KURSHEVA, A. N.

"The Reaction of Urine Precipitation in Brucellosis," Trudy Nauchno-issledovatel'skogo Instituta Mikrobiologii i Epidemiologii Yugo-Vostoka SSSR, Saratov, Vol 1, 1951, pp 298, 299.

KURGHEVA, A.N.:

KURGHEVA, A.N.: "Obtaining and experimentally studying anti-tularemia sera". Saratov, 1955. Min Health USSR. State Sci R s Inst of Microbiology and Epidemiology of the Southwest of the USSR "Mikrob". (Dissertations for the Degree of Candidate of Biological Sciences)

SO: Knizhnaya letopis' No. 44, 29 October 1955. Moscow.

KURSHEVA, A.N.

Effect of the type of the nervous system on conditioned reflex activity in experimental tumor growth [with summary in English]. Biul.eksp.biol. i med. 45 no.1:83-85 Ja '58. (MIRA 11:4)

1. Iz kafedry patologicheskoy fizologii (zav. - dotsent P.Ya.Novorasova) Saratovskogo meditsinskogo instituta. Predstavlena akademikom A.D.Speranskim.
(NEOPLASMS, experimental,
eff. on conditioned reflex activity, role of type of nervous system (Rus))
(REFLEX, CONDITIONED,
in exper. neoplasms, eff. of type of nervous system (Rus))

EXCERPTA MEDICA Sec 16 Vol 7/8 Cancer August 59

3087. **Peculiarities in the development of M-1 tumours in rats with a changed functional condition of the central nervous system (Russian text)**
KURSHEVA A. N. Dept. of Pathol. Physiol., Saratov Med. Inst., Saratov *Byull. Eksper. Biol. i Med.* 1958, 46/11 (91-93) Graphs 2
It was shown in experiments on rats that small doses of caffeine inhibit the development of the transplanted tumour (sarcoma M-1) by increasing the functional mobility of the CNS. Large doses of caffeine accelerate the growth of the tumour in connection with the development of the supraliminal inhibition in the CNS.

VERENINOVA, N.K.; KURSHEVA, A.N.; OLLI, V.D.; KONTORINA, A.A.

Compound therapy of experimental cholera infection. Report No.1: Studies on the effectiveness of certain antibiotics in the treatment of cholera septicemia in white mice. Antibiotiki 4 no.3:81-85 My-Je '59. (MIRA 12:9)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut mikrobiologii i epidemiologii Yugo-Vostoka SSSR ("Mikrob").
(ANTIBIOTICS, eff.
on exper. cholera, comparison of various drugs (Rus))
(CHOLERA, exper.
eff. of various antibiotics, comparison (Rus))

KURSHEVA, A.N.

Change in the blood circulation apparatus in reflexogenic hypertension in dogs. Report no. 1. Trudy Sar. gos. med. inst. 26:39-41 '59. (MIRA 14:2)

1. Saratovskiy meditsinskiy institut, kafedra patologicheskoy fiziologii (zav. - dotsent P.Ya. Novorasova).
(BLOOD—CIRCULATION) (HYPERTENSION)

KURSHEVA, A.N.

Reactivity of the blood circulation apparatus in reflexogenic hypertension in dogs with a changed functional condition of the central nervous system. Report No. 2. Trudy Sar. gos. med. inst. 26:42-45 '59. (MIRA 14:2)

1. Saratovskiy meditsinskiy institut, kafedra patologicheskoy fiziologii (zav.-dotsent P.Ya. Novorasova).
(BLOOD—CIRCULATION) (HYPERTENSION) (NERVOUS SYSTEM)

KURSHEVA, A.N.; LUNTS, A.M.

Influence of drinking water contaminated with saratov petroleum on the animal organism. Trudy Sar. gos. med. inst. 26:89-93 '59. (MIRA 14:2)

1. Saratovskiy meditsinskiy institut, kafedra patologicheskoy fiziologii (zav. - dotsent P.Ya. Novorasova).
(BLOOD—DISEASES) (PETROLEUM—PHYSIOLOGICAL EFFECT)

FEDOROV, A.F.; KOROBOV, Ye.B.; KURSHEVA, N.G.

About the so-called "systoamylase". Ferm. i spirt. prom. 30 no.1: 13-14 '64. (MIRA 17:11)

1. Voronezhskiy tekhnologicheskiy institut.

KURSHEVA, V.I.

Lipogranuloma, a rare disease of the breast. Zdrav. Turk. 7 no.3:22-23 Mr'63. (MI[redacted])

1. Iz kafedry gospital'nou khirurgii (zav. - chlen-korrespondent AMN SSSR prof. I.F.Berezin) Turkmenskogo gosudarstvennogo meditsinskogo instituta i Ashkhabadskoy gorodskoy klinicheskoy bol'nitsy No.1 imeni N.I.Semashko (glavnyy vrach G.V.Bondar').
(BREAST—TUMORS)

FEDOROV, A. F.; KURSHEVA, N. G.; ZHUPIKOVA, T. G.

Fundamentals of the enrichment of the distiller's grain by means of ammonium lactate. Izv. vys. ucheb. zav.; pishch. tekh. no.5:92-95 '62. (MIRA 15:10)

1. Voronezhskiy tekhnologicheskiy institut, kafedra tekhnologii brodil'nykh proizvodstv.

(Fermentation) (Feeds)

ROSTOVSKIY, G.V., kand.med.nauk; KURSHEVA, V.I.

Echinococcus of the left femur. Zdrav. Turk. 5 no.2:30 Mr-Ap '61.
(MIRA 14:5)

1. Iz kafedry gospital'noy khirurgii (zav. - chlen-korrespondent AMN SSSR prof. I.F.Berezin) Turkmenskogo gosudarstvennogo meditsinskogo instituta imeni I.V.Stalina.
(FEMUR)

KURSHIKOV, P.

"Minimum coefficient of deep drawing."

p. 20 (Leka Promishlenost, Vol. 6, no. 7, 1957, Sofiia, Bulgaria)

Monthly Index of East European Accessions (EEAI) LC, Vol. 7, No.6, June 1958.

LIPOVSKIY, V.M., kand.tekhn.nauk; ZAVDOLIKOV, V.A.; KURSHIN, A.S.; MALKEVICH, P.P.

The E-15-14 excavator. Mekh. stroi. 18 no. 2:25 F '61. (MIRA 14:2)

1. Glavleningradskoy.

(Excavating machinery)

YEVDOKIMOV, V.I., inzh.; KURSHIN, I.K., ninzh.; NEBOV, Yu.N., inzh.

Semitrailer with controllable wheels for transporting long structural elements. Stroi. i dor. mash. 7 no.7:21-22 Jl '62. (MIRA 15:7)
(Truck trailers) (Precast concrete--Transportation)

KURSHIN, L., inzhener; BAUTMAN, Yu., inzhener.

Suspended roofs for mechanized operations in open pits. Stroi. mat. 2 no.12:26 D '56. (MLRA 10:2)

(Clay) (Roofs)

L 33535-65 EWT(d)/EWT(m)/EWP(w)/EWA(d) EM

ACCESSION NR: AP5006986 S/0198/65/001/001/0022/0031

25

AUTHORS: Grigolyuk, E. I. (Novosibirsk); Kurshin, L. M. (Novosibirsk); Fil'shtinskiy, L. A. (Novosibirsk)

24

TITLE: On one method of solving doubly-periodic problems in the theory of elasticity

B

SOURCE: Prikladnaya mekhanika, vo. 1, no. 1, 1965, 22-31

TOPIC TAGS: periodic function, harmonic function, elasticity theory, potential function, complex variable, elliptic function

ABSTRACT: Fundamental relationships are obtained in the solution of the biharmonic problem in theory of elasticity where the region under consideration forms a congruent system of identical circular holes (see Fig. 1. on the Enclosure). Complex potentials $\Phi(z)$ and $\Psi(z)$ are introduced which are expressed by Weierstrass elliptic functions $\Phi(z) = \alpha_0 + \sum_{k=0}^{\infty} \alpha_{2k+2} \frac{\lambda^{2k+2} p^{(2k)}(z)}{(2k+1)!}$, $\Psi(z) = \beta_0 + \sum_{k=0}^{\infty} \beta_{2k+2} \frac{\lambda^{2k+2} p^{(2k)}(z)}{(2k+1)!} - \sum_{k=0}^{\infty} \alpha_{2k+2} \frac{\lambda^{2k+2} Q^{(2k+1)}(z)}{(2k+1)!}$; $\operatorname{Im} \alpha_{2k} = \operatorname{Im} \beta_{2k} = 0$ $(k = 0, 1, \ldots)$. The solution is shown to be

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applicable to both the homogeneous and nonhomogeneous biharmonic doubly-periodic problems. Two cases are analyzed: the case with a doubly-periodic distribution of stress and the case with doubly-periodic distribution in stress as well as displacement. To the first case corresponds the lattice bending under a self-balancing peripheral stress applied to the hole boundaries. To the second, the problem of bending of lattice holes fixed or hinged at their boundaries under a bi-periodic transverse stress. For a regular triangular lattice this last case gives the closed form solution $w(x, y) = \frac{qz^2\bar{z}^2}{64D} + \frac{2q}{D}\mathrm{Re}\,[A_1 z\bar{z} + A_0\bar{z}\xi(z) - A_0\xi_*(z)]$. Stress concentration curves are given together with curves of elasticity modulus for regular lattice structures. Orig. art. has: 35 equations and 9 figures.

