

PUZYREV, A.V.; ODINOKOV, I.V.; OSMOLOVSKAYA, T.; KOBELYAKOV, L.M.,
red.

[Air conditioning in textile factories] Konditsirovanie
vozdukha na tekstil'nykh predpriatiakh. Ivanovo, 1961.
22 p. (MIKA 17:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut okhrany
truda.

PHASE I BOOK EXPLANATIONS 501/5600

Yadernaya geofizika; sbornik stat'yi po ispol'sovaniyu radioaktivnykh izotopov i izotopov y geologii i geofiziki (Nuclear Geophysics; Collection of Scientific Papers on the Use of Radioactive Isotopes and Isotopes in Geology and Geophysics). Moscow, Gosgeotekhnizdat, 1959. 370 p. State slip inserted. 4,000 copies printed.

Ed.: V. A. Alshcheyev, Professor, Doctor of Geological and Mineralogical Sciences; Exec. Ed.: A. P. Kobastarov; Tech. Ed.: A. S. Polosina.

PURPOSE: This book is intended for petroleum geologists, geophysicists and scientists engaged in geological research who are interested in radioisotopic techniques of petroleum prospecting.

COVERAGE: The collection contains 28 articles compiled by staff members and associates of the Laboratory for Petrology, Geology and Geophysics of the Petroleum Institute of the USSR, the Laboratory for Mineral Fuel Processing) of the Academy of Sciences USSR, the Laboratory for Radioactive Logging of the All-Union Scientific Research Institute of Geophysics, and the heads of counsils for planning research projects for petroleum enterprises. The articles treat new material on radiometric surveying in petroleum geology, describe radioisotopic instruments (counters, etc.) for registering neutrons and gamma rays, give the results of research with models of rock strata, introduce fundamentals of a new method for effectively utilizing radioisotopes. Problems of analysis of rock samples from petroleum-bearing strata are treated. Problems of methods in the study and use of geoelectric measurements in boreholes are discussed. The book will be the results of studies in the ammonia-rylon method in tracing the movement of petroleum and water in a stratum. Finally, a new method of surveying based on measuring the radioactivity of the surface of a prospective petroleum deposit is described. No personalities are mentioned. References accompany each article.

Also see: S. M. Mapping Petroleum-Water Surfaces of Contact in Karst-Deposits of Oil Fields by the Method of Induced Radioactivity of Sodium

Bereznev, P. A. Possibility of the Method of Induced Radioactivity for Quantitative Evaluation of the Petrologic Capacity and Other Characteristics of Strata 100

Blankova, I. N. The Effectiveness of the Methods of Induced Radioactivity of Sodium and Chlorine to Compute the Oil- and Water-bearing Capacity of Devonian Sandstones 103

Burov, B. K., G. E. Derjov, V. Ya. Denisik, B. P. Olsinshov, and V. G. Shchegolev. Radiation Spectrometry of Sediment Samples by the Gamma-Ray Method (RSM) of Evaluation of the Ability of Sand and Carbonate Collectors 121

Alshcheyev, V. A., S. A. Denisik, V. E. Kuller, and V. P. Olsinshov. The Use of Gamma-Ray Spectrometry to Investigate Core Samples 134

Guberman, S. A. Gamma-Ray Spectrometry of Natural and Artificial Radioactive Isotopes Under More Sole Conditions 146

Olsinshov, V. P., S. A. Denisik, and Ya. S. Shcherbatskikh. Determination of the Radioactivity of Sediment Samples by the Gamma-Ray Method (RSM) and the Neutron Method Based on Thermal Neutrons (SNM-F) 154

Blankov, Ye. B. Separation of the Radiation of Different Elements During the Investigation of Petroleum-Survey Core Samples by the Method of Induced Radioactivity of Sodium and Chlorine 170

Drozdin, I. L., and B. A. Kuznetsov. The Use of Scintillation Counters to Count Slow Neutrons in Petroleum Survey Core Samples 187

