was made by comparing strengths of flat specimens of impregnated fabric with different numbers of layers. The results of these tests are given in Table 2. Actual burst pressure is compared with burst pressure calculated from Formula (3) without correction by coefficient C_2''. C_2'' is then deduced from the difference between these values and Formula (9) is found to give a close approximation to these deduced values for general calculation of C_2'' for any given number of layers of fabric, i. Using these values of C_2'', from Eq (9), burst pressures calculated according to Formulae (3) and (6) are given for comparison with actual values.

A parameter η is introduced, designated "relative load bearing capacity of the carcass", or P_B/i. It is convenient to express η as a dimensionless index of the ratio of the product of the coefficients C_2', C_2'' and C_5 for a hose with i layers of fabric to the product of these coefficients for a hose with $i = 2$ layers of fabric as in

Formula (12). The parameter η is plotted against i for a 51-mm diameter hose in Figure 8. As coefficients C_2'' and C_5 are independent of diameter and C_2' changes relatively little with diameter (where the number of layers are few), the parameter η, calculated and given graphically against number of layers i, for any particular size of hose as in Figure 8, gives immediately a combined term for the coefficients which must be entered into Eq (6) when calculating number of layers required to give a certain burst pressure in a pipe of given diameter and strength of fabric.
There are 8 figures and 2 tables.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova (Moscow Institute of Chemical Precision Technology imeni M.V. Lomonosov)

15(9) PHASE I BOOK EXPLOITATION SOV/3120

Lepetov, Vasiliy Aleksandrovich

Rezinovyye tekhnicheskiye izdeliya. (Industrial Rubber Products) Leningrad, Goskhimizdat, 1959. 445 p. Errata slip inserted. 5,000 copies printed.

Ed.: P.I. Esman; Tech. Ed.: Ye.Ya. Erlikh

PURPOSE: This book is intended as a textbook for students specializing in rubber technology at schools of higher technical education. It may also be useful to engineers and technicians in the rubber insustry.

COVERAGE: The textbook contains data on the design, equipment and technological processes connected with the manufacture of industrial rubber products such as drive belts, belting, hose, ebonite, machine parts, articles of rubberized fabrics and foam rubber, and hollow rubber articles. It also includes data on structural materials including rubber, textiles, and metals used in constructions of industrial rubber products. The author thanks the staff of the

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Rubber Technology Department of the MITKhT Institute im. M.V. Lomonosov. References Follow the chapters of the book.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

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2-15-60

AUTHORS: Shlyakhman, A. A. and Lepetov, V. A. SOV/138-59-2-10/24

TITLE: Calculations on Hosepipes in Flexure (K voprosu rascheta rukavov na izgib)
Part I. Relation Between the Radius of Curvature on the Longitudinal Axis of the Pipe, the Properties of the Material and the Geometrical Section of the Hosepipe (Soobshcheniye I. Zavisimost' mezhdu radiusom krivizny prodol'noy osi rukava, kharakteristikami materiala i geometriyey secheniya rukava)

PERIODICAL: Kauchuk i rezina, 1959, Nr 2, pp 34-38 (USSR)

ABSTRACT: There is a need to establish methods of calculating the minimum bend radius to which hose can be subjected without permanent deformation of its cross-section and to ensure the required length of service at normal and at low temperatures. A mathematical calculation is given to establish the relations between longitudinal bend radius and deformation of the cross-section for pipe of given material and construction. From Eq (8) the reaction force R_φ (see Fig 2) acting on the periphery of the hose for a given bend radius, and the sinusoidal pressure distribution shown in Fig 3, can be deduced. The deformation of the horizontal diameter can be found

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Calculations on Hosepipes in Flexure. Part I. Relation Between the Radius of Curvature on the Longitudinal Axis of the Pipe, the Properties of the Material and the Geometrical Section of the Hosepipe

from Eq (19), where E_k is the modulus of elasticity of the hose as a whole and $E_k I_k$ is the stiffness of an annular section of thickness d and width 1. r is the radius of the hose and ρ the bend radius. The deformation on the vertical diameter is found from Eq (21) to be the same as that on the horizontal one. From Eq (25) the bend radius for any given relative deformation $\varepsilon_r = (\Delta r/r)$ can be found. The critical value of ε_r can be found by calculation or established experimentally, hence a critical (minimum) bend radius can be established for a given condition. The strain ε_k of the fibres in an annular cord, when z is the coordinate of the thickness of the ring is related to the radial deformation ε_r by Eq (29). Knowing the critical value of deformation for a cord in an annular section, the critical radial deformation ε_r can be deduced from Eq (31). In an example given, the critical

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SOV/138-59-2-10/24

Calculations on Hosepipes in Flexure. Part I. Relation Between the Radius of Curvature on the Longitudinal Axis of the Pipe, the Properties of the Material and the Geometrical Section of the Hosepipe

cord strain ε_k at the limit of proportionality is taken at 11 x 10^{-4}. With a 25 mm diameter hose with annular cords of 1 mm diameter, ε_{cr} is 1%. From these critical values of radial strain or deformation, critical bend radii of the hose can be found from Eq (25). There are 4 figures and 12 references, 8 of which are Soviet, 3 English, 1 German.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry).

Card 3/3

LEPETOV, V.A.

PHASE I BOOK EXPLOITATION SOV/4419

Spravochnik po mashinostroitel'nym materialam, tom 4: Nemetallicheskiye materialy (Handbook on Machine-Building Materials, Vol 4: Nonmetallic Materials) Moscow, Mashgiz, 1960. 723 p. Errata slip inserted. 46,000 copies printed.

Ed.: G.I. Pogodin-Alekseyev, Doctor of Technical Sciences, Professor; Ed. of this vol.: A.N. Levin, Doctor of Technical Sciences, Professor; Ed. of Publishing House: V.I. Rybakova, Engineer; Tech. Ed.: T.F. Sokolova; Managing Ed. for Information Literature (Mashgiz): I.M. Monastyrskiy, Engineer.

PURPOSE: This book is intended for machine-building and construction engineers, architects, and other persons interested in the properties of building materials.

COVERAGE: This is the fourth of a 4-volume Handbook on Machine-Building Materials. Volume 4 discusses nonmetallic materials suitable for use in machine building and in other constructional applications. Textile, wood, plastic, ceramic, rubber, and glass materials and laminates of these materials are reviewed and data on their physical and mechanical properties are listed. No personalities are mentioned. References follow individual chapters.

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APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320004-2"

SOV/4419

Handbook on Machine-Building Materials (Cont.)

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LEPETOV, V.A.

Technological calculation of shock-absorbing cables. Kauch.i rez. 19 no.5:37-40 My 60. (MIRA 13:7)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova.

(Rubber goods)

LEPETOV, V.A.; NOVIKOV, V.I.; LEBEDEVA, L.V.

Investigating the deflection of a round rubber membrane with a stiff center. Kauch.i rez. 21 no.8:32-35 Ag '62. (MIRA 16:5)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova.

(Rubber--Testing)

S/138/62/000/002/006/009
A051/A126

AUTHORS: Lepetov, V.A.; Chelmodeyev, A.D.

TITLE: Determination of the optimum time of vulcanization by measuring the static compression modulus of rubber

PERIODICAL: Kauchuk i rezina, no. 2, 1962, 34 - 36

TEXT: The compression modulus of rubber was used to calculate the optimum vulcanization time, since this index is found to depend on the degree of vulcanization to the greatest extent. The following determinations were made the relative and residual elongation, expansion moduli [ГОСТ 270-53 (GOST 270--53)], tensile strength (GOST 262-53), swelling (GOST 421-41), bound sulfur (from the unbound residual), hardness according to ТМ-2 (TM-2) (GOST 263-53) of rubber. Mixtures of NR, СКС-30А (SKS-30A), СКН-26 (SKN-26) and nairite, were used to determine the optimum vulcanization time. The ДМ-2 (DM-2) "defometer" was used to determine the conditional-equilibrium load in static compression of the sample by 20%, applying only the mechanical part of the instrument. The conditional-equilibrium static compression modulus E was determined according to the formula:

$$E = \frac{P_{stat.} \cdot h_1}{S_0 (h_0 - h_1)} \ kg/cm^2, \qquad (1)$$

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Determination of the optimum time of vulcanization ...

where P_{stat} is the load of the static equilibrium state in kg, S_0 - the initial cross-section of the sample in cm^2, h_0 - the initial height of the sample in cm, h_1 - the height of the sample under load at the time of reaching the static conditional-equilibrium state in cm. The parameters of (1) are found experimentally. The variation coefficient was determined according to the formula

$$V = \frac{\pm \sigma}{\bar{x}} \cdot 100\ \%, \qquad (2)$$

where $\bar{x}$ is the arithmetic mean, σ - the quadratic mean deviation equaling:

$$\sigma = \pm \sqrt{\frac{\Sigma (x_i - \bar{x})^2}{n - 1}},$$

where $\bar{x}_i$ is the result of the test, n - general number of tests. Obtained data showed that the suggested method for determining the optimum vulcanization method results in a lesser scattering of the indices. The method is said to be applicable to the determination of the optimum vulcanization time of all the investigated rubbers. A saving of rubber (up to 6%) is accomplished, consumption of energy and work of the technician is reduced. There are 2 tables, 1 figure and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im M.V. Lomonosov (Moscow Institute of Fine Chemical Technology im M.V. Lomonosov)

AUTHORS: Fogel', V.O.; Lepetov, V.A.; Agayants, I.M.

