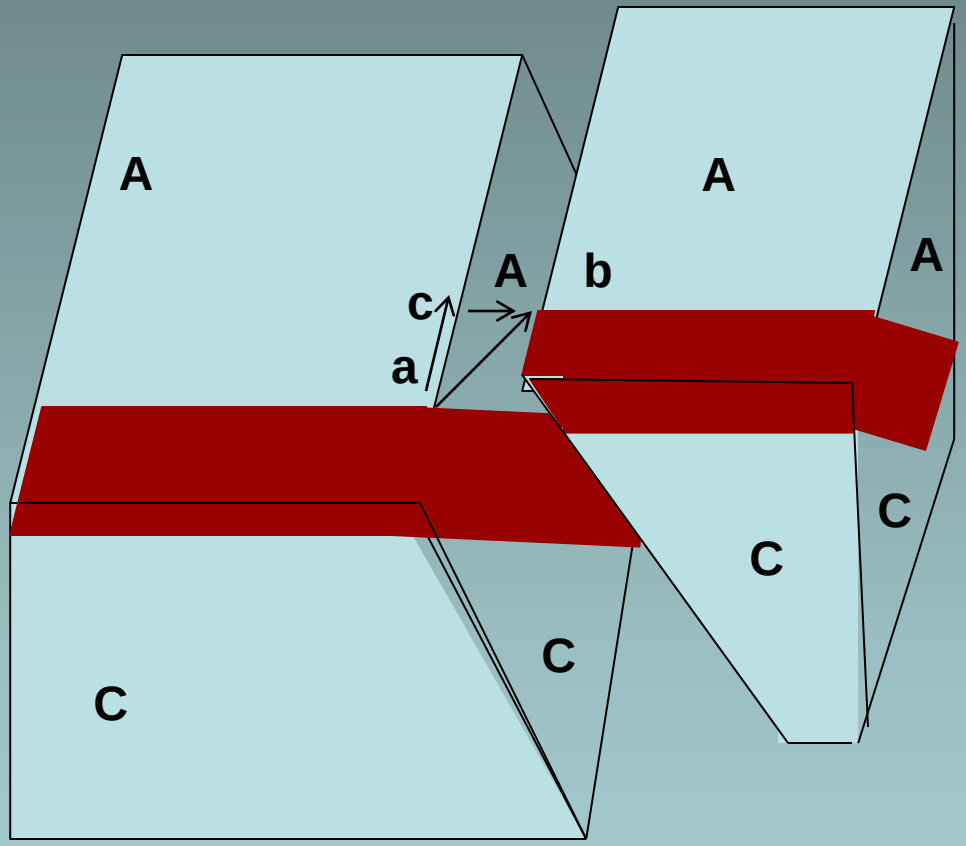
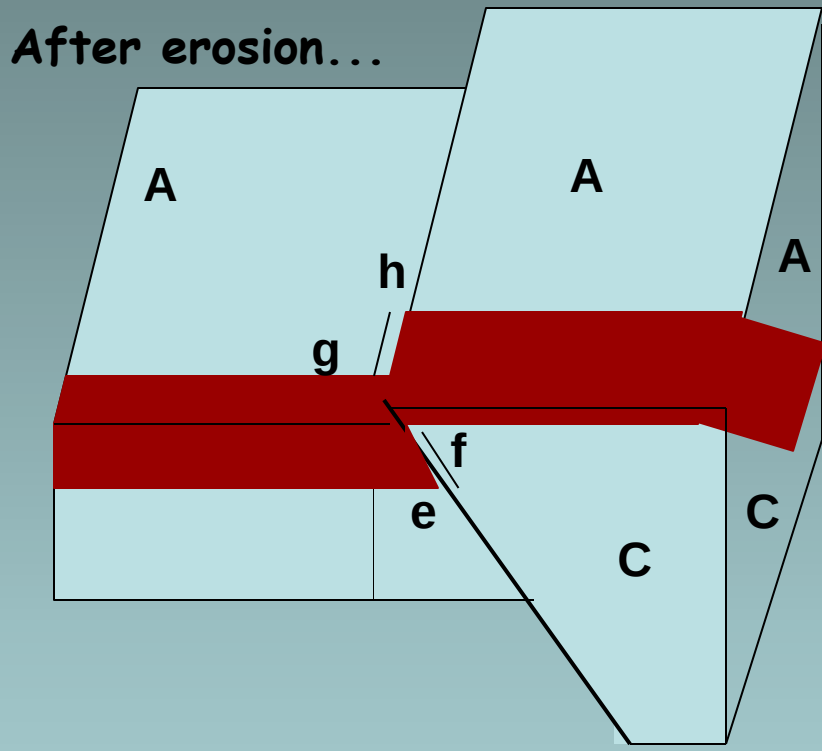
Motion on a fault is always relative..