ASSOCIATION: Sibirskiy nauchno-issled. institut (Siberian Institute of Scientific Research)

SUBMITTED: 21Feb64 ENCL: 01 SUB CODE: ME

NO REF SOV: 012 OTHER: 003

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L 33535-65
ACCESSION NR: AP5006986

ENCLOSURE: 01

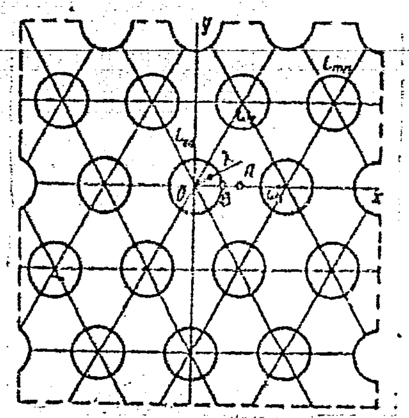

Fig. 1.

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SOV/124-58-8-9067 D

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 8, p 109 (USSR)

AUTHOR: Kurshin, L.M.

TITLE: Some Aspects of the Flexure and Stability of Cylindrical Three-layered Sandwich Shells (Nekotoryye voprosy izgiba i ustoychivosti trekhsloynykh tsilindricheskikh obolochek)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Technical Sciences, presented to the In-t mekhan. AN SSSR (Institute of Mechanics, Academy of Sciences, USSR), Moscow, 1958

ASSOCIATION: In-t mekhan. AN SSSR (Institute of Mechanics, Academy of Sciences, USSR), Moscow

Card 1/1

AUTHOR: Kurshin, L.M. SOV/55-58-1-8/33

TITLE: On the Paper of V.I.Korolev "Symmetric Forms of the Loss of Stability of Plates and Shells of Three Layers" (O rabote V.I. Koroleva "Simmetricheskaya forma poteri ustoychivosti trekhsloynykh plastin i obolochek")

PERIODICAL: Vestnik Moskovskogo universiteta, Seriya fiziko-matematicheskikh i yestestvennykh nauk, 1958, Nr 1, pp 73-77 (USSR)

ABSTRACT: This is an adverse criticism of the above paper of Korolev [Ref 1]. the author proves that in the paper of Korolev there are incorrect assumptions and results and he accuses him implicitly of a plagiarism.
There are 15 references, 2 of which are Soviet, 6 English, and 7 American.

SUBMITTED: July 17, 1957

Card 1/1

KURSHIN, L. M.

24-58-3-24/38

AUTHOR: Kurshin, L. M. (Moscow)

TITLE: Equations for Three-Layer Cylindrical Shells (Uravneniya trekhsloynykh tsilindricheskikh obolochek)

PERIODICAL: Izvestiya Akademii Nauk SSSR Otdeleniye Tekhnicheskikh Nauk 1958, Nr 3 pp 142-144 (USSR)

ABSTRACT: In calculations on three layer shells one usually neglects the transverse deformation of the middle layer, or filler, and also the bending stiffness of the outside layers; this work presents equations obtained without these assumptions. It is assumed that each layer has curvilinear isotropy. The filler has a small modulus of elasticity compared with the outer layers, and

$$E_{11} = E_{22} = G_{12} = 0 \quad (1)$$

E and G are moduli of elasticity and shear, indices 1 and 2 are for axes along generators and along arcs, while 3 is for an axis perpendicular to 1 and 2. Eq.(1) is equivalent to assuming that stresses σ_{11}, σ_{22} and τ_{12} are absent. For the outer layers

$$E_{33} = G_{13} = G_{23} = \infty \quad (2)$$

Card 1/5 These assumptions allow one to write down the integrals for

Equations for Three-Layer Cylindrical Shells.

the nonlinear elasticity of each layer. These contain 18 product functions of x and y, the curvilinear co-ordinates of the mean surface. (Refs.2,4). Using certain simplifications a system of nonlinear equations is obtained (Equations (3) (4) and (4')), pp 142-143). In these: U_B, V_B, W_B, V_H, W_H denote displacement of mean surface of top and bottom layers; T_{1B}, T_{2B}, S_B, T_{1H}, T_{2H}, S_H stresses in these layers; R, mean radius of three layer shell; δ, thickness of outer layers; $2h$, thickness of filler, E, μ, modulus of elasticity and Poisson's ratio for outer layers, G_{13} G_{23} moduli of rigidity for filler; E_{33} modulus of elasticity of filler in radial direction; q distributed radial load. For an isotropic filler

$$E_{33} = E_c, \quad G_{23} = G_{13} = G_c = \frac{E_c}{2(1 + \mu_c)}$$

B and H correspond to upper and lower layers. Δ Laplace operator. Eqs.(4) and (4') are integral equations for the outer layers. These equations may be compared with those of Wang (Ref. 5) and the differences between them may be explained by the neglect by Wang of the bending rigidity of the outer plate. Neglecting transverse deformation of filler $E_{33} = \infty$ and therefore $w_\beta = 0$ stress functions φ and ψ are introduced.

$$\varphi_{yy} = T_{1\alpha} ; \quad \varphi_{xx} = T_{2\alpha} ; \quad \varphi_{xy} = -S_\alpha ; \quad \psi = u_{\beta x} + v_{\beta y}$$

to give the equations for the three layer shells with a light isotropic filler.

$$\Delta\Delta\varphi = (1 - \mu^2)B(w_{xy}^2 - w_{xx}w_{yy} + \frac{1}{R} w_{xx})$$

$$\frac{Bh}{G_c}\Delta\psi = \psi + \left(h + \frac{\delta}{2}\right)\Delta w \qquad (6)$$

$$D\Delta\Delta w + \frac{1}{R}\varphi_{xx} - w_{xx}\varphi_{yy} - w_{yy}\varphi_{xx} + 2w_{xy}\varphi_{xy} - B(h + \frac{\delta}{2})\Delta\psi = q_\alpha$$

These agree with work of Grigolyuk (Ref. 6) and for $R = \infty$ Eq. (6) gives two equations for three layer shells sheets

Equations for Three-Layer Cylindrical Shells.

comparable with those obtained by Reissner (Ref.1). If the nonlinear members of Eq.(3) are neglected, we have a linear system of equations for the transverse bending of a three layer shell, and the corresponding stability equations may be obtained (Eqs.7, p.144). If in Eqs.(7) $R = \infty$,

$T^{0}_{1\beta} = T^{0}_{2\beta} = S^{0}_{\beta} = 0$ then the equations are comparable with

those of Prusakov (Ref.2). This previous work shows that the equations developed into the two systems of buckling of three layer sheets, i.e. the symmetric and obliquely symmetric; Eqs.(7) above are not developed to the end. The stability equations also require boundary conditions, but this point is not pursued. These equations for stability may be compared with those of Reissner, E., Teichmann et aiii and Stein and Mayers (Refs.7, 8, 9); differences are due to the taking account of the bending rigidity of the outer layers ($D \neq 0$) and of the transverse deformation of the filler ($E_{33} \neq \infty$).

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24-58-3-24/38

Equations for Three-Layer Cylindrical Shells.

There are 9 references, 4 of which are Soviet and 5 English.

SUBMITTED: November 30, 1957.

Card 5/5 1. Cylindrical shells--Mathematical analysis

AUTHOR: Kurshin, L. M., (Moscow) SOV/24-58-8-17/37

TITLE: On the Stability of Three-layered Curved Cylindrical Shells in Compression (Ob ustoychivosti trekhsloynoy pologoy tsilindricheskoy obolochki pri szhatii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 8, pp 97-100 (USSR)

ABSTRACT: The stability problem for sandwich plates and shells is usually solved in linearized form. By this means sufficiently simple equations for plates (Ref 1) and shells (Ref 2) can be written. But it is known that for simple shells the solution according to normal linear theory can lead to significant reductions in the load after loss of stability. Equations for large displacements have been obtained for sandwich plates (Ref 3) and shells (Ref 4). In these equations the bending strength of the exterior layers and the normal stresses in the filler are neglected. In the present paper the equations for large displacement for sandwich shells are obtained which are free from these omissions. In deducing the equations it is assumed that the Kirchhoff-Love hypothesis is valid for the exterior layers of the shell. It is usual to neglect the normal

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SOV/24-58-8-17/37

On the Stability of Three-layered Curved Cylindrical Shells in Compression

stresses in the interior layer (Refs 1, 3, 4) but sufficiently simple equations can be obtained without doing so, assuming only that the displacements in the filler change linearly with depth. This assumption for sandwich shells was first introduced by Legget and Hopkins (Ref 6) and Van der Neut (Ref 7). The linearized equations for bending and stability of sandwich shells based on this assumption were obtained by Eringen (Ref 5). It is assumed that in the transverse direction the filler is undeformed. Poisson's coefficients for all three layers of the shell are assumed equal. It is further assumed that the shell is curved and known simplified formulae are used for the deformations at large deflections. The thickness of the shell is neglected in comparison with the radius of curvature. It is shown that the non-linear behaviour of the sandwich shell can be more or less significant than for a simple shell of the same thickness, depending on the tensile strength and the displacement of the middle layer. For sandwich shells with a filler of

Card 2/3 average rigidity, the reduction of the strength after

SOV/24-58-8-17/37

On the Stability of Three-layered Curved Cylindrical Shells in Compression

loss of stability is less than that for simple shells of the same thickness. Discussing the same problem on the basis of a model of a compressed sandwich column with a number of supports having non-linear properties, Wang Chi-The and Rao (Ref 10) arrive at the incorrect conclusion that the tendency to loss in strength of sandwich shells in comparison with simple shells is explained by the reduced resistance to displacement of the middle layer. In fact this comes about due to the weakened response of the middle layer to normal stresses. There are 10 references, 3 of which are Soviet, 6 English and 1 German.

