

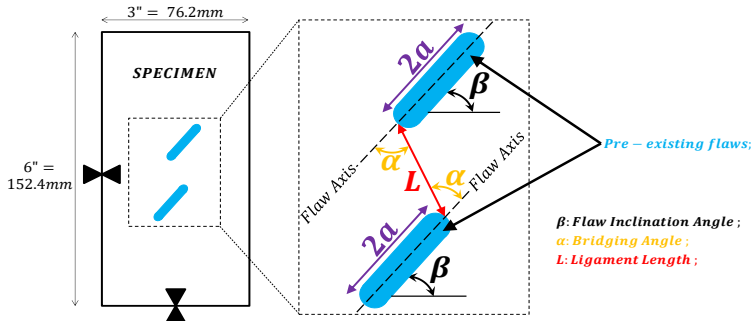
Enhanced Geothermal Systems (EGS): Numerical prediction of the mode and location of fracture initiation

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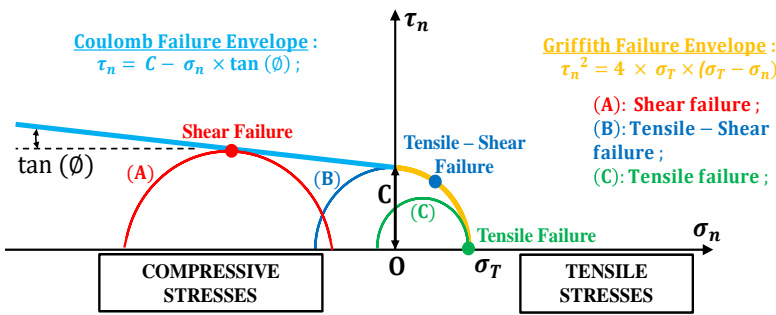
Encadrement : Prof. Dr. Lyesse Laloui <sup>1</sup> / Prof. Dr. Herbert H. Einstein <sup>2</sup>

<sup>1</sup> Soil Mechanics Laboratory (LMS), EPFL / <sup>2</sup> Rock Mechanics Laboratory, MIT

Double-flaw geometrical designation (Gr-L-β-α)



Combined Griffith-Coulomb failure criterion

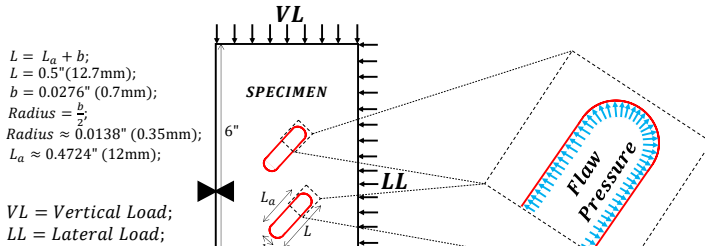


C : Cohesion ;  
tan (φ) : Coefficient of friction ;  
φ : Angle of friction ;  
σT : Tensile strength of the rock ;

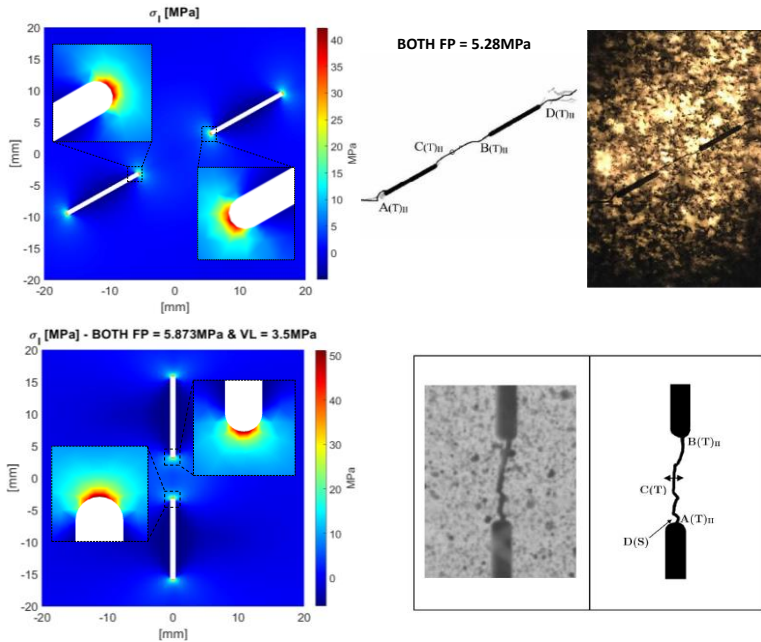
Sign Convention :  
+ σn : Tensile Stresses ;  
- σn : Compressive Stresses ;