Net Slip (ns): **Straight line distance** between two points, that were originally adjacent to one another, after fault moved.

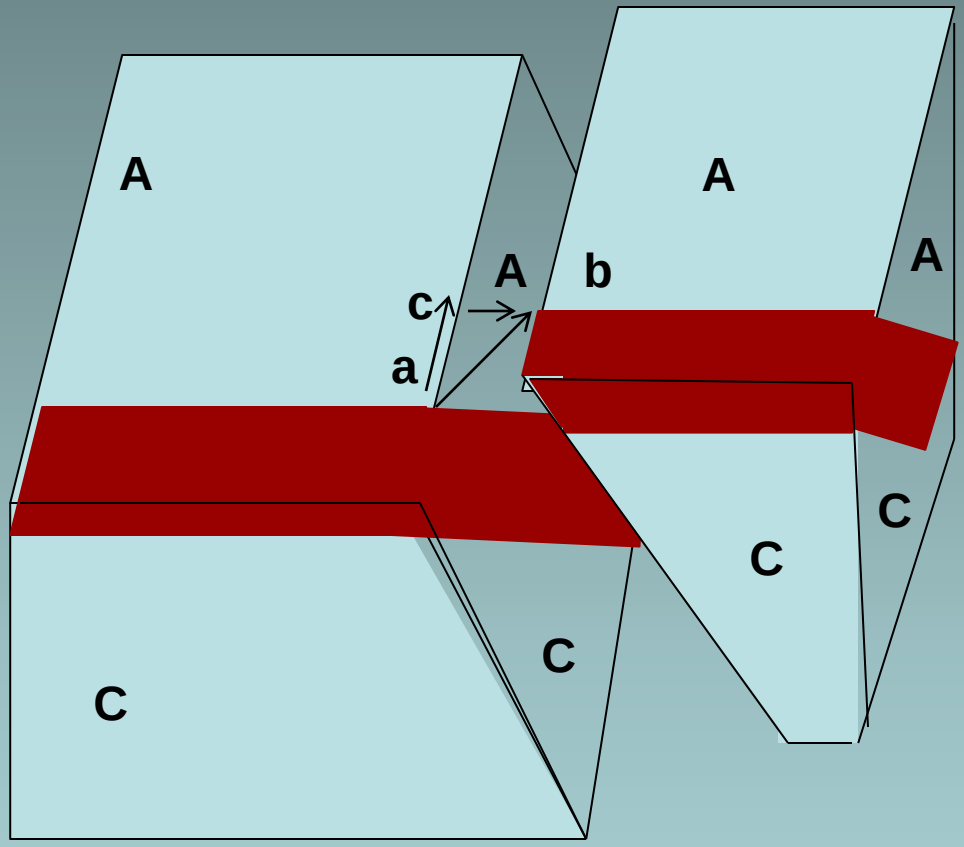
Total movement could be different; it's the vector PP'.

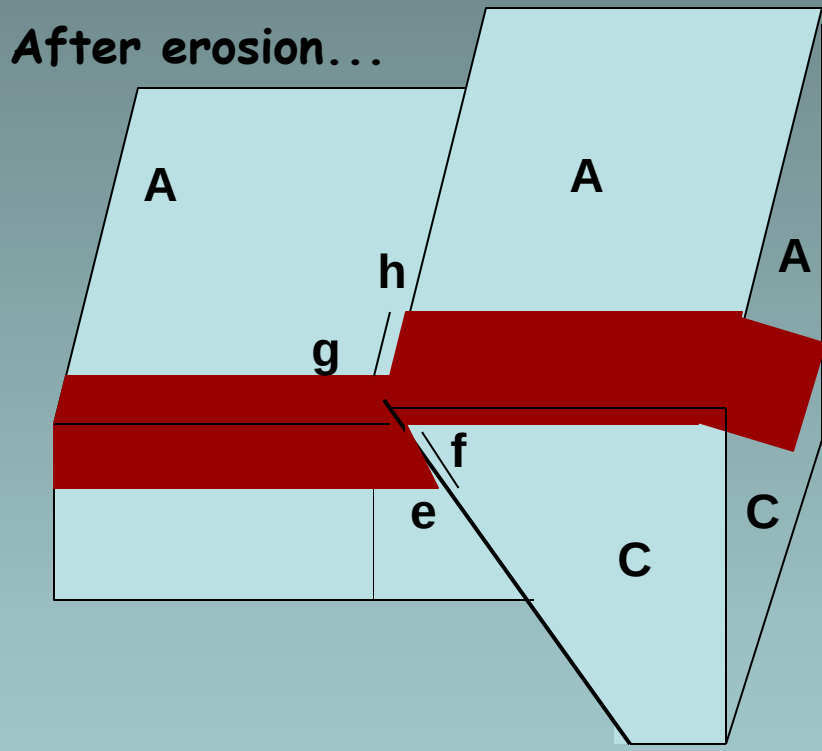
Net slip lies on the fault plane

Components of net slip:

