Professor Joseph Kempner (1923 – 2008)

Obituary in the New York Times, August 5, 2008:
KEMPNER--Joseph, 85, formerly of Brooklyn, died July 24th, 2008 in Marlboro, NJ. Beloved husband of Carol Brown, father of Robert (Tere), Marien K. Barker (Rick), grandfather of Robert, Jason and John, Samantha and Jamie Barker, great-grandfather of Alex, Gabrielle and Kailyn. World renowned professor of aerospace and applied mechanical engineering before his retirement from Polytechnic University. Will be missed.

Selected Publications:

Bruno A. Boley, Joseph Kempner and J. Mayers (Polytechnic Inst. of Brooklyn), "A numerical approach to the instability problem of monocoque cylinders", NACA Technical note, April 1951,
proxy Url : http://handle.dtic.mil/100.2/ADA382028
ABSTRACT: Two closely related numerical methods which employ operations tables have been developed and used in the calculation of the buckling load of a monocoque cylinder subjected to pure bending. They are based on the assumption of a simplified structure which includes only the most highly compressed portion of the cylinder. The first method makes use of a 10-row determinant, whereas the second method requires the solution of a single 10-row determinant. The buckling loads of three cylinders with widely different characteristics were calculated by these methods. Reasonable agreement with experiment was obtained. A procedure similar to the first method was developed for the calculation of the buckling load of a cylinder with a cutout. A limited experimental check was obtained.

Joseph Kempner (Polytechnic Institute of Brooklyn), "Creep bending and buckling of nonlinearly viscoelastic columns", NACA TN 3137, January 1954

Kempner, J., "Post Buckling Behavior of Axially Compressed Circular Cylindrical Shells," J. Aero, Sci., 21, No. 5, (1954), 239.

Nicholas J. Hoff, Joseph Kempner and Frederick V. Pohle 1954 Line Load Applied Along Generators of Thin-Walled Circular Cylindrical Shells of Finite Length, Quarterly of Applied Mathematics, Vol. 1, 411, January 1954.

J. Kempner (Polytechnic Institute of Brooklyn), "Remarks on Donnell's Equations", Journal of Applied Mechanics, Vol. 22, No. 1, 1955, PP. 117-118

Kempner, J., "Recent Results in the Theory of Large Deflections of Cylindrical Shells," Ninth Congress of Intern. Mecan. Appl., University of Bruxelles, 6, (1957), 247.

F. Romano and J. Kempner. Stress and displacement analysis of simply supported noncircular cylindrical shells under lateral pressure. PIBAL Report No. 415, 1958.

Joseph Kempner, "Unified thin-shell theory", Polytechnic Institute of Brooklyn, NY, March 1960,
DTIC Accession Number : AD0689144

ABSTRACT: Structural components which have one dimension very much smaller than the other characteristic dimensions are widely used in many fields of engineering. Such plate and shell structures have received wide attention in the literature. Quite often a complex reinforced shell can be represented by an equivalent unreinforced anisotropic shell which under appropriate conditions can be considered to be of an orthotropic material. With very few exceptions, problems involving small deformations, large deformations, and buckling are treated separately with the interrelation of these three areas of theory not clearly revealed. It is the purpose of these notes to present in a concise manner a theory of thin-shells which, while revealing the essential unity of the whole of shell theory, still retains much of the simplicity afforded by the acceptance of the usual assumptions. The general mathematical approach described by Novozhilov for problems of nonlinear elasticity is applied in the present development.

Joseph Kempner, Some results on buckling and postbuckling of cylindrical shells", in Collected Papers on Instability of Shell Structures, NASA TN DF-1510, December 1962, pp. 173-186

F. Romano and J. Kempner. Stress in short noncircular cylindrical shells under lateral pressure. Journal of Appl. Mech., 12:69–77, 1962.

Joseph Kempner (Polytechnic Institute of Brooklyn, New York, USA), "Investigation of plates and shells under external loading and elevated temperatures", Final Report, PIBAL Report No. 664, April 1963
DTIC Accession Number: AD0407886, Handle / proxy Url : http://handle.dtic.mil/100.2/AD407886
ABSTRACT: The studies briefly described stem from continuing investigations of plates and shells under external loading and elevated temperatures, and include problems of special interest to designers of missiles and aircraft. Chapter 1 presents the results of investigations of the effects of creep in structures, with particular emphasis on the bending of circular plates. Chapter 2 outlines the work performed on heat conduction problems using Biot's variational method. Chapter 3 discusses the problem of the buckling (small-deflection theory) and postbuckling (large-deflection theory) of noncircular (oval) cylindrical shells under axial compression. Chapter 4 describes work on the analysis of the effects of concentrated loads applied to reinforcing frames of finite and infinitely long circular cylindrical shells. Chapter 5 discusses the results obtained from the analysis of the dynamic response of plastic spherical shells.