SUBMITTED: April 25, 1957

1. Cylindrical shells--Stability 2. Cylindrical sheels--Stresses 3. Mathematics

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PHASE I BOOK EXPLOITATION . SOV/4441

Voprosy rascheta elementov aviatsionnykh konstruktsiy; raschet trekhsloynykh paneley i obolochek, sbornik statey, no. 2 (Problems in Calculating Aircraft Construction Elements; Calculation of Sandwich Panels and Shells, Collection of Articles, No. 2) Moscow, Oborongiz, 1959. 135 p. Errata slip inserted. 1,900 copies printed.

Eds.: A. Ya. Aleksandrov, Doctor of Technical Sciences, Professor, and L.M. Kurshin, Candidate of Technical Sciences; Managing Ed.: A.S. Zaymovskaya, Engineer; Ed. of Publishing House: P.B. Morozova, Tech. Ed.: V.I. Oreshkina.

PURPOSE: This book is intended for engineers, designers, scientific workers and students.

COVERAGE: The book is a collection of 10 articles dealing with theoretical and experimental investigation of the strength of sandwich constructions with light-weight fillers of the foamed-plastic type and rigid fillers of the corrugated and honeycomb type. The articles discuss the general rigidity of sandwich plates and cylindrical shells during longitudinal compression; simultaneous bending, compression and shear of plates; local rigidity; problems in the determination of reduced elastic parameters of honeycomb fillers; and the selection of optimum parameters for plates. No personalities are mentioned. There are no references.

AVAILABLE: Library of Congress

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AC/rn/gmp
10-27-60

Kurshin, L.M.

KURSHIN, L.M.

1(3); 14(10) p. 3 PHASE I BOOK EXPLOITATION SOV/2606

Voprosy rascheta elementov aviatsionnykh konstruktsiy; raschet trekhsloynykh paneley i obolochek. Sbornik statey, No. 1 (Problems in Calculating Aircraft Structural Elements; Calculating of Sandwich Panels and Shells. Collection of Articles, Nr. 1) Moscow, Oborongiz, 1959. 169 p. Errata slip inserted. 2,600 copies printed.

Ed.: A.Ya. Aleksandrov, Doctor of Technical Sciences, Professor; Ed. of Publishing House: T.A. Valedinskaya; Tech. Ed.: V.P. Rozhin.

PURPOSE: This collection of articles is intended for engineers and scientific workers concerned with stress analysis of aircraft structural elements.

COVERAGE: The articles in this collection discuss problems in the structural analysis of sandwich panels with light cores, such as problems of the stability of curved panels, design of cores with consideration of transversal tension (tear-off) and the results of panel-strength tests. In addition, problems in the calculation of torsion and bending of a

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cylindrical shell reinforced by bulkheads are covered and the calculation of unsteady temperatures in an I-beam element is considered.

TABLE OF CONTENTS:

with consideration of shear and transversal stresses (tear-off) which arise along the surface of the junction between the outer layers and the core. Calculation formulas were obtained for plates operating under longitudinal compression and longitudinal and transverse bending.

A system of nonlinear equations for ultimate buckling of cylindrical sandwich shells is obtained by the variational method. The problem of longitudinal compression of a cylindrical sandwich panel simply supported along its four edges is solved according to the nonlinear theory. The results permit the conclusion that load reduction following loss of stability is smaller for sandwich shells with a light core than for single-layer shells of the same thickness.

Stability equations are obtained for a cylindrical sandwich shell consisting of two thin outer layers and a corrugated middle layer. The problems of stability of a curved sandwich panel simply supported along its four edges and of a cylinder under compression are solved.

5. Kurshin, L.M. Stability Under Compression of a Curved Cylindrical Sandwich Panel the Transverse Edges of Which Are Fastened While the Longitudinal Edges Are Simply Supported 69

This paper analyzes the stability of a cylindrical sandwich panel with a light isotropic core under uniform longitudinal compression for a case where the transverse edges are fastened and the longitudinal edges are simply supported.

6. Kurshin, L.M. On the Calculation of Bending Stiffness of the Outer Layer of a Curved Sandwich Panel Under Longitudinal Compression 80

A formula is obtained for calculating curved sandwich panels under longitudinal compression with consideration of the natural bending stiffness of the outer layers. The domain is established in which the assemption of this stiffness being equal to zero is applicable.

7. Galkin, S.I. Torsion of an Open Cylindrical Shell Reinforced by Bulkheads 85

Torsion of an open cylindrical shell reinforced by bulkheads is considered in this paper. The solution is obtained without introduction of additional hypotheses aside from the general assumptions associated with representing the operation of an open shell as momentless. On the basis of the solution the limits of applicability are shown of the hypothesis of warping which has been widely used in problems of calculating open shells under torsion.

8. Galkin, S.I. Torsion and Bending of a Circular Cylindrical Shell Reinforced by Elastic Bulkheads 102

This paper investigated the state of stress of a circular cylindrical shell which is reinforced by elastic bulkheads and loaded along the edges by an arbitrary system of axial and tangential forces. Calculation formulas are obtained which permit calculating all elastic-deformation components for various boundary conditions at the edges of the shell. The effect of self-balancing forces on the state of stress of the shell as a function of the stiffness of the bulkheads was investigated. It is shown that the self-balancing stresses do not decay very rapidly; the zone of their propagation into the depth of the shell is practically equal to the length of the contour of the transverse cross section of the shell. A calculation example is given for a shell under torsion allowing for elasticity of the bulkheads.

9. Nazarov, N.I., M.S. Povarnitsyn, and Ye. V. Yurlova. Calculation of Unsteady Temperatures in an I-beam Element 142
This paper presents two methods of calculating the temperature fields in an I-beam element (representing, in this particular case, a typical part of a multilongeron

wing): 1) the method of direct integration of the heat-conduction equations, and 2) the method of elementary equilibrium. Cases of symmetrical and unsymmetrical heating of such elements through the outer flange surfaces are considered as well as the case of different thicknesses of flanges. Solution of the problem is given under the assumption that physical characteristics of the material and the heat-transfer coefficients do not depend on temperature variation.

AVAILABLE: Library of Congress

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11-24-59

ALEKSANDROV, A.Ya., prof., doktor tekhn.nauk, red.; KURSHIN, L.M., kand.tekhn.nauk, red.; MOROZOVA, P.B., izdat.red.; ORESHKINA, V.I., tekhn.red.

[Designing elements of aircraft structures; analysis of sandwich panels and shells] Voprosy rascheta elementov aviatsionnykh konstruktsii; raschet trekhsloinykh panelei i obolochek. Sbornik statei. Pod red. A.IA. Aleksandrova i L.M.Kurshina. Moskva, Gos.izd-vo obor.promyshl. No.2. 1959. 134 p. (MIRA 14:2)

(Elastic plates and shells)
(Airplanes--Design and construction)

24 7200,

S/124/62/000/009/022/026
A057/A101

AUTHOR: Kurshin, L. M.

TITLE: Greater deflections of a triple-layer cylindrical shell

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 9, 1962, 8, abstract 9V46 (In collection: "Vopr. rascheta elementov aviats. konstruktsiy. no. 1", Moscow, Oborongiz, 1959, 39 - 50)

/B

TEXT: A system of non-linear differential equations was obtained for the final deflections of triple-layer cylindrical shells with rigid filler and carrier layers of the same thickness by means of the variation method. The validity of the hypothesis by Kirchhoff-Loew was assumed in the deduction of equations for carrier layers, and the linear law of change of displacement in vertical direction assumed for the filler. The transversal compression of the filler was not considered. The shell was considered to be slanting, and for the deformation at the final deflections are used the known simplified equations. The material of the outer layers is uniform and isotropic, the filler transversally isotropic. Poisson's ratios of all the three layers were taken as equal. The variation

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Greater deflections of a triple-layer cylindrical shell A057/A101

equation of the triple layer shell is written in the form: $\delta(V_1+V_2+V_3) + \delta A + \iint q\delta w dxdy = 0$ where V_1, V_2 = the potential energy of deformation of the upper and bottom layer respectively, V_3 = potential energy of deformation of the filler, A = work of outer forces, applied to the contour of the triple layer panel, q = = outer pressure, w = deflection. From the variation equation is obtained a system of five differential equations of equilibrium in displacements and boundary conditions. Introducing the function Φ of stresses and function Ψ of displacements the author reduces the mentioned system to three differential equations in variables Φ, Ψ, and w. The problem of longitudinal compression of a triple-layer square cylindric panel, free resting along the found edges was solved according to the non-linear theory, and the function of deflection was selected in the form $w = f \sin \frac{\pi x}{a} \sin \frac{\pi y}{b}$. An equation was obtained which connects the value of the compression load and the magnitude of deflection in the middle of the panel. The conclusion is drawn that the decrease of the load after the loss of stability is smaller in triple-layer shells with light fillers, than in single-layer shells of the same thickness.

T. N. Vasitsyna

[Abstracter's note: Complete translation]

Card 2/2

KURSHIN, L.M.