(A) Dip slip (ds): Component of net slip parallel to dip of the fault

(B) Strike slip (ss): Component of net slip parallel to strike of the fault

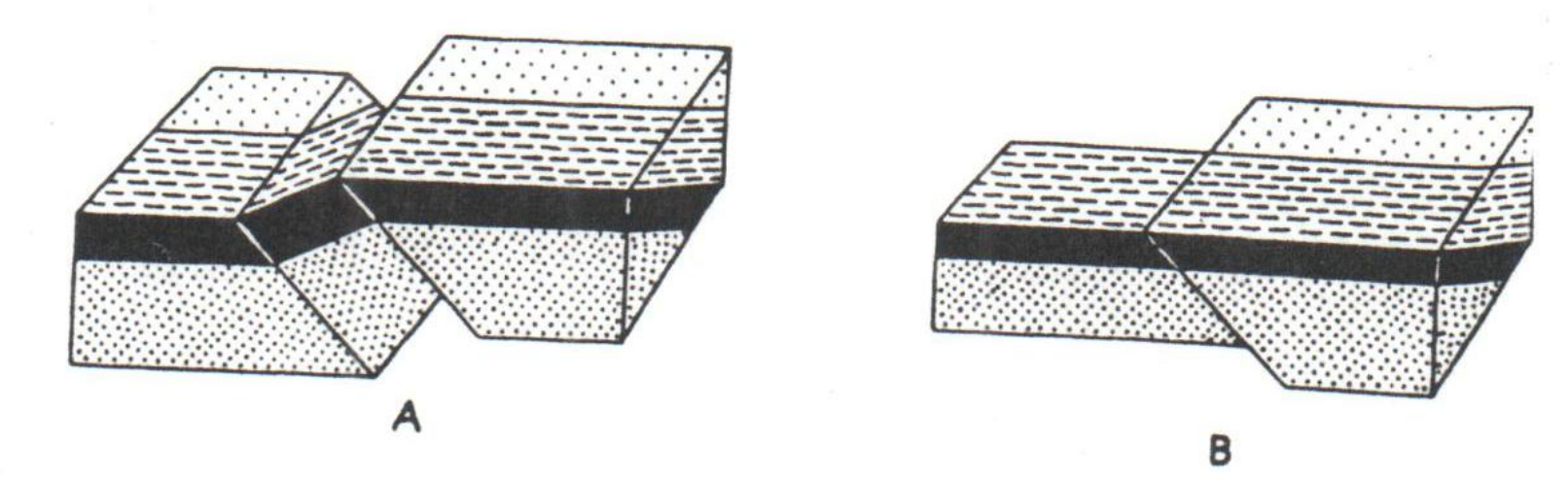




ab = netslip
ac= strikeslip
cb=dipslip

ef = dip separation
gh= strike separation

- Net slip is calculated based on other parameters, as fault plane seldom exposed
- Map view/cross section views not sufficient to comment on actual sense of movement on a fault plane

