Effective Modulus of Twisted Wire Cables

by George A. Costello, (M.ASCE), Prof.; Dept. of Theoretical and Applied Mechanics, Univ. of Illinois at Urbana-Champaign, Urbana, Ill.,
James W. Phillips, Prof.; Dept. of Theoretical and Applied Mechanics, Univ. of Illinois at Urbana-Champaign, Urbana, Ill.,


Document Type: Journal Paper

Abstract:
The axial stiffness of single-lay cables composed of an arbitrary number of smooth wires is determined analytically from the general nonlinear theory for the bending and twisting of thin helical rods. Although large changes in the helix-angle are permitted, the longitudinal strain in each wire is assumed to be small. Numerical results are presented for two cases of practical interest, namely: (1) Cables with zero end-moment; and (2) cables restrained against end-rotation. It is found that the effective stiffness is strongly dependent upon the type of end-condition, except when the initial helix angle is close to 90°.

Subject Headings: Cables | Stiffening | Arbitration | Nonlinear analysis | Bending (structural) | Rods | Strain | Numerical methods

Services: Buy this book/Buy this article

Since zinc has a different modulus than steel, will the effective cable modulus be dependent on the steel area or the total stranded area? ... I have been called "A storehouse of worthless information" many times. RE: Modulus of Elasticity for guy wire. oldrunner (Structural) 17 Jul 07 15:03. This page provides approximate moduli of elasticity for a number of wire ropes. Anywhere from 12E6 to 25E6. My edition is October 1968. RE: Modulus of Elasticity for guy wire. This factor allows for the fact that the individual strands of material are twisted into a spiral pattern rather than running directly from end to end. The actual value depends upon the winding pattern that is used.