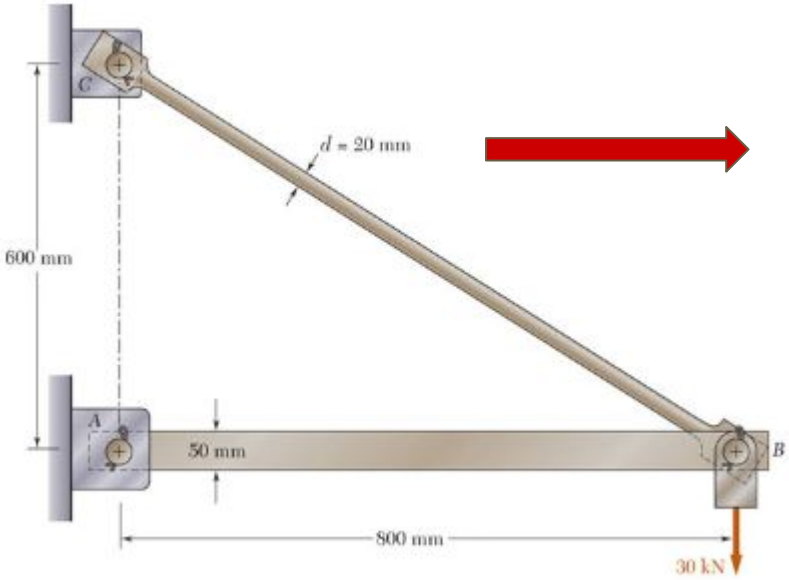
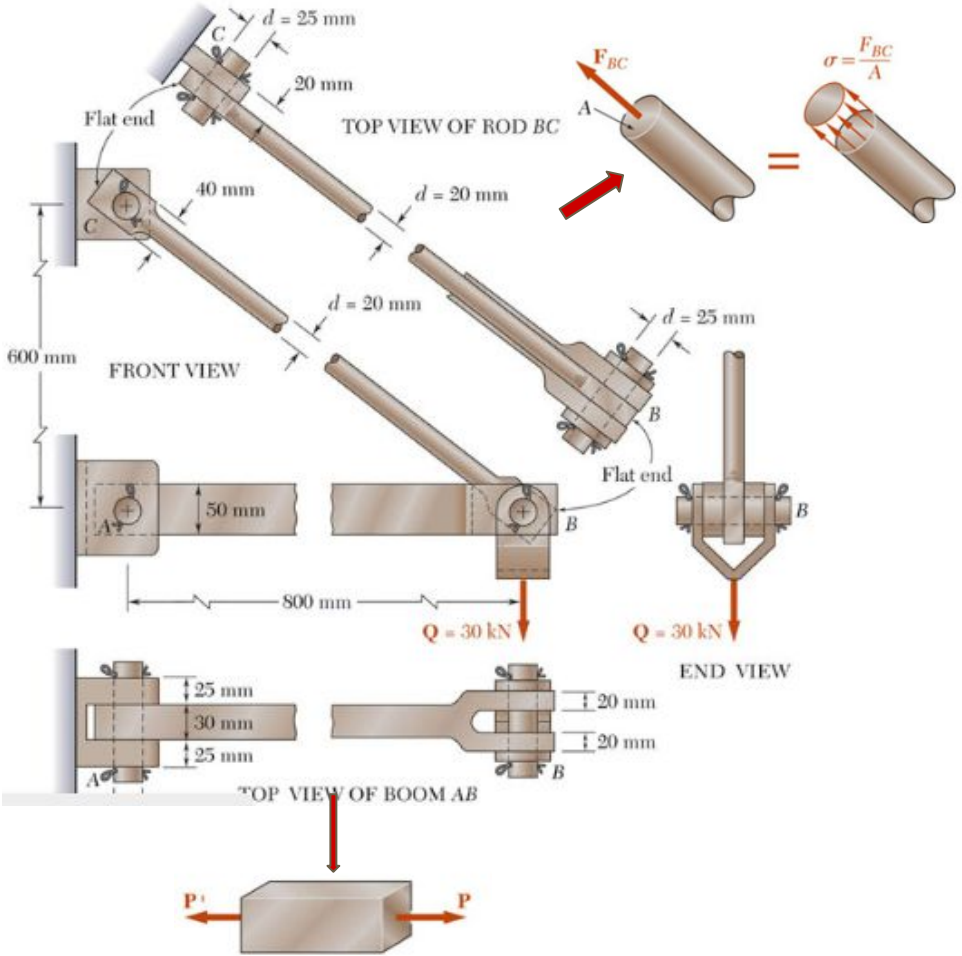
Introduction to Stress