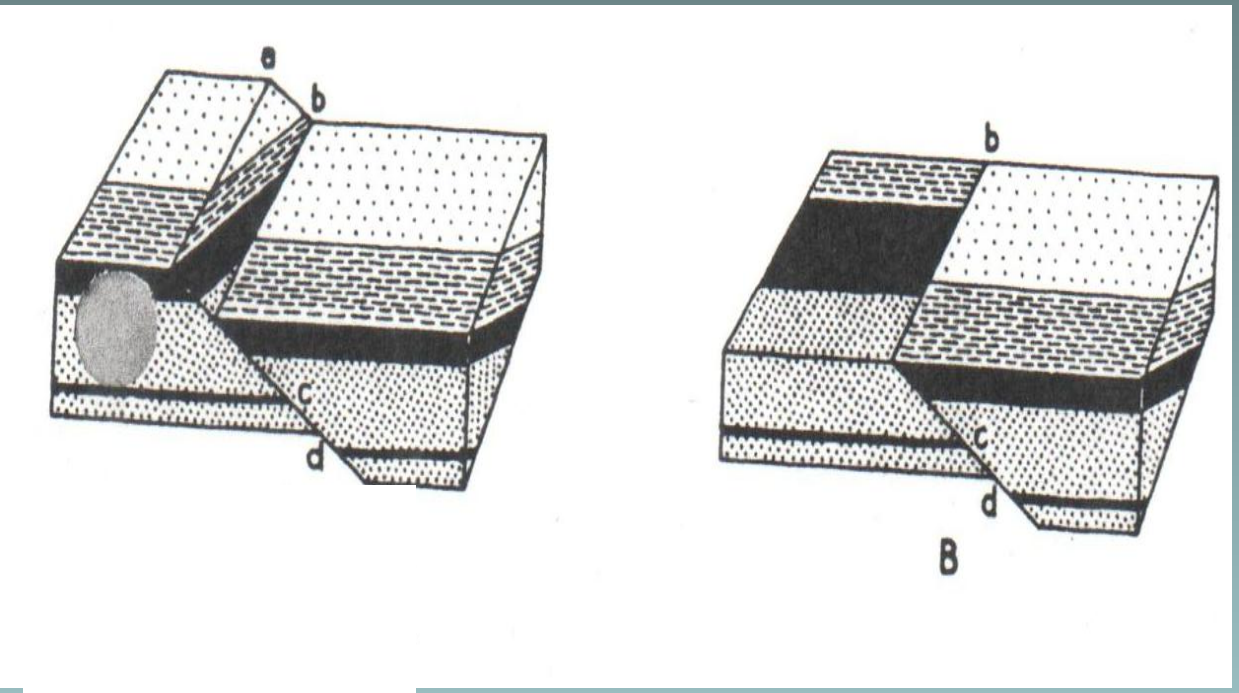


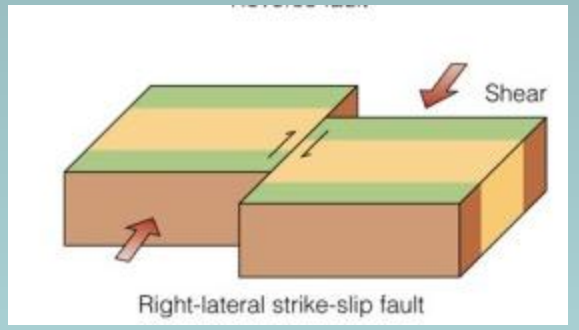
Any separation?

Trace slip fault

General rule

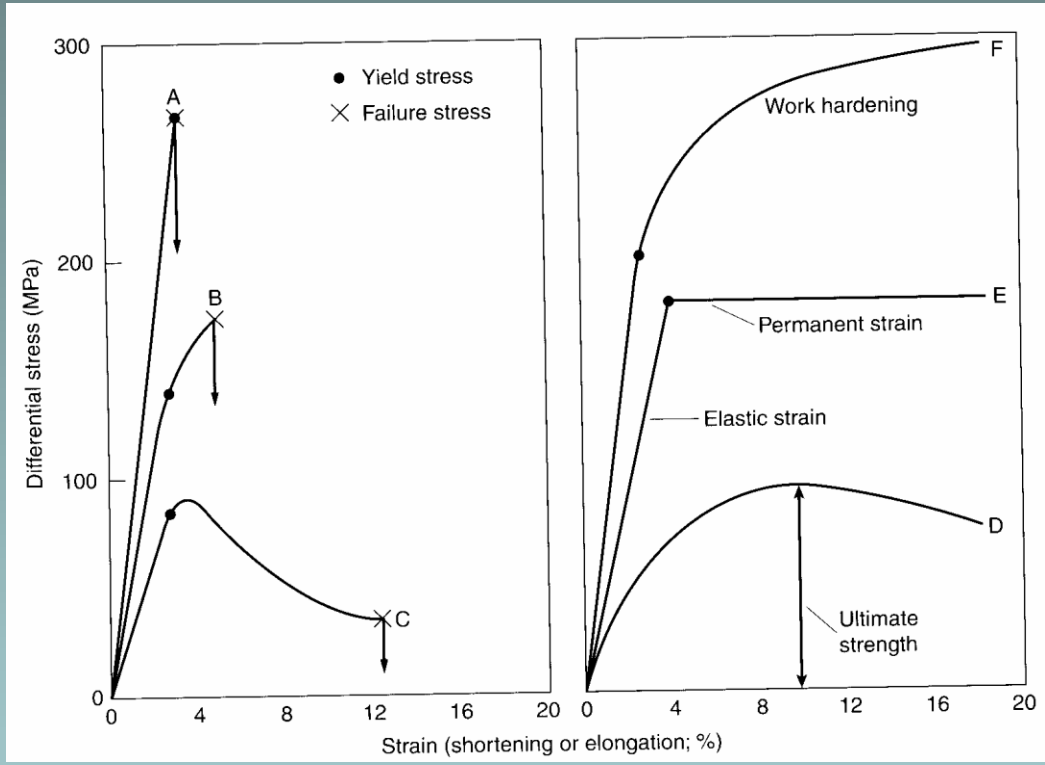
1. Rake of net slip = Rake of beds on fault plane-> no separation → trace slip fault





Net slip=?
Strike slip=?
Dip slip=?
Dip separation =?
Strike separation=?