TITLE: Thermophysical characteristics of raw rubber mixes and their relation to temperature

PERIODICAL: Kauchuk i rezina, no. 5, 1962, 26 - 29

TEXT: The thermal and temperature-conductivity, as well as the thermal capacity of raw rubber mixes were determined experimentally at various temperatures. Four raw tire mixes, based on CKC-30 APM (SKS-30ARM) and NR were used as investigating materials in addition to one vulcanized mix (casing), based on SKS-30ARM for reference. The method used to investigate ebonite mixes was used. A new calorimeter (Fig. 1) was developed for determining the thermal capacity. Ethyl glycol served as the calorimetric fluid. A comparison of the thermal coefficients of tire mixes based on SKS-30ARM and NR showed that these, as a rule, are higher than those for mixes based on SKS-30ARM. The authors conclude that the thermal conductivity of the raw tire mix, with a temperature range of 30 - 100°C, changes very slightly. This leads to the possibility of calculating the

Thermophysical characteristics of raw rubber ....

temperatures in the vulcanized articles, using the Furje differential equation. The temperature conductance of the raw tire mixes drops and the thermal capacity increases with the rising temperature.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova (Moscow Institute of Fine Chemical Technology im. M.V. Lomonosov)

TRESHCHALOV, V.I.; LEPETOV, V.A.

Investigating the load on spiral elements exerted by inner contact pressure. Kauch.i rez. 21 no.3:25-30 Mr '62. (MIRA 15:4)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
(Strains and stresses) (Hose--Testing)

TRESHCHALOV, V.I.; LEPETOV, V.A.

Investigating the load of internal contact pressure and axial stress of a pressure hose carcass made of entwined spiral elements. Kauch.i rez. 21 no.4:26-30 Ap '62. (MIRA 15:4)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti. (Hose—Testing) (Strains and stresses) (Rubberized fabrics)

TRESHCHALOV, V.I.; LEPETOV, V.A.

Design for strength of pressure hose reinforced with outer stiff elements. Kauch.i rez. 21 no.11:27-33 N '62. (MIRA 15:12)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

(Hose)
(Strength of materials)

SUKHAREV, A.T.; LEPETOV, V.A.; YEVMENENKO, A.T.; YURTSEV, L.N.

Pressure hose braided with polyamide fibers. Kauch.i rez. 22 no.1: 28-31 Ja '63. (MIRA 16:6)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti. (Hose)

S/0138/64/000/001/0021/0024

ACCESSION NR: AP4015075

AUTHORS: Avrushchenko, B. Kh.; Lepetov, V. A.

TITLE: Effect of preliminary aging on change in high elasticity properties of rubber at low temperatures

SOURCE: Kauchuk i rezina, no. 1, 1964, 21-24

TOPIC TAGS: high elasticity property, relative elongation, low temperature, static modulus

ABSTRACT: Type SKN-18 rubber with TM-2 hardness equal to 60 and 343% relative elongation has been studied to determine the preliminary aging effects on rubber strength at low temperatures. The specimen was subjected to 100% axial stress at temperatures from 20 to -50C, after various aging durations in a thermostat at 90C. The magnitude of K', the coefficient of increase in rigidity during and after aging, does not depend on the determined temperature during the aging process itself. The coefficient of increase in strength at low temperatures after different storage time durations is expressed by the product KK' (K- rigidity increase before aging). The static modulus after aging at low temperatures is given by EKK' (E-

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ACCESSION NR: AP4015075

high elasticity static modulus at 20C, in kg sec/cm^2). Orig. art. has: 10 formulas, 4 figures, and 2 tables.

ASSOCIATION: Leningradskiy filial nauchno-issledovatel'skogo instituta resinovoy promy*shlennosti (Leningrad Institute of Scientific Research in the Rubber Industry)

SUBMITTED: 00 DATE ACQ: 26Feb64 ENCL: 00

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

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LEPETOV, V.A.; BLOKH, L.D.

Forcing of rigid dies into rubber. Kauch. i rez. 22 no.12: 24-28 D '63. (MIRA 17:9)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova.

ACCESSION NR: AP4017165 S/0138/64/000/002/0024/0027

AUTHORS: Yurovskiy, V. S.; Arkhipov, A. M.; Lepetov, V. A.; Kosenkova, A. S.; Novikov, V. I.; Tsy*buk, B. S.

TITLE: Investigation of sealing effectiveness of rubber metal seals

SOURCE: Kauchuk i rezina, no. 2, 1964, 24-27

TOPIC TAGS: rubber metal seal, sealing, rubber hardness, sealing force, rubber SKS 30

ABSTRACT: The rubber-metal sealing configuration shown in Fig. 1 on the Enclosure was investigated, using rubber inserts with different properties (TM-2 hardness 85-95, 75-85, and 55-65). It was found that the hardness of the rubber insert played the most important part in securing the sealing effectiveness. Experiments showed that hardness was related to the modulus of elasticity E_{60} (after a 60-minute compression) by a single curve for all types of rubber used ($E_{60} = \frac{F}{S_o} \frac{h_1}{h_o - h_1}$; S_o = initial area). By pushing the metal ring into the rubber seal to a depth h and pressurizing the seal with air until it leaked, it was determined

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ACCESSION NR: AP4017165

that the following relation described the critical pressure:

$$P_{cr} = \left(\frac{Q}{\pi d_{cp} b} - nE_{00}\frac{h}{h_0}\right)\frac{Kd_{cp}b}{r_1^2}, \text{ kg/cm}^2$$

(where Q = load on seal, for d_{cp}, b, h_0 and r, see Fig. 1, K = empirical constant which varied from 2 to 2.5). which varied from 0.85 to 0.95, n = empirical constant This equation permits the calculation of the pressure at which a seal will leak or, conversely, calculation of the sealing force Q required to seal a joint at a certain pressure. Orig. art. has: 5 figures and 2 formulas.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promy*shlennosti (Scientific Research Institute of the Rubber Industry)

SUBMITTED: 00 DATE ACQ: 23Mar64 ENCL: 01

SUB CODE: MT NO REF SOV: 007 OTHER: 000

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ACCESSION NR: AP4017165

ENCLOSURE: 01

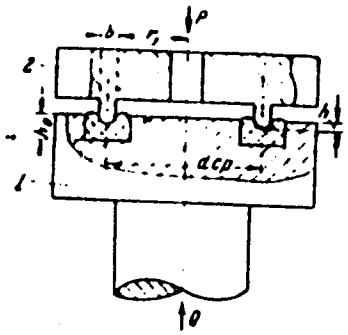

Fig. 1. Schematic of rubber-metal seal;
1- rubber-metal detail; 2-seat.

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SHLYAKHMAN, A.A.; LEPETOV, V.A.; LEONOV, I.I.

Hydraulic strength of hose with metal braiding. Kauch. i rez. 23 no. 3:37-40 Mr '64. (MIRA 17:5)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

TRESHCHALOV, V.I.; LEPETOV, V.A.

Balanced location of the elements of force in a carcass of a pressure hose. Kauch. i rez. 23 no.4:22-26 Ap'64 (MIRA 17:7)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

ALYAVDIN, N.A.; LEPETOV, V.A.

Dispersion and spread are the basic characteristics of the scattering of experimental values. Kauch. i rez. 23 no.9:32-34 S '64. (MIRA 17:11)

1. Moskovskiy tekstil'nyy institut i Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova.

YUROVSKIY, V.S.; ARKHIPOV, A.M.; KOSENKOVA, A.S.; LEPETOV, V.A.; TSYBUK, B.S.