Barre Granite (Gr)  
σT = 7.5MPa ;  
C = 15MPa ;  
tan (φ) = 0.6MPa ;

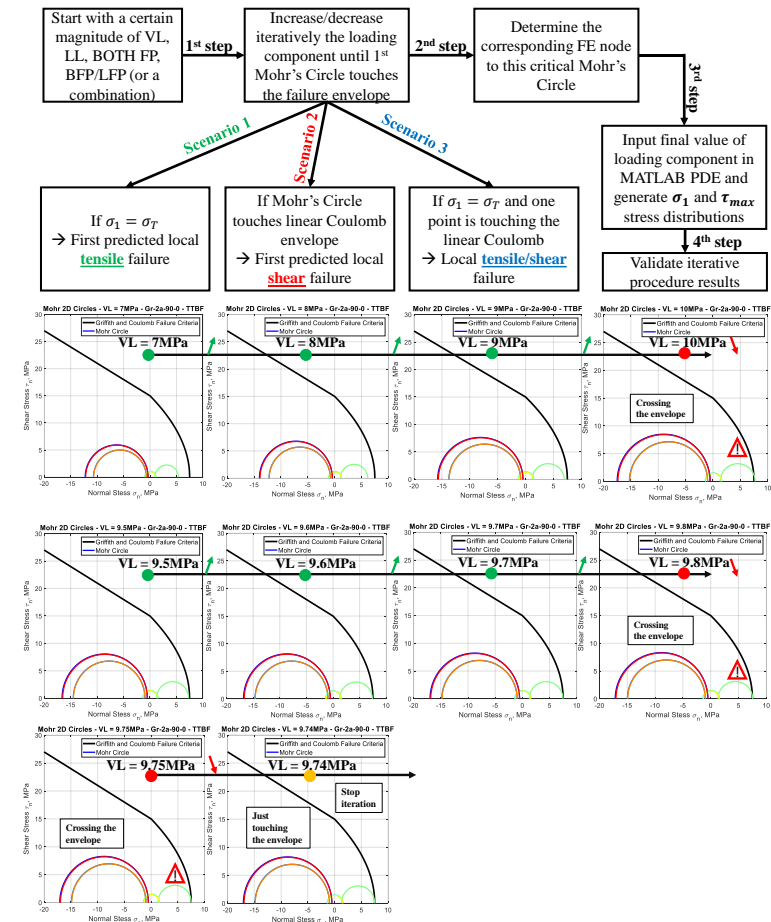
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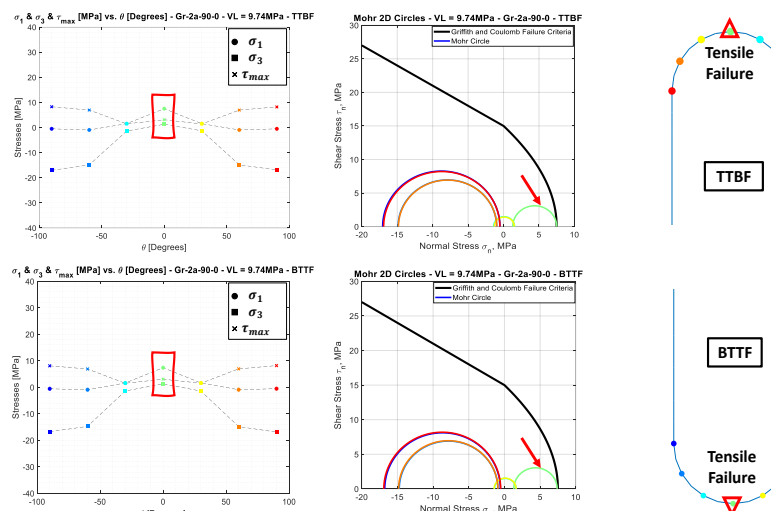
Comparison: NUMERICAL VS. EXPERIMENTAL results



Iterative numerical procedure: Prediction of fracture initiation



Final step of the iterative procedure (TTBF & BTTF)



Maximum principal and shear stress distributions