• **Failure:** **Rock is unable to support stress increase without permanent deformation**



Non-linear behavior between stress and strain

Brittle Failure – Rock breaks to form continuous fractures resulting in the loss of cohesion.

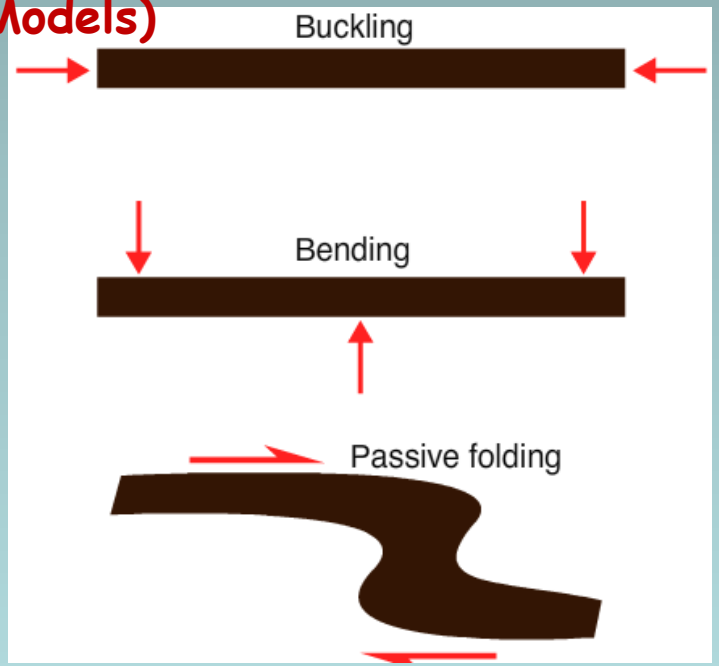
Ductile Failure – Material deforms permanently without losing cohesion.

Brittle Failure – 1. Development of new fracture in an intact rock

2. Slip on a pre-existing fracture in a previously fractured rock

How stress acts on layered rocks (Mechanical Models)

Kinematic models of Folding



Motion of the deforming body , but generally, do not relate the motion to the mechanical properties of the folded layer &/ to the stress

Whether the beds respond actively/passively to the imposed strain field

Kinematics of Folding

A layer may respond to bending/buckling by :