Methodology of accelerating the determination of warranted storage life of metal-rubber valves. Kauch.i rez. 23 no.11: 10-13 N '64. (MIRA 18:4)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

LEPETOV, Vasiliy Aleksandrovich; ERMAN, P.I., red.; GRIVA, Z.I., red.

[Engineering rubber goods] Rezinovye tekhnicheskie izdeliia. Izd.2., perer. i dop. Moskva, Khimiia, 1965. 471 p. (MIRA 18:6)

TRESHCHALOV, V.I.; LEPETOV, V.A.

Design and application of hose as hollow elastic packing.
Kauch. i rez. 24 no.11:29-33 '65. (MIRA 19:1)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

LEPETSKIY, I.A. [deceased]; FROLOV, V.V., kandidat tekhnicheskikh nauk, redaktor; PASTERNAK, N.A., redaktor izdatel'stva; SHMEL'KINA, S.I., tekhnicheskiy redaktor; TIKHONOV, A.Ya., tekhnicheskiy redaktor

[Modification of metals during welding] Izmenenie metallov pri svarke. Pod red. V.V.Frolova. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 116 p. (MLRA 9:7)
(Welding)

LEPETTA, B.G.

VORONOVA, N.A., kand.tekhn.nauk; GUTMAN, M.P., inzh.; TROSKUNOV, Ya.Ya., inzh. ARMEN, V.D., inzh.; LEPETTA, B.G., inzh.

Rollers made of low-carbon cast iron. Biul.TSNIICHM no.17:27-36 '57. (MIRA 11:4)

1.Institut chernoy metallurgii AN USSR i Stalinskiy metallurgicheskiy zavod.

(Rolling mills)

LEPETUKHIN, Nikolay Ustinovich; ARTEMOV, I.S., red.; POPOV, V.N., tekhn. red.

[Abolishing labor days] Bez trudodnia. Tambov, Tambovskoe knizhnoe izd-vo, 1960. 23 p. (MIRA 16:3)

1. Predsedatel' kolkhoza imeni Chapayeva Inzhavinskogo rayona (for Lepetukhin).
(Collective farms--Income distribution)

LEPETYUKHA, I.D., gornyy master; BARDAVELIDZE, O.; SHATSOV, Yu.B.; KHOROSHKEVICH, N.F.

Readers' letters. Bezop.truda v prom. 5 no.4:31 Ap '61. (MIRA 14:3)

1. Starshiy inzh.upravleniya Chelyabinskogo okruga Gosgortekhnadzora RSFSR (for Bardavelidze). 2. Nachal'nik uchastka bashennykh kranov Upravleniya mekhanizatsii No.16 stroitel'no-montazhnogo tresta No.1 Kiyevskogo sovnarkhoza (for Shatsov).
(Industrial safety)

LEPETYUKHA, I., gornyy master

Working with enthusiasm. Sov.shakht. 10 no.7:10 Jl '61.
(MIRA 14:8)

1. Shakhta No.2 imeni Chapayeva Luganskogo sovnarkhoza.
(Donets Basin—Coal mines and mining—Labor productivity)

LEPETYUKHINA, Z.

The masters of production. Sov. profsoiuzy 17 no.3:18-19 F '61.
(MIRA 14:2)

1. Predsedatel' postoyanno deystvyuyshchego proizvodstvennogo soveshchaniya Gusevskogo khrystal'nogo zavoda.
(Gusev—Glass manufacture) (Works councils)

SAVCHENKOV, V.A., kand. tekhn. nauk, NEVERA, I.A., inzh., LEBEYKO, I.P., inzh., VERETNIK, L.D., kand. tekhn. nauk, GRIGORASH, G.I., inzh.

Reviews and bibliography. Svar. proizv. no.3:46 Mr '65. (MIRA 18:5)

AUTHORS: Lepeyko, I.P., and Fridman, Ya.N., Engineers SOV/135-59-8-10/24

TITLE: The Use of Natural Gas for Cutting and Welding of Metals

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 8, pp 31-35 (USSR)

ABSTRACT: In the Khar'kov electro-mechanical plant imeni Stalin the natural gas found in the deposits of Shebelinka is widely used to cut steels and to weld and solder non-ferrous metals and cast iron. The natural gas of this deposit contains 94% of methane and 6% of heavy hydrocarbons. Its heating power is about 8500 Kcal/m^3 and the burning temperature about 2000°C. The working data for the cutting and soldering were compiled by the welding laboratory and the welding department of the plant. The directions given by the VNIIAVTOGEN (The Utilization of Gases - Substitutes for Acetylene in Oxygen Flame Cutting of Metals, Mashgiz 1958) were taken as initial data in adjusting the diameters of the openings of the outer mouth pieces of the flame cutter UR. The dimensions of the injector openings and the inner mouth pieces were set by experiments.

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The cutting data were worked out on the hand flame cutter UR, the semi-automatic cutter PL-1, and the automatic cutters ASSh-1 and ASh-1. The working data and the equipment were tested with a pressure which went up to 10 Atm in the system of the oxygen and 0.5 Atm in that of the natural gas. As a result of the tedious tests the diameters for the injectors, the mixer chamber, and the cuter and inner mouth pieces were set as they are given in table 1 and the drawings 1-6. The outer mouth piece of the flame cutter for mechanical cutting was altered - the holes for preheating were substituted by one hole which includes the inner mouth piece. Thus the frequent choking of the jets was prevented. Before the introduction of natural gas it had been necessary to interrupt the cutting process from time to time to clean the jet. During the first month of working with natural gas the production norm dropped by 24%, but when the workers had accustomed themselves to the cutting with natural gas the norm exceeded that of using acetylene. At the present time

natural gas is used for flame-cutting metals of a thickness up to 250 mm. When natural gas was introduced the working places were arranged in a straight line and equipped with special shelves under which were conveyers for the mechanical removal of slags. In acetylene-oxygen welding the cut is usually interrupted and scorious. In cutting with natural gas the cut has a clean surface. This helped to reduce the labor spent on cleaning the details from the slags after the cutting. Simultaneously with the introduction of natural gas for the cutting of metals devices were tested in the plant to weld and solder non-ferrous metals and cast-iron. The use of flame cutters with the characteristic given above permits to change completely to using natural gas in soldering and welding of metals and in welding blow-holes in cast-iron. Acetylene is now used in the plant only for autogenous welding of thin-plated steel parts and pipes. At the present time burners for soldering with natural gas without oxygen are produced in the plant and introduced

The Use of Natural Gas for Cutting and Welding of Metals

in the production. The studies carried out in the field of welding cast-iron with natural gas, which were conducted in collaboration with the welding laboratory of the KhTGZ imeni Kirov, led to good results in regard to the applicability of the parts welded together with build-up welding. It was found: a) all spots of the build-up weld can be processed with completely satisfactory effect, and there is little difference in the processing of gray cast-iron; b) cast iron as well as brass can be processed a little bit better than after welding with acetylene. The authors come to the following conclusion: In changing to natural gas the existing flame cutters for manual cutting may still be used; only the outer mouth pieces have to be altered, the inner ones remain the same. The other changes are contained in tables 1 and 2. The apparatus which was built and applied in the plant produced satisfactory results in manual and automatic cutting of metals, and in gas welding and soldering of non-ferrous metals and cast-iron. The productivity

of work did not drop in the change from acetylene to natural gas. The acetylene station could now be used for other purposes in the production, and it was possible to employ the working personnel in other processes. The quality of the metal cuts was improved and labor saved in removing the slags after the cutting. It is obvious that it is practical to introduce natural gas in gas-welding and cutting processes where there is not centralized supply of acetylene. There are 3 tables, 8 diagrams and 2 photographs.

ASSOCIATION: Khar'kov, elektromekhanicheskiy zavod imeni Stalina (Khar'kov Electro-Mechanical Plant imeni Stalin)

LEPEYKO, I.P., inzh.

