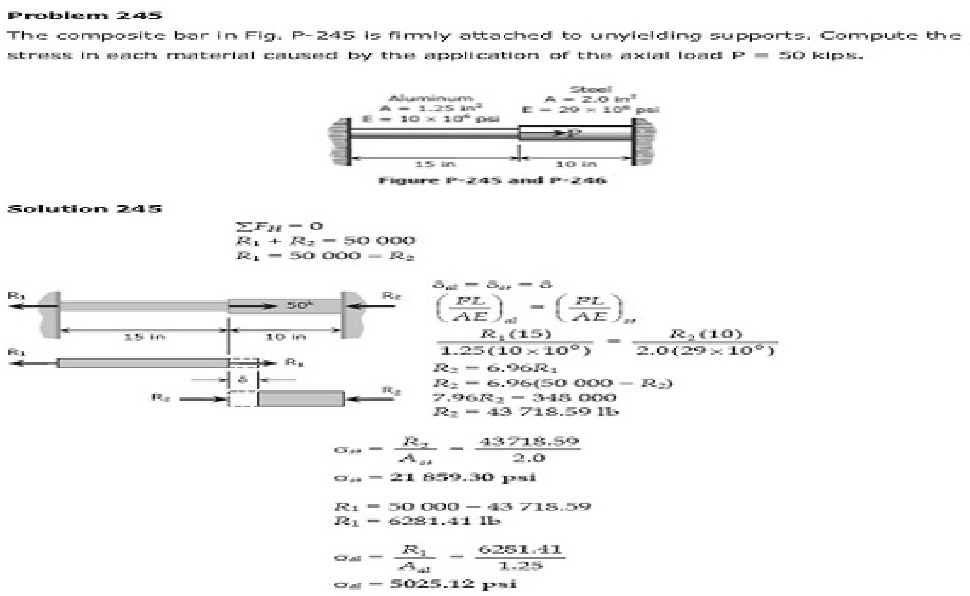
Zip Mechanics Of Materials By B C Punmia Torrent Book Full Edition .mobi



Problem 245

The composite bar in Fig. P-245 is firmly attached to unyielding supports. Compute the stress in each material caused by the application of the axial load P = 50 kips.

Figure P-245 and P-246

Solution 245

$\Sigma F_H = 0$

$R_1 + R_2 = 50\,000$

$R_1 = 50\,000 - R_2$

$\delta_{al} = \delta_{st} = \delta$

$\left(\frac{PL}{AE}\right)_{al} = \left(\frac{PL}{AE}\right)_{st}$

$\frac{R_1(15)}{1.25(10\times10^6)} = \frac{R_2(10)}{2.0(29\times10^6)}$

$R_2 = 6.96R_1$

$R_2 = 6.96(50\,000 - R_2)$

$7.96R_2 = 348\,000$

$R_2 = 43\,718.59$ lb

$\sigma_{st} = \frac{R_2}{A_{st}} = \frac{43718.59}{2.0}$

$\sigma_{st} = 21\,859.30$ psi

$R_1 = 50\,000 - 43\,718.59$

$R_1 = 6281.41$ lb

$\sigma_{al} = \frac{R_1}{A_{al}} = \frac{6281.41}{1.25}$

$\sigma_{al} = 5025.12$ psi

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The Rate of Change of Volume Chapter 3. The Relationship Between Stress and Strain Chapter 4. The Rate of Change of Surface Area Chapter 5. The Laws of Motion In this chapter, we will discuss a large number of the laws that govern motion. We will start by discussing Newton's First Law which states that every particle of matter is attracted by all other particles. If a body is acted upon by a force or a force acts on a body, the body will accelerate in a direction perpendicular to the vector of the force. The force of a mass is equal to the rate of change of momentum. More information on momentum is given in a later chapter. Mechanics can be broken down into two components called speed and direction. These two components describe the motion of a body through space. Velocity is the average rate at which a body moves through space. It is equal to the distance moved by the body divided by the amount of time spent in moving. Direction is the direction in which the body is traveling. Direction is described in two different ways. First, it can be described by the direction of the resultant force. The direction of the resultant force is the vector sum of all the individual forces acting on the body. Second, it can be described as the direction in which the body's acceleration is changing. Newton's Second Law states that a force is equal to the product of mass and acceleration. In other words, a force is the product of mass and the rate at which acceleration is changing. Newton's Second Law says that mass is directly proportional to force and acceleration is directly proportional to the second time derivative of velocity. If Newton's Second Law is true, we can combine it with Newton's First Law to get the equation for momentum. Force equals mass times acceleration. Velocity equals the distance traveled times the time elapsed. Momentum equals force times velocity. The equation for momentum is momentum = force times velocity. The equation for momentum works for any one-dimensional motion. 2nd. Newton's Third Law states that the sum of all the forces acting on a single body is zero. This is the "action at a distance" law. Newton's Third Law states that for every action there is an equal and opposite reaction. As we mentioned in the previous chapter, the sum of all the forces is zero. If we assume that an object is being pulled by a force towards some other object, then we know that the object is acting on the other object. The other object is then acting on the first object with the same force. The second object is then acting 82157476af