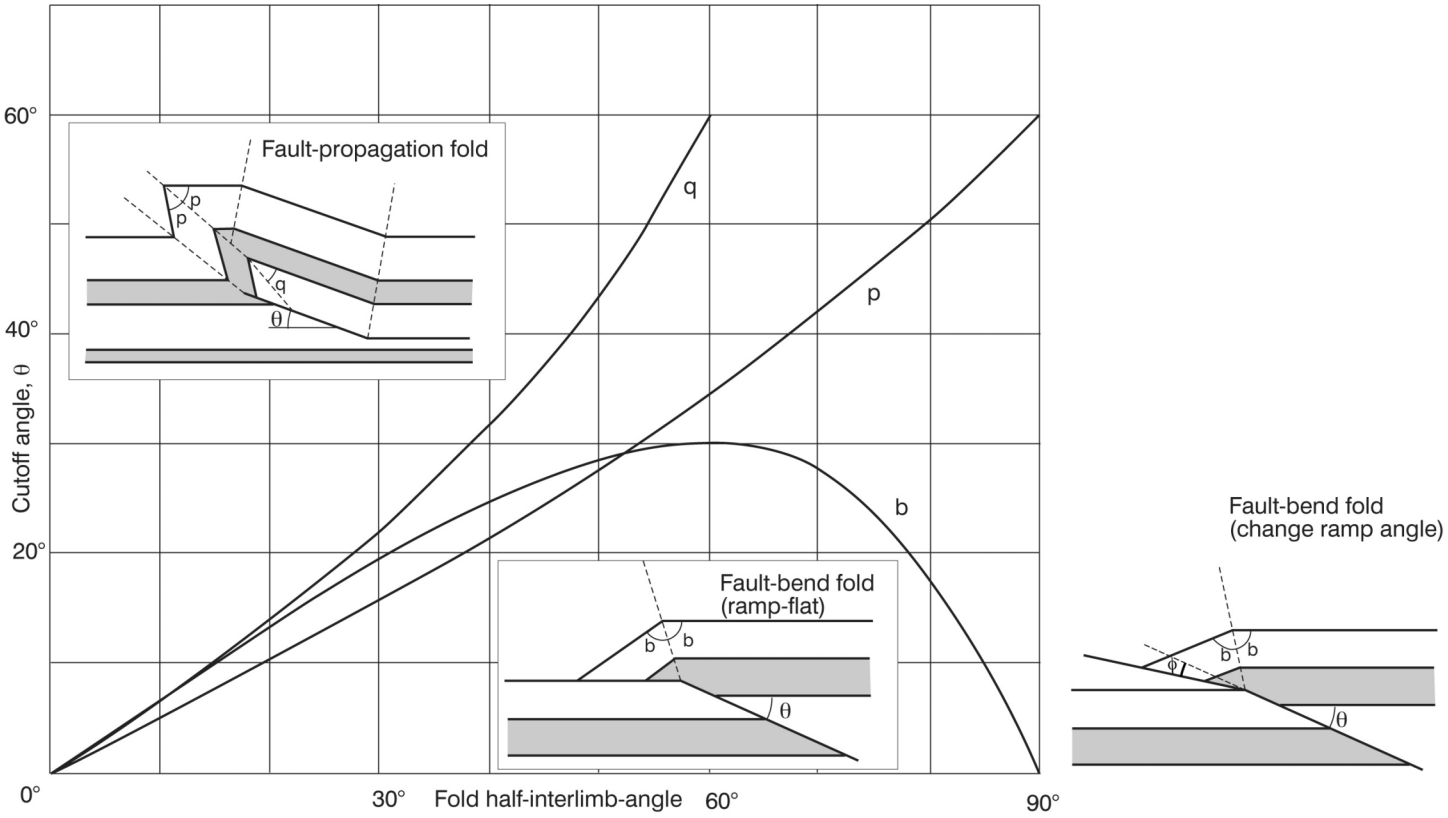
Thrust belts



Shape of fault-bend fold (kink model):

Change in dip ϕ at ramp

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

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

Shape of fault-propagation fold (kink model)

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

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

Above tip of propagating fault, half interlimb angle leading edge of structure: $p = q+\theta/2$

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 surface slope α

and décollement slope β

Internal strength of wedge k

Internal fluid pressure ratio λ_I

Décollement friction μ_b

Décollement fluid pressure ratio λ_b

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