X

used in the present investigation. The machine (whose detailed description is given) is of the resonance type and was designed for single-plane bending fatigue tests which can be carried out under the conditions of both imposed and resonance vibrations. The vibrations, generated by a powerful electromagnetic system consisting of an amplifier and a transformer, are transmitted to the test piece through a heavy beam, capable of producing alternating loads which are sufficiently high to break standard test pieces or even actual components, such as turbine blades. The auxiliary equipment consists of a microscope used for setting the test piece and for measuring the vibration amplitude which at high temperatures is measured with the aid of a cathetometer, and an electrical resistance furnace for high temperature work. Before testing, the test pieces were heat treated according to schedules given in Table 2. The tests were carried out on cylindrical test pieces of the cantilever type. The gauge length ℓ of the test pieces varied depending on the load frequency and test temperature, and was calculated from the formula

$$\ell = \sqrt{\frac{(1.8751)^2}{2\pi f}} \sqrt{\frac{EJ}{m}}$$

where f is the vibration frequency per sec, E the modulus of elasticity (kg/mm^2), J the moment of inertia (mm^4), and m mass per unit length (kg.sec^2/mm^2). The tests were conducted on a base N = 10^8 cycles in the case of the EI617 and ZhS6K alloys, and 10^7 and 10^8 cycles in the case of the VT3-1 alloy. Each fatigue curve was constructed from data obtained on eight test pieces. In the first test of each series a stress equal approximately to 0.5 σ_b was used, where σ_b is the U.T.S. of the alloy tested; in each subsequent test the applied stress was lowered by 2 kg/mm^2. The vibration amplitude, A (mm), of the free end of the test piece, required to produce a given stress, was calculated from the formula

$$A = 0.5682 \frac{\ell^2}{Ed} \sigma,$$

where ℓ and d are the length and diameter of the specimen, respectively, E the modulus of elasticity (kg/mm^2), and σ_{-1} the applied stress (kg/mm^2). The results are reproduced in Figs.10-13, where the stress σ_{-1} (kg/mm^2) is plotted against the number of cycles to fracture. The fatigue curves in Fig.10 relate to alloy EI617, tested at 20°C under the following conditions:(1)testing

machine of the ГЗИП(GZIP) type (bending of the revolving specimen), load frequency f = 50 cycles/sec; (2) testing machine of the П-391 (P-391) type (bending of a revolving specimen), f = 200 cycles/sec, (3) testing machine VIU-1 MAI-VIAm (single plane bending), f = 1000 cycles/sec. The fatigue curves in Fig.11 relate to alloy ZhS6K tested at 20°C, the testing conditions for curves 1-3 being the same as in Fig.10. The results, reproduced in Fig.12 relate to alloy VT3-1 tested under the following conditions: curve 1 - testing machine VIU-1 MAI-VIAM, f = 1100 cycles/sec, t = 20°C; curve 2 - same as for curve 1, except f = 420 cycles/sec; curve 3 - testing machine GZIP, f = 50 cycles/sec, t = 20°C; curve 4 - testing machine VIU-1 MAI-VIAM, f = 420 cycles/sec, t = 400°C. Fig.13 shows the fatigue curves of the VT3-1 alloy, tested at 20°C on the VIU-1 MAI-VIAM machine, curves 1-3 relating to tests carried out at f = 450, 1100 and 1650 cycles/sec, respectively; these are the most significant results of the present investigation, showing that the endurance limit of the alloys studied increased with increasing load frequency. Metallographic examination of the fatigue test pieces in the region of fracture revealed no changes in the microstructure

Investigation of endurance of ... S/535/60/000/129/005/006
E193/E580

due to increased loading frequency. The fatigue cracks were trans-crystalline, and only in the zone of final fracture were intergranular cracking and some degree of plastic deformation of the grains observed. It was concluded that both the equipment used and the method employed by the present authors are suitable for fatigue testing under high frequency loading and give reliable results which can be used as design data in the production of turbine and compressor blades, operating under high frequency loads. There are 15 figures, 5 tables and 6 references: 1 Soviet and 5 English. The English-language references read as follows: Lomas T., Ward I., Rait, I., Colbeck E., International Conference on Fatigue of Metals, London, Sept., 1956; Krouse G., Proc. ASTM, 34, 1934, II, 156; Jenkin C. and Lohman G., Proc. Roy. Soc., 125, 1929, 83; Wade A and Grootenhuis P., International Conference on Fatigue of Metals, London, Sept., 1956.

Card 5/9

L 07501-67 EWP(k)/EWT(d)/EWT(l)/EWT(m)/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c) EM/JD

ACC NR: AR6017329 SOURCE CODE: UR/0264/66/000/001/A013/A013

AUTHOR: Zhukov, S. A.; Shadskiy, I. A.; Zhukov, N. D.

TITLE: Strength of certain alloys at high frequencies

SOURCE: Ref. zh. Vozdushnyy transport, Abs. 1A72

REF SOURCE: Tr. Kuybyshevsk. aviats. in-t, vyp. 19, 1965, 399-404

TOPIC TAGS: fatigue strength, alloy, fatigue test, METAL BLADE, PROPELLER BLADE

ABSTRACT: The study concerned effects of high frequency variable loads on fatigue limit of blade materials (SAP, VT3-1, EI961 and EI617). Fatigue tests employed a resonance setup, using an electromagnetic system to excite oscillations from 200 to 2400 cps. Test temperature varied from room temperature to 550C. It was established that the fatigue limit improves for all tested materials as the loading frequency increases. Best improvement in fatigue limit was noted for alloy VT3-1. [Translation of abstract] 4 illustrations and bibliography of 3 titles. V. Ivanova

SUB CODE: 11,01

Card 1/1 UDC: 620.1

ZHUKOV, N.F., inzhener-kapitan 3-go ranga

Distribution of training time for an exercise on specialty.
Mor. sbor. 48 no.6:59-61 Je '65. (MIRA 18:6)

BRITVA, Ya.D.; ZHUKOV, N.F.; ZHURBA, V.K.; PECHERSKIY, Ye.A.

Rate of compression in die casting machines. Lit. proizv. no.1:10-11 Ja '63. (MIRA 16:3)
(Die casting)

S/128/63/000/001/003/008
A004/A127

AUTHORS: Britva, Ya.D., Zhukov, N.F., Zhurba, V.K., Pecherskiy, Ye.A.

TITLE: On the problem of pressing rate in die-casting machines

PERIODICAL: Liteynoye proizvodstvo, no. 1, 1963, 10 - 11

TEXT: To vary the pressing rate during die-casting, it is necessary to change over from the differential feed of the hydraulic fluid to the cylinder to the non-differential feed. An accurate determination of the change-over moment requires a device which measures the rate of pressing. A prototype model of a device determining the average speed of the plunger over a distance of at least 10 mm has been developed by the Novosibirsk "Siblitmash" Plant. The time intervals in which the plunger travels the necessary section of stroke are determined by two contact pickups which are mounted on the path of travel of the press plunger. The authors present a brief description of operation and a block diagram of the device. There are 2 figures.