Compressive strength of a freely supported cylindrical sandwich panel and a cylinder with a corrugated filler. Vop.rasch. elem.aviats.konstr. no.1:51-68 '59. (MIRA 13:6)
(Elastic plates and shells)

KURSHIN, L.M.

Compressive strength of a curvilinear cylindrical sandwich panel having fastened lateral edges and freely supported longitudinal edges. Vop.rasch.elem.aviats.konstr. no.1:69-79 '59. (MIRA 13:6)

(Elastic plates and shells)

KURSHIN, L.M.

Stability of cylindrical sandwich shells beyond the elastic limit.
Vop.rasch.elem.aviats.konstr. no.2:43-51 '59.
(MIRA 13:6)

(Elastic plates and shells)

ALEKSANDROV, A.Ya.; KURSHIN, L.M.

Compression of a reinforced plate. Vop.rasch.elem.aviats.konstr. no.2:114-124 '59. (MIRA 13:6)
(Elastic plates and shells)

SOV/179-59-3-29/45

AUTHORS: Bryukker, L. E. and Kurshin, L. M. (Novosibirsk)

TITLE: The Static Derivation of the Equations of Bending of a Three-Layered Plate with Rigid Filling (O vyvode staticheskim putem uravneniy izgiba trekhsloynykh plastin s zhestkim zapolnitelem)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1959, Nr 3, pp 167-168 (USSR)

ABSTRACT: The outer layers of the plate are assumed to be isotropic, and the middle layer orthotropic. Consideration of the bending moments, shearing forces and shear stresses in the three layers leads to the system of equations governing the bending of the plate previously derived by Grigolyuk (Ref 1).
There are 1 figure and 1 Soviet reference

SUBMITTED: February 13, 1959

Card 1/1

Kurshin, L. M.

PHASE I BOOK EXPLOITATION SOV/4733

Aleksandrov, Avraam Yakovlevich, Leonid Eduardovich Bryukker, Lev Moiseyevich Kurshin, and Aleksandr Pavlovich Prusakov

Raschet trekhsloynykh paneley (Calculations for Sandwich Panels). Moscow, Oborongiz, 1960. 270 p. Errata slip inserted. 1,600 copies printed.

General Eds.: A. Ya. Aleksandrov, Doctor of Technical Sciences, Professor, and L.M. Kurshin, Candidate of Technical Sciences; Ed.: A.A. Goryainov, Candidate of Technical Sciences; Managing Ed.: A.S. Zaymovskaya, Engineer; Ed. of Publishing House: P.B. Morozova; Tech. Ed.: N.A. Pukhlikova.

PURPOSE: This book is intended for designers, scientific personnel, and students in related fields.

COVERAGE: The book contains formulas and diagrams for strength calculation of flat and curved sandwich panels with various cores (homogeneous foam-plastic type, ribbed, etc.) under various support conditions, and subjected to various combinations of loads. Data on selecting optimum parameters of panels and on strength testing of panels are included. The introduction and Chapters 11, 12, 13, 15, 27, and 28 were written by A. Ya. Aleksandrov; Chs. 6, 16, 17, 18, 19, 21, 23, 24, 25, and 26 by L.E. Bryukker; Chs. 2, 3, 5, 8, 9, 10, 14, 20, part of Ch. 4

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and part of Ch. 1 (Sections 1.5, 1.7, 1.8.2, 1.10, 1.11, and 1.12) by L.M. Kurshin; and Chs. 7, 22, part of Ch. 4, and part of Ch. 1 (Sects. 1.1, 1.2, 1.3, 1.4, 1.6, 1.8.1, 1.9, 1.13) by A.P. Prusakov. Materials supplied by N.I. Nazarov are used in Sect. 16.2 of Ch. 16. The authors thank E.P. Trofimova for her assistance. There are 136 references: 32 Soviet, 101 English, and 3 German.

TABLE OF CONTENTS:

KUZNETSOV, A.P. (Novosibirsk); KURSHIN, L.M. (Novosibirsk)

Solutions based on the theory of strengthening to certain problems of the stability of plates and shells in conditions of creep. PMTF no.4:84-89 N-D '60. (MIRA 14:7)
(Elastic plates and shells)
(Creep of materials)

Kurshin, L.M.

BOROVSKIY, P. V. PHASE I BOOK EXPLOITATION SOV/6206 75

Konferentsiya po teorii plastin i obolochek. Kazan', 1960.

Trudy Konferentsii po teorii plastin i obolochek, 24-29 oktyabrya 1960. (Transactions of the Conference on the Theory of Plates and Shells Held in Kazan', 24 to 29 October 1960). Kazan', [Izd-vo Kazanskogo gosudarstvennogo universiteta] 1961. 426 p. 1000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Kazanskiy filial. Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina.

Editorial Board: Kh. M. Mushtari, Editor; F. S. Isanbayeva, Secretary; N. A. Alumyae, V. V. Bolotin, A. S. Vol'mir, N. S. Ganiyev, A. L. Gol'denveyzer, N. A. Kil'chevskiy, M. S. Kornishin, A. I. Lur'ye, G. N. Savin, A. V. Sachenkov, I. V. Svirskiy, R. G. Surkin, and A. P. Filippov. Ed.: V. I. Aleksagin; Tech. Ed.: Yu. P. Semenov.

PURPOSE: The collection of articles is intended for scientists and engineers who are interested in the analysis of strength and stability of shells.

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75

Transactions of the Conference (Cont.) SOV/6206

COVERAGE: The book is a collection of articles delivered at the Conference on Plates and Shells held in Kazan' from 24 to 29 October 1960. The articles deal with the mathematical theory of plates and shells and its application to the solution, in both linear and nonlinear formulations, of problems of bending, static and dynamic stability, and vibration of regular and sandwich plates and shells of various shapes under various loadings in the elastic and plastic regions. Analysis is made of the behavior of plates and shells in fluids, and the effect of creep of the material is considered. A number of papers discuss problems associated with the development of effective mathematical methods for solving problems in the theory of shells. Some of the reports propose algorithms for the solution of problems with the aid of electronic computers. A total of one hundred reports and notes were presented and discussed during the conference. The reports are arranged alphabetically (Russian) by the author's name.

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APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000927810007-7"

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000927810007-7"

S/124/62/000/009/026/026
A057/A101

AUTHOR: Kurshin, L. M.

TITLE: Stability of the panel of a wing at non-stationary aerodynamic heating

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 9, 1962, 49, abstract 9V371 ("Tr. Konferentsii po teorii plastin i obolochek, 1960", Kazan', 1961, 209 - 214)

TEXT: It is assumed that the initial temperature is equal in all points. The heating occurs because of the heat exchange with the external medium. The non-uniformity of temperature distribution along the thickness of the elements and change of heat-physical and elastic constants of materials with temperature is not considered. The temperature and stresses are obtained in form of Riemann-Mellin integrals, containing parameters of the problem, coordinates and time. The equation of stability is integrated by the method of Galerkin. The critical value of time is determined. The following cases of heating are discussed: a constant heat flux in a time unit through a surface unit is given, the value of

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S/124/62/000/009/026/026
A057/A101

Stability of the panel of...

the constant coefficient of heat emission and temperature in the boundary layer are given, and conditions of heating are given, approximately corresponding to a flight with varying acceleration.

I. N. Danilova

[Abstracter's note: Complete translation]

Card 2/2

KURSHIN, L.M.; FIL'SHTINSKIY, L.A.

Strength of an evenly compressed polygonal plate. Izv.Sib. otd.AN SSSR no.4:3-8 '61. (MIRA 14:6)
(Elastic plates and shells)

KURSHIN, L.M. (Novosibirsk); FIL'SHTINSKIY, L.A. (Novosibirsk)

Determining the reduced elastic modulus of an isotropic plane weakened by a double-periodic system of circular holes. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.6:110-114 N-D '61. (MIRA 14:11)

(Elastic plates and shells)

31639
S/207/61/000/006/015/025
A001/A101

10.7300 also 1413

AUTHOR: Kurshin, L. M. (Novosibirsk)

TITLE: Stability of rods under conditions of creep

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1961, 128 - 134

TEXT: The author proposes a new formulation of the problem of rod stability under conditions of creep, based on investigation of the rod motion subjected to perturbations. At first he analyzes the case of a hinge-supported rod of rectangular cross section loaded by a constant longitudinal load T, assuming the state equation with creep to be described by the following equation: $\dot{p} = A \sigma^n p^{-\alpha}$ (1.1), where σ is stress, p is creep strain. Integrating (1.1) and introducing some substitutions the author transforms it into an integral Volterra equation which has only one trivial solution, that the rod preserves its stability at $T < T_e$, the latter quantity being $T_e = \frac{\pi^2 EI}{l^2}$, where E is elasticity modulus, I is moment of inertia of cross section, and l is rod length. The next case considered is complicated by the presence of perturbations in the rod motion, which may be a small residual buckling of the rod. The author

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31639
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A001/A101

Stability of rods under conditions of creep

proves that the rod remains stable up to a critical strain p* which is determined from the following expression:

$$\frac{\sigma^{o}}{1-\sigma^{o}} \frac{En}{\sigma} p^{*} = 2\alpha \qquad (2.10)$$

where $\sigma^{o} = \frac{T}{T_e}$, n and α are from equation (1.1). The last problem considered is the case of generalized state equation under more general conditions of support. The author proves that even this generalization leads to the same expression (2.10) for the critical strain of rod stability. The name of Yu. N. Rabotnov is mentioned in the article. There are 3 references, two of which are Soviet-bloc.

