



16ME207- STRENGTH OF MATERIALS

UNIT II - TORSION AND SPRINGS

Strain energy in Torsion





Strain energy in Torsion

When a body will be loaded then there will be deformation in the body and due to this deformation, energy will be stored in the body and that energy will be termed as strain.

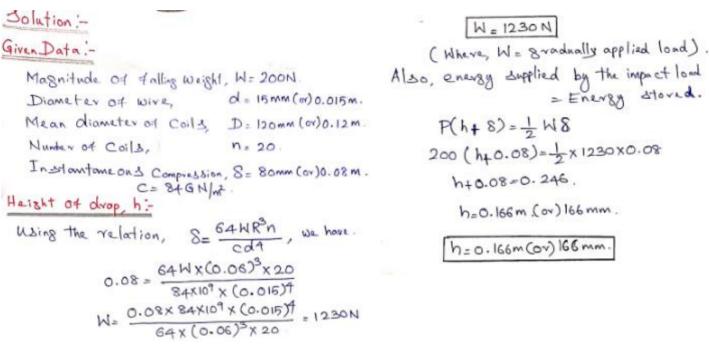






Problems

A weight of 200 N is dropped on to a helical spring made of 15 mm wire closely coiled to a mean diameter of 120 mm with 20 coils. Determine the height of drop if the instantaneous compression is 80 mm. Assume: C = 84 GN/m2.

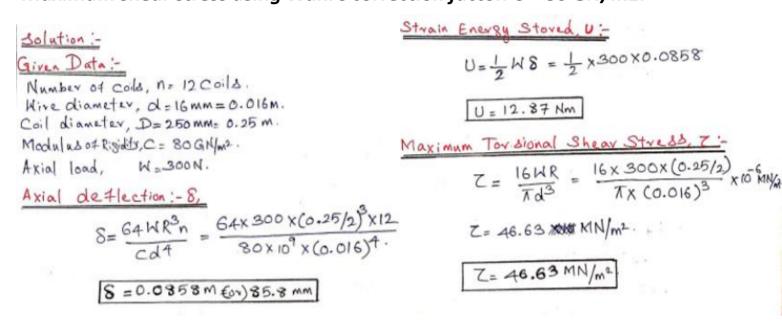






Problems

For a close-coiled helical spring subjected to an axial load of 300 N having 12 coils of wire diameter of 16 mm, and made with coil diameter of 250 mm, find A)Axial deflection;B) Strain energy stored;C) Maximum torsional shear stress in the wire;D) Maximum shear stress using Wahl's correction factor. C = 80 GN/m2.







Problems

Maximum Sheav Stress using Whal's factor:

$$Z = \frac{16 MR}{Td^3} \times K$$

Where $K = \frac{43-1}{43-4} + \frac{0.615}{3}$

But $SCSpring Index) = \frac{D}{d} = \frac{250}{16} = 15.625$
 $K = \frac{4 \times 15.625 - 1}{4 \times 15.625 - 4} + \frac{0.615}{15.625}$
 $= 1.0513 + 0.0394 = 1.0907$
 $Z = \frac{16 \times 300 \times (0.25/2)}{T \times (0.016)^3} \times 1.0907 \times 10^{-6} MM/m^2$