Efficiency of using certain welding processes. Svar. proizv. no.7: 30-31 Jl '64. (MIRA 18:1)

1. Khar'kovskiy elektromekhanicheskiy zavod.

LEPEYKO, I.P., inzh.; OLEYNIK, L.U., kand.ekonomicheskikh nauk

Increasing engineering efficiency of units by welding.
Mashinostroenie no.4:62-64 Jl-Ag '62. (MIRA 15:9)

1. Khar'kovskiy elektromekhanicheskiy zavod (for Lepeyko).
2. Khar'kovskiy politekhnicheskiy institut (for Oleynik).
(Electric welding) (Machinery--Construction)

L 9678-66 EWT(m)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) WW/JD/HM

ACC NR: AP5027601 SOURCE CODE: UR/0135/65/000/011/0020/0022

AUTHOR: Lepeyko, I. P. (Engineer); Karavelkov, S. M. (Technician) 44,55 44,55 54 23

ORG: Khar'kov Electric Machinery Plant (Khar'kovskiy elektromekhanicheskiy zavod) 44,55

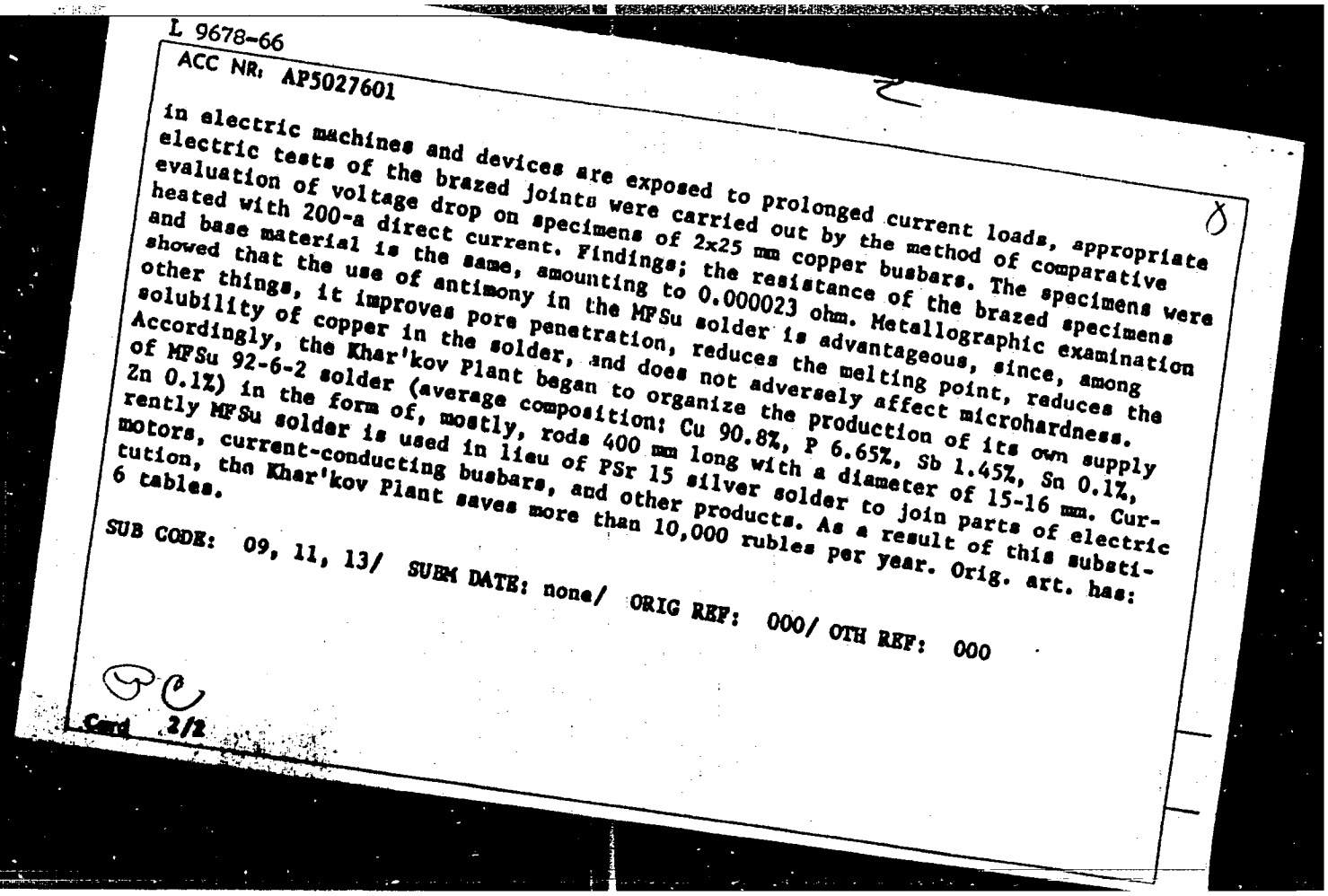
TITLE: Use of silverless solder to join parts of electric machinery and equipment

SOURCE: Svarochnoye proizvodstvo, no. 11, 1965, 20-22

TOPIC TAGS: solder, antimony, metal soldering, electric equipment / MFSu 92-6-2 silverless solder 44,55

ABSTRACT: Considering the high cost and scarcity of silver solders, the Khar'kov Electric Machinery Plant has been investigating the possibilities for replacing them with silverless solders displaying roughly the same properties. In this connection, the authors describe the experimental investigation of varieties of MFSu 92-6-2 solder, which consists chiefly of copper, phosphorus and antimony and costs only one-fourth as much as PSr 15 silver solder, since the literature on the MFSu 92-6-2 solder is very scanty. It was tried out on copper and brass plates measuring 2x25 mm in area and 100-110 mm in length. The soldering was carried out with the aid of natural gas, on using a flux consisting of 50% KF + 50% H_3BO_3, and was followed by tensile, shear and bending tests of the soldered copper and brass specimens, along with similar comparative tests of specimens joined with standard silver solder. Since brazed joints

Card 1/2 UDC: 621.791.35



L 9678-66

ACC NR: AP5027601

in electric machines and devices are exposed to prolonged current loads, appropriate electric tests of the brazed joints were carried out by the method of comparative evaluation of voltage drop on specimens of 2x25 mm copper busbars. The specimens were heated with 200-a direct current. Findings; the resistance of the brazed specimens and base material is the same, amounting to 0.000023 ohm. Metallographic examination showed that the use of antimony in the MFSu solder is advantageous, since, among other things, it improves pore penetration, reduces the melting point, reduces the solubility of copper in the solder, and does not adversely affect microhardness. Accordingly, the Khar'kov Plant began to organize the production of its own supply of MFSu 92-6-2 solder (average composition: Cu 90.8%, P 6.65%, Sb 1.45%, Sn 0.1%, Zn 0.1%) in the form of, mostly, rods 400 mm long with a diameter of 15-16 mm. Currently MFSu solder is used in lieu of PSr 15 silver solder to join parts of electric motors, current-conducting busbars, and other products. As a result of this substitution, the Khar'kov Plant saves more than 10,000 rubles per year. Orig. art. has: 6 tables.

SUB CODE: 09, 11, 13/ SUBM DATE: none/ ORIG REF: 000/ OTH REF: 000

Card 2/2

LEPEYKO, I. P., inzh.; OLEYNIK, L. U., kand. ekonom. nauk

Economic efficiency of using welded structures. Svar. proizv. no.10:22-23 O '62. (MIRA 15:10)

1. Khar'kovskiy elektromekhanicheskiy zavod (for Lepeyko).
2. Khar'kovskiy politekhnicheskiy institut (for Oleynik).

(Machinery—Welding)

LEPEYKO, I.P.

Timely task. Avtom. svar. 16 no.6:65-86 Je '63. (MIRA 16:7)

1. Khar'kovskiy elektromekhanicheskiy zavod.
(Gas welding and cutting)

LEPEYKO, I.P., inzh.

Some examples of the economy of materials in the manufacture of welded structures. Sver. proizv. no.8:27-29 Ag '64. (MIRA 17:9)

1. Khar'kovskiy elektromekhanicheskiy zavod.

BEYROM, S.G.; LEPETIN, P.A.

