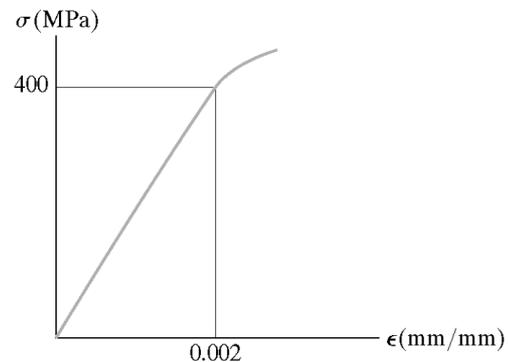
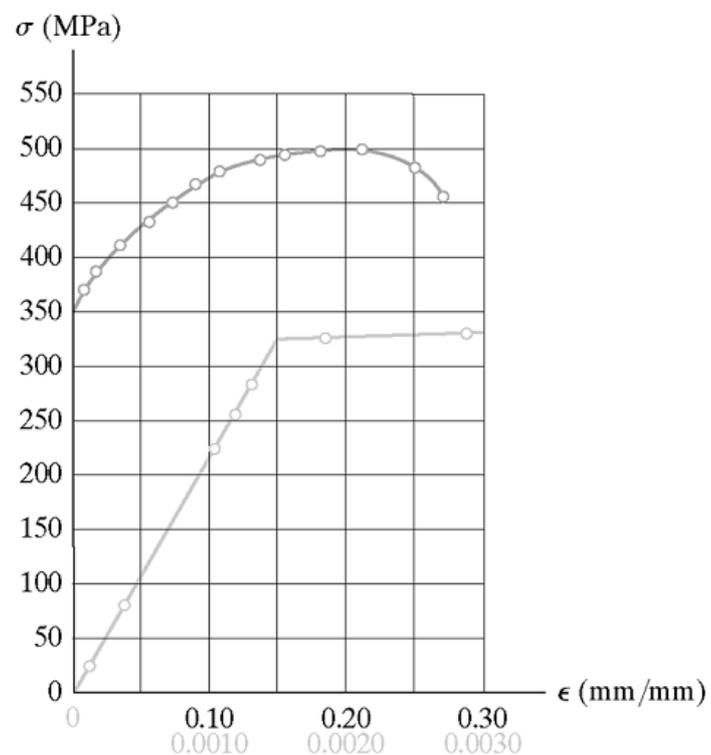


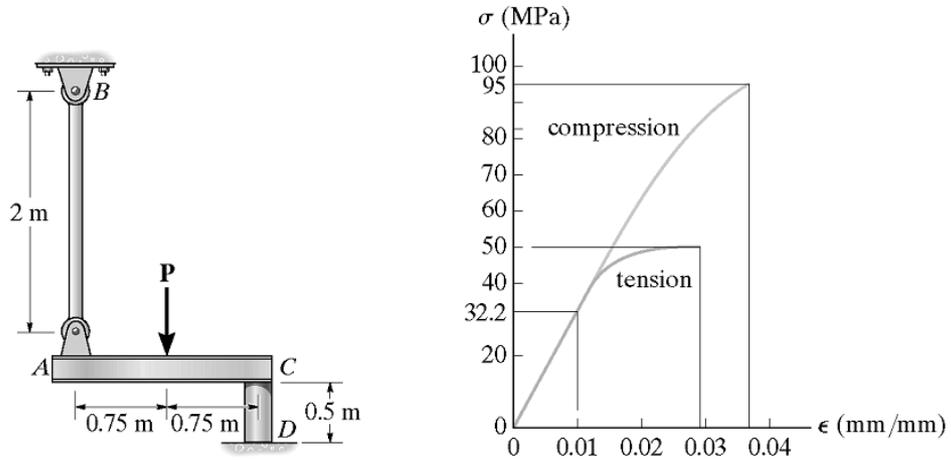
1. The elastic portion of the stress-strain diagram for a steel alloy is shown in the figure. The specimen from which it was obtained had an original diameter of 13 mm and a gauge length of 50 mm. When the applied load on the specimen is 50 kN, the diameter is 12.99265 mm. Determine Poisson's ratio for the material.



2. The stress-strain diagram for a steel bar is shown in the figure. Determine approximately the modulus of elasticity, the proportional limit, the ultimate stress, the fracture stress and the modulus of resilience. If the bar is loaded until it is stressed to 450 MPa, determine the amount of elastic strain recovery and the permanent set of strain in the bar when it is unloaded.



3. The stress-stain diagram for a polyester resin is given in the figure. If the rigid beam AC is supported by a strut AB and post CD made from this material, determine the largest load P that can be applied to the beam before AB or CD ruptures. The diameter of the strut is 12 mm and the diameter of the post is 40 mm.



4. The steel wires AB and AC support the 200-kg mass. If the allowable axial stress for the wires is 130 MPa, determine the required diameter of each wire. Also what is the new length of wire AB after the load is applied? Take the unstretched length of AB to be 750 mm and $E_{st} = 200$ GPa.

