Professor G. D. Gavrilenko

G. D. Gavrilenko, “Inhomogeneous nonlinear problems of ribbed-shell theory”, International Applied Mechanics, Vol. 15, No. 9, 1979, pp. 808-813, doi: 10.1007/BF00885392 (no abstract given)

G. D. Gavrilenko, **“Stability of smooth and ribbed shells of revolution in a nonuniform stress-strain state (survey)”**, International Applied Mechanics, Vol. 31, No. 7, 1995, pp. 501-520, doi: 10.1007/BF00846784 (no abstract is given, about 200 references?)

J. G. A. Croll and G. D. Gavrilenko, “Substantiation of the method of reduced stiffness”, Strength of Materials, Vol. 30, No. 5, 1998, pp. 481-496, doi: 10.1007/BF02522630
ABSTRACT: We suggest the theoretical fundamentals of the method of reduced stiffness for the determination of the lower bounds of sensitivity of longitudinally compressed shells whose shapes are close to cylindrical to imperfections of the shape under the conditions elastic buckling. The theoretical and experimental data demonstrating the validity of the method of reduced stiffness are also presented.

J. G. A. Croll and G. D. Gavrilenko, “Reduced-stiffness method in the theory of smooth shells and the classical analysis of stability (review)”, Strength of Materials, Vol. 31, No. 2, 1999, pp. 138-154, doi: 10.1007/BF02511103
ABSTRACT: We present a promising method for the investigation of the load-carrying capacity of imperfect shells based on simple analytic approaches. This method is called the reduced-stiffness method. In many cases, it enables one to obtain analytic relations for the estimation of the lower bounds of buckling loads for actual shells. We present the exact lower bounds of the buckling loads for compressed smooth cylindrical shells. For comparison, we also used the classical approach to the analysis of the critical loads for shells.

G. D. Gavrilenko, V. I. Matsner and A. S. Sytnik, “Stability of ribbed cylindrical shells with a nonideal shape”, International Applied Mechanics, Vol. 35, No. 12, 1999, pp. 1222-1228, doi: 10.1007/BF02682395 (S. P. Timoshenko Institute of Mechanics, National Academy of Sciences of Ukraine, Kiev. Translated from Prikladnaya Mekhanika, Vol. 35, No. 12, pp. 33–39, December, 1999.)
ABSTRACT: A finite-difference method was proposed and used for analysis of critical loads of shells that have initial imperfections of different types, both regular and local. Ribbed shells were analyzed with allowance for the discreteness in the arrangement of the ribs.

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“Reduced-stiffness method in the theory of buckling of stiffened shells”, Strength of Materials, Vol. 32, No. 2, 2000, pp. 168-177, doi: 10.1007/BF02511677
ABSTRACT: The reduced-stiffness method is used to establish the lower bounds of buckling loads for stringer- or ring-stiffened cylindrical shells. The numerical results obtained by using this method are compared with the experimental data. We also consider the problem of applicability of the reduced-stiffness method in design practice as well as the prospects for its development and generalization.

Effect of localized imperfections on the critical loads of ribbed shells

G. D. Gavrilenko and V. I. Matsner
International Applied Mechanics, 2010, Volume 46, Number 7, Pages 771-775

Stability of compressed cylindrical shells with localized asymmetric deflections
G. D. Gavrilenko
International Applied Mechanics, 2010, Volume 46, Number 1, Pages 54-59
ABSTRACT: The paper proposes a new approach to the problem of stability of imperfect shells, which is used to assess their quality. Numerical results for ribbed shells with initial deflections of two types are presented. Comparing them allows assessing the quality of shells. The approach is used to determine the minimum critical load of a smooth shell, which was experimentally examined before

Critical loads of shells with high-modulus reinforcement
G. D. Gavrilenko and V. I. Matsner
International Applied Mechanics, 2009, Volume 45, Number 6, Pages 654-659

Free vibration of shells with axisymmetric dimples and bulges under axial compression
G. D. Gavrilenko, V. I. Matsner and O. A. Kutenkova
Strength of Materials, 2009, Volume 41, Number 2, Pages 209-218

