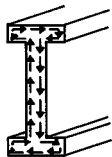


(a) I-Beam with torque M

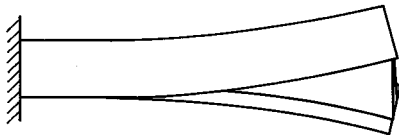


(b) Uniform torque gives rise to only shear stresses. Warping stresses are zero and every cross-section warps by the same amount. This is Saint Venant torsion.

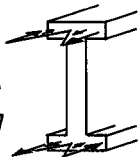


τ_s

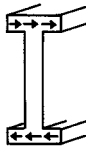
Saint Venant shear stresses on left hand end



(c) Prevention of warping leads to warping stresses



σ_w



τ_w

Warping stresses on left hand end.