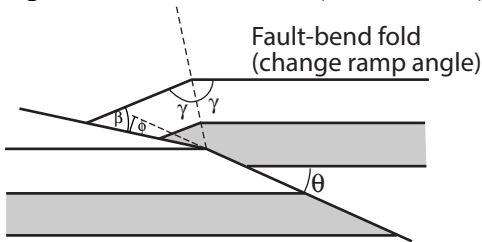


Foreland fold and thrust belts

Kink models for fault-bend and fault-propagation folds

Shape of fault-bend fold (kink model):



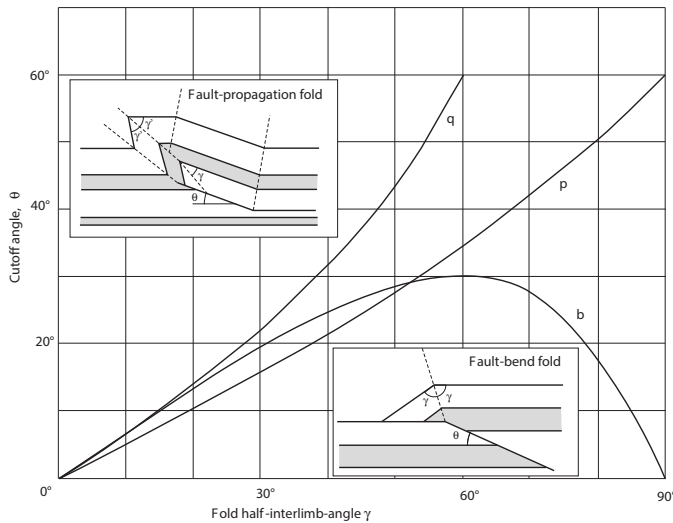
Change in dip ϕ at ramp

$$\phi = \tan^{-1} \left[\frac{-\sin(\gamma - \theta) [\sin(2\gamma - \theta) - \sin \theta]}{\cos(\gamma - \theta) [\sin(2\gamma - \theta) - \sin \theta] - \sin \gamma} \right]$$

where γ is the half-interlimb angle of fold at the front of the structure, and θ is the ramp angle

If we assume that $\theta = \phi$ then

$$\phi = \theta = \tan^{-1} \left(\frac{\sin 2\gamma}{2 \cos^2 \gamma + 1} \right) \text{ graphed below.}$$



Shape of fault-propagation fold (kink model):

$$2 \sec \theta - \cot \theta = \left[\frac{1 - 2 \cos^2 \gamma}{\sin 2\gamma} \right]$$

where γ is half-interlimb angle of fold at the crest of the structure, and θ is the ramp angle.

Half interlimb angle γ at leading edge of structure above tip of propagating fault, $\gamma' = \gamma + \theta/2$

Foreland basin subsidence

Shape of foreland basin:

z = downward deflection

x = horizontal distance

z_{max} maximum downward deflection

$$z = z_{max} e^{-x/\alpha} \cos \left(\frac{x}{\alpha} \right)$$

where α is a constant that depends on the flexural rigidity of the lithosphere D , the density contrast

$\Delta\rho$ and gravity g

$$\alpha = \sqrt[4]{\frac{4D}{\Delta\rho g}}$$

Coulomb thrust wedges

For décollement slope β

Internal strength of wedge k

Internal fluid pressure ratio λ_i

Décollement friction μ_b

Décollement fluid pressure ratio λ_b

Surface slope is α where

$$\alpha = \frac{(1 - \lambda_b)\mu_b - (1 - \lambda_i)k\beta}{(1 - \lambda_i)k + 1}$$

Or, critical taper

$$\alpha + \beta = \beta \frac{(1 - \lambda_b)\mu_b}{(1 - \lambda_i)(k - 1) + 1}$$