Orthogonal Flexure

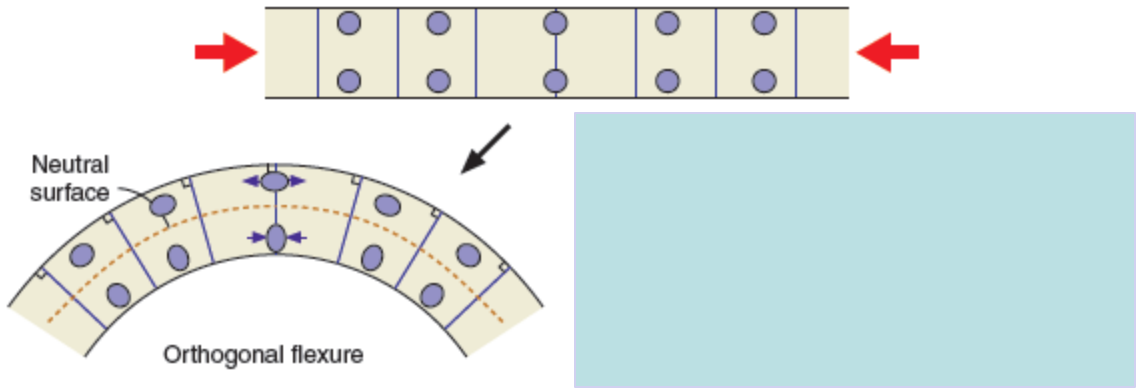
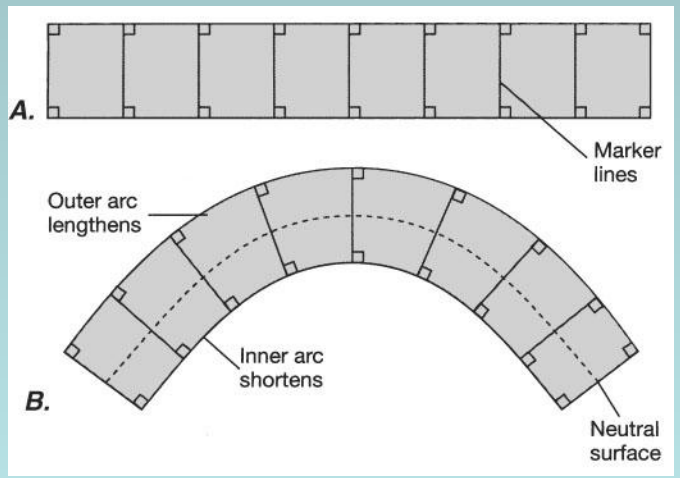
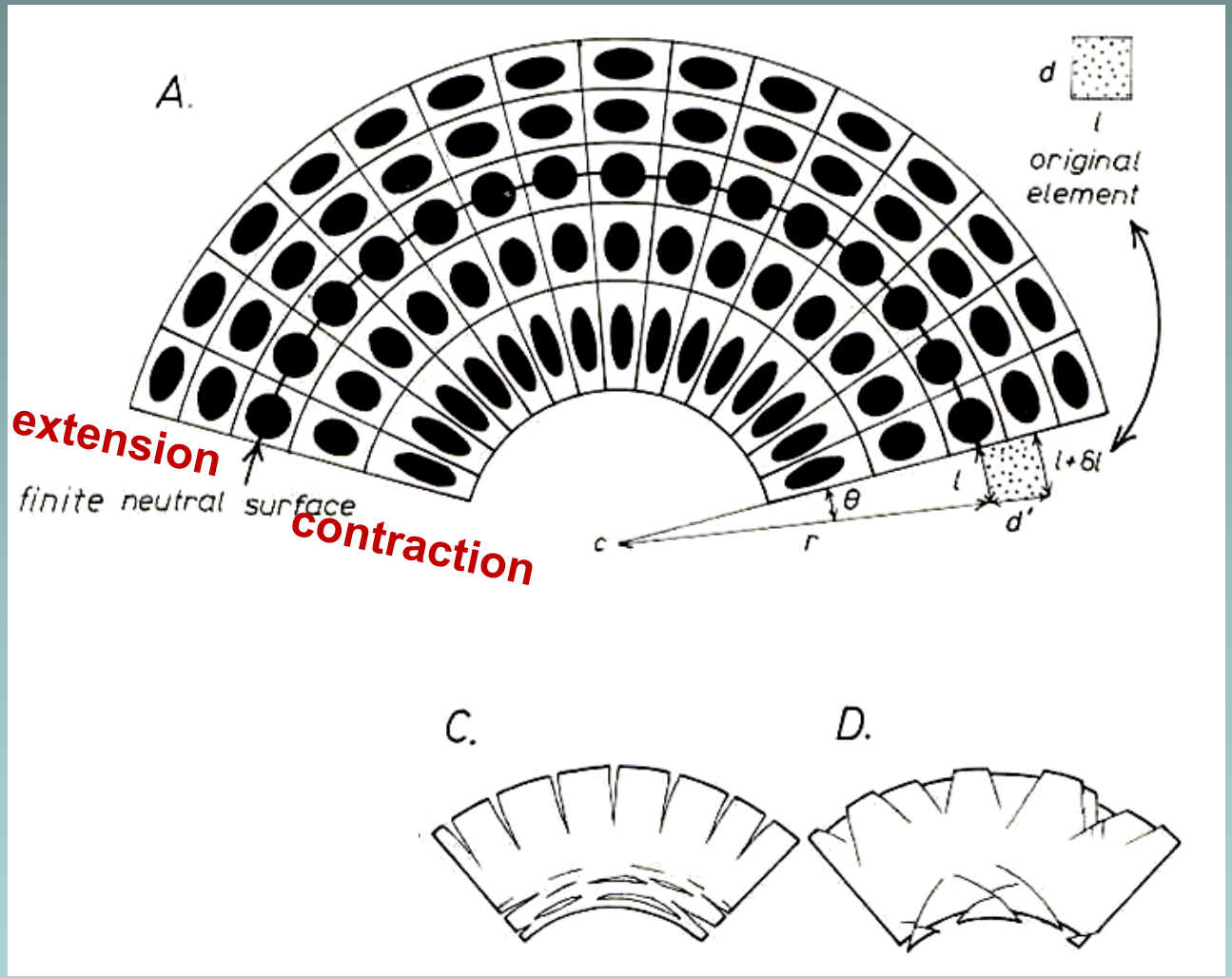


Figure 11.28 Layer-parallel shortening resulting in orthogonal flexure and flexural flow. Note what happens to the originally orthogonal lines. Strain ellipses are indicated.

