

# Total calm-water drag (resistance)

## Parasitic drag $D_p$

### Shear forces

Skin friction  $D_{\text{fric}}$

Profile drag  $D_{\text{pr}}$

Interference drag  $D_{\text{int}}$

Wave breaking/spray drag  $D_{\text{spray}}$

### Normal forces (pressure)

#### Flow separation in boundary layer

Form drag  
(viscous flow separation)  
 $D_{\text{form}}$

#### Circulation/vorticity

Multiphase flows: virtual camber effect, re-entrant jet driven cavity drag, cavitation shockwave drag

Supervelocity effect  
on skin friction

Supervelocity effect  
on form drag

Wave-making/  
wave pattern drag  
 $D_w$

Lift-induced/vortex drag  $D_i$

## Drag due to lift $f$ (lift)