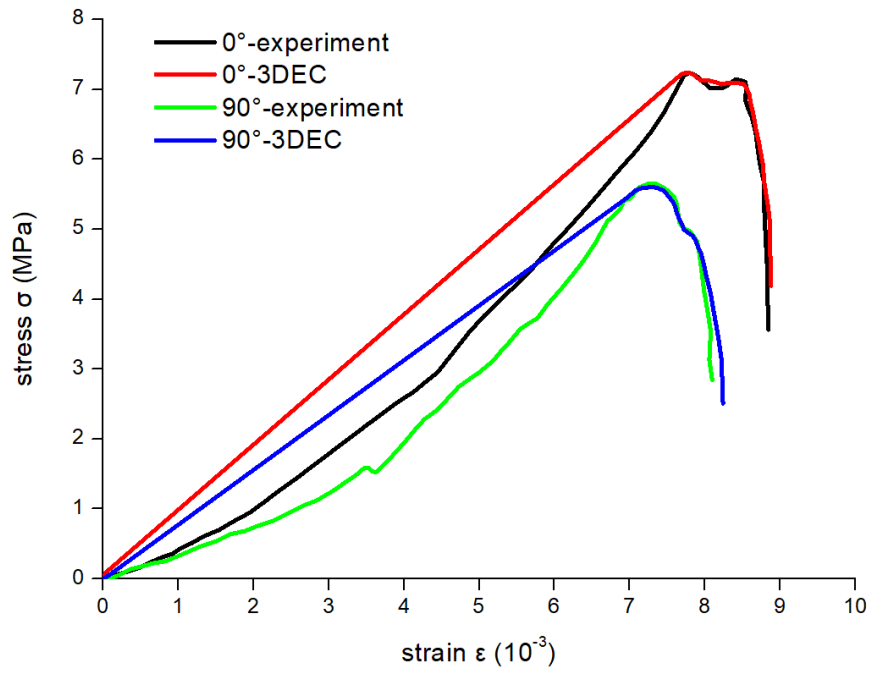
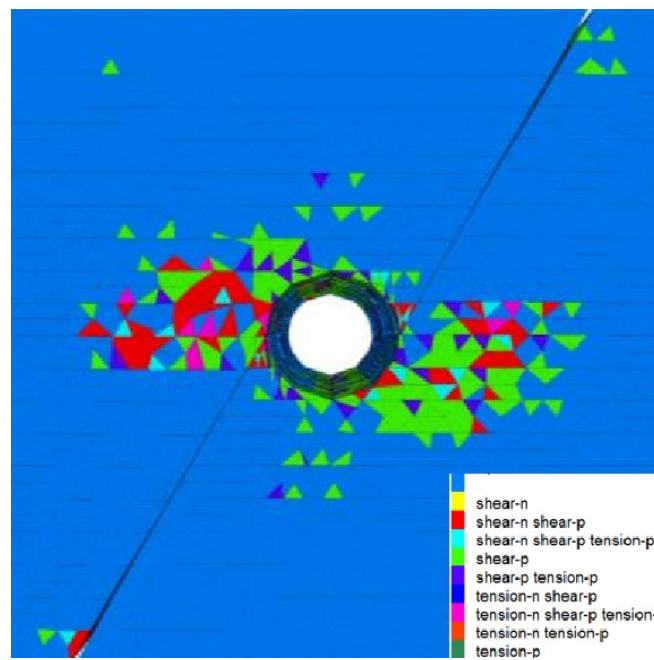
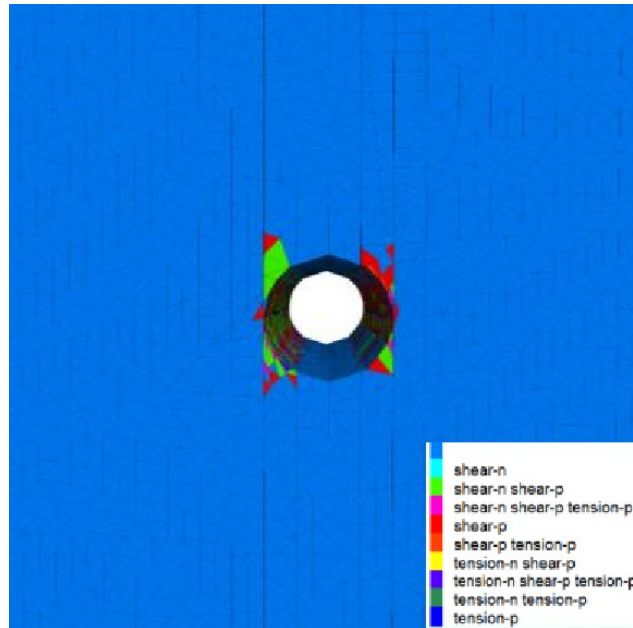