Underground water in the Altai. Trudy Transp.-energ.inst. Sib. otd. AN SSSR no.13:117-128 '61. (MIRA 15:6)
(Altai Territory—Water, Underground)

21745
P/043/61/000/001/001/001
A223/A126

15.8340 2808, 2409

AUTHOR: Lepiarz, L., Master, and Nazim, H., Engineer

TITLE: Steel-vinidur tubes

PERIODICAL: Wiadomości Hutnicze, no. 1, 1961, 15 - 18

TEXT: The rapid development of the Polish chemical industry calls for an increased production of tubes resistant to chemicals. The acid-proof austenitic tubes produced in Poland cover only part of the country's needs and a considerable amount has to be imported. The Sosnowiec Huta (Metallurgical Plant) started the production of steel tubes with "vinidur" lining. These tubes are produced by cold rolling through simultaneous reduction of the steel and vinidur tube diameter which makes for a close adhesion of metal and synthetic material. Steel-vinidur tubes can be used instead of chromium-nickel or non-ferrous metal tubes, and are 5 - 6 times cheaper than the conventional acid-proof tubes. The production program includes steel-vinidur tubes with an external diameter ranging from 10 to 110 mm. The steel wall of the tube is made from low-carbon steel and makes the steel-vinidur tubes suitable for underground and surface pipelines. Vinidur tubes

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21745

P/043/61/000/001/001/001
A223/A126

Steel-vinidur tubes

with outer steel tube can withstand temperatures from -10 to +60 and in some cases even to +100°C, while the ordinary vinidur tube can resist temperatures from -5 to +50°C. Experiments showed that a temperature of 100°C does not cause a separation of the vinidur lining from the steel tube. "Vinidur", a thermoplastic substance derived from polyvinyl chloride is resistant to certain acid and alkaline solutions, acid salts, mineral oils, plant oils and organic compounds. Steel-vinidur tubes can be subjected to bending like any other tubes, without causing a separation of the "vinidur" lining from the steel tube. The bending can be carried out by a bending machine or by bending equipment with grooved rolls. Bending is done by the conventional method of filling the tube with sand preheated to a temperature of 130 - 160°C and consisting of 1-mm granules. Pipelines consisting of steel-vinidur tubes may have permanent or detachable connections. Permanent connections, used mainly for low pressures, can be either threaded joints or welded joints. Welding is carried out by an air jet of 210 to 230°C with a vinidur rod having a diameter of 1/3 or 1/4 of the thickness of the vinidur tube. Detachable connections are flanged joints with or without reinforcement. Both these connections are made by removing a strip of steel at the ends to

Card 2/3

Steel-vinidur tubes

be connected, forming a flange from the ends of the vinidur tube and inserting an annular vinidur, "igelit" or rubber gasket. The reinforced type of these flanged joints differs from the other by a vinidur ring, with a thickness equal to the thickness of the vinidur tube wall, welded to the vinidur flange, which insures greater resistance to high pressures. Vinidur can be welded by hot air jet, by heat from friction, by contact with a hot object and by high-frequency current. Welding by hot air proved most practical. The joints are tested for tightness by a spark inductor. In practice for each mm of tube-wall thickness a tension of 15,000 to 20,000 v is used. Steel-vinidur tubes should have a smooth inner and outer surface. The R35 steel with tensile strength Rr = min. 38 kg/mm^2 and ductile strength a_{10} = min. 8% and vinidur with tensile strength Rr = min. 400 kg/cm^2 and ductile strength a_{10} = min. 5% are used in the manufacture of steel-vinidur tubes. Steel-vinidur tubes can resist pressure tests similar to steel tubes and in accordance with the PN-53/H-74220. On the basis of tests, permanent connections should resist a pressure of cold water of 15 kg/cm^2 and the detachable ones a pressure of 40 kg/cm^2. Steel-vinidur tubes are a new Polish product manufactured by the Sosnowiec Metallurgical Plant. Tests proved that these tubes can successfully replace in many cases the acid-proof tubes. There are 4 tables, 6 figures and 5 Soviet-bloc references.

Card 3/3

LEPIC, Jiri

Inventor and Improver Movement in 1962. Doprava no.4:310-311 '63.

FRACZEK, Kazimierz; LEPICH, Teresa; POLACZEK, Jerzy

Cumarone-indene resins. Pt.1. Koks 8 no.3:94-100 My-Je'63.

1. Instytut Ciezkiej Syntezy Organicznej, Warszawa.

[redacted], G.M.; [redacted]SKIY, Ya.L.

Electric-contact brinding of cutting tools. Trudy SNTO MVTU no.3:54-66 '57. (MIRA 10:9)
(Cutting tools) (Metal cutting, Electric)

LEPIESZKIEWICZ, Zygmunt, mgr inz.; SYNORADZKI, Jerzy, mgr inz.

Certain control and signaling installations applied to weirs and chamber locks. Gosp. wodna 22 no.10:433-436 O '62.

1. Hydroprojekt, Warszawa.

LEPIESZKO, W.

5033. Determination of the optimum geometrical shape of transformers. W. LEPIESZKO. *Przegląd elektrotech.*, 31, No. 2, 113–[illegible] (1955). In Polish.

The method described is claimed to be simpler and more accurate than similar ones. A numerical example illustrates the method.

A. KARLSBAD

621.314.2

LEPIESZYNSKA, O.

"Ways of Longevity." p. 160 (Problemy, Vol, 9 no. 3 1953 Warszawa.)

Vol. 3, no. 6

SO: Monthly List of East European Accessions./Library of Congress, June 1954, Uncl.

MEL'KANOVITSKIY, I. M.; AKHMATOV, P. G.; LEPIGOVA, E. L.

Magnetic properties of rocks in the eastern part of Central Asia. Uzb. geol. zhur. 6 no.5:33-85 '62. (MIRA 15:10)

1. Sredneaziatskiy nauchno-issledovatel'skiy institut geologii i mineral'nogo syr'ya, Tashkent.

(Soviet Central Asia--Rocks--Magnetic properties)

MEL'KANOVITSKIY, I.M.; Prinimala uchastiye: LEPIGOVA, E.L.

Physical properties of Pre-Mesozoic rocks in the northern Tien Shan. Izv. AN SSSR. Ser. geol. 29 no. 2:44-54 F '64. (MIRA 17:5)

1. Srednеaziatskiy nauchno-issledovatel'skiy institut geologii i mineral'nogo syr'ya, Tashkent.

LEPIK, B.K.

Experimental study of combined immunization against staphylococcal infections, tetanus, typhoid and paratyphoid B. Report No.1. Zhur. mikrobiol., epid. i immun. 40 no.11:118-122 N '63. (MIRA 17:12)

1. Iz Instituta epidemiologii i mikrobiologii imeni Gamalei AMN SSSR.

LEPIK, B.K.

Experimental study of combined immunization against staphylococcal infections, tetanus, typhoid fever and paratyphoid B. Report No.2: Resistance of immunized animals to corresponding bacterial cultures and their toxins. Zhur. mikrobiol.; epid. i immun. 41 no.6:125-130 Je '64. (MIRA 18:1)

1. Institut epidemiologii i mikrobiologii imeni Gamalei AMN SSSR.

42749

S/854/61/000/102/002/004
B187/B104

10.7000

AUTHOR: Lepik, Yu.

TITLE: Analysis of the postcritical state of elastoplastic beams

SOURCE: Tartu. Universitet. Uchenyye zapiski. no. 102. 1961. Trudy po matematike i mekhanike. no. 2. 342-350

TEXT: The equilibrium problem in the postcritical state for freely supported, straight, incompressible bars of length l, with rectangular cross section, and linear strengthening is dealt with by a method of Engesser-Kármán and solved by the perturbation method. If the maximum deflection f is so small that no regions of plastic deformation arise in the bar then the axial compressive force at the ends of the bar has the approximate value

$$P = P_o \left[1 + \frac{1}{8}\pi^2 \left(\frac{f}{l}\right)^2 + \ldots\right] \qquad (3.7)$$

The distribution of the regions of active and passive deformations remains unchanged in the transition from the critical to the postcritical state. A dependence analogous to (3.7) is valid also for other supports. Since secondary plastic deformation takes place when deflection is relatively.

Card 1/2

Analysis of the postcritical ...

small, the applicability of (3.7) is limited considerably. It is shown that deviation from the rectangular shape of the cross section has only little influence on the instant at which the first plastic deformation appears. States without regions of plastic deformation are possible only if the deflection is less than the bar cross section, i.e. when the second term in (3.7) can be neglected: $P = P_0 = \text{const}$. Since the resistance to buckling decreases rapidly after secondary plastic deformation appears, the buckling load according to Engesser-Kármán is also the upper load limit of the bar.

ASSOCIATION: Kafedra teoreticheskoy mekhaniki (Department of Theoretical Mechanics)

SUBMITTED: March 9, 1960

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B187/B104

10 6100

AUTHORS: Aarend, A., Lepik, Yu., and Lukht, L.