Mechanics of Materials-Chapter 1

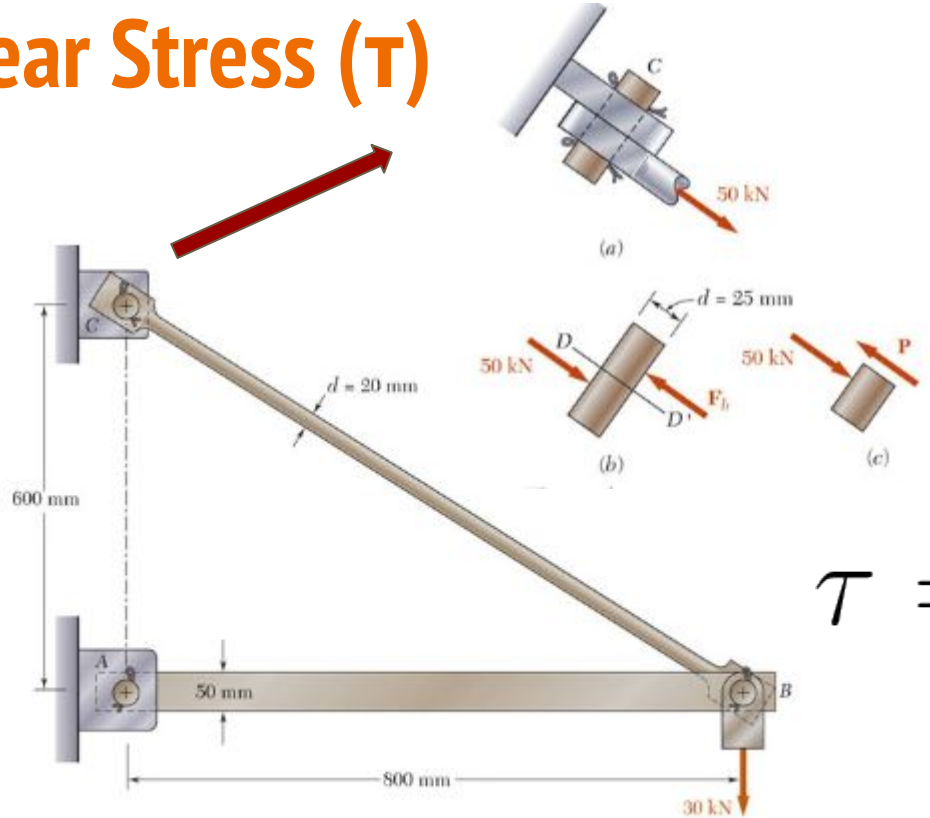
Normal Stress (σ)

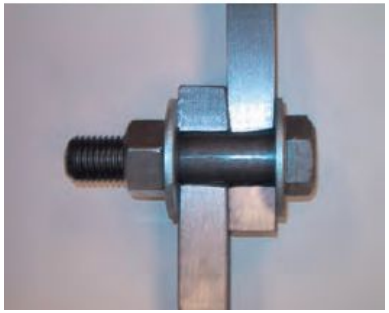




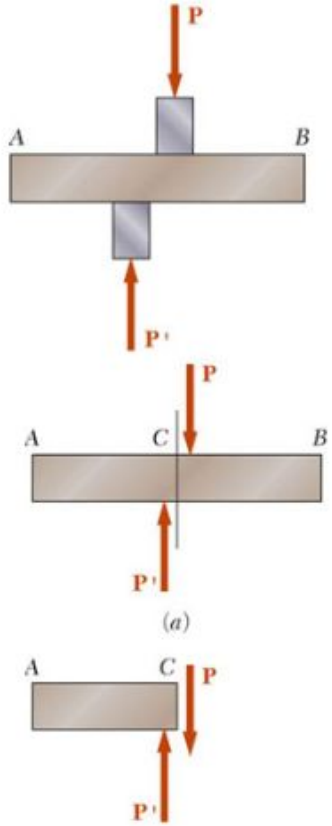
Normal Stress, $\sigma = P/A$

Shear Stress (τ)