SUBMITTED: August 4, 1961

89607
S/020/61/136/002/010/034
B019/B056

10.4100

16.7300

AUTHOR: Kurshin, L. M.

TITLE: The Stability of the Wing Panels During Heating

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 313-315

TEXT: Thin-walled multi-longeron wings during nonsteady aerodynamic heating lose their stability by the heat stresses formed by the faster heating of the sheathing compared to the longeron walls. The solutions of the thermal conduction equations for the longerons and the sheathings may be written down in integral form:

$$\theta_i(\xi_i,\tau) = \frac{1}{2\pi i}\int_{\varepsilon-i\infty}^{\varepsilon+i\infty} \vartheta_i^*(\xi_i,p)e^{p\tau}dp, \quad \varepsilon>0, \ i = 1,2$$

In consideration of the self-equalization of temperature differences the integral

$$\sigma_{yz} = \alpha T_0 E_2\left\{\frac{1}{\beta(1+\kappa)}\int_0^\beta \theta_2 d\xi_2 + \frac{\kappa\psi}{1+\kappa}\int_0^1 \theta_1 d\xi_1 - \theta_2\right\} \qquad (3)$$

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89607

The Stability of the Wing Panels During Heating

S/020/61/136/002/010/034
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is obtained from this solution for the thermal stresses in the sheathing, where $\chi = \frac{\delta_1}{2\delta_2} \frac{aE_1}{bE_2}$, $\alpha_1/\alpha_2 = \gamma$, E_i is the elasticity modulus, and α_i is the linear expansion coefficient. In the solution of the stability problem, the sheathing is considered to be infinitely long, and for the bending $w(x_2,y) = (\sin\pi x_2/sb).\sin\pi y/l$ is assumed. The stability equation

$$\int_0^b\int_0^l \left(D_2\Delta\Delta w - \sigma_{y2}\delta_2 \frac{\partial^2 w}{\partial y^2}\right) w\,dx_2dy = 0$$

is written and integrated. Here, the stability problem is solved by means of integral representations of temperature and stresses, without it being necessary to calculate the temperature and the stress itself. An expression is obtained for determining the critical points of time. The theoretical results obtained here were experimentally checked. A. G. Zagorskiy took part in the experiments. There are 3 figures and 2 references.

PRESENTED: July 29, 1960, by Yu. N. Rabotnov, Academician

SUBMITTED: July 9, 1960

Card 2/2

28726
S/020/61/140/003/005/020
B104/B125

24 4200 1327 1131

AUTHOR: Kurshin, L. M.

TITLE: Stability of rods and plates under creep conditions

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 3, 1961, 549-552

TEXT: A joint-supported rod with a load applied by a constant longitudinal force T was tested. The equation of state for such a rod reads: $\dot{p} = A\sigma^n p^{-\alpha}$, $p = \varepsilon - \sigma/E$. If this equation is linearized, the relation valid for the rod in case of small deviations from its straight-lined state will be: $\delta\dot{p} = An\sigma^{n-1}p^{-\alpha}\delta\sigma - A\alpha\sigma^n p^{-\alpha-1}\delta p$. σ denotes the tension; p is the creep deformation; ε is the total deformation. p and σ refer to the rod axis, while δp and $\delta\sigma$ are slight increases in thickness. Since a rod under creep conditions does not lose its stability in the sense that a bifurcation occurs the motion of the rod is examined after disturbances have acted upon it. A slight residual bend found on the rod at a certain moment is such a disturbance. The acceleration of the disturbed motion is given by

$$(\ddot{\tau})_{p=p^*} = A^2\sigma^{2n}p^{-2\alpha}k(k-(2\alpha/p)) \qquad (7)$$

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B104/B125

where p* denotes the creep deformation at the moment when the disturbance is applied: $k = \frac{\bar{\sigma}}{1 - \bar{\sigma}} \frac{En}{\sigma}$ Eq. (7) indicates that the character of the disturbed motion depends on the p value at which the disturbance has been applied. If $p < 2\alpha/k$, the disturbed motion will be retarded; if $p > 2\alpha/k$, it will be accelerated. A rod will be in a critical state when the disturbance applied gives rise to a non-retarded, disturbed motion, whereas any disturbance applied somewhat earlier will cause a retarded, disturbed motion. This critical creep deformation is given by

$p_k = 2\alpha \frac{1 - \bar{\sigma}}{\bar{\sigma}} \frac{\sigma}{En}$. This definition differs from that by Yu. N. Rabotnov et al. (Prikl. matem. i mekh. no. 3 (1957); The Theory of Creep and its Applications, Plasticity, 1960) in the character of forced motion and in the formulation of the criterion of stability. The value of p_k calculated here is twice as high as that calculated by Rabotnov. The application of the foregoing to the stability problem of a plate is discussed in detail.

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28726
S/020/61/140/003/005/020
B104/B125

Stability of rods and plates...

There are 2 references: 1 Soviet and 1 non-Soviet.

PRESENTED: May 15, 1961, by Yu. N. Rabotnov, Academician

SUBMITTED: May 10, 1961

X

Card 3/3

ALEKSANDROV, Avraam Yakovlevich, prof.; BORODIN, Mikhail Yakovlevich; PAVLOV, Viktor Vasil'yevich; KURSHIN, L.M., kand. tekhn.nauk, red.; GORTSUYEVA, N.A., red. izd-va; NOVIK, A.Ya., tekhn. red.

[Elements with foamed plastic filters] Konstruktsii s zapolniteliami iz penoplastov. Pod obshchei red. A.IA.Aleksandrova. Moskva, Oborongiz, 1962. 186 p. (MIRA 15:7)
(Plastic foams) (Sandwich construction)

34573
S/207/62/000/001/014/018
B104/B108

10.7300
24.4200

AUTHOR: Kurshin, L. M. (Novosibirsk)

TITLE: The stability of plates in creep conditions

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 1, 1962, 93 - 101

TEXT: The deflections caused by perturbations occurring at different moments are examined on a plate subjected to uniform stress. The equation of state for the plate in creep conditions is $\dot{p}_i = g(p_i, \sigma_i)\sigma_i$ (1.1). The relations

$$\dot{p}_{ij} = \frac{3}{2} g(p_i, \sigma_i)\sigma_{ij}^*, \qquad p_{ij} = \varepsilon_{ij} - \frac{1}{2G}\sigma_{ij}^* \qquad (1.2)$$

are presumed between the components $\dot{p}_{ij}$ of the tensor of creep deformation rate and the stress deviator σ_{ij}^*. Presuming that in small deflections stress and deformation across the plate change only little, Eqs. (1.1) and

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(1.2) are linearized:

$$\begin{aligned} \delta\dot{p}_i &= a\delta p_i + g(b+1)\delta\sigma_i \\ \delta\dot{e}_{ij} - \frac{1}{2G}\delta\dot{\sigma}_{ij}^* &= \frac{3}{2}g\delta\sigma_{ij}^* + \frac{3}{2}\frac{\sigma_{ij}^*}{\sigma_i}(a\delta p_i + gb\delta\sigma_i) \\ a = a(\sigma_i, p_i) = \sigma_i\frac{\partial g}{\partial p_i}, &\quad b = b(\sigma_i, p_i) = \frac{\sigma_i}{g}\frac{\partial g}{\partial \sigma_i} \end{aligned} \quad (1.4)$$

(1.4).

The equation of the perturbed motion is derived in the form

$$\left(E\lambda - \mu - \nu\frac{\partial}{\partial t}\right)\left[\frac{\sigma_i}{e_i}\left(\triangle\triangle - \frac{3}{4}\Lambda\Lambda\right)(w - w^\circ) - \frac{9\sigma_i}{4h^2}\Lambda w\right] - \frac{3}{4}E\left(\mu + \nu\frac{\partial}{\partial t}\right)\Lambda\Lambda(w - w^\circ) = 0$$

(3.8), where

$\Lambda = \alpha_{11}\frac{\partial^2}{\partial x^2} + 2\alpha_{12}\frac{\partial^2}{\partial x\,\partial y} + \alpha_{22}\frac{\partial^2}{\partial y^2}$, $D = \frac{8}{9}Eh^3$, w - deflection, w^0 - perturbation (initial deflection). The initial condition for this equation is

$$D\triangle\triangle(w^* - w^\circ) - 2h\sigma_i\Lambda w^* = 0$$

(3.9).

$w^* = w$ when $t = t^*$, t^* the instant of time at which the perturbation is applied. From these equations three more can be derived for w^*, $\dot{w}^*$, and $\ddot{w}^*$ of the perturbed motion at time $t = t^*$. In order to determine the limit of stability of the plate, the condition $\ddot{w}^* = 0$ which satisfies the perturbed motion must be included in these equations. There are 2 figures and 2 Soviet references.

SUBMITTED: August, 1961

24.4200

S/207/62/000/003/011/016
1028/1228

AUTHOR: Kuznetzov, A. P. and Kurshin, L. M. (Novosibirsk)

TITLE: Stability of circular cylindrical shells under conditions of creep

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1962, 66-72

TEXT: The problem of stability under conditions of creep is treated on the basis of an analysis of the accelerations of disturbed motions. Ths state of the cylindrical shell is considered as unstable if the velocity of the disturbed motion produced at a given moment under the influence of a disturbance increases with time. The equations determining the velocity and acceleration at the initial moment of the disturbed motion are established, and the equations of stability obtained from them. These equations are solved for the case of longitudinal compression. There are 2 figures.

