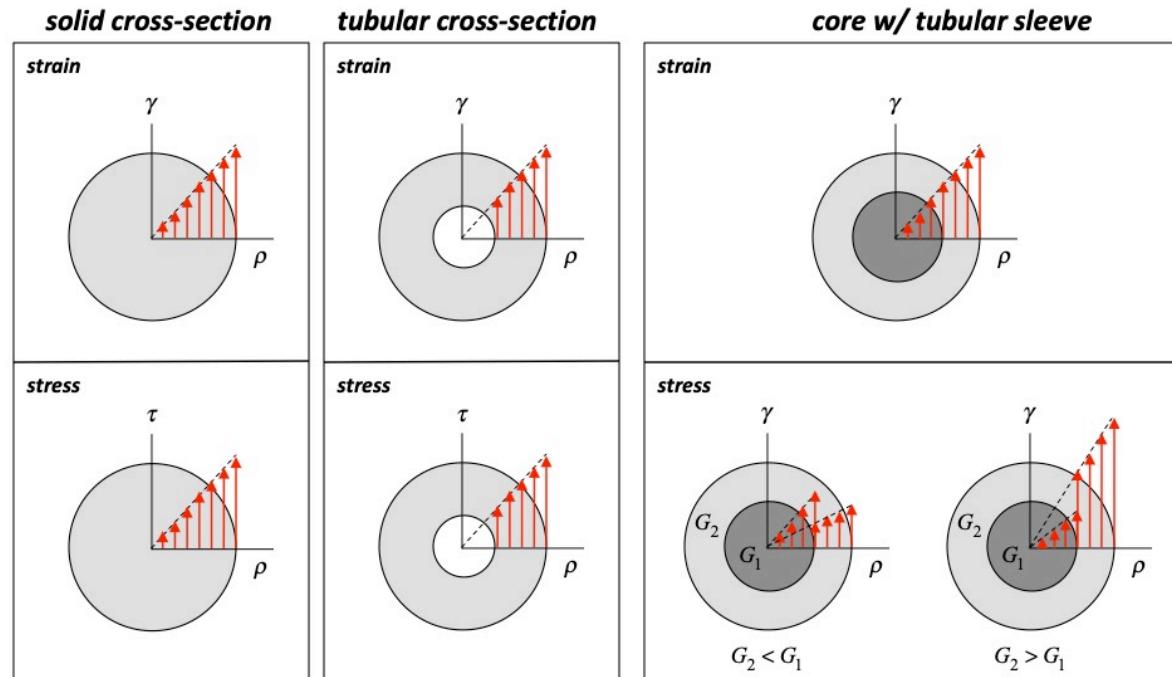# *Summary*: torsion stresses in shafts

Consider an axial torque T acting on a shaft with a circular cross section.

- *STRAIN*: The shear strain, γ, varies linearly with radius, ρ, through the cross-section of the shaft, regardless of the material makeup of the cross-section.
- *STRESS*: Across annular regions on the cross-section where the material makeup is a constant, the shear stress, τ, varies linearly with radius, ρ, through the cross-section of the shaft: $\tau = G\gamma = T\rho / I_P$ where I_P is the polar area moment of the cross section.
- *STRAIN/STRESS DISTRIBUTIONS*: