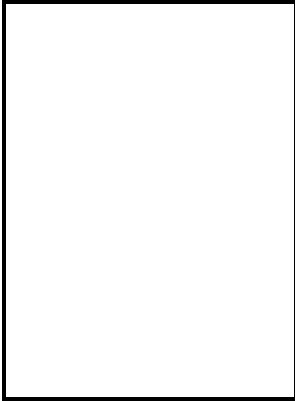


Note on the strain energy of elastic shells

Dept. of Solid Mechanics, Technical University of Denmark - The strain energy density of rubber



Description: -

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Elastic plates and shells.note on the strain energy of elastic shells

-note on the strain energy of elastic shells

Notes: Includes bibliographical references.

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On a theory for large elastic deformation of shells of revolution including torsion and thick

Consider the beam as shown and specifically a slice dx wide. The equation for shear stress at any distance z from the neutral axis for a rectangular section, with constant width b , subject to a transverse shear force V is as shown below. .

Strain Energy

It is also subject to stresses as a result of transverse shear load. Using similar principles the strain energy for different sections subject to transverse shear can be identified as shown below Comparing the strain energy due to direct shear in a beam and that due to bending: For the simply supported rectangular section beam with a central transverse force of $2V$ of length l the strain energy due to bending and due to transverse shear as shown below.

Strain Energy

To within errors inherent in shell theory itself, it is shown that the strain energy density is the same as that of a plate of the same material.

A note on the strain energy of elastic shells

The approximate theory includes torsion, transverse shear deformation, and transverse normal stress and strain but neglects body forces. IUTAM Symposium on the Theory of Thin Shells, Copenhagen, pp. Calculate the energy stored in the wire, if the elastic limit is not exceeded.

Theory and numerical analysis of shells undergoing large elastic strains

CISM Course on Applications of Poly-, Quasi-, and Rank-One Convexity in Applied Mechanics, vol. Dividing both sides above equation by AL , the volume of the wire. Lagrangian displacement shell equations are derived and the incremental shell deformation is considered.

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