Fig.8 Comparison of indoor test and numerical simulation test results

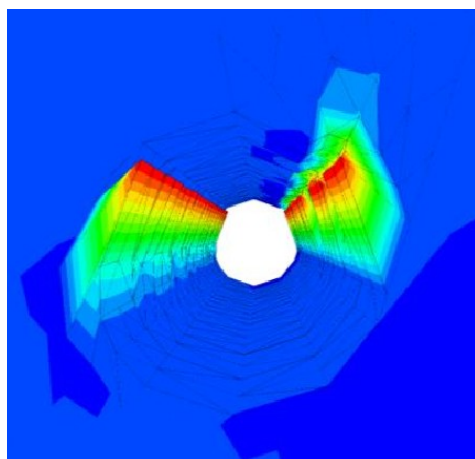


(a) a bedding angle of 0°



(b) a bedding angle of 90°

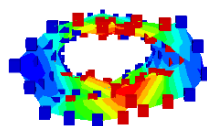
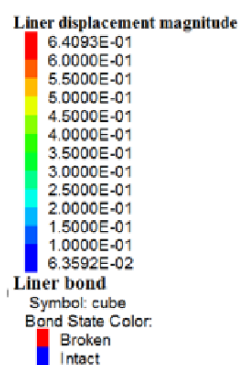
Fig.9 Failure mode of numerical simulation