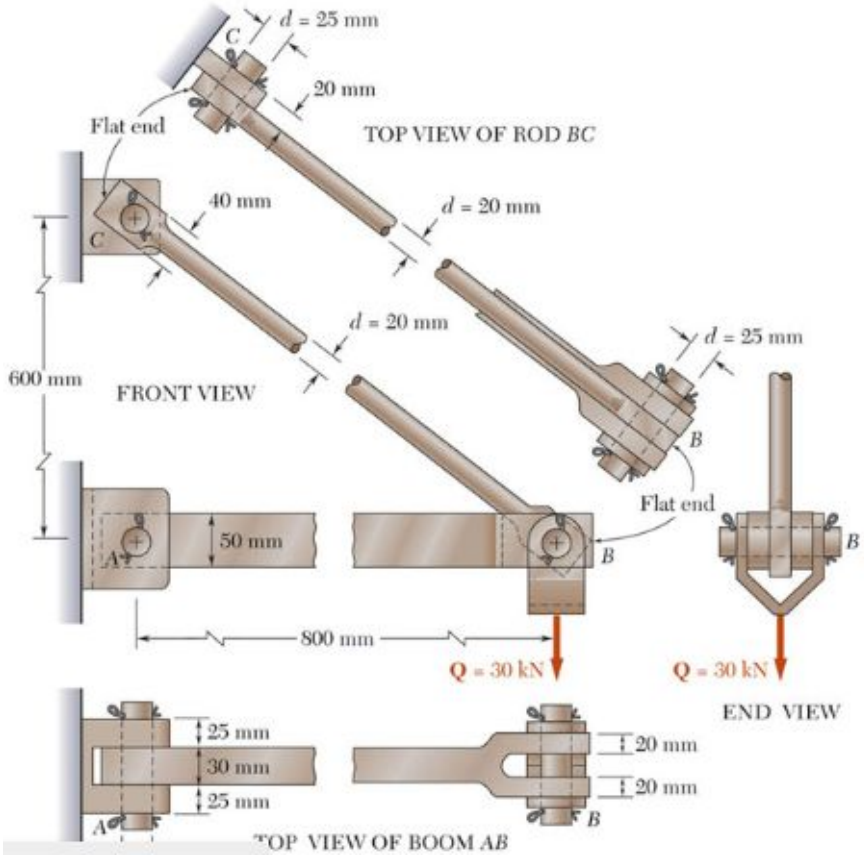




$$\tau = P/A$$



Example



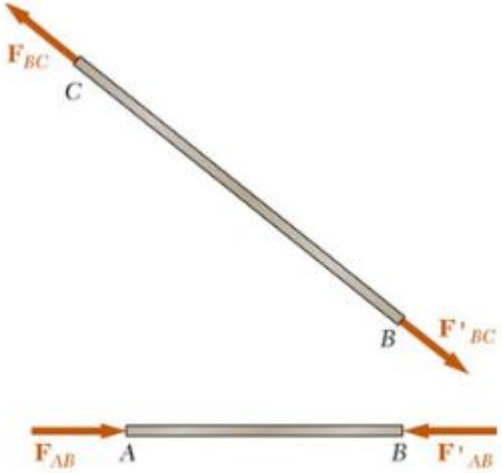
The 20-mm diameter rod BC has flat ends of 20 x 40-mm rectangular cross section.

Boom AB has a 30 x 50-mm rectangular cross section. It is fitted with a clevis at end B.

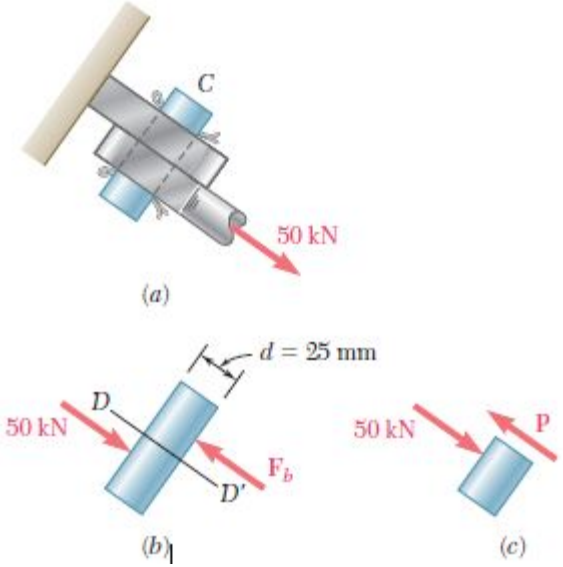
Both members are connected at B by a pin from which the 30-kN load is suspended.

Boom AB is supported at A by a pin fitted into a double bracket. Rod BC is connected at C to a single bracket.
All pins are 25 mm in diameter.