Zolotarev, A. V. Distribution of Slow Neutrons in a Homogeneous Medium 199

Gul'ba, Ya. A. Influence of the Conditions of Measuring Upon Evaluating the Porosity of Rock According to Data Obtained by the Neutron Gamma Method 201

Rubtsov, O. V. Development of New Types of Radiometric Apparatus for Use in Petroleum Survey Operations 222

Selez', L. Z. The Problem of Determining the Point of Water-Petroleum Contact Under Conditions of Gased Wells in Carbonate Deposits 231

Levchenko, D. I., and Z. Ye. Gauer. Analysis of Rock Based on Neutron-Induced Activity 239

Alshcheyev, V. A., V. I. Verzhakov, and V. A. Filonov. The Problem of Radium and Uranium Content in Oil-Field Waters 252

Yermakov, V. I., A. I. Lashchinskii, M. O. Oranovskiy, Yu. A. Romanov, and L. M. Sokolov. Results of Investigation of Stratal Gamma Fields in Oil-bearing Regions, Using Aerial and Ground Radiometric Survey Methods 264

ODINOKOV, B. P.

ODINOKOV, A. V. (Engineer)

"Modern Sand Blasting Devices."

report presented at Conference on Construction and Utilization of Casting Equipment,
Gor'kiy, Dec 1957.

Mashinostroitel'. 1958, No. 5, p. 48.

ILLEGIBLE

MAKAROV, N.I.; SKLYAROV, V.Ya.; ALIKPEROVA, Sh.M.; NADZHAROV, A.F.;
DZEBISASHVILI, Yu.I.; MNATSAKANYAN, A.G.; ODINCCHENKO, O.N.;
AZUGAROVA, M.Kh.; ZYUZIN, A.S.

Morbidity from anthrax in animals and humans in Ciscaucasia and
Transcaucasia in 1960-1961: authors' abstract. Zhur. mikrobiol.
epid. i immun. 40 no.5:112-113 My '63. (MIRA 17:6)

1. Iz Nauchno-issledovatel'skogo protivochumnogo instituta
Kavkaza i Zakavkazy, Azerbaydzhanskoy, Armyanskoy, Gruzinskoy,
Severo-Osetinskoy, Checheno-Ingushskoy respublikanskikh sanitarno-
epidemiologicheskikh stantsiy i Azerbaydzhanskoy protivochumnoy
stantsii.

MOSKOVCHENKO, B., inzh.; ODING, R., inzh.
G

Stand for checking and repairing wall panels. Stroitel' no.6:
23 Je '60. (MIRA 13:7)
(Concrete slabs)

MOSKOVCHENKO, B.P., inzh.; ODING, R.G., inzh.

All-purpose unit for stretching reinforcements using
electricity. Biul.tekh.inform.po stroi. 5 no.10:21-22
0 '59. (MIRA 13:3)
(Electric heating) (Prestressed concrete)

L 09380-67

ACC NR: AT6026914

the following structural processes which take place in sequence during the cyclic loading: 1) increase in dislocation density and blocking of mobile dislocations as a result of their reaction with point defects; 2) creation of dislocation clusters of critical density, and 3) formation of fatigue crack sites, as well as the coalescence and deposition of insipient vacancies in the process of fatigue. The variable character of internal friction change is a regular rule for materials which are prone to the first stage of deformation aging during their resting for fatigue at stresses close to the fatigue strength, or slightly below it. Under conditions of cyclic loading the final magnitude of internal friction does not exceed the initial level in spite of defect nucleation during fatigue, although this should occur during explicit fatigue failure. The conclusion in this case is that the accumulating damage is reversible for the most part, and can be eliminated by annealing the mechanical properties restored. The results of a check of this hypothesis will be published in a later work. Orig. art. has: 3 figures.

SUB CODE: 11/SUBM DATE: 02 Apr 66/ORIG REF: 014/OTH REF: 002

Card 2/2 *mla*

L 09380-67 EWP(k)/EWT(d)/EWT(m)/EWP(h)/EWP(l)/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c)

ACC NR: AT6026914 EM/JW/JD/GD

SOURCE CODE: UR/0000/66/000/000/0109/0114

AUTHOR: Oding, I. A. (Deceased) Gordiyenko, L. K. (Candidate of technical sciences);
 Mar'yanovskaya, T. S.