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SUBMITTED: November 28, 1961

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1.1719
S/207/62/000/005/009/012
B125/B102

AUTHOR: Kurshin, L. M. (Novosibirsk)

TITLE: Solution to stability problems of plates in the presence of creep according to the quasistationary theory

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1962, 154-158

TEXT: The initial conditions for the disturbed motion of a rod if $\tau = 0$ (τ is the deflection of the rod) are generalized for plates. From the linearized equation of state

$$\delta\dot{p} = An\sigma^{n-1}p^{-\alpha}\delta\sigma - A\alpha\sigma^{n}p^{-\alpha-1}\delta p \tag{1.2}$$

formula

$$(1-\sigma^{\circ})\tau - \left(\frac{p}{p^{\bullet}}\right)^{-\alpha}\tau_c^{\bullet} - \frac{En}{\sigma}\sigma^{\circ}p^{-\alpha}\int\limits_{p^{\bullet}}^{p} p^{\alpha}\tau(p)\,dp = 0 \tag{1.6}$$

$$\left(\sigma^{\circ} = \frac{T}{T_e},\ T_e = \frac{\pi^2 EI}{l^2}\right)$$

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follows for a small hinged rod. This corresponds to a disturbed motion under quasistationary conditions. The stability limits ($kp = \alpha$) correspond to the minimum of the function

$$\tau(p) = \frac{\tau_c^*}{1-\sigma^\circ}\left(\frac{p}{p^*}\right)^{-\alpha} e^{k(p-p^*)} \qquad \left(k = \frac{\sigma^\circ}{1-\sigma^\circ}\frac{En}{\sigma}\right) \qquad (1.7),$$

σ is the stress, p is the creep deformation, ε is the total deformation, δp and $\delta\sigma$ are small increments of p and σ added to the thickness of the rod; I is the moment of inertia of the cross section. At the initial instant of time $t = t^*$, $p = p^*$ and $(\delta p)_{p=p^*} = \delta p^*$. The creep deformation is $\delta p^* = \delta\varepsilon^* - \tau^*_\sigma/E$ with $\delta\dot{\varepsilon} = -z\dot{w}^*_{xx}$. W is the initial deflection. For plates the equation of state with allowance for creep is $\dot{p}_i = g(p_i, \sigma_i)\sigma_i$. The relations $\dot{p}_{ij} = (3/2)g(p_i, \sigma_i)\sigma^{oo}_{ij}$ and $p_{ij} = \varepsilon_{ij} - \sigma^{oo}_{ij}/2G$ hold between the components σ^{oo}_{ij} of the stress deviator and the components of the tensor of the rates of creep deformation. When such a plate is subject to a certain disturbance the creep deformation $\delta p^*_i = \alpha^{oo}_{ij}\,\delta p^*_{ij}$ arises. After integration over the thickness ($\int_{-h}^{h} \delta p^* z dz$) the equation $p^* = -(2/3)h^3\Lambda\omega^* M^*/E$ (2.12) follows with $M^* = -(3/4)D\beta\Lambda\omega$. $D = (8/9)Eh^3$, $\Lambda = \alpha_{11}\partial^2/\partial x^2 + 2\alpha_{12}\partial^2/\partial x\partial y + \alpha_{22}\partial^2/\partial y^2$. h is the thickness of the plate. ω^* is its deflection for $p_i = p_i^*$. These conditions together with

$$G_1^* = -\beta D\left(w_{xx}^* + \tfrac{1}{2} w_{yy}^*\right)$$
$$G_2^* = -\beta D\left(w_{yy}^* + \tfrac{1}{2} w_{xx}^*\right) \qquad (2.13)$$
$$H^* = -\beta \frac{D}{2} w_{xy}^*$$

and

$$G_{1xx}^* + G_{2yy}^* + 2H_{xy}^* = -\beta D\Delta\Delta w^* \qquad (2.15)$$

determine the motion at which the time derivative of the deflection vanishes for a certain value of p_i. The relaxation caused by the initial creep is taken into account by the factor β. Where cylindrical stability is lost by the compression of a hingod plate, $p_i^* = (1 - \sigma^o)\alpha\sigma_i/\sigma_o En$. For a hinged square plate (compressed in two directions by equal forces) $p_i^* = (1 - \sigma^o)3\alpha\sigma_i/\sigma^o(1 + 3n)E$. For a long hinged plate homogeneously loaded in a longitudinal direction,

$$p_i^* = \frac{1 - \sigma^o}{\sigma^o}\frac{3\alpha\sigma_i}{(13+3n)E}$$

$\sigma^o = \sigma_i/\sigma_e$ where σ_e is the intensity of stress associated with loss of elastic stability.

SUBMITTED: May 28, 1962

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000927810007-7"

KURSHIN, L.M., kand.tekhn.nauk (Novosibirsk)

Survey of works on the design of sandwich plates and shells.
Rasch.prostr.konstr. no.7:163-192 '62. (MIRA 15:4)
(Sandwich construction)

Kurshin, L.M.

AID Nr. 967-17 15 May

DERIVATION OF VARIATIONAL EQUATIONS FOR SHALLOW CYLINDRICAL SHELL WITH REGARD TO THERMAL STRESSES (USSR)

Kurshin, L. M. Izvestiya vysshikh uchebnykh zavedeniy. Aviatsionnaya tekhnika, no. 1, 1963, 151-156. S/147/63/000/001/018/020

The derivation of variational equations for the relation between the force and deflection of a heated thin shallow cylindrical shell in the range of finite deflections is presented. The initial equations are comprised of 1) expressions in the finite-deflection theory of shallow shells describing the basic relationships between the normal forces (acting in the middle surface of the shell) and moments on one hand and displacement components on the other hand, and 2) the equilibrium equation. The thermal stresses are taken into account in accordance with Neumann's hypothesis and with the assumption of preservation of the straightness of normals to the middle surface. Stability equations are obtained by investigating the instant of occurrence of a nonunique solution of the problem, i.e., when the difference between two successive states of

Card 1/2

AID Nr 967-17 15 May

DERIVATION OF VARIATIONAL EQUATIONS [Cont'd] S/147/63/000/001/018/020

equilibrium is infinitely small. The variational equations are derived by applying the principle of virtual displacements and by introducing two potential-energy functions, one in terms of forces and the other in terms of displacements. These equations are reduced to a single equation in which the variations in deflections and forces satisfy the geometric and static boundary conditions, respectively. Formulation of the conditions for buckling is discussed from the energy point of view, and a corresponding equation of stability is given. [VK]

Card 2/2

VOL'MIR, Arnol'd Sergeyevich. Prinimali uchastiye: TRAPEZIN, I.I.; KURSHIN, L.M.; SNITKO, I.K., red.; BRUDNO, K.F., tekhn. red.

[Stability of elastic systems] Ustoichivost' prugikh sistem. Moskva, Fizmatgiz, 1963. 879 p. (MIRA 16:7)
(Elastic solids)

L 17654-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(b) JD/EM

ACCESSION NR: AR4045241 S/0124/64/000/007/V035/V036

SOURCE: Ref. zh. Mekhanika, Abs. 7V268

AUTHOR: Kurshin, L. M.

TITLE: One possible approach to the problem of the stability of rods under creep conditions

CITED SOURCE: Sb. Polzuchest' i dlitel'n. prochnost'. Novosibirsk, Sib. otd. AN SSSR, 1963, 29-31

TOPIC TAGS: rod stability, rod creep, bending strength, compressed rod, hinge supported rod

TRANSLATION: As the source of perturbation causing the bending of a centrally compressed rod, the author considers a spread in the values of the creep constant of the material throughout the rod. It is assumed that at each point in the rod the following equation describing the state is valid: $\dot{p} = A\sigma^n p^{-\alpha}$, $p = \epsilon - \sigma/E$

where σ is the stress, ϵ is the complete deformation; p is the creep deformation; and A, α,

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L 17654-65
ACCESSION NR: AR4045241

n are variable parameters. Assuming that the values p, σ, A, α, n differ only to a small degree along the rod section, the author linearizes Eq. 1 by variation and, after substituting the varible p for the variable t (time), he accepts the initial condition $(\delta p)_{p=0} = 0$ and obtains the integral of the linear equation in the form

$$\delta\varepsilon - \delta\sigma/E = p^{-\alpha} \int_0^p [(n/\sigma)\delta\sigma + \delta A/A +$$

Here p, σ, A, n, and α are the mean values of the corresponding magnitudes; δ p... are small increments; and δA, δn, δα are random co-ordinate functions. At this point the author applies the hypothesis of plane sections, and the buckling of a hinge-supported rod is sought in the form $u = \tau(p) \sin(\pi x/L)$, where L is the length of the rod. After integration for x by the Galerkin method, τ(p) is found by quadrature formulae. The random functions A, n, α, found in the expression for τ(p), must be obtained through the statistical processing of a large number of tensile strength tests under creep conditions. Attention is called to the importance of studying the creep parameter spread as a function of the dimensions of the samples tested. As a stability criterion, it is suggested that a buckling value be given, at which the serviceability of a rod may be considered to be practically exhausted, and that the critical time be determined by using the expression found for τ(p). B. M. Broude.