Card 1/1

GARBER, V.I., inzhener; ZHUKOV, N.F., master.

Capacitors as a source of operating current. Elek.sta. 27 no.5: 58-59 My '56. (MLRA 9:8)
(Electric engineering)

15-57-4-5648D

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 4, p 218 (USSR)

AUTHOR: Zhukov, N. G.

TITLE: Surveying for the Construction of Mountain Tunnels (Nekotoryye marksheyderskiye raboty pri sooruzhdenii gornykh tunneley)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Technical Sciences, presented to Krivorozhsk. gornorud. in-t (Krivoy Rog Ore Institute), Krivoy Rog, 1956

ASSOCIATION: Krivorozhsk. gornorud. in-t (Krivoy Rog Ore Institute)

Card 1/1

ZHUKOV, N. G.: Master Tech Sci (diss) -- "Some mine-surveying work in rein forced mine tunnels". Novocherkassk, 1958. 14 pp (Min Higher Educ USSR, Novocherkassk Order of Labor Red Banner Inst im S. Ordzhonikidze), 160 copies

(KL, No 2, 1959, 121)

127-58-4-17/31

AUTHOR: Zhukov, N.G.

TITLE: The Determination of the Accuracy of Measurements of Bench Surveying (Opredeleniye tochnosti zamerov pri s"emke ustupov)

PERIODICAL: Gornyy Zhurnal, 1958, Nr 4, pp 61-63 (USSR)

ABSTRACT: The author describes analytical calculations to determine the accuracy of measuring ordinate-linear bench surveying. He found that on given parameters, the accuracy of measure is of ± 4%. To increase this accuracy, it is necessary to shorten the intervals between the ordinates. There are 3 graphs.

ASSOCIATION: Krivorozhskiy gornorudnyy institut (The Krivoy-Rog Ore-Mining Institut)

Card 1/1 1. Surveying - Accuracy - Test results

ZhUKOV, N. G., Cand Tech Sci — (diss) "Certain Surveying works during the digging of mine tunnels," Leningrad, 1960, 10 pp (Leningrad Mining Institute im G. V. Plekhanov) (KL, 37-60, 121)

ZHUKOV, N.G., starshiy prepodvatel'.

Establishing the optimum interval between the cross section measurements of the Saksagan tunnel. Izv. vys. ucheb. zav.; gor. zhur. no.10:35-38 '60. (MIRA 13:11)

1. Krivorozhskiy gornorudnyy institut. Rekomendovana kafedroy geodezii i marksheyderskogo dela Sverdlovskogo gornogo instituta imeni V.V.Vakhrusheva.
(Saksagan Valley--Tunneling) (Mine surveying)

ZHUKOV, N.G., inzh.

New instruments for surveying block workings. Sbor. nauch. trud. KGRI no.10:195-202 '61 (MIRA 17:8)

Evaluating the accuracy of a connection of the lateral drift between the "Gigant" and "Kommunar" Mines on the 160m.-horizon. Sbor. nauch. trud. KGRI no.10:203-206 '61 (MIRA 17:8)

ZHUKOV, N.G.

Studying deflections of a conveyor bridge. Sbor. nauch. trud. KORI 18:93-94 '62. (MIRA 17:5)

ZHUKOV, N.G.

Surveying observations of shifts and deformations of the Semanovskii transporter bridge. Sbor. nauch. trud. KGRI no.19:46-52 '62. (MIRA 16:5)

(Transporter bridges)

ZHUKOV, N.; GRECHKO, D.

Help for the lagging is the law of competition. Mast. ugl. 7 no.1: 3-4 Ja '58. (MIRA 11:2)

1. Nachal'nik shakhty No.3 "Severo-Gundorovskaya" kombinata Shakhtantratsit (Zhukov). 2. Predsedatel' shakhtnogo komiteta shakhty No.3 "Severo-Gundorovskaya" kombinata Shakhtantratsit (for Grechko).
(Coal mines and mining)

GOSPODINOV, G.V.; ZHUKOV, N.G.; MALAKHOVA, G.A.; SOROKIN, V.N.

[Handbook of practical assignments in surveying]Rukovodstvo k prakticheskim zaniatiiam po geodezii; kameral'nye raboty. Moskva, Mosk. gos.univ. im. M.V.Lomonosova, 1962. 118 p. (MIRA 15:11)

(Cartography) (Surveying)

ARTEMOV, G.Z., inzh; ZHUKOV, N.G., inzh.

Degree of accuracy in volumetric determinations in mine surveying. Izv. vys. ucheb. zav.; gor. zhur. no. 4:52-55 '61. (MIRA 14:6)

1. Krivorozhskiy gornorudnyy institut. Rekomendovana kafedroy geodezii i marksheyderskogo dela Krivorozhskogo gornorudnogo instituta.
(Mine surveying)

ZHUKOV, N.I.

Some immunobiological reactions in convection and radiation cooling. Biul. eksp. biol. i med. 58 no.8: 101-105 Ag '64.

(MIRA 18:3)

1. Kafedra fiziologii cheloveka i zhivotnykh (zav. - prof. G.N. Sorokhtin) Petrozavodskogo gosudarstvennogo universiteta. Submitted June 19, 1963.

ZHUKOV, N.I.; SHKURKO, N.A.

Experience with wall panels made of cellular concrete in industrial construction. Prom. stroi. 40 no.5:40-41 '62.
(MIRA 15:5)

(Lightweight concrete)
(Factories--Design and construction)

ZHUKOV, N.M.

Epidemiologic effectiveness of controling helminth infections among the population. Med. paraz. i parazit. bil. no.3:253-256 Jl-S '54. (MLRA 8:2)

1. Iz sanitarno-epidemiologicheskoy stantsii vrachebno-sanitarnogo otdela Ministerstva putey soobshcheniya SSSR (nachal'nik T.I.Artemenkova).

(HELMINTH INFECTIONS, prevention and control, Russia, results)

ZHUKOV, N.M.

Comparative data on effectiveness of dehelminthization of the population in two regions in 1950 and 1951, preliminary communication. Med. parazit., Moskva no.3:268-271 May-June 1953. (CIML 25:1)

1. Of the Malaria Station of the Medical Sanitary Department of Moselektrotyagostroy of the Ministry of Communication Routes.

ZHUKOV, N. M.

PA-75T68

USSR/Medicine - Malaria
Medicine - Transfusion

Apr 1948

"Question of Malaria and Transfusion," N. M. Zhukov, Moscow Oblast Malaria Sta, Inst imeni Mechnikov, ½ p

"Sov Meditsina" No 4

Reports cases observed of transfer of malaria to children through blood transfusions from donors who at one time had been afflicted by malaria.

FDB

75T68

ZHUKOV N.N., inzh.