TITLE: Large deflections of a flexible, elastoplastic circular disk freely supported at the edge

SOURCE: Tartu. Universitet. Uchenyye zapiski. no. 102. 1961. Trudy po matematike i mekhanike. no. 2. 377-384

/C

TEXT: A study is made of the strong deflection in the direction of the symmetry axis of an incompressible elastoplastic circular disk of radius a and thickness h with linear strengthening in the postcritical range. The edge of the plate is hinged and freely movable in the plane of the plate. The problem is solved with the aid of Lagrange's variational equation

$$\int_0^a \left[(1 - \frac{1}{2}\varphi_1)P_r - \frac{h}{2}\varphi_2 P_{r\varphi} + \frac{h^2}{12}(1 - \frac{1}{2}\varphi_3)P_\varphi - \frac{2a}{2Eh}\Delta w\right] r\,dr = 0$$

with the following boundary conditions: for $r = 0$: $\varepsilon_1 = \varepsilon_2$, $\varkappa_1 = \varkappa_2$, $u = 0$. $dw/dr = 0$; the quotients u/r and $\frac{1}{2}\,dw/dr$ are bounded; for $r = a$:

Card 1/5

Large deflections of a flexible, ...

$w = 0$, $T_\rho = M_\rho = 0$. The solution is sought in the form

$$U^* = \frac{1}{2}(C_1 + C_2\rho^2 + C_3\rho^4); \quad w^* = w_0(1 - \frac{44}{11}\rho^2 + \frac{5}{11}\rho^4)$$

with the four coefficients w_0^*, C_1, C_2, C_3, interdependent because of the boundary conditions:

$$C_3 = -\frac{1}{11}(5C_1 + 7C_2 + (\frac{16}{11})^2 w_0^*).$$

Hence, three parameters are varied. The asterisk denotes the transformation into dimensionless quantities:

$$u^* = au/h^2, \quad w^* = w/h, \quad \rho = r/a, \quad q^* = a^4q/Eh^4.$$

Yu. N. Lepik's method (O ravnovesii gibkikh plastnok za predelom uprugosti - Equilibrium of elastic disks beyond the elastic limit, Prikl. matem. i mekhanika, 1957, 21, 835-842) was used to solve the problem. The designations are also taken from this paper. The numerical computations were made for an ideal plastic material ($\lambda = 1$) at the Vychislitel'nyy tsentr Tartuskogo gos. universiteta (Computer Center of Tartu University) with the "Ural" electronic computer. The programming was

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made by A. Laumets. Values calculated for comparison ($\mu = 2$; $\lambda = 1$) showed that the mechanical properties of the disk depend on the strengthening to only a small degree. The following initial values of the parameter $\mu = a^2 l_s / h^2$ characterizing the flexibility were taken into account: $\mu = 0.2$; 2; 5. The corresponding numerical values for

$$w_o^*, \quad C_1, \quad C_2, \quad Q = \frac{3}{2}\int_0^1 q^*(\varrho)\frac{w^*}{w_o^*}\varrho d\varrho, \quad T_o^* = \frac{a^2}{Eh^4}T_1(0), \quad M_o^* = \frac{9a^2}{Eh^4}M_1(0)$$

and the characterization of the deformation intensity e_i by $n = \frac{(1i)\max}{l_s}$ at the point of maximum load are listed in a table. The regions of plastic deformation for $\mu = 2$ in the disk cross section are shown in a schematical drawing (Fig. 1). The values found experimentally and those published by N. I. Rasskazov (K vobrosu o rabote krugloy plastniki za predelom uprugosti - Operation of a circular disk beyond the elastic limit, Tr. Mosk. in-ta khim. mashinostroyenniya, 1957, 14, 55-79) and R. Haythornthwaite, E. Onat (The load-carrying capacity of initially flat

Large deflections of a flexible, ... S/854/61/000/102/003/004
B187/B104

circular steel plates under reserved loading, J. Aeronaut. Sci., 1955, 22, 867-869; The load-carrying capacity of circular plates at large deflection, J. Appl. Mech., 1956, 23, 49-67) are compared with the calculated values.

	w_o^*	Q	Q_{exp}	$(Q-Q_{exp})/Q_{exp}$
Rasskazov plate no. 6. $\lambda = 1$, $\mu = 0.212$ $Q_1^* = 1$	0.5	0.124	0.109	13.8%
	1	0.144	0.132	9.1%
	1.5	0.179	0.174	2.9%
Rasskazov plate no. 3. $\lambda = 1$, $\mu = 1.46$ $Q_1^* = 1$	0.5	0.347	0.28	23.9%
	1	0.712	0.59	20.7%
	1.5	1.020	1.10	- 7.3%
	2	1.316	1.43	- 7.8%
Haythornthwaite & Onat $\lambda = 1$, $\mu = 0.46$ $Q_1^* = 0.1$	0.5	0.240	0.17	41.2%
	1	0.303	0.26	16.5%
	1.4	0.355	0.34	4.4%
	1.77	0.413	0.41	0.7%

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Large deflections of a flexible, ... S/854/61/000/102/003/004
B187/B104

The deviations of the loading parameter Q decreasing with increasing w_o^* are explained by the presupposition of incompressibility. There are 1 figure and 2 tables.

ASSOCIATION: Kafedra teoreticheskoy mekhaniki (Department of Theoretical Mechanics)

SUBMITTED: March 30, 1960

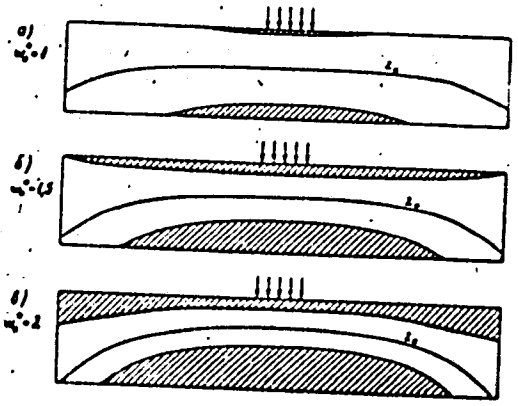

Fig. 1

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S/0124/64/000/001/V030/V030

ACCESSION NR: AR4014427

SOURCE: RZh. Mekhanika, Abs. 1V232

AUTHOR: Lepik, Yu

TITLE: Carrier capability of circular laminas subjected to neutron irradiations

CITED SOURCE: Uch. zap. Tartusk. un-ta, vy*p. 129, 1962, 482-486

TOPIC TAGS: irradiated lamina, carrier capability, radiation material effects radiation and plasticity

TRANSLATION: The author determines the carrier capability of circular, freely supported lamina subjected to neutron irradiation in a direction perpendicular to its plane. The material is assumed to be an ideally plastic solid. The applied load is distributed evenly along the circle. The radiation interaction results in an increase in the fluidity limit σ_s.

The irradiation dose penetrating to a depth z is given by the expression $N = N_0 e^{-\mu(h/2 + z)}$, where μ is a material constant. If one knows the experimental dependence of $\sigma_s(N)$, the problem reduces to the calculation of the carrier properties of the nonuniform lamina. The author presents an example in which the

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ACCESSION NR: AR4014427

carrier capability was augmented by 70% relative to the nonirradiated lamina.
V. P. Tamuzh.