Free vibrations of ribbed cylindrical shells with local axisymmetric deflections
G. D. Gavrilenko, V. I. Matsner and O. A. Kutenkova
International Applied Mechanics, 2008, Volume 44, Number 9, Pages 1006-1014

Stability of imperfect cylindrical shells
G. D. Gavrilenko
Strength of Materials, 2008, Volume 40, Number 4, Pages 463-468

Influence of axisymmetric dents in ribbed shells on minimum critical loads
G. D. Gavrilenko and V. I. Matsner
International Applied Mechanics, 2007, Volume 43, Number 5, Pages 534-538

On lower-bound estimates of critical loads for cylindrical shells
G. D. Gavrilenko, A. S. Sitnik and V. I. Matsner
International Applied Mechanics, 2006, Volume 42, Number 10, Pages 1145-1150
ABSTRACT: The paper proposes a new approach to estimate the lower bounds of critical loads for circular cylindrical shells. These bounds are compared with the ordinary lower bound of critical load under which a shell with initial deflections loses stability. The lower bound produced by the approach is higher than the ordinary bound and can be used in design.

Experimental justification of the analytical method for determining the upper and lower bounds of the critical loads in ribbed shells
G. D. Gavrilenko and V. I. Matsner
Strength of Materials, 2006, Volume 38, Number 2, Pages 150-165, doi: 10.1007/s11223-006-0027-4
ABSTRACT: The method developed for determining the upper and lower bounds of the critical load parameters in elastic ribbed shells is described. The critical parameters for cylindrical shells with three types of stiffening, namely, by cross ribs, by stringers and by rings only, are justified experimentally. It is shown that the lower

bounds of the critical loads agree with the minimum experimental parameters much better than the upper bounds of the critical loads determined from the linear momentless theory.

Some features of the buckling of stringer shells
G. D. Gavrilenko and V. I. Matsner
International Applied Mechanics, 2006, Volume 42, Number 2, Pages 176-180

Analytic upper-bound estimates for the critical loads of perfect ribbed shells
G. D. Gavrilenko and V. I. Matsner
International Applied Mechanics, 2005, Volume 41, Number 12, Pages 1391-1398

Stability and Load-Carrying Capacity of Elastic Reinforced Cylindrical Shells
G. D. Gavrilenko and V. I. Matsner
Strength of Materials, 2005, Volume 37, Number 6, Pages 624-632

Stability and load-bearing capacity of smooth and ribbed shells with local dents
G. D. Gavrilenko
International Applied Mechanics, 2004, Volume 40, Number 9, Pages 970-993,
doi: 10.1007/s10778-005-0002-y
ABSTRACT: A method for analysis of the stability and load-bearing capacity of imperfect smooth and ribbed shells is developed. This method is based on the finite-difference method and is implemented as an algorithm for fast calculation of critical forces, as opposed to the finite-element method. The theoretical results discussed include both early and recent results. The emphasis is on shells with local dents. The numerical results are successively corrected and compared with available experimental data for shells with a single dent and with other data. The method enables us to discover new features in the behavior of thin-walled structures under loading: development of precritical state, change in the dent shape, and exhaustion of load-bearing capacity. The lower local critical loads and upper stresses are determined. They correspond to general buckling and agree well with available experimental data.

Calculation of Load-Carrying Capacity of Elastic Shells with Periodic Dents (Theory and Experiment)
G. D. Gavrilenko and V. L. Krasovskii
Strength of Materials, 2004, Volume 36, Number 5, Pages 511-517
ABSTRACT: The phenomenon of the local loss of stability (buckling) earlier discovered by the authors experimentally was simulated theoretically. An approach to assessing the load-carrying capacity of circular cylindrical shells with periodic dents is presented. The authors show that application of the linear theory or solution of the problem in the nonlinear formulation with few iterations (when calculating the subcritical state) results in large quantitative errors. To get more accurate and reliable numerical data, one needs to solve the problem of the nonuniform subcritical state in the nonlinear formulation with many iterations. The local buckling loads determined numerically are lower than the experimental values, i.e., the errors are on the safe side. The loads characterizing the overall buckling are either close to the experimental values or also lower.