Calculating ventilation air piping. Vod. i san. tekh. no.8:6-9 Ag '64 (MIRA 18:1)

ZHUKOV, N.M.

Comparative data on the effectiveness of dehelminthization of the inhabitants of two populated points in 1950 and 1951. Preliminary report. Med.paraz.i paraz.bol. no.3:268-271 My-Je '53. (MLRA 6:8)

1. Malyariynaya stantsiya vrachebno-sanitarnogo otdela Moselektrotyagstroya Ministerstva putey soobshcheniya. (Worms, Intestinal and parasitic)

ZHUKOV, M.M.

Epidemiologic effectiveness of controling helminth infections among the population. Med. paraz. i paraz. bil. no.3:253-256 Jl-S '54. (MLRA 8:2)

1. Iz sanitarno-epidemiologicheskoy stantsii vrachebno-sanitarnogo otdela Ministerstva putey soobshcheniya SSSR (nachal'nik T.I.Artemenkova).

(HELMINTH INFECTIONS, prevention and control, Russia, results)

ZHUKOV, N.M.; GRECHNEVA, L.V.; KAZAKOVA, A.G.

Result of mass two-stage therapy of ascariasis. Med. paras. i paras. bol. no.2:120-124 Ap-Je '54. (MLRA 7:8)

1. Iz protivomalyariynoy stantsii, sanitarno-epidemiologicheskoy stantsii i detskogo sanatoriya Vrachebno-sanitarnogo otdela Moselektrotyagstroya Ministerstva putey soobshcheniya SSSR.
(ASCARIASIS, in infant and child,
*ther., two-stage mass ther.)

ACC NR: AM7003443 Monograph UR/

Smirnov, Nikolay Konstantinovich; Maksimov, Vitaliy Ivanovich; Zhukov, Nikolay Nikolayevich; Maslak, Viktor Gavrilovich

Control of fires and water on ships (Bor'ba s pozharami i vodoy na korablyakh) Moscow, Voyenizdat M-va obor. SSSR, 66. 0183 p. illus., biblio. 8,500 copies printed

TOPIC TAGS: naval fire control system, fire control equipment, ship navigation, navigation training

PURPOSE AND COVERAGE: The first part of the book discusses the peculiarities and specific characteristics of shipboard fires, of firefighting methods, and equipment, and describes the installation and principles of operation of fire-fighting facilities. The second part of the book presents examples of measures taken to control the flow of water into a ship and practical recommendations on the use of emergency equipment and instruments to seal hulls, and to strengthen bulkheads, decks, bridges and watertight covers. Data on stationary and mobile water-emptying equipment are also given. The book is intended for a

Card 1/3 UDC: 628.74:623.82+629.12:532.3.072

ACC NR: AM7003443

variety of readers, but mainly for naval personnel, and for the transport, river, and fishing fleets, as well as teachers and students at navigation schools.

TABLE OF CONTENT [abridged]:

Card 2/3

ACC NR: AM7003443

Section 2.

Facilities and Methods of water control on ships

SUB CODE: 13, 19, 20/ SUBM DATE: 29Dec65/ ORIG REF: 023

Card 3/3

GUREVICH, G.; ZHUKOV-VEREZHNIKOV, N.N.

Life's password. Nauka i zhizn' 27 no.11:58-63 N '60. (MIRA 13:12)

1. Deystvitel'nyy chlen AMN SSSR (for Zhukov-Verezhnikov).
(TRANSPLANTATION (PHYSIOLOGY)) (CELLS)

LUGOVOY, V.S.; APOSTOLATOV, G.A.; VOLYNKIN, V.G.; GRECHKO, G.V.; ZHUKOV, N.N.

Factors to be considered in calculating and designing electric power transmission lines in Kirghizistan. Izv. AN Kir. SSR. Ser. est. i tekh. nauk 1 no. 4:3-32 '59. (MIRA 14:4)
(Kirghizistan--Electric lines)

ZHUKOV, Nikolay Nikolaevich, 1908-.

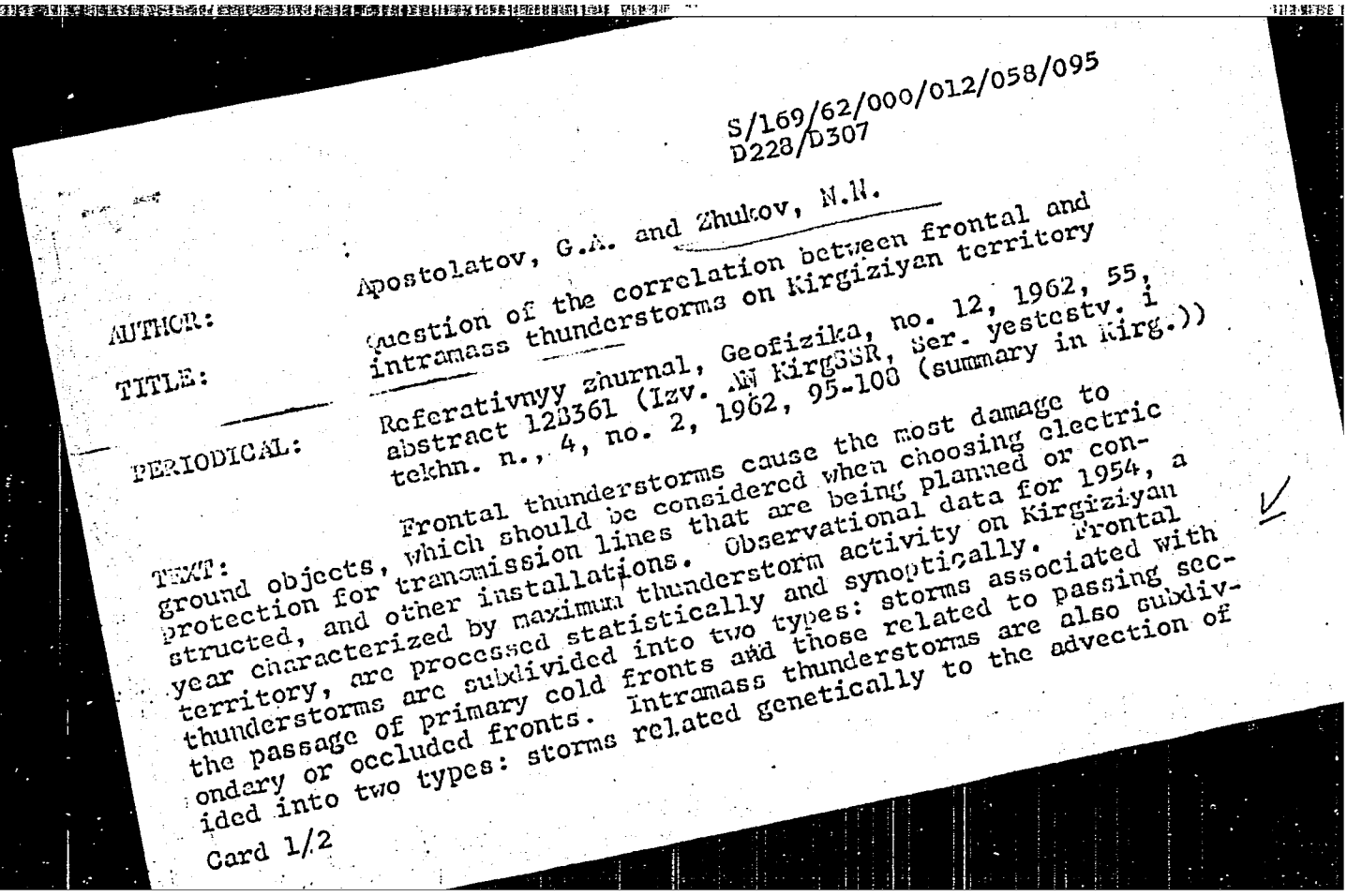
[Militarization of the economy and the increased impoverishment of the West German laboring class] Militarizatsiia ekonomiki i usilenie obnishchaniia rabochego klassa Zapadnoi Germanii. [Moskva] Profizdat, 1952. 135 p. (MLRA 6:7)