Determine the normal stress in the rod and the boom



Determine the shear stress in various connections



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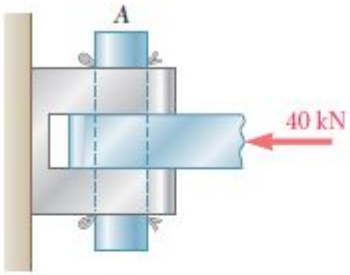
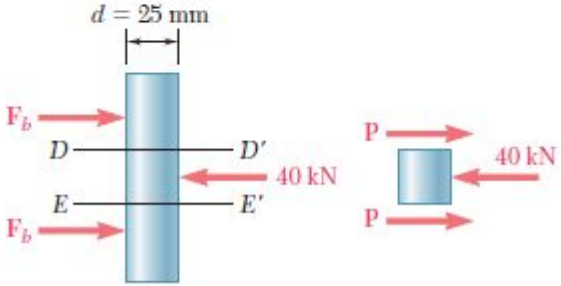
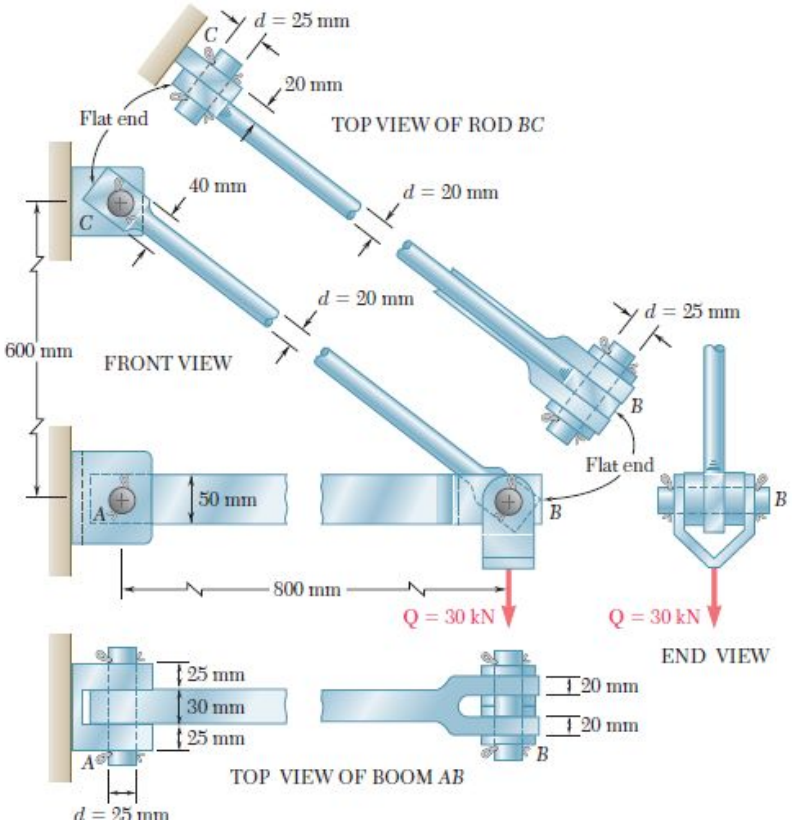
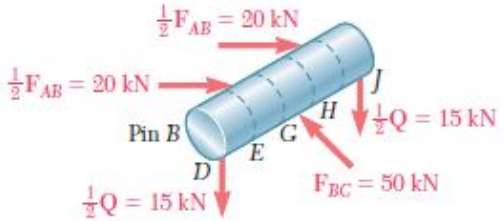


(a)

