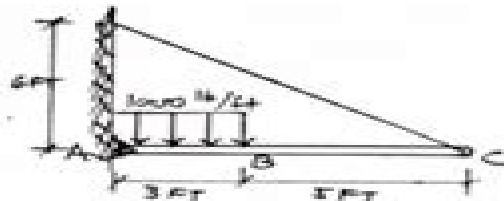


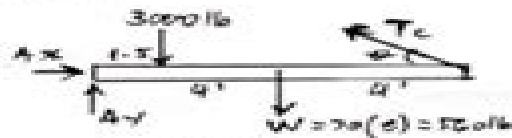
# MECHANICS OF DEFORMABLE BODIES

## Problem and Solution

Problem 1: The beam ABC, built into the wall at A and supported by a  $\frac{3}{4}$  inch diameter cable at C, carries a distributed load over part of its length, as shown below. The weight of the beam is 70lb/ft. Determine the tensile stress on the cable and its deformation. Assume modulus of elasticity of cable is 180ksi.



Solution:



$$\theta = \tan^{-1}(6/10)$$

$$\theta = 36.87^\circ$$

$$\sum M_A = 0 \quad \uparrow$$

$$T_c (\sin 36.87^\circ)(10) = 3000(1.5) + 700(5)$$

$$T_c = 1,404.16 \text{ lb}$$

$$\sigma_t = \frac{T_c}{A} = \frac{1404.16 \text{ lb}}{\pi/4 \left(\frac{3}{4}\right)^2 \text{ in}^2}$$

$$\sigma_t = 3,178.37 \text{ psi} //$$

$$f = \frac{PL}{AE} = \frac{\sigma L}{E}$$

$$L = \sqrt{a^2 + b^2}$$

$$L = 10 \text{ FT}$$

$$f = \frac{3178.37(10)(12)}{180K}$$

$$f = 2.12 \text{ in} // \text{ans.}$$

# Mechanics Of Deformable Bodies Solution Manual

**Irving Herman Shames**



## **Mechanics Of Deformable Bodies Solution Manual:**

**Journal of Applied Mechanics**, 1971 Publishes original research in all branches of mechanics including aerodynamics aeroelasticity boundary layers computational mechanics constitutive modeling of materials dynamics elasticity flow and fracture heat transfer hydraulics impact internal flow mechanical properties of materials micromechanics plasticity stress analysis structures thermodynamics turbulence vibration and wave propagation

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Yih-Hsing Pao, Li-Sheng Wang, 2025-03-28 This book describes the basic concepts and principles of classical mechanics in the intermediate level Given the perspective that different mechanical problems require an appropriate approach drawn from various methods or principles a textbook discussing multiple methods or principles in mechanics is highly desirable Additionally a good textbook should include historical context on the motivation and the development of the methods or principles allowing students to gain insights that may help them discover new theories However after many years of teaching Dynamics in the graduate school the authors were unable to find a suitable intermediate level textbook on classical mechanics which motivated them to begin writing this book For the aforementioned reasons this book includes the descriptions of various methods or principles in mechanics such as the Newton Euler Principle the d'Alembert Principle Lagrangian methods Gauss's Principle of Least Constraint the Gibbs-Appell equation Jourdain's equation the Principle of Virtual Power the Appell-Kane method the Hamilton Principle and the Hamiltonian mechanics among others Moreover many historical remarks on the motivation and the development of the methods or principles are given in this book as well as numerous applications The authors also believe that in studying the motion of a material body different models may be used depending on the application If the position of the body is of interest a particle model may be chosen If the orientation or attitude of the body is under consideration a rigid body model should be adopted If deformation is a concern a model of deformable body should be applied Consequently a book in mechanics for engineers should encompass a variety of models of the body ranging from particles to continua such as solids or fluids This book also meets that need

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