(Germany, Western--Defenses) (Germany, Western--Labor and laboring classes) (Labor and laboring classes--Germany, Western)

ZHUKOV, N. N.

Formation of the snow cover on southern and northern slopes of the Kirghiz Range. Izv. AN Kir. SSR. Ser. est. i tekh. nauk 4 no.1:121-126 '62. (MIRA 15:10)

(Kirghiz Range—Snow)



S/169/62/000/012/058/095
D228/D307

AUTHOR: Apostolatov, G.A. and Zhukov, N.N.

TITLE: Question of the correlation between frontal and intramass thunderstorms on Kirgiziyan territory

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 12, 1962, 55, abstract 12B361 (Izv. AN KirgSSR, Ser. yestestv. i tekhn. n., 4, no. 2, 1962, 95-100 (summary in Kirg.))

TEXT: Frontal thunderstorms cause the most damage to ground objects, which should be considered when choosing electric protection for transmission lines that are being planned or constructed, and other installations. Observational data for 1954, a year characterized by maximum thunderstorm activity on Kirgiziyan territory, are processed statistically and synoptically. Frontal thunderstorms are subdivided into two types: storms associated with the passage of primary cold fronts and those related to passing secondary or occluded fronts. Intramass thunderstorms are also subdivided into two types: storms related genetically to the advection of

Card 1/2

S/169/62/000/012/058/095
D228/D307

Question of the correlation ...

moist unstable air at a height of 3-5 km and local storms resulting from specific conditions in a given area. The frequency of each type of thunderstorm in the months from April to November, 1954, is given for 7 points in Kazakhstan. Most thunderstorms originate at fronts; more often at secondary, and not at primary fronts. On an average for the year intramass thunderstorms constitute 29% of the total number of thunderstorms. Intramass thunderstorms develop most often in the foothills of the Ferganskiy Range (40%) and in the Issyk-Kul'skaya Basin and the Keminskaya Valley (36%). In the Talasskaya and Chuyskaya Valleys, and also in Central Tyan'-Shan', there are few intramass thunderstorms (20-24%). The number of local thunderstorms does not exceed 11%. Maps of the distribution of the average number of days with thunderstorms, the average annual duration of thunderstorms are given, as are maps illustrating specific examples of synoptic conditions, characteristic of each of the four types of thunderstorm. 3 references.
[Abstracter's note: Complete translation]

Card 2/2

GETSOV, L.B.; ZHUKOV, N.P.

Heat-resistant foundry alloys. Lit.proizv. no.11:9-11 N '62.
(MIRA 15:12)

(Heat-resistant alloys) (Foundries—Equipment and supplies)

LOMIZE, G.M.; GUTKIN, A.M.; ZHUKOV, N.V.

Study of the rheological properties of plastic clays. Ozn., fund i mekh grun. 5 no.2:1-4 '63. (MIRA 16:3)
(Clay--Testing)

LOMIZE, G.M.; GUTKIN, A.M.; ~~ZHUKOV, N.V.~~

Measurement of the conditionally instantaneous modulus of elasticity in tenacious soils. Inzh.-fiz. zhur. 5 no.6:61-66 Je '62. (MIRA 15:12)

1. Energeticheskiy institut, Moskva.
(Elasticity)
(Soil research)

SUBBOTIN, S.V., kand.tekhn.nauk; ZHUKOV, N.V., inzh.

New method of testing the tensile strength of concrete. Transp. stroi. 9 no.2:52-54 F '59. (MIRA 12:5)
(Concrete--Testing)

AUTHOR: Zhukov, N.V. SOV/136-58-9-13/21

TITLE: Method of Producing 2 1/2" Grooves with a Pass of 36 x 16 Rectangular Form (Tekhnologiya izgotovleniya kalibrov 2-1/2" s ruch'yem pryamougol'noy formy 36 x 16)

PERIODICAL: Tsvetnyye Metally. 1958, Nr 9, p 71 (USSR)

ABSTRACT: The machining of roll passes with the aid of a special device (figure) is very briefly described. There is 1 figure.

1. Rolling mills--Equipment 2. Rolling mills--Performance
3. Metals--Processing

Card 1/1

ZHUKOV, N.T.

New developments in working the soil. Est.v shkole no.6:9-15 N-D '54.
(MLRA 7:12)

1. Glavnyy agronom Komsomol'skoy MTS Chashinskogo rayona Kurganskoy oblasti.
(Tillage)

ZHUKOV, N.T.

According to T.S.Mal'tsev's method. Nauka i zhizn' 21 no.11: 36-37 N '54. (MLRA 7:12)

1. Glavnyy agronom Komsomol'skoy MTS, Chashinskogo rayona, Kurganskoy oblasti.
(Mal'tsev, Terentii Semenovich) (Tillage)

BAYEV, N.V.; BOBROV, Ye.G.; DEMIDOV, G.A.; DENISOV, A.D.; ZHUKOV, N.Ya.; LELEKOV, Yu.S.; POZDNYAKOV, I.M.; POLKOVNIKOV, B.M.; TRIBURT, I.I.; TYURIKOV, A.A.; SHESTAKOV, A.I., inzh.; PESKOVA, L.N., red.; KHITROVA, N.A., tekhn. red.

[Advanced technology on railroads] Peredovaia tekhnologiia na zheleznoi doroge. Moskva, Vses. izdatel'sko-poligr. ob"edinenie M-va putei soobshcheniia, 1961. 84 p. (MIRA 14:12)
(Railroads)

ZHUKOV,N.V., inzh.