ORG: None

TITLE: Change in internal friction of carbon steel as a result of cyclic loading

SOURCE: AN SSSR. Institut metallurgii. Vnutrenneye treniye v metallakh i splavakh.
 (Internal friction in metals and alloys). Moscow, Izd-vo Nauka, 1966, 109-114

TOPIC TAGS: internal friction, cyclic load, alloy steel, fatigue test, tensile strength, carbon steel

ABSTRACT: Internal friction was used to study the fine structural changes in a given steel and to compile those changes, together with changes in mechanical properties of fatigue. Samples 5 mm in diameter and 100 mm long were cut from a rail steel (0.65% C and 0.77% Mn), which had been fatigue tested at loads accumulating to 100, 200, 300, 400 and 500 million tons, and subjected to internal friction measurements in a vacuum at room temperature and 2,300 cycles on a UIMD-2 unit. Plotted graphs of internal friction measurements show the erratic path of the curves, analysis of which shows that increase in fatigue strength is completed sooner than the increase in tensile strength and yield point. The study also reveals that the nature of the curve of linear change in the level of internal friction, and the behavior of the complex of mechanical properties, allows the establishment of a correlation between

Card 1/2

L 46559-66

ACC NR: AT6012387

of x-ray surface analysis at room temperature give some indication of the "slip" of surface pyramids and prisms. A discussion of the changes occurring in the material fabric in plastic deformation is presented. It is thought that this material is perhaps more sensitive to minute imperfections in chemical content and microstructure than are many others. Electron microscope tests were made on titanium alloy AT-4¹⁶ [4.5% Al, 1.5% (Cr+Fe+Si), 0.01% B, 0.1% C, 0.15% O, 0.05% N, 0.015% H, and the remainder titanium]. The results show that under cyclical loading deformation develops through several mechanisms. These results are diagrammed and described, and compared with the findings of other research. Orig. art. has: 4 figures and 1 table.

SUB CODE: 11/ SUBM DATE: 02Dec65/ ORIG REF: 007/ OTH REF: 004

Card 3/3

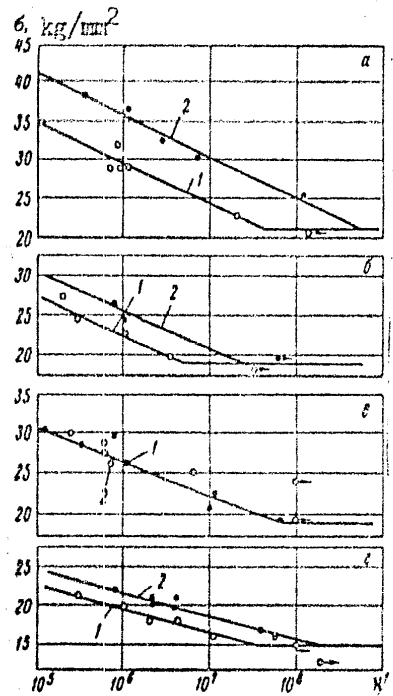
J8

L 46559-66

ACC NR: AT6012387

Fig. 1. Fatigue curves in air (1) and in vacuum (2).

a - alloy AT4, b - titanium IMP-1A,
c - transformer iron, d - steel 10.



Card 2/3

L 45539-66 EMP(m)/EMP(w)/T/EMP(t)/RTI/EMP(L) LJP(a) JD/EM/EM/SD
ACC NR: AT6012387 SOURCE CODE: UR/0000/65/000/000/0167/0172

AUTHORS: Oding, I. A. (deceased); Ivanova, V. S.; Kosyakina, Ye. S.

25
21
311

ORG: none

TITLE: Peculiarities of plastic deformation and failure of titanium at room temperature

SOURCE: Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovykh splavov (New research on titanium alloys); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