Permeability Change in Intermediate Principal Stress Direction during Fault Formation

Manabu Takahashi[1], Xiaochun Li[2]

[1] GSJ, [2] RITE

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A uniform strain distribution in the specimen and permeability measuring technique without any leakage wasn't able to establish at the same time as an experimental procedure. The previous works couldn't adopt the conditions of high pore pressure, high axial differential stress, and continuous loading from intact to failure. A new coupled shear deformation -flow testing system is designed and developed to investigate experimentally the fluid flow characteristics parallel to the intermediate principal stress direction for the rectangular specimens. This paper describes some major aspects of the test system, especially jacketing method and material, geometrical arrangement of grooves and holes for water distribution plate, decision of lubricant for intermediate principal stress direction, and presents the experimental results of the permeability change due to the shear deformation of the final fault plane under general stress states.