Determining the area of the compressed part of the cross section of the supports of bridges according to the given position of the center of gravity. Transp. stroi. 13 no.1:62 Ja '63 (MIRA 18:2)

ZHUKOV, O., inzh.; FEDOROV, O., ekonomist

Construction elements and details for prefabricated apartment houses. Proek. i bud. 1 no.1:30-33 O '59. (MIRA 13:12)
(Apartment houses) (Precast concrete construction)

ZHUKOV, O.D.

[Chain algorithm in a system of residual classes] TSepnoi algoritm v sisteme ostatochnykh klassov [By] O.D.Zhukov-Emel'ianov. Moskva, Akad. nauk SSSR, 1965. 21 p. (MIRA 19:1)

ZHUKOV, O. I.

We are repairing tractors without the help of collective farm mechanizers. Mekh. sil'. hosp. 14 no.1:11-13 Ja '63.
(MIRA 16:4)

1. Glavnyy inzh. Verkhne-Teplovskogo rayonnogo otdeleniya "Sil'gosptekhniki" Luganskoy oblasti.

(Ukraine—Tractors—Maintenance and repair)

ZHUKOV, O.K.

Piezoelectric effect in ferroelectric ceramics under hydrostatic pressure. Izv.vys.ucheb.zav.; fiz. no. 2:66-68 '64. (MIRA 17:6)

1. Voronezhskiy gosudarstvennyy universitet.

L 36512-66 EWP(e)/EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/WH

ACC NR: AP6013467 SOURCE CODE: UR/0139/66/000/002/0151/0153

AUTHOR: Zhukov, O. K.; Milovidova, S. D.

ORG: Voronezh State University (Voronezhskiy gosuniversitet)

TITLE: On temperature self-stabilization of ferroelectric ceramic of the barium titanate - tin dioxide system

SOURCE: IVUZ. Fizika, no. 2, 1966, 151-153

TOPIC TAGS: barium titanate, tin containing alloy, ferroelectric property, ceramic dielectric, thermal stability, Curie point, temperature dependence, dielectric loss

ABSTRACT: The authors investigated the self-stabilization of a ferroelectric ceramic by heating it with an external electric alternating field to a temperature slightly higher than the maximum of its dielectric loss at a constant ambient temperature. When so heated, a change in the ambient temperature has a minimum influence on the properties of the ferroelectric. Three batches of $BaTiO_3$-SnO_2 were tested, with Curie temperatures 92.6, 87.5, and 78.5C. The temperature dependence of the dielectric loss was measured for each of these batches with a capacitive bridge. The heating was at 20 kcs from a sound generator. The ambient temperature was maintained constant accurate to 0.1C. The temperature dependence curves of the three batches showed a reasonably flat character in the range from 10 to 60C, the stabilization being better in the lower part of the range. The tests have thus demonstrated the self-stabilization property of $BaTiO_3$-SnO_2 ceramics. Orig. art. has: 3 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 19Apr65/ ORIG REF: 002/ OTH REF: 001

Card 1/1 mlp

ACCESSION NR: AP4036559 S/0139/64/000/002/0066/0068

AUTHOR: Zhukov, O. K.

TITLE: The problem of ferroelectric ceramic piezoeffect under hydrostatic pressure

SOURCE: IVUZ. Fizika, no. 2, 1964, 66-68

TOPIC TAGS: hydrostatic pressure, ferroelectric ceramic, piezoeffect, galvanometer, charge generation, galvanometer M21 2

ABSTRACT: The piezoeffect on ferroelectric ceramic composed of an isomorphic mixture of barium titanate and lead titanate under hydrostatic pressure has been investigated. A special chamber capable of withstanding 150 atm pressure was used for 5 to 8 mm cubic specimens. A $\rho = 10^{14}$ ohm-cm transformer oil was used as the compressing liquid. Charge measurements were made on M21/2 ballistic galvanometers. The piezomodulus under hydrostatic pressure was calculated from the expression $d = 3.9 \times 10^{-1} n/pS \times 10^{6}$, where n - galvanometer deflection, S - area of cubic specimen, p - pressure in kg/cm^2. The results showed that charge generation is directly proportional to the pressure, and hence, (within the experimental error), d has a constant magnitude for each concentration. For 2% $PbTiO_3$ by

Card 1/2

ACCESSION NR: AP4036559

weight, d = 0.41 x 10^{-6}, and for 10%, d = 0.26 x 10^{-6}. Orig. art. has: 8 equations and 1 table.

ASSOCIATION: Voronezhskiy gosuniversitet (Voronezh State University)

SUBMITTED: 30Jan63 DATE ACQ: 05Jun64 ENCL: 00

SUB CODE: SS NO REF SOV: 001 OTHER: 002

Card 2/2

ZHUKOV, O. K., Cand Phys-Math Sci -- (diss) "Research on the Piezoelectric Properties of Barium Tiatanate with Isomorphic Inclusions of Lead Titanate and Strontiun Titanate." Voronezh, Voronezh University Press, 1960, 8 pp (Ministry of Higher and Secondary Specialist Education RSFSR; Voronezh State Univ) 150 copies, no price given (KL, 21-60, 117)

ZHUKOV, O.K.

Dependence of the potential difference of barium titanate-based piezoelectric elements on mechanical loading. Izv.vys.uch.zav.; fiz. no.4:176-177 '62. (MIRA 15:9)

1. Voronezhskiy gosudarstvennyy universitet.
(Piezoelectricity) (Barium titanate)
(Dielectric constants)

24.2800

S/058/62/000/006/080/136
A061/A101

AUTHOR: Zhukov, O. K.

TITLE: The effect of isomorphous impurities on the piezoelectric coefficients of barium titanate.

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 25 - 26, abstract 6E216 ("Tr. Voronezhsk. un-ta", 1961, v. 55, 25 - 27)

TEXT: A table of the piezoelectric coefficients d, g, f, e for isomorphous $(Ba, Pb)TiO_3$ and $(Ba, Sr)TiO_3$ mixtures containing impurities from 0 to 17 per cent by weight is presented. It is noted that, regardless of the decrease of the piezoelectric modulus d, the use of $BaTiO_3$ piezoelectric ceramics with $PbTiO_3$ admixtures can be technically advantageous owing to the fact that the coefficients g and f remain practically invariable for all compositions of $(Ba, Pb)TiO_3$, whereas the tetragonal ferroelectric region grows with Pb content increase.

[Abstracter's note: Complete translation]

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ZHukov, O.N.

21(8) PHASE I BOOK EXPLOITATION SOV/1764

Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya po primeneniyu radioaktivnykh i stabil'nykh izotopov i izlucheniy v narodnom khozyaystve i nauke Moscow, 1957.

Trudy... Mashinostroyeniye i priborostroyeniye (Transactions of the All-Union Conference on the Use of Radioactive and Stable Isotopes and Radiation in the National Economy and Science; Machine and Instrument Manufacturing) Moscow, Izd-vo AN SSSR, 1958. 358 p. 4,500 copies printed.