DATE ACQ: 18Feb64 SUB CODE: AP, NS ENCL: 00

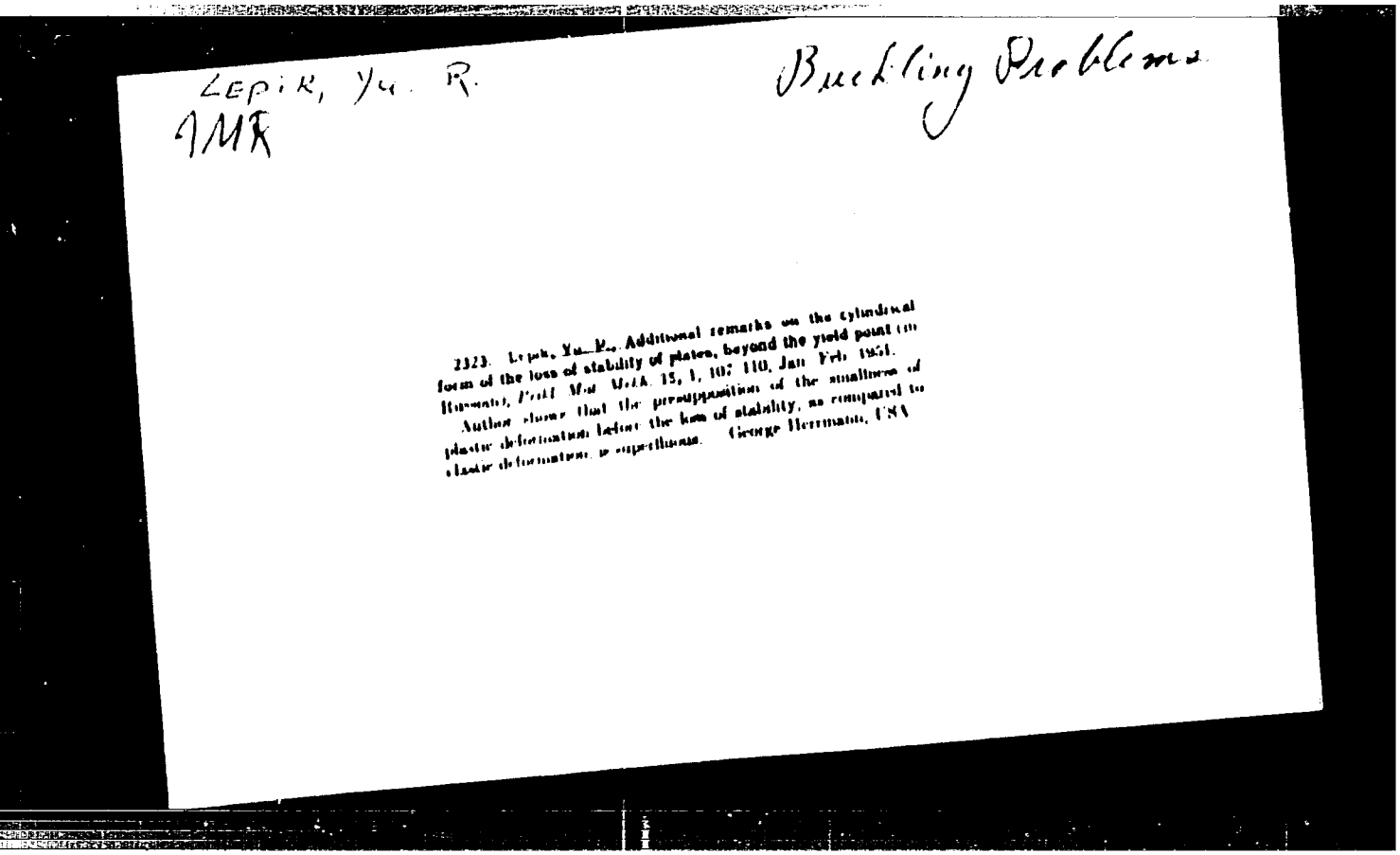
Card 2/2

Lepik, Yu. R.

Lepik, Yu. R. Two remarks on the theory of stability of plates beyond the elastic limit, taking account of the compressibility of the material. Akad. Nauk SSSR. Prikl. Mat. Meh. 14, 553–557 (1950). (Russian)

A. A. Ilyushin has discussed the problem for incompressible materials in terms of the theory of small elastic-plastic deformations. The present paper discusses the validity of Ilyushin's results for compressible materials. It is shown that the solution under the assumption of incompressibility approaches the true solution as the difference between the yield stress and the buckling stress increases. On the other hand, the solution based on the assumption of small plastic deformation can be used only so long as the buckling stress does not exceed the yield stress by more than 3 per cent. The second part of the paper formulates four conditions under which the relative thickness of the plastic zone remains constant in compressible materials. It is shown that the assumption of incompressibility leads to an overestimate of the relative thickness. *H. I. Ansoff.*

Source: Mathematical Rev... Vol 13 No. 1



Lepik, Yu. R.

AMR

Buckling Problems

2323. Lepik, Yu. R. Additional remarks on the cylindrical form of the loss of stability of plates, beyond the yield point (in Russian), Prikl. Mat. Mekh. 15, 1, 107-110, Jan.-Feb. 1951.

Author shows that the presupposition of the smallness of plastic deformations before the loss of stability, as compared to elastic deformations, is superfluous. (George Herrmann, USA)

USSR/Mathematics - Plates, Stability Sep/Oct 51

"Loss of Stability in a Plate of Compressible Material in Area of Flow," Yu. R. Lepik, Tartu State U

"Prik Matem i Mekh" Vol XV, No 5, pp 629-635

This problem is treated under assumptions that: (1) state of tension of plate before loss of stability is uniform; (2) variations δT_1, δT_2, δS of forces equal zero at loss of elasticity. In this case material of plate is mostly deformed plastically. Obtained results facilitate

193T58

USSR/Mathematics - Plates, Stability (Contd) Sep/Oct 51

evaluation of compressibility effect of material on critical elasticity of plate. Submitted 6 Jan 51.

193T58

LEPIK, YU. R.

"APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929320004-2"

3

USSR • 1-F/W

Lenik, Yu. P. Stability of a rectangular elastic-plastic plate nonuniformly compressed in one direction. Inten. Sb. 18, 161–164 (1954). (Russian)

The problem of the title is treated for simply-supported plates. The analysis only differs from that for elastic plates through the use of plastic moduli. Numerical results for a range of plate aspect ratios are given for the case when the applied end load varies linearly from zero across the plate width. These results are computed for plate material with specified values of the plastic moduli. The results need careful interpretation in view of recent work [e.g. H. G. Hopkins, Quart. Appl. Math. 11, 185–200 (1953); MR 14, 930; E. T. Onat and D. C. Drucker, J. Aero. Sci. 20, 181–186 (1953); MR 14, 929] illuminating the complex behaviour of plastic systems at instability. *H. G. Hopkins.*

Tartu State U.

LEPIK; Yu. R.

6671*. More on the Problem of the Cylindrical Form of the Loss of Stability of Elastoplastic Sheets. Eshche raz k voprosu o tsilindricheskoi forme poteri ustoichivosti uprugo-plasticheskikh plastinok. (Russian.) Yu. R. Lepik. *Prikladnaia Matematika i Mekhanika*, v. 21, no. [illegible], [illegible] 1957, p. 440-443.

Equations for theory of loss of bearing capacity in flat sheets or bars stressed beyond the elastic limit. Mechanisms and forms of curling, sagging, and buckling. Graphs. 2 ref.

Tartu State U.

LEPIK, Yu.R.

AUTHOR: Lepik, Yu.R. (Tartu) 24-8-2/34

TITLE: A possibility of solving the problem of the stability of an elastic-plastic lamina in its exact formulation. (Odna vozmozhnost resheniya zadachi ob ustoychivosti uprugo-plasticheskikh plastinok v tochnoy postanovke)

PERIODICAL: "Izvestiya Akademii Nauk SSSR. Otdeleniye Tekhnicheskikh Nauk." (Bulletin of the Academy of Sciences USSR. Technical Sciences Section.) No.8, pp. 13-19 (U.S.S.R.) 1957

ABSTRACT: As is known, the problem of the stability of an elastic-plastic lamina in exact and approximate formulation was first formulated mathematically and solved by A.A.Ilyushin. Ilyushin describes the approximate solution of the problem as that for which changes in the tangential forces on the loss of stability are identically zero. This method of solution has been developed in sufficient detail and is already beginning to be introduced in engineering practice. There is, in addition, undoubted interest in the search for exact solutions. These solutions are significant even if only to evaluate the degree of accuracy of the approximate solution, but solution of problems on the stability of an elastic-plastic lamina is attended by considerable mathematical difficulties as a result of which an exact solution

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A possibility of solving the problem of the stability of an elastic-plastic lamina in its exact formulation. (Cont.)

has been obtained only for certain of the simpler cases. These difficulties arise fundamentally because the satisfying of the continuity conditions at the boundary of an elastic-plastic and purely plastic domain leads, in the simplest cases, to complicated equations. Moreover, this boundary is initially unknown and is defined only in the course of the solution. In the present paper, it is shown that, by starting from flow theory, it is possible to construct a variational equation of Galerkin's type for which all the continuity conditions on the boundary of the elastic-plastic and purely plastic domain are satisfied automatically. This makes it possible to solve any problem on the stability of an elastic-plastic lamina in exact formulation. It is proved that for the case of sufficiently small plastic deformations (i.e. when $\omega = 1 - E'/E \approx 0$), results found on the basis of deformation theory and flow theory coincide. The problem of the stability of a continuous, circular lamina is investigated in greater detail. It is indicated that the solution given by Tolokonnikov, L.A.(2)

A possibility of solving the problem of the stability of an elastic-plastic lamina in its exact formulation. (Cont.)

appears to be inaccurate. There are 2 tables and 2 Slavic references.

SUBMITTED: April 20, 1957.

AVAILABLE: Library of Congress

Card 3/3

PA - 2212

AUTHOR LEPIK, YU.R.

TITLE On the Equilibrium of Elastically Plastic Rods (O ravnovesii uprugo -plasticheskikh sterzhney).

PERIODICAL Prikladnaia Matematika i Mekhanika,1957,Vol 21,Nr 1,pp 101-108 (U.S.S.R.)
Received 3/1957 Reviewed 5/1957

ABSTRACT The present work shows that there are cases in which the application of the solution by A.PFLUEGLER (Ingenieur Archiv, Vol XX, Nr 5, 1952) for the determination of deflection of a rod leads to considerable errors. The basic equation for the equilibrium of a rod. A straight rod which has been compressed by a longitudinal force is investigated here, the cross section of which contains two symmetry axes. X here denotes the central longitudinal axis of the rod, and x and y are assumed to be the symmetric axes of the cross section. On losing stability the rod is assumed to bend through in the xz-plane. The author here confines himself to small deflections. The above mentioned basic equation is derived and written down. It is not possible for the whole rod to deform elastically and plastically.
Next, the relative thickness of the plastic layer is determined. The basic equation of equilibrium can be integrated if the distribution of the zones of the active plastic deformations are known. The following conclusion is drawn. An equilibrium without the existence of domains with purely plastic deformations is impossible.
The limits of applicability of the solution discussed here. All formula are derived here on the assumption that no zone of secondary plastic deformations occurs, i.e. that the material of the rod within the zone of

Card 1/2

LEPIK, Yu. R.

AUTHOR: LEPIK,Yu.R. (Tartu) 40-5-20/20

TITLE: On the Stability of an Elasto-Plastic Rectangular Plate Which is Pressed in one Direction (Ob ustoychivosti uprugo-plasticheskoy pryamougol'noy plastinki, szhatoy v odnom napravlenii)

PERIODICAL: Prikladnaya Mat. i Mekh.,1957,Vol.21,Nr 5,pp.722-724 (USSR)

ABSTRACT: The stability of elasto-plastic plates in general is calculated according to an approximative method given by Il'yushin [Ref.1] . In order to determine the error of this approximative method it is important to have more exact solutions. This problem has been solved by the author in a preceding paper. The present investigation continues the previous papers by the investigation of two special cases of the stability of rectangular plates. The author considers rectangular plates which are stressed in pressure on two opposite sides by forces equally distributed on the boundaries. He restricts himself to the case of small deviations of the plate from the quadratic form so that the loss of stability by a buckling of the plate takes place in the form of a half-wave. The material of the plate is assumed to be incompressible. Galerkin's variational equations are applied for the calculation. The Galerkin equations are solved for the two

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On the Stability of an Elasto-Plastic, Rectangular Plate Which is Pressed in one Direction 40-5-20/20

cases of a totally fixed plate and of a completely freely supported plate. The calculation shows that in the case of the freely resting plate the error of the approximative formula is smaller than in the case of the fixed plate. On the basis of the obtained results it can be stated that Il'yushin's method gives an exactness which is completely sufficient for practical purposes.
There are no figures, no tables, and 2 Slavic references.

SUBMITTED: March 5, 1957

AVAILABLE: Library of Congress

Card 2/2

40-21-6-13/18

AUTHOR: Lepik, Yu.R. (Tartu)

TITLE: On the Equilibrium of Flexible Plates Beyond the Limit of Elasticity (O ravnovesii gibkikh plastinok za predelom upru-gosti)

PERIODICAL: Prikladnaya Matematika i Mekhanika, 1957, Vol 21, Nr 6, pp 833-842 (USSR)

ABSTRACT: In a paper published two years ago the author Ref 1 investigated the problem of the equilibrium of flexible, elasto-plastic plates and set up the basic equations. He simultaneously developed a general method for the solution of the basic equations which is similar to Il'yushin's method. In the present paper the former orders of thoughts are continued. Formulas for determining auxiliary functions are derived, and as examples of application of the general theory two problems of the equilibrium of circular plates are calculated. At first the author considers great deflections of a circular plate under the effect of a transverse stress and then longitudinal and transverse bendings of a circular plate. The calculations carried out on the quickly working electronic computer of the type "Strela" in the computing center of the University Mos-

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cow show a good convergence of the approximative solutions obtained according to the given method. There are 11 figures and 5 references, 3 of which are Soviet, 1 German, and 1 English.

SUBMITTED: June 17, 1957

AVAILABLE: Library of Congress

1. Elasticity-Theory

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SOV/124-58-8-9149 D

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 8, p 120 (USSR)

AUTHOR: Lepik, Yu.R.

TITLE: Some Aspects of the Equilibrium of Elastic-plastic Plates and Bars (Nekotoryye voprosy ravnovesiya uprugo-plasticheskikh plastinok i sterzhney)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Doctor of Physical and Mathematical Sciences, presented to the MGU (Moscow State University), Tartu, 1958

ASSOCIATION: MGU (Moscow State University), Tartu

Card 1/1

AUTHOR: Lepik, Yu. R. (Tartu) SOV/179-59-3-26/45

TITLE: Determination of Residual Deflection and Stresses on Rupture of a Flexible Elasto-plastic Plate (Opredeleniye ostatochnogo progiba i ostatochnykh usiliy pri razgruzhenii gibkikh uprugo-plasticheskikh plastinok)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1959, Nr 3, pp 154-157 (USSR)

ABSTRACT: The paper is a continuation of previous work (Refs1 and 3). The problem of equilibrium of a flexible plate is taken as solved (e.g. as in Ref 1) so that the stresses X_x ..., the strains e_{xx} ..., the stress resultants T_1 ..., and the moments M_1... are known. At rupture, these quantities take values X_x^o ..., e_{xx}^o ... etc. and new variables are introduced $X_x' = X_x - X_x^o$ ..., $e_{xx}' = e_{xx} - e_{xx}^o$ ... etc. The equilibrium equations are written in terms of the primed variables, and a differential equation for residual deflection is obtained and solved by a variational method, allowance being made for secondary plastic deformation.

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Determination of Residual Deflection and Stresses on Rupture of a Flexible Elasto-plastic Plate

As a particular example, the case of a circular plate with clamped edges subjected to a uniformly distributed load is discussed, and a numerical example is given. There are 3 Soviet references.

SUBMITTED: January 26, 1958

Card 2/2

Lepik, Yu.R.

S/179/60/000/02/011/032
E031/E213

AUTHOR: Lepik, Yu. R. (Tartu)

TITLE: The Plastic Flow of Flexible Circular Plates 26 Made From Rigid Plastic Material

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk Mekhanika i mashinostroyeniye, 1960, Nr 2, pp 78-87 (USSR)

ABSTRACT: The problem of the load-carrying capabilities of circular plates under symmetrical loading has been considered by various authors (Refs 1 to 4) for the case of small deflections. A solution has been attempted for large deflections (Ref 6) in which the equations of statics were not satisfied. In order to arrive at a more realistic value of the limiting load it is necessary to make the statically permissible stress field conform with the kinematically possible velocity field. Consider a circular plate subjected to a symmetrical transverse load, with a freely supported edge, and assume that the plate, in deforming, retains its axial symmetry. The material is supposed to be incompressible and not hardened. The flow conditions of Tresk-St. Venant are assumed. The plate is assumed to be so thin that the Kirchhoff hypothesis of straight normals is

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applicable. Small deformations, but moderate deflections are considered. Expressions for the tangential forces and moments are obtained from the expression for the magnitude of the plastic deformation of unit area of the mean surface, and the radial force and radial bending moment are determined from the equations of equilibrium. By applying continuity conditions on these quantities at the edge of the plate and the boundary of the circular region over which the load is applied, one arrives at an equation from which the load can be calculated as a function of the deflection at the centre of the plate. It is frequently necessary to assume that the stressed state on both sides of the surface of discontinuity is homogeneous or varies linearly with the thickness, but these assumptions are not required in this paper. Two special cases are considered. The first is a freely supported plate with a fixed boundary. An expression is given for the relative deflection at the centre of the plate and

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the load parameter can be determined as a function of this deflection. The second example is that of a freely supported plate for which the points of the edge can move freely. The problem is similar to the previous one and some of the details of the solution are omitted. In both cases the solution is derived in stages corresponding to increasing load. It has been assumed that the surface of discontinuity has been defined in accordance with the theory of plasticity, but it might have been determined by consideration of the theory of deformations. By solving the problems considered on both theories it is possible to evaluate the effect of compound loading. To illustrate this the case of a hinge-supported plate with an edge which can move freely is considered. Theoretical results are compared with experimental ones. No conclusions are drawn. There are 5 figures and 11 references, 8 of which are Soviet and 3 English.

SUBMITTED: November 20, 1959

V B

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