Reduced-Stiffness Method in the Theory of Shells
G. D. Gavrilenko and J. G. A. Croll
International Applied Mechanics, 2004, Volume 40, Number 7, Pages 715-743

Effect of the Stress State on the Critical Load and Load-Carrying Capacity of Shells with Axisymmetrical Dents

G. D. Gavrilenko and V. I. Matsner
Strength of Materials, 2004, Volume 36, Number 2, Pages 171-177

Stability of Circular Cylindrical Shells with a Single Local Dent
G. D. Gavrilenko and V. L. Krasovskii
Strength of Materials, 2004, Vol. 36, No. 3, Pages 260-268, doi: 10.1023/B:STOM.0000035759.85256.6e
ABSTRACT: The theoretical-and-experimental investigation has been performed on the stability of smooth cylindrical shells of steel with a single local dent. All the shells manufactured using the same process were tested with the fulfillment of identical conditions for observations and measurements. Theoretical calculations were carried out by the mesh method with the use of the nonlinear theory of shells. A comparison of the experimental and theoretical values of the critical loads has been made. The theoretical-and-experimental approach proposed enables one to evaluate the quality of shells by studying local dents and other specific imperfections.

G. D. Gavrilenko, "Stability of Cylindrical Shells with Local Imperfections", International Applied Mechanics, Vol. 38, No. 12, 2002, pp. 1496-1500, doi: 10.1023/A:1023218009879
ABSTRACT: We propose a nonlinear approach to the stability analysis of imperfect cylindrical shells under axial compression. The approach takes into account the initial deflections (imperfections) of the shell shape from cylindrical. A series of typical initial deflections is analyzed: local and longitudinal bulges (dents) and unilateral annular corrugations. A nonlinear stability problem is solved. The results are represented as plots of the nondimensional stress versus the nondimensional amplitude of initial deflections. It is shown that the capabilities of the nonlinear theory for estimating the critical stresses for thin shells have not been exhausted yet and that it could be used in future to explain some phenomena experimentally observed in shells

G. D. Gavrilenko, "Numerical and Analytical Approaches to the Stability Analysis of Imperfect Shells", International Applied Mechanics, Vol. 39, No. 9, 2003, pp. 1029-1045,
doi: 10.1023/B:INAM.0000008211.27840.04
ABSTRACT: Two new approaches are proposed for the numerical and analytical stability analyses of imperfect shells. One approach is based on the generalized mesh method, whereas the other employs a modified reduced-stiffness method. Both approaches apply to shells with initial geometrical imperfections. Numerical results are compared with experimental data for shells with a single dent. Analytical results are also presented and compared.

G.D. Gavrilenko (S.P. Timoshenko Institute of Mechanics, Ukrainian Academy of Sciences, Kiev, Nesterova Str. 3, 03057 Kiev, Ukraine), "Transformed initial dent as a trigger of the post-buckling process", Thin-Walled Structures, Vol. 45, Nos. 10-11, October-November 2007, pp. 840-844, Special Issue: Stability of Structures
doi:10.1016/j.tws.2007.08.003
ABSTRACT: A procedure for determination of critical loads of imperfect shells is proposed with allowance for the technique of stability and load carrying capacity of incomplete shells in an inhomogeneous stress–strain state developed earlier in the monographs [Gavrylenko GD. Stability of ribbed cylindrical shells in inhomogeneous stress–strain state. Kiev: Nauk. Dumka; 1989. 176pp [in Russian]; Gavrylenko GD. Stability of ribbed shells of incomplete form. Ukraine: Institute of Mathematics of NAS; 1999. 190pp [in Russian]]. New method of numerical estimation of carrying capacity of a shell is suggested and realized. Results from a joint theoretical and experimental investigation of the buckling of cylindrical shells containing localized dent damage are presented.