Sponsoring Agencies: USSR. Glavnoye upravleniye po ispol'zovaniyu atomnoy energii, and Akademiya nauk SSSR.

Editorial Board of Set: V.I. Dikushin, Academicain (Resp. Ed.), N.N. Shumilovskiy (Deputy Resp. Ed.), Yu. S. Zaslavskiy (Deputy Resp. Ed.), L.K. Tatochenko, B.I. Verkhovskiy, S.T. Nazarov, L.I. Petrenko, and N.G. Zelevinskaya (Secretary).

Ed. of Publishing House: P.M. Belyanin; Tech. Ed.: T.P. Polenova.

PURPOSE: This book is intended for specialists in the field of machine and instrument manufacture who use radioactive isotopes in the study of materials and processes.

COVERAGE: This collection of papers covers a very wide field of the utilization of tracer methods in industrial research and control techniques. The topic of this volume is the use of radioisotopes in the machine-and instrument-manufacturing industry. The individual papers discuss the applications of radioisotope techniques in the study of metals and alloys, problems of friction and lubrication, metal cutting, engine performance, and defects in metals. Several papers are devoted to the use of radioisotopes in the automation of industrial processes, recording and measuring devices, quality control, flowmeters, level gauges, safety devices, radiation counters, etc. These papers represent contributions of various Soviet institutes and laboratories. They were published as Transactions of the All-Union Conference on the Use of Radioactive and Stable Isotopes and Radiation in the National Economy and Science, April 4-12, 1957. No personalities are mentioned. References are given at the end of most of the papers.

Fakidov, I.G., and A.Ye. Buzynov (Institut fiziki Ural'skogo filiala AN SSSR — Institute of Physics, Ural Branch, Academy of Sciences, USSR). Defectoscopy of Very Thick Steel Products 334

Grigor'yev, K.N., and I.G. Fakidov (Uralvagonzavod i Institut fiziki metallov Ural'skogo filiala Akademii nauk SSSR — Uralvagonzavod and the Institute of the Physics of Metals, Ural Branch, Academy of Sciences, USSR). Characteristics of Gamma Control and Stereoscopic Technique for Complex Weldments 339

Grazhdankina, N.P., and I. G. Fakidov (Institut fiziki metallov Ural'skogo filiala AN SSSR — Institute of the Physics of Metals, Ural Branch, Academy of Sciences, USSR). Study of the Blurring of Images of Defects During the Co^{60} Gamma Radioscopy of Steel 342

Zhukov, O.N. (Ministerstvo sudostroitel'noy promyshlennosti SSSR — Ministry of the Shipbuilding Industry, USSR). Use of Soft-radiation Isotopes for the Control of Welding in Shipbuilding 348

Birshteyn, V.O. (Rizhskiy sudoremontnyy zavod — Riga Repair Docks). Use of the Ir^{192} Isotope at the Riga Repair Docks 352

AVAILABLE: Library of Congress

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L 7857-66 EWT(1)/EWP(e)/EPA(s)-2/EWT(m)/EWP(w)/EWP(t)/EPA(w)-2/T/EWP(t)/EWP(b

ACC NR: AP5028130 EWA(h) IJP(c) JD/ SOURCE CODE: UR/0048/65/029/011/2101/2103
GG/WH

AUTHOR: Zhukov, O.K.; Milovidova, S.D.; Chirkin, A.N.

ORG: Voronezh State University (Voronezhskiy gosudarstvennyy universitet)

TITLE: Concerning temperature autostabilization of ferroelectric ceramics [Report, Fourth All-Union Conference on Ferro-electricity held at Rostov-on-the Don 12-16 September 1964]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 11, 1965, 2101-2103

TOPIC TAGS: ferroelectric material, ceramic material, solid solution, barium titanate, strontium titanate, Curie point, dielectric constant, dielectric loss, heating, temperature stabilization

ABSTRACT: The temperature stabilization of ferroelectric materials by dielectric heating at a temperature slightly above that at which the dielectric loss is maximum, first observed by L.A.Shuvalov (Izv. AN SSSR. Ser. fiz. 24, No. 11, 1416 1960)) in triglycine sulfate, was investigated in a series of ceramic solid solutions of barium and strontium titanates. Ceramic specimens containing 10, 15 and 20 % by weight $SrTiO_3$ and having Curie points of 87, 67, and 47°C, respectively, in the form of 5 mm diameter, 2 mm thick disks with small central recesses to receive thermocouple junctions for temperature measurement were provided with fired on silver electrodes. The dielectric constants were measured at 15 kilocycle/sec with a bridge; the imaginary

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parts of the dielectric constants showed sharp maxima at temperatures 4-5° below the respective Curie points. The specimens were dielectrically heated with a 200 W, 15 kilocycle/sec audio oscillator while there temperatures were measured to 0.01° with a thermostat. Optimum stabilization was obtained at a temperature 1-2° above that at which the dielectric loss was maximum (3-4° below the Curie point). A stabilization factor dT/dt (T is the ambient temperature and t is the specimen temperature) of 5 was achieved with the highest Curie point material over the range $20° < T < 80°C$, and factors 3 with the other two materials. The stabilization factor was always greatest at the lower ambient temperatures. It is concluded that not only triglycine sulfate single crystals, but also barium titanate base ceramics can be temperature stabilized near the Curie point by dielectric heating, and it is suggested that similar experiments be performed with other ferroelectric ceramics.[15] The authors thank: I.S.Zheludev and L.A.Shuvalov for their interest in the work and for valuable remarks. Orig. art. has: 2 figures and 1 table.

SUB CODE: SS, EM, TD SUBM.DATE: 00/ ORIG. REF: 002 OTH.REF: 001

Card 2/2

BRUK, Boris Il'ich; PETROV, G.L., dotsent, retsenzent; ZHUKOV, O.N., nauchnyy red.; NIKITINA, R.D., red.; SHISHKOVA, L.M., tekhn.red.

[Use of radioactive isotopes in welding metallurgy and metallography] Radioaktivnye izotopy v metallurgii i metallovedenii svarki. Leningrad, Gos.soiuznoe izd-vo sudostroit.promyshl., 1959. 231 p. (MIRA 12:6)
(Radioisotopes--Industrial applications)
(Electric welding) (Metallography)

ZHUKOV, O.S.

Results of studying the fertility of common cherry sweet-cherry hybrids. Biul. nauch. inform. TSGL no.7/8:77-82 '59.
(MIRA 13:1)

(Cherry breeding)

ZHUKOV, O.S.

Genetic characteristics of sour cherry and sweet cherry hybrids. (MIRA 15:10)
Trudy TSGL 7:72-81 '61.
(Cherry breeding)

ZHUKOV, O.S., nauchnyy sotrudnik

Methods of cytological investigation of fruit trees and berry plants. Trudy TSGL 7:118-139 '61. (MIRA 15:10)
(Plant cells and tissues) (Fruit culture--Research)
(Microscopy--Technique)

ZHUKOV, O.S.

