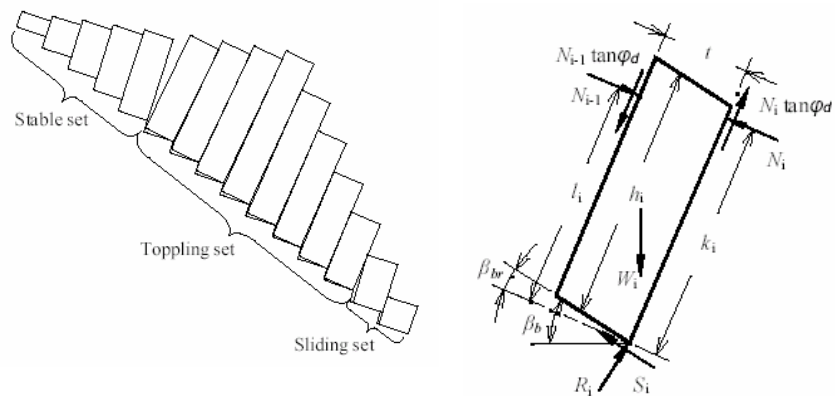


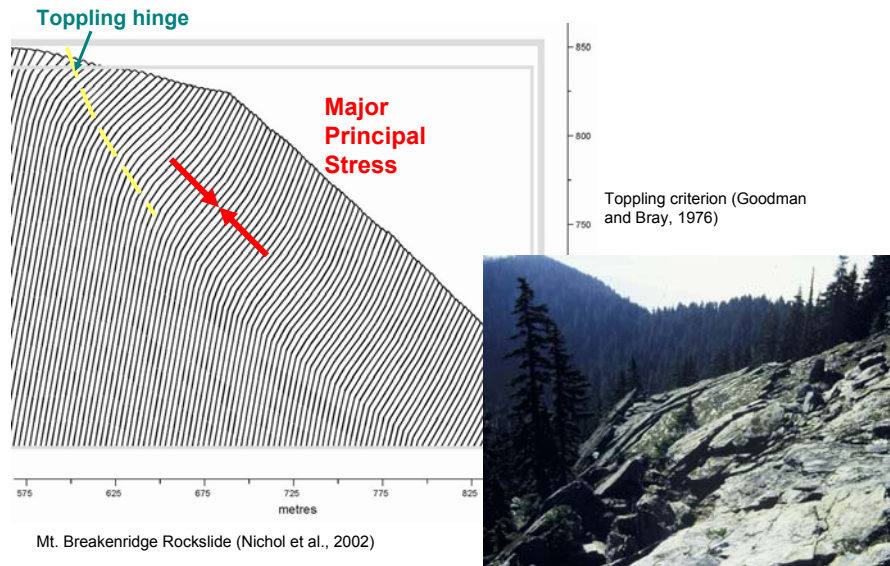


## Block Toppling Analysis (Hoek and Brown, 1973)

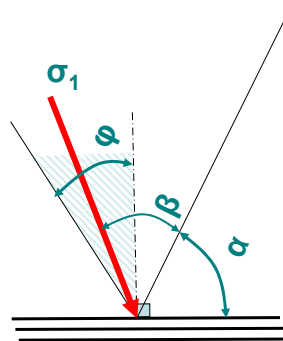
### Rigid Body Equilibrium



# Flexural toppling



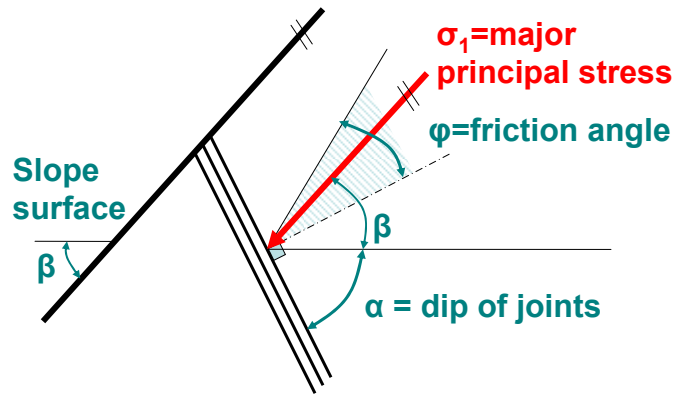
# Frictional sliding criterion



Sliding occurs only if the arrow is outside the shaded area

# Kinematic test for block toppling

(Cruden, 1989, Goodman and Bray, 1976)



$$\alpha + \beta + (90^\circ - \phi) \geq 180^\circ$$



1982

## La Clapiere, France

Flexural topple changing to a rock slump



1987