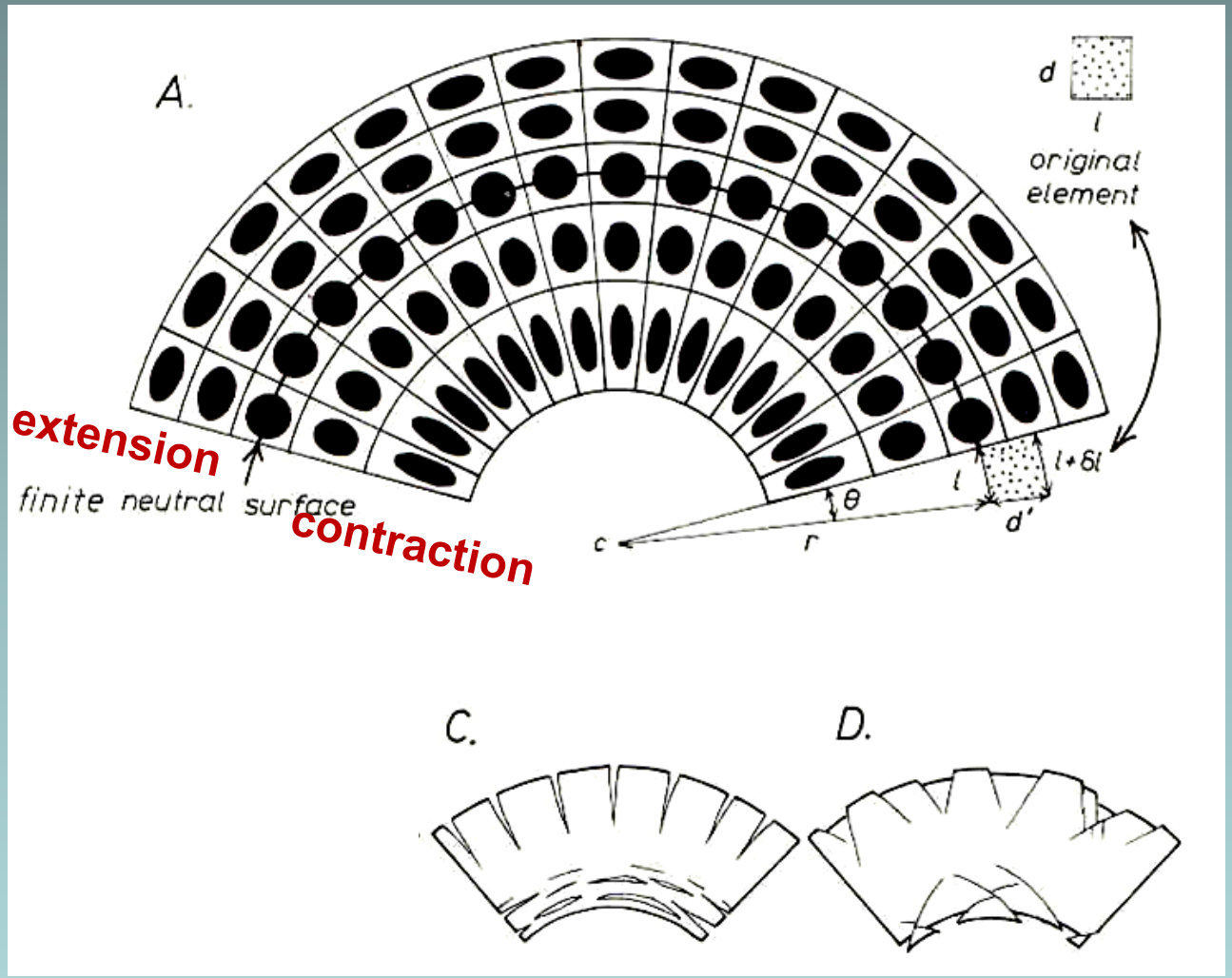


Kinematics of Buckle Folds



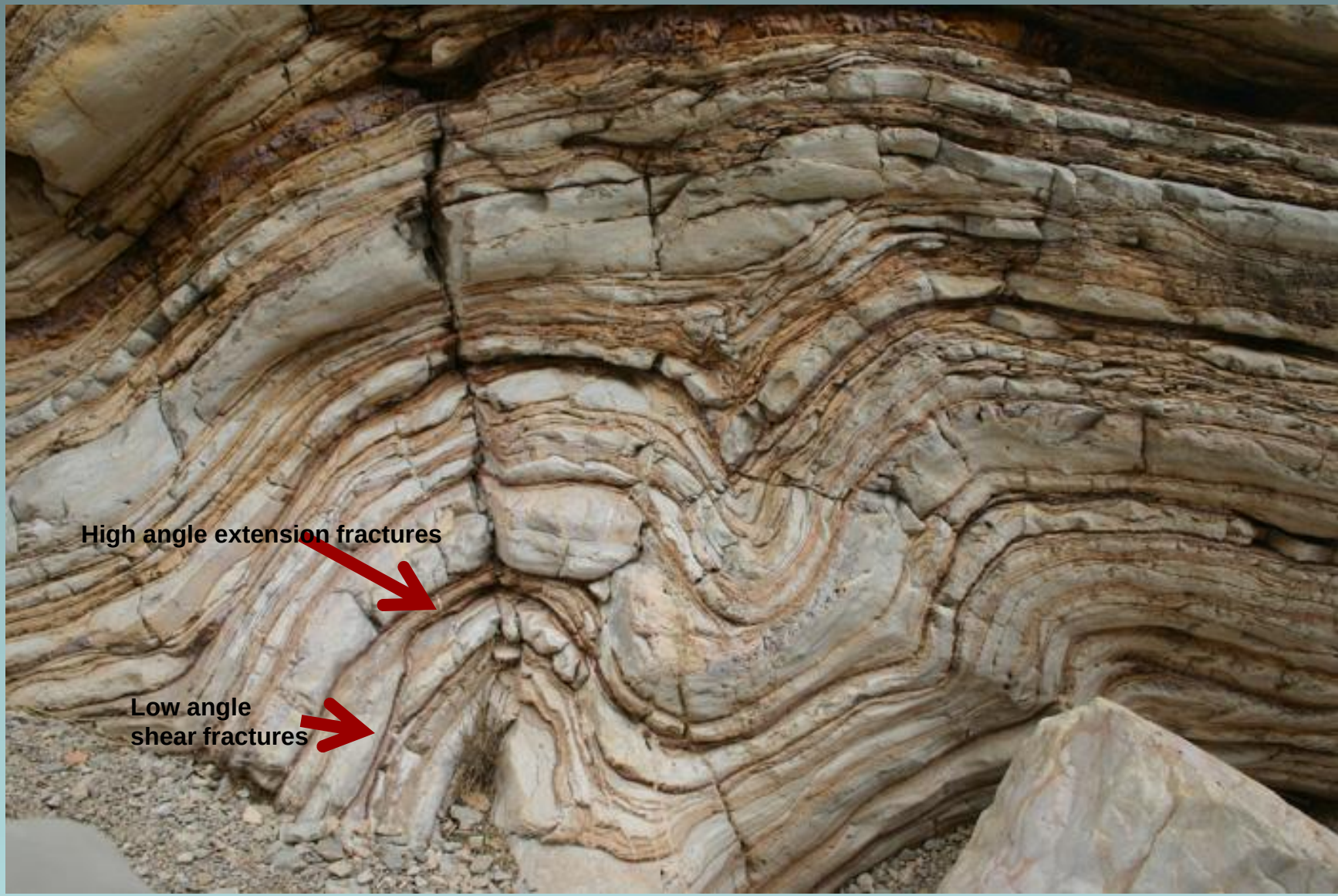
Neutral Surface: **Surface along which the stretch is 1; no layer parallel length change during folding.**

Kinematics of Buckle Folds



Neutral Surface: **Surface along which the stretch is 1; no layer parallel length change during folding.**

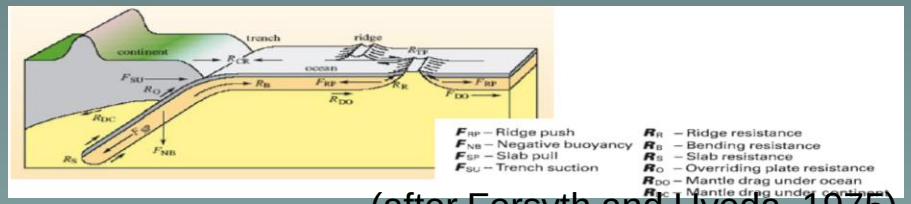
Normal to hinge surface → direction of maximum shortening (Z)



https://maps.unomaha.community/Maher/GEOL3300/week7/folds.html

General Summary: Deformation in rocks

https://blogger.googleusercontent.com/img/bua4JI0zRXOofseaKx8DLTg/s1440/recumbent-fold.jpg



(after Forsyth and Uyeda, 1975)

- **Not one structure uniquely represents a tectonic condition→ suites of structures**
- **Scale dependence → multiscale structural analysis**
- **STRESS & STRAIN NOT CORRELATABLE**