Effect of gibberellin on flowering and fruiting in the garden strawberry. Bot. zhur. 46 no.10:1491-1496 O '61. (MIRA 14:9)

1. TSentral'naya geneticheskaya laboratoriya imeni I.V.Michurina, Michurinsk.

(Strawberries) (Gibberellins)

ZHUKOV, O.S.

Experimental production of a fasciated shoot in a remote hybrid of sour cherry. Bot. zhur. 48 no.11:1678-1680 N '63.
(MIRA 17:4)

1. TSentral'naya geneticheskaya laboratoriya imeni Michurina, Michurinsk.

LEZIN, Yu.S.; ZHUKOV, O.V., inzh.

Integral noise distribution function at the output of a quadratic exponential-weight storage device. Trudy GPI 18 no.2:42-45 '62. (MIRA 17:8)

ZHUKOV, O.V.

Geological conditions governing the formation of coal measures in the northern part of the Chelyabinsk Basin. Trudy Sver. gor. inst. no.43:75-86 '63. (MIRA 18:7)

ZHUKOV, O.V.

Conditions governing the accumulation of coal-bearing sediments in the northern part of the Chelyabinsk Basin. Izv.vys.ucheb.zav.; geol. i razv. 6 no.11:35-46 N '63.

(MIRA 18:2)

1. Sverdlovskiy gornyy institut im. V.V.Vakhrusheva.

GLEBOVICH, G.V.; ZHUKOV, O.V.

Distortions of nanosecond pulses transmitted by cable. Prib. i tekh. eksp. 9 no.1:102-105 Ja-F '64. (MIRA 17:4)

1. Gor'kovskiy politekhnicheskiy institut.

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Outlook for coal in Mesozoic sediments in the strip between the Bulanash-Yelkinskoye deposit and the Sugoyak region in the Chelyabinsk Basin. Izv.vys.uchsb.zav.;geol.i razv. 4 no.10:102-109 O '61. (MIRA 14:12)

1. Sverdlovskiy gornyy institut imeni V.V. Vakhrusheva.
(Chelyabinsk Basin--Coal geology)

ZHUKOV, P., shofer

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1. Rizhskiy avtobusnyy park.

ZHUKOV, P.

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(MIRA 17:1)

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1. ZHUKHOV, P.

2. USSR (600)

4. Reclamation of Land-Bibliography

7. "Reclamation of sands of deserts and semideserts by agriculture and forestry in the U. S. S. R.; bibliography of the literature in Russian, 1768-1950." M. P. Petrov. Reviewed by P. Zhukhov. Les.khoz. 5 no. 11, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953, Unclassified.

BAKHVALOV, I., direktor; STEPANOV, V., zaveduyushchiy partkabinetom; KYUZIN, S., frezerovshchik-rastochnik; KSENOKRATOV, V., inzhener; KOZHEVNIKOVA, M., nachal'nik tokarno-otdelochnogo otdeleniya, laureat Stalinskoy premii; UL'YANOV, M., predsedatel' tsekhkoma sborochnogo tsekha; NAUMOV, A., brigadir komsomol'sko-molodezhnoy brigady; DUDKIN, I., dotsent, direktor; ZHUKOV, P., tokar'.

[In a progressive plant; accounts of workers and technical engineering workers of the Moscow Order of the Red Banner of Labor Second State Bearing Plant] Na peredovom zavode; rasskazy rabochikh i inzhenerno-tekhnicheskikh rabotnikov Moskovskogo ordena Trudovogo Krasnogo Znameni 2-go Gosudarstvennogo podshipnikovogo zavoda. [Moskva] Profizdat, 1952. 94 p. (MLRA 6:5)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni vtoroy Gosudarstvennyy podshipnikovyy zavod. 2. Vecherniy mashinostroitel'nyy institut (for Dudkin).
(Efficiency, Industrial)

ZHUKOV, P.

Assistance of contiguous institutes is needed. NTO no.11:62 N '59. (MIRA 13:4)

1. Glavnyy konstruktor proyekta instituta Karagandagiproshakht. (Mining research)

SERB, Petr Fedorovich; GOLUBEVA, K.A., inzh., retsenzent; MASLIY, K.Ya., zuborez, retsenzent; ZHUKOV, P.A., kand.ekon.nauk, red.; BELYAKOV, M.N., red.; MAGNITSKIY, A.V., red.; ROZENBERG, I.A., kand.ekon.nauk, red.; SMIRNITSKIY, Ye.K., kand.ekon.nauk, red.; SUSTAVOV, M.I., inzh., red.; DUGINA, N.A., tekhn.red.

[Organizational and technical plan in the workshop] Orgtekhplan na rabochem meste. Moskva, Mashgiz, 1960. 30 p. (Seriia "Osnovy konkretnoi ekonomiki," no.5). (MIRA 14:4)
(Sverdlovsk--Machinery industry)

VLASOVA, Antonina Aleksandrovna; DRUGALEVA, Zinaida Samuilovna; ZHUKOVA, Larisa Mikhaylovna; GOLUBEVA, K.A., inzh., retsenzent; MASLIY, K.Ya., zuborez, retsenzent; ZHUKOV, P.A., kand. ekon.nauk, red.; SERAFIMOVICH, B.V., red. vypuska; BELYAKOV, M.N., red.; ROZENBERG, I.A., kand.ekon.nauk, red.; SHIRNITSKIY, Ye.K., kand.ekon.nauk, red.; SUSTAVOV, M.I., inzh., red.; DUGINA, N.A., tekhn.red.

[How to increase labor productivity] Kak povysit' proizvoditel'nost' truda. Moskva, Mashgiz, 1960. 37 p. (Biblioteka rabochego mashinostroitelia: Seriia "Osnovy konkretnoi ekonomiki," no.6) (MIRA 14:5)

(Machinery industry--Labor productivity)

ZHUKOV, P. A.

PHASE I BOOK EXPLOITATION 772

Ganshtak, Vladimir Iosifovich, and Zhukov, Pavel Aleksandrovich

Spetsializatsiya i kooperirovaniye v promyshlennosti; na primere promyshlennosti Sverdlovskoy oblasti (Specialization and Cooperation in Industry; Examples From the Industry of Sverdlovsk Oblast) Moscow, Gospolitizdat, 1957. 152 p. 20,000 copies printed.

Ed.: Tyagay, Ye.; Tech. Ed.: Troyanovskaya, N.

PURPOSE: This book is intended for the general reader interested in the extent and significarce of industrial specialization and cooperation in the Soviet Union and in Sverdlovsk Oblast in particular.

