

(6)

* problem (4):-

* Given:-

The material in problem (2), $\nu = 0.3$

* Req:-

To find the following:-

Solu

a) - The new dimensions of the specimen:-

we have $D_0 = 2 \text{ mm}$, $L_0 = 8 \text{ mm}$

$$\Delta L \text{ (at failure)} = 0.08 = L_f - L_0 \Rightarrow L_f = 8 + 0.08$$

$$L_f = \underline{\underline{8.08 \text{ mm}}}$$

$$\text{Also } \nu = -\frac{\epsilon_L}{\epsilon_a} \quad \text{as } \epsilon_L: \text{lateral strain}$$

ϵ_a : Axial strain

$$\text{At failure} \Rightarrow 0.3 = -\frac{\epsilon_L}{10 \times 10^{-3}} \Rightarrow \epsilon_L = \underline{\underline{-0.3 \times 10^{-2}}}$$

$$\epsilon_L = \frac{\Delta D}{D_0} \Rightarrow \Delta D = \epsilon_L \cdot D_0 = -0.3 \times 10^{-2} \times 2 = \underline{\underline{-0.6 \times 10^{-2} \text{ mm}}}$$

$$\Delta D = D_f - D_0 \Rightarrow D_f = D_0 + \Delta D = 2 + (-0.6 \times 10^{-2})$$

$$D_f = \underline{\underline{1.994 \text{ mm}}}$$