

Unattached Surfaces

The FRICTIONAL components of the contact forces between unattached surfaces are parallel to the plane of contact; NORMAL components are perpendicular to that plane.

The direction of frictional forces opposes SLIPPING.

KINETIC frictional forces occur between surfaces where slipping is occurring; STATIC frictional forces occur between surfaces where NO slipping is occurring.

The size of kinetic friction is roughly a constant fraction of the size of the normal force; the constant of proportionality is the COEFFICIENT OF KINETIC FRICTION μ_k , *i.e.* $f_k = \mu_k N$ with $\mu_k \leq 1$. The similar rule for the size of static friction is only true for the maximum possible size of static friction, *i.e.* $f_s \leq \mu_s N$, with $\mu_s \leq 1$ (in most cases); up to the maximum value, static friction is as big as needed to prevent slipping.