COVERAGE: The book briefly reviews some of the more serious cases where the lack of specialization in various manufacturing

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establishments and inadequate cooperation between plants and industries significantly retarded economic progress. Numerous cases cited by the authors have been taken from the industrial experience of the Soviet Union and from the experiences of industrial establishments located in Sverdlovsk Oblast. According to the authors, at one time there were more than 3,000 plants engaged in metal-working, mechanical maintenance, and the manufacture of machinery, which were administered by other than manufacturing ministries and departments. These plants possessed more than 50 percent of all Soviet metal-cutting machine tools and about 60 percent of all press-forging equipment, but they turned out less than 30 percent of the total volume of machinery produced in the USSR. These plants produced a variety of machines and mechanisms, but low output levels prevented any degree of specialization. The Ministry of Agriculture alone produced about 10 percent of the total machine tools and 24 percent of the press-forging equipment manufactured in the USSR.

Specialization and Cooperation in Industry (Cont.) 772

Because of inadequate specialization and cooperation the plants of this ministry were turning out substandard machine tools, often of old design, whose production costs remained quite high. There are no references.

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AVAILABLE: Library of Congress (HD70.R9G3)

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[Labor organization in a workshop] Organizatsiia truda na rabochem meste. Moskva, Mashgiz, 1960. 46 p. (Biblioteka rabochego mashinostroitelia: Seriia "Osnovy konkretnoi ekonomiki," no.4) (MIRA 14:5)
(Machinery industry--Labor productivity)

SMIRNITSKIY, Yevgeniy Konstantinovich; GOLUBEVA, K.A., inzh., retsenzent; MASLIY, K.Ya., zuborez, retsenzent; ZHUKOV, P.A., kand. ekon.nauk, red.; SITNIKOV, M.A., red. vypuska; BELYAKOV, M.N., red.; ROZENBERG, I.A., kand.ekon.nauk, red.; SMIRNITSKIY, Ye. K., kand.ekon.nauk, red.; SUSTAVOV, M.I., inzh., red; DUGINA, N.A., tekhn.red.

[Machinery-industry worker and technological innovations] Rabochii-mashinostroitel' i tekhnicheskii progress. Moskva, Mashgiz, 1960. 49 p. (Biblioteka rabochego mashinostroitelia. Seriia: "Osnovy konkretnoi ekonomiki," no.1) (MIRA 14:5)
(Machinery industry--Technological innovations)

GLADIL'SHCHIKOV, Yevgeniy Ivanovich; GOLUBEVA, K.A., inzh., retsenzent; MASLIY, K.Ya., zuborez, retsenzent; SHIROKOV, N.P., red. vypuska; BELYAKOV, M.N., red.; GERKEN, I.V., dotsent, red.; ZHUKOV, P.A., kand. ekon. nauk, red.; ROZENBERG, I.A., kand. ekon. nauk, red.; SMIRNITSKIY, Ye.K., kand. ekon. nauk, red.; SUSTAVOV, M.I., inzh., red.; DUGINA, P.A., tekhn. red.

[Let's economize on electric power] Berech' elektroenergiiu. Moskva, Mashgiz, 1960. 43 p. (Biblioteka rabochego mashinostroitelia: Seriia "Osnovy konkretnoi ekonomiki," no.10) (MIRA 14:9)
(Electric power)

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Public office for economic analysis. Vest. mashinostr. 43 no.10: 71-74 O '63. (MIRA 16:11)

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[Special course of lectures on the calculation of heat and mass transfer in the processes of drying and combustion; for the students of the Faculty of Heat Engineering] Spetsial'nyi kurs lektsii po raschetu teplo- i massoobmena v protsessakh sushki i goreniia; dlia studentov teplo-energeticheskogo fakul'teta. Leningrad, Leningr. tekhnologicheskii in-t tsellyulozno-bumazhnoi promyshl., 1963. 92 p. (MIRA 17:10)

VERSHININ, A.M.; GANSHTAK, V.I.; ZHUKOV, P.A., prof.; KONOVALOV, V.N.; MASLICH, G.Ye.; RADUKIN, V.P.; ROZENBERG, I.A.; SMIRNITSKIY, Ye.K.; PRUDENSKIY, G.A., retsenzent; NEYMARK, A.I., doktor tekhn. nauk, prof., retsenzent; BEZUKLADNIKOV, M.A., inzh., ved. red.; DUGINA, N.A., tekhn. red.

[Economics of machinery manufacturing; the organization and planning of enterprises] Ekonomika mashinostroeniia, organizatsiia i planirovanie predpriiatii. [By] A.M. Vershinin i dr. Moskva, Mashgiz, 1963. 504 p. (MIRA 16:9)
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(Machinery industry--Finance) (Sverdlovsk--Railroads--Cars)

GOLIKOV, Aleksandr Arsen'yevich; POTEKUSHIN, Nikolay Vasil'yevich; GOLUBEVA, K.A., inzh., retsenzent; MASLIY, K.Ya., zuborez, retsenzent; ZHUKOV, P.A., kand.ekon.nauk, red.; VOLOSATOV, A.Ya., red. vypuska; BELYAKOV, M.N., red.; KON'KOV, A.S., inzh., red.; ROZENBERG, I.A., kand.ekon.nauk, red.; SMIRNITSKIY, Ye.K., kand.ekon.nauk, red.; SUSTAVOV, M.I., inzh. red.; DUGINA, N.A., tekhn.red.

[How to save metals] Kak luchshe ekonomit' metall. Moskva, Mashgiz, 1960. 40 p. (Biblioteka rabochego mashinostroitelia. Seriia: "Osnovy konkretnoi ekonomiki," no.9) (MIRA 14:5)
(Metalwork) (Metals, Substitutes for)

ZHUKOV, Pavel Aleksandrovich; Prinimal uchastiye SMIRNITSKIY, Ye.K., kand.ekon.nauk, SHABASHOV, A.P., kand.tekhn.nauk, retsenzent; PETUKHOV, P.Z., doktor tekhn.nauk, red.; MARCHENKOV, I.A., tekhred.

[Development of the excavator industry in the U.S.S.R.] Razvitie ekskavatorostroeniia v SSSR. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1960. 92 p.
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[Specialization and cooperation in industry; examples taken from the industry of Sverdlovsk Province] Spetsializatsiia i kooperirovanie v promyshlennosti (na primere promyshlennosti Sverdlovskoi oblasti). Moskva, Gos. izd-vo polit. lit-ry, 1957. 151 p.
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DLC: HD9705.R9225

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(48-25158)

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ZHUKOV, PAVEL ALEKSANDROVICH

GANSHTAK, Vladimir Iosifovich; ZHUKOV, Pavel Aleksandrovich; TYAGAY, Ye., redaktor; TROYANOVSKAYA, M., tekhnicheskiy redaktor

[Specialization and cooperation in industry; based on the example of industry in Sverdlovsk Province] Spetsializatsiia i kooperirovanie v promyshlennosti; na primere promyshlennosti Sverdlovskoi oblasti. Moskva, Gos.izd-vo polit. lit-ry, 1957. 151 p. (MIRA 10:9)
(Sverdlovsk Province--Industries)

ZHUKOV, P.A.

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