

Consider the rod shown below with an axial force P acting at H. All three components of the shaft are made of a material having a Young's modulus of E .

- Write down the strain energy in the rod in terms of the geometric and material properties of the rod, and the loading P .
- Write down the work done by P in terms of P and the horizontal displacement of H, u_H .
- Using the work energy equation, determine the displacement u_H .
- Using Castigliano's theorem, determine the displacement u_H .