Kempner, J. and Chen, Y.N., "Large deflections of an axially compressed oval cylindrical shell", Proceedings of the Eleventh International Congress of Applied Mechanics, Munich, Springer-Verlag, Berlin, 1964, pp. 299-306

J. Kempner and Y. N. Chen. Buckling and postbuckling of an axially compressed oval cylindrical shell. In D. Muster-Univ. Houston, editor, Proceedings – Symposium On theory of shells to honor Lloyd Hamilton Donnell, pages 141–175, Houston, 1967. McCutchaw Publishing Corporation.

Kempner, J. and Chen, Y.N., "Buckling and postbuckling of an axially compressed oval cylindrical shell", Polytechnic Institute of Brooklyn, PIBAL Report No. 917, April 1966, presented at Seventh Anniversary Symposium on Shells to honor Lloyd H. Donnell, DTIC Accession Number: AD0635481
ABSTRACT: Energy expressions and related differential equations for non-circular cylindrical shells, analogous to the corresponding relations presented by Donnell for thin-walled circular cylindrical shells, are summarized. Appropriate energy expressions are then applied to the classical buckling and to the nonlinear postbuckling problems of an axially compressed oval cylinder whose cross section is characterized by a simplified form of an expression proposed by Marguerre. In the case of classical buckling, the results show, for

a range of major-to-minor axis ratio of the cross section lying between 1 (the circular cylinder) and 2.06, that the out-of-roundness has a marked effect on the critical load, and that introduction of the maximum radius of curvature into the formula for the classical buckling stress of a circular cylinder leads to good results for thin-walled shells of moderate eccentricity of the cross section. The postbuckling behavior is investigated through the application of the principle of stationary potential energy together with an approximate deflection function. The latter represents a modification of the expression applied earlier by the authors. The new results show that, in addition to the previously observed relative minimum postbuckling load, a relative maximum postbuckling load can exist. Furthermore, for controlled end-displacement loading, the large-deflection load vs end-shortening curve can correspond to stable equilibrium configurations throughout the entire loading range, whereas for dead-weight loading the region of the curve between the maximum and the minimum loads represents unstable configurations.

J. Kempner and Y. N. Chen. Postbuckling of an axially compressed oval cylindrical shell. In M. Hetényi and W.G. Vincenti, editors, Proceedings of the XII International Congress of Applied Mechanics, pages 246–256, Stanford, CA, 1968. Springer-Verlag, Berlin/Heidelberg, 1969.

Y. N. Chen, G. Feinstein, and J. Kempner. Buckling of clamped oval cylindrical shells under axial compresion. AIAA Journal, 9(9):1733–1738, 1971.

G. Feinstein, B. Erickson and J. Kempner (Brooklyn Polytech), “Stability of oval cylindrical shells: Experimental investigation of initial and ultimate buckling loads of fixed-end, oval cylindrical shells under axial compression”, Experimental Mechanics, Vol. 11, No. 11, 1971, pp. 514-520, doi: 10.1007/BF02327691
ABSTRACT: Elastic buckling under axial compression of finite, oval cylindrical shells with clamped boundaries was investigated experimentally. The determination of the buckling strength was made on a series of oval shells made of Mylar A. The test results indicated that the discrepancy between theoretical and experimental initial buckling loads for the ovals is similar to that of the circular cylindrical shells. However, in contrast to the circular case, a collapse load significantly exceeding the initial buckling load is observed in the case of ovals with moderate-to-large eccentricity.

J. Kempner, Y.N. Chen, Buckling and Initial Post-buckling of Oval Cylindrical Shells under Combined Axial Compression and Bending, Transactions of the New York Academy of Sciences, 1974, pp. 171–191.

Chen YN, Kempner J. Buckling of oval cylindrical shells under compression and asymmetric bending. AIAA J 1976;14:1235–40.