SUB CODE: ME, AS ENCL: 00

Card 2/2

ACCESSION NR: AT4010249 S/3052/63/000/003/0211/0219

AUTHOR: Kurshin, L. M. (Novosibirsk)

TITLE: Thermal stability of cylindrical shells equipped with cooled diaphragms

SOURCE: AN UkrSSR Institut mekhaniki. Teplovy*ye napryazheniya v elementakh konstruktsiy; nauchnoye soveshchaniye. Doklady*, no. 3, 1963, 211-219

TOPIC TAGS: shell, cylindrical shell, thermal stability, shell thermal stability, cylindrical shell thermal stability, diaphragm, cooled diaphragm, shell thermal stability diaphragm dependence, shell elastic limit

ABSTRACT: Several investigations dealing with the question of the thermal stability of cylindrical shells equipped with cooling diaphragms have appeared in the literature during recent years. It is known that heating of a cylindrical shell with a frame restraining its thermal expansion produces circumferential compression stresses which may result in the loss of its stability. The thermal stability of clamped cylindrical shells was investigated by W. Zuk, but the results obtained by W. Zuk cannot be accepted for long shells, because of the rough approximation of circumferential and bending stresses; his value for the coefficient K differs substantially from the value of 6.41 obtained in the present paper. The attempt by Jones to improve the results of Zuk's analysis was not successful,

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ACCESSION NR: AT4010249

since his value for K was 12.7. The present paper presents a solution for the problem of the thermal stability of circular cylindrical shells with tubular diaphragms (for circulation of the cooling liquid.) The author analyzes a semi-infinite shell, since the tensions resulting in the loss of shell stability attenuate with distance from the diaphragm, including cases in which the shell either is clamped or rests freely on the diaphragm. In the solution of the problem, use is made of stability equations which take into consideration the state of the shell preceding the loss of stability. The critical temperature during heating of a shell with a diaphragm is given by:

$$T = \frac{k}{\sqrt{3(1-\nu^2)}} \cdot \frac{h}{\alpha R} \qquad (1)$$

where R is the radius of curvature, α - the coefficient of linear expansion, T - temperature, and K = 6.41 for a clamped shell and 12.2 for a shell resting on the hinge. The critical value of the temperature as found by formula (1) is sufficiently large so that the solution of problems involving performance of the material beyond the elastic limit has no particular meaning. The reason for this is that in the performance of a shell material in the area of maximum stress, as encountered beyond the elastic limit, the rigidity of the frame itself is decreasing and the shell becomes more pliable. To prove the above statement, a

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special experiment was conducted to determine the actual behavior of material under conditions beyond the elastic limit. For a clamped shell, the calculated value of the critical temperature (according to formula 1) was 440C. Actually, no loss of stability was observed at 620C. "The author would like to thank Engineers N. G. Cherny*shev and V. N. Nikonova for helping with the calculations, and Engineer A. G. Zagorskiy for doing the experimental work." Orig. art. has: 26 formulas.

ASSOCIATION: Institut mekhaniki AN UkrSSR (Institute of Mechanics, AN UkrSSR)

SUBMITTED: 00 DATE ACQ: 17Jun63 ENCL: 00

SUB CODE: AP NO REF SOV: 000 OTHER: 003

Card 3/3

KUZNETSOV, A.P.; KURSHIN, L.M.; LIPOVTSEV, YU.V. (Novosibirsk)

"On the solution of the problem of creep buckling of shell on the basis of geometrically non-linear theory".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

GRIGOLYUK, E.I.; KURSHIN, L. M. ;FIL'SHTINSKY, L.A.(Novosibirsk)

"On a method of solving biperiodical problems of elasticity".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

ACCESSION NR: AP4026955

S/0258/64/004/001/0060/0068

AUTHORS: Galkina, A. P. (Novosibirsk); Kurshin, L. M. (Novosibirsk); Stywtsyuk, V. I. (Novosibirsk)

TITLE: Stability of a heated fastened plate under displacement

SOURCE: Inzhenerny*y zhurnal, v. 4, no. 1, 1964, 60-68

TOPIC TAGS: stability, heated plate, fastened plate, square plate, plane form of equilibrium, curved form of equilibrium, temperature stress, bifurcation deflection

ABSTRACT: The authors consider the case of instability of a curved form of equilibrium (caused by preliminary heating) in contrast to the usual formulation of plate stability problems involving instability of the plane form of equilibrium for a heated square plate with fastened contours under displacement. Graphical comparisons are made between experimental data and the numerical results derived in the paper. Orig. art. has: 6 figures and 31 formulas.

ASSOCIATION: none

Card 1/2

ACCESSION NR: AP4026955

SUBMITTED: 19Aug62 DATE ACQ: 15Apr64 ENCL: 00

SUB CODE: AP NO REF SOV: 004 OTHER: 000

Card 2/2

GRIGOLYUK, E.I.; KURSHIN, L.M.; PRISEKIN, V.L.

Refinement of the hypothesis of plane reflection. Dokl. AN SSSR 155 no.1:65-66 Mr '64. (MIRA 17:4)

1. Institut gidromekhaniki Sibirskogo otdeleniya AN SSSR.
2. Chlen-korrespondent AN SSSR (for Grigolyuk).

GRIGOLYUK, E.I. (Novosibirsk); KURSHIN, L.M. (Novosibirsk);
FIL'SHTINSKIY, L.A. (Novosibirsk)

Method for solving doubly periodic problems in the theory of elasticity. Prikl. mekh. 1 no.1:22-31 '65.
(MIRA 18:5)

1. Sibirskiy nauchno-issledov tel'skiy institut.

L 64810-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/
ACCESSION NR: AT5017588 EWA(h)/ETC(m) IJP(c) UR/0000/65/000/000/0280/0287
MJW/JD/WW/EM/GS

AUTHORS: Kuznetsov, A. P. (Novosibirsk); Kurshin, L. M. (Novosibirsk)

TITLE: On calculating the stability of shells in conditions of creep according to the theory of aging

SOURCE: Vsesoyuznaya konferentsiya po problemam ustoychivosti v stroitel'noy mekhanike, Moscow, 1963. Problemy ustoychivosti v stroitel'noy mekhanike (Problems of stability in structural mechanics); trudy konferentsii. Moscow, Stroyizdat, 1965, 280-287

TOPIC TAGS: creep characteristic, cylindrical shell, shell structure stability, shell theory, shell structure buckling / D16T alloy

ABSTRACT: The authors conducted experimental studies on the stability of thin cylindrical shells under longitudinal compression and under creep conditions. The experiments were performed on specimens cut from tubes of aluminum alloy D16T. Brief comments on the test observations include: on the shell surface during loading no appreciable dents appeared for a long period of time. Shortly before the failure of the shell a dent appeared on its surface; the dent developed until a "snap" occurred, signifying the virtual destruction of the shell. The time lapse between initial loading and the failure snapping is from 10 to 15% greater than the time

lapse to the moment of dent appearance. The loss of stability by this type of failure occurs for both subcritical and supercritical loading, hence the ensuing treatment of shell stability attempts to account for geometric nonlinearity. Some recent approaches to the problem are reviewed. The authors' own treatment involves the hypothesis of aging. Solution is achieved on the basis of equations describing the behavior of the shell under creep conditions. A dual-layered shell model, used for simplicity, has an outer layer of thickness δ and an interlayer of length 2h. Layer displacements are given by the equations

$$u_{B,H} = u \mp \left(h + \frac{\delta}{2}\right) w_x; \quad v_{B,H} = v \mp \left(h + \frac{\delta}{2}\right) w_y,$$

where u, v, and w are referred to the middle surface of the shell, and indices "B" and "H" refer to the upper and lower bearing layers. Deformation of shell layers is given by

$$e_{ij\,B,H} = e_{ij} \mp \left(h + \frac{\delta}{2}\right) \chi_{ij\,B,H}; \quad i,j = 1,2,$$

where

$$\chi_{11} = w_{xx} - w^0_{xx}, \quad \chi_{22} = w_{yy} - w^0_{yy}, \quad \chi_{12} = w_{xy} - w^0_{xy};$$

$$e_{11} = u_x + \frac{1}{2} w_x^2 - \frac{1}{2} w_x^{0^2} - u^0_x;$$

$$e_{22} = v_y + \frac{1}{2} w_y^2 - \frac{1}{2} w_y^{0^2} + \frac{w - w^0}{R} - v^0_y;$$

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$$e_{12} = \frac{1}{2}(u_y + v_x) + \frac{1}{2}w_x w_y - \frac{1}{2}w_x^0 w_y^0 - \frac{1}{2}(u_y + v_x^0).$$

Other equations describe creep deformations and stress components, forces, and moments, and a solution is demonstrated for a particular parameter setting. Conclusions obtained from the calculations are in agreement with experimental data and with earlier work. Orig. art. has: 21 equations and 1 figure.

ASSOCIATION: Vsesoyuznaya konferentsiya po problemam ustoychivosti v stroitel'noy mekhanike, Moscow (All-Union Conference on Problems of Stability in Structural Mechanics) 44,55

SUBMITTED: 12Feb65 ENCL: 00 SUB CODE: ME

NO REF SOV: 001 OTHER: 001

Card 3/3

L 60023-65 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(h)
Pf-4/Peb JD/WW/EM

ACCESSION NR: AP5018070 UR/0020/65/163/001/0046/0049

33
B

AUTHOR: Kurshin, L.M.

TITLE: Formulation of the problem of shell bulging during creep

SOURCE: AN SSSR. Doklady, v. 163, no. 1, 1965, 46-49

TOPIC TAGS: shell bulging, shell creep, creep theory, elasticity theory

ABSTRACT: One of the previous formulations for determining stability during creep deals with the bulging of a rod, plate, or shell under a load in the presence of certain initial irregularities (see, e.g., F.K. Odquist, J. Appl. Mech., 23, no. 3, 1956; V. I. Rozenblyum, Inzh. sborn., 18, 1954 - for the case of rods; N. J. Hoff, W. E. Jahsman, W. Nachbar, J. Aero Space Sci., 26, no. 10, 1959; A. S. Vol'mir, Ustoychivost' uprugikh sistem, M., 1963 - for the case of shells). The present paper investigates two new formulations of shell bulging during creep by developing the initial irregularities by means of equations which take into account geometrical nonlinear relationships. The equations are derived under the assumption that the stresses and deformations within the shell during creep differ only little from the stresses and deformations of the basic momentless state. This permits the linearization of the physical relationships relative to the basic state; in both alternatives, the determination of the sag and stresses in the flat shell is carried out via a system of two

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ACCESSION NR: AP5018070

nonlinear integro-differential equations depending on the coordinates of the middle plane and on time. Orig. art. has: 21 formulas.

ASSOCIATION: None

SUBMITTED: 09Nov64 ENCL: 00 SUB CODE: ME, AS

NO REF SOV: 007 OTHER: 006

Card 2/2

L 37128-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k) IJP(c) WW/EM/GD/RM

ACC NR: AT6011753 SOURCE CODE: UR/0000/65/000/000/0106/0157

AUTHOR: Kurshin, L. M. (Doctor of technical sciences)

ORG: None

TITLE: Equations for sloping and non-sloping sandwich-type shells

SOURCE: Raschety elementov aviatsionnykh konstruktsiy, vyp. 3: Trekhsloynyye paneli i obolochki (Calculation of aircraft construction elements, no. 3: Sandwich panels and shells). Moscow, Izd-vo Mashinostroyeniye, 1965, 106-157

TOPIC TAGS: shell structure, shell theory, sandwich structure

ABSTRACT: This paper reviews developments in sandwich shell theory. Sandwich shells with light filler are considered. A characteristic feature of such shells is the possibility of disregarding the rigidity of the filler in a direction parallel to the external layers. The longitudinal forces and moments in a structure with light filler are compensated by the outer layers which act as carrying or support layers. This makes it possible to introduce an assumption concerning the absence in the filler of stresses parallel to the center surface of the shell. The introduction of this assumption makes it possible to obtain integrals of a three-dimensional problem of elasticity for the center layer. By subordinating these

Card 1/2 UDC 629.13.011.1:62-41.539.4

L 37128-66

ACC NR: AT6011753

integrals to the conditions of coupling to the outer layers (which are regarded as thin elastic shells), two-dimensional equations for the sandwich shell are obtained. In these equations allowance is made for the work of the filler on deflection and transverse deformations. The obtained equations are integrated as a function of boundary and load conditions. A generalization is then made of certain equations, derived earlier by the same author, to include the more general situations of sloping sandwich shells with rigid filler of symmetrical and unsymmetrical structure. Within the filler a linear law for the change of the tangential displacements is assigned. Through the introduction of functions of the same type as in the equations for light-filled shells, the number of equations is reduced. An analysis of special boundary conditions is provided. Shells of unsymmetrical structure are considered. The equations are transformed without the introduction of the assumption of the equality of the Poisson factors of the layers. Some estimations of this assumption are presented. Orig. art. has: 201 formulas.

SUB CODE: 13 / SUBM DATE: 25Oct65 / ORIG REF: 032 / OTH REF: 012

Card 2/2 af

L 37130-66 EWT(d)/EWT(m)/EWP(w)/EWP(v)/EWP(k) IJP(c) WW/EM/JT/GD/RM

ACC NR: AT6011754 SOURCE CODE: UR/0000/65/000/000/0158/0169

AUTHOR: Kurshin, L. M. (Doctor of technical sciences)

ORG: None

46
43
B+1

TITLE: Stability of cylindrical sandwich shells under compression, pressure and the combined effect of pressure and compression

SOURCE: Raschety elementov aviatsionnykh konstruktsiy, vyp. 3: Trekhsloynyye paneli i obolochki (Calculating of aircraft construction elements, no. 3: Sandwich panels and shells). Moscow, Izd-vo Mashinostroyeniye, 1965, 158-169

TOPIC TAGS: shell structure, sandwich structure, shell structure stability, shell deformation, cylindric shell

ABSTRACT: In this paper the solutions of the stability problems are based on the equations of the theory of both curved and uncurved shells. The solutions are obtained with consideration of the moment work of the outer layers. Also used is a case of lost shell stability under compression with the formation of long waves. A solution is derived which resembles Southwell's solution for single-layer shells. The author also obtains solutions for shells under external pressure and under the joint effect of pressure and compression.

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L 37130-66

ACC NR: AT6011754

3

Taking part in the computational part of this work were Engineer L. P. Denisova and programmers L. F. Ivannikova and V. P. Karyakin. Orig. art. has: 16 figures and 18 formulas.

SUB CODE: 13 / SUBM DATE: 25Oct65 / ORIG REF: 002 / OTH REF: 003

Card 2/2 af

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000927810007-7"

L 37126-66 EWT(d)/EWT(m)/EWP(w)/EWP(k) IJP(c) EM/JT/JD/EM

ACC NR: AT6011755 SOURCE CODE: UR/0000/65/000/000/0170/0188

AUTHOR: Kurshin, L. M. (Doctor of technical sciences); Lamper, R. Ye.; Lipovtsev, Yu. V.

ORG: None

TITLE: Calculating the stability of sandwich panels beyond the limit of proportionality

SOURCE: Raschety elementov aviatsionnykh konstruktsiy, vyp. 3: Trekhsloynyye paneli i obolochki (Calculation of aircraft construction elements, no. 3: Sandwich panels and shells). Moscow, Izd-vo Mashinostroyeniye, 1965, 170-188

TOPIC TAGS: shell structure stability, shell structure, sandwich structure, shell deformation

ABSTRACT: The authors study the possibility of an approximate calculation of sandwich layers for stability beyond the limit of proportionality by means of simple formulas in such a manner as to reduce the problem of the calculation to the determination of a critical stress assuming elastic working of the material and to a certain recalculation of this value into a rated stress. With this kind of approach it becomes possible to make stability calculations for sandwich structures beyond the limit of proportionality even in those cases for which solutions are available only within the limits of proportionality. In order to solve

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L 37126-66

ACC NR: AT6011755

the problem of the selection of an approximate formula, a solution is given to two problems of sandwich panels beyond the limit of proportionality: for a hinge-fastened panel under compression and for a long panel with deflection. The equations employed were obtained elsewhere by the authors, on the assumption that plastic deformation takes place only in the support layers, whereas the filler works within the limits of elasticity. At the same time, on the basis of the conception of a continuing load it is postulated that the stability loss is not accompanied by unloading and that the plastic deformation is everywhere active. The external layers of the panel are considered to be non-moment, with the filler working only on the deflection and not taking on normal stresses. Certain variations of the approximate formulas for the determination of the critical stresses are also considered. A comparison is made between experimental data and the results of a calculation of critical stresses according to an approximate method outlined in the paper. Equations are presented for calculating the stability of sandwich panels in the event that the stresses in the filler are outside the limit of proportionality. Orig. art. has: 20 figures and 26 formulas.

SUB CODE: 13 / SUBM DATE: 25Oct65 / ORIG REF: 006 / OTH REF: 001

Card 2/2 af

L 04110-67 EWP(k)/EWT(d)/EWT(m)/EWP(w)/EWP(v) IJP(c) EM/WW

ACC NR: AR6032361 SOURCE CODE: UR/0264/66/000/007/A008/A009

AUTHOR: Kurshin, L. M.; Denisova, L. P.

38

B

TITLE: Stability of triple-layer cylindrical shells under torsion

SOURCE: Ref. zh. Vozdushnyy transport, Abs. 7A59

REF SOURCE: Sb. Raschety elementov aviats. konstruktsii. Vyp. 4. M., Mashinostroyeniye, 1965, 152-156

TOPIC TAGS: shell structure, cylindric shell structure, asymmetric shell structure, shell structure stability, cylindrical shell, torsion stress, cylindrical shell stability

ABSTRACT: A study was made of the stability of a closed cylindrical sandwich shell under torsion. A solution which is based on equations for steep shells and which takes into account the work moment of the outside layers is obtained. The stability of hinged shells of finite length under torsion is examined. It is demonstrated that a transition to a rigid filler and a shell of asymmetrical structure is achieved in the same way as in the case of a long shell. [Translation of abstract]

SUB CODE: 13/

Card 1/1 kh

[illegible], L., and [illegible], P. P.

"The Dependence of the Intensity of Raman Lines on the Frequency of the Exciting Line in the Resonance Region," a paper submitted at the International Meeting of European Molecular Spectroscopists, Freiburg, Breisgau, West Germany.

KURSHINSKIY, L.V.

Extrapolation reflexes in birds. Uch. zap. Mosk. un. no.197:145-159 '58. (MIRA 11:9)

(Birds--Habits and behavior) (Reflexes)

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000927810007-7"