(a)3DEC simulated hole failure



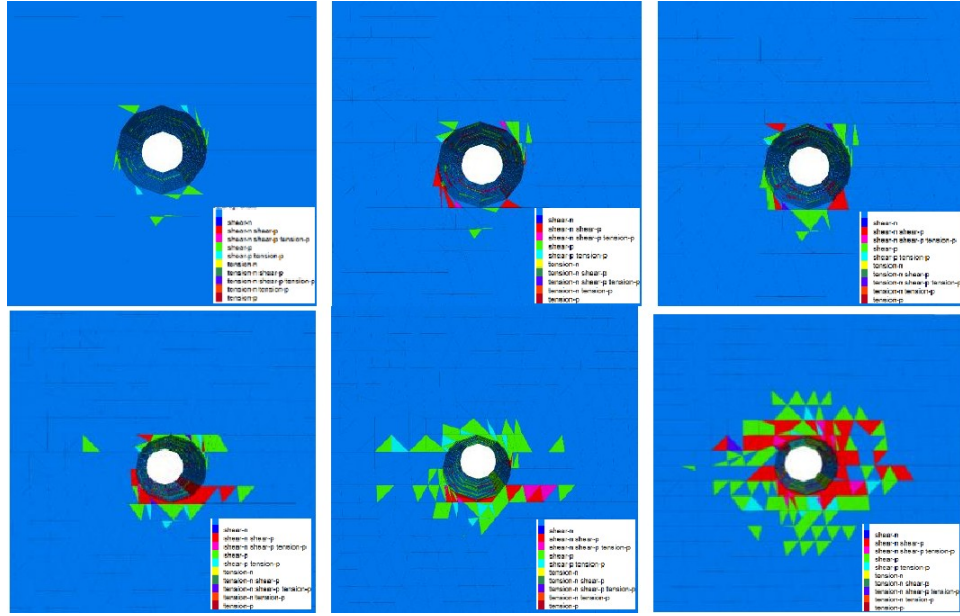
(b) Failure of holes in the test



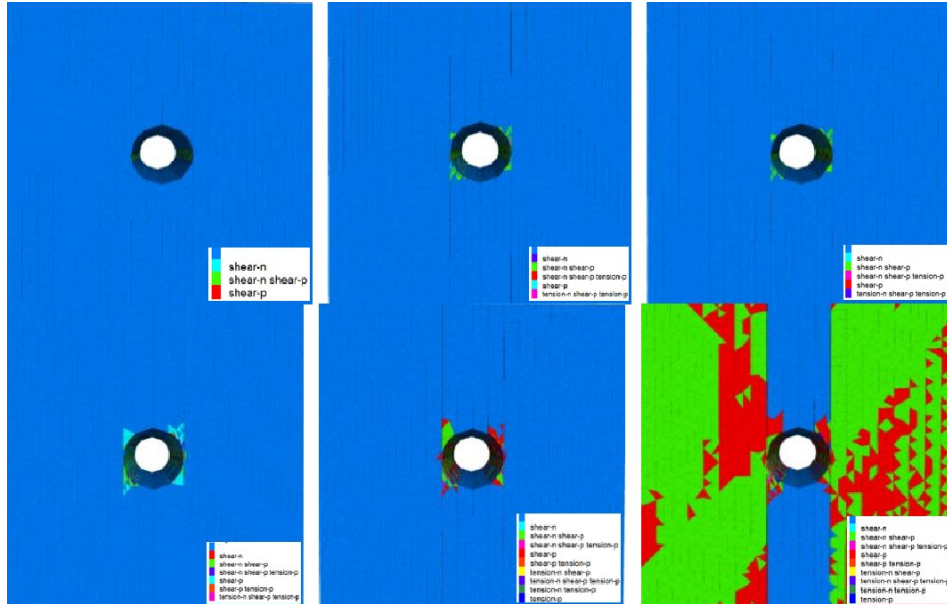
(c)3DEC simulates the deformation of shotcrete (d) Deformation of shotcrete in the test



Fig.10 Damage of hole and shotcrete



(a) a bedding angle of 0°



(b) a bedding angle of 90°

Fig.11 Damage evolution in real triaxial 3DEC simulation test

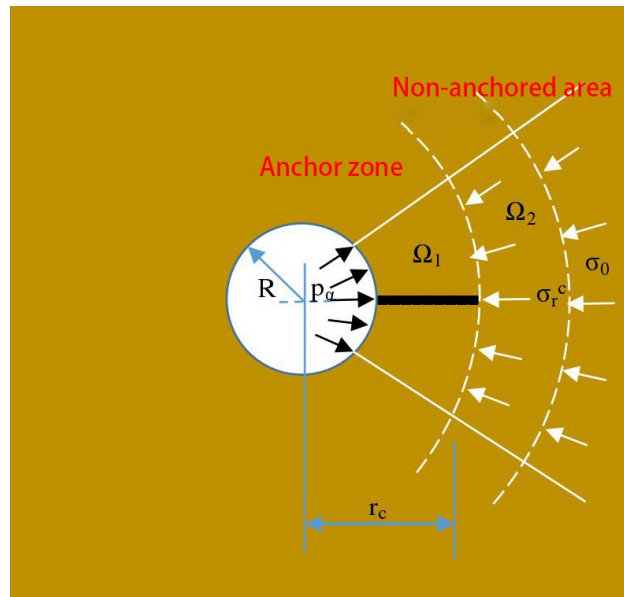


Fig.12 Anchoring mechanical model