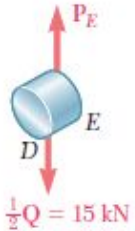


Determine the shear stress in various connections

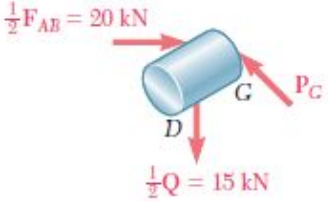




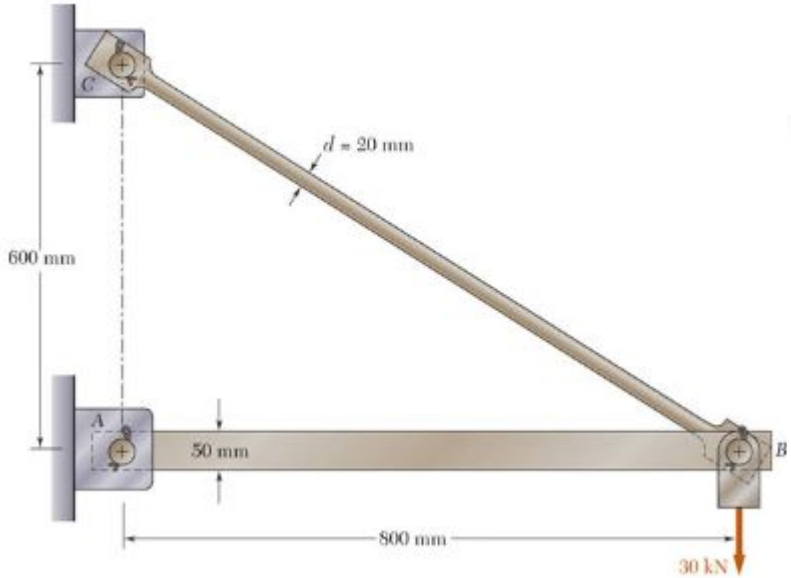
(a)

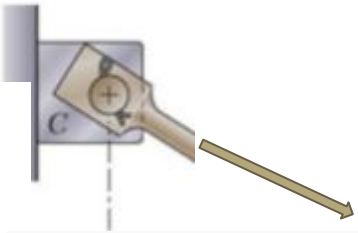


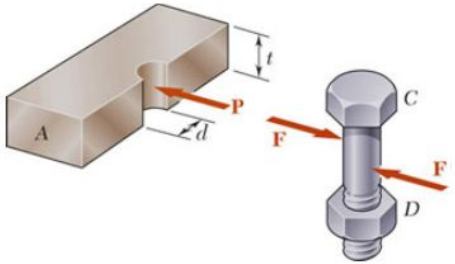
(b)

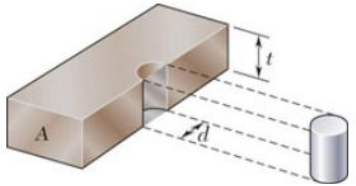


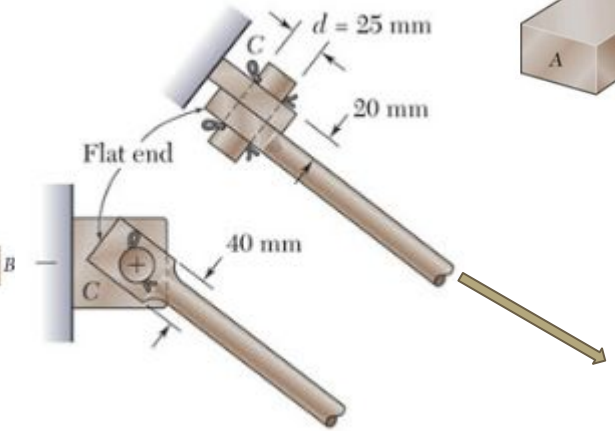
Bearing Stress



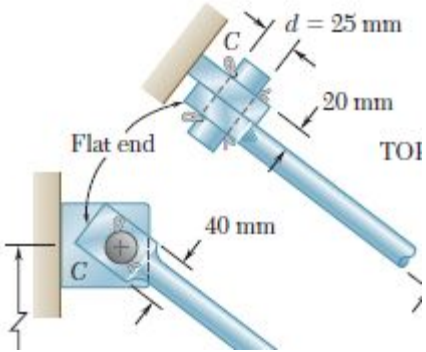


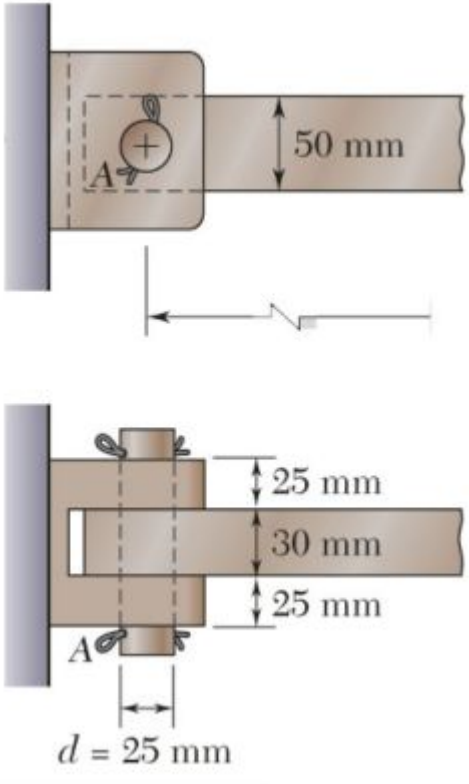






Determine the bearing stress in joints





Determination of components of stress in various parts of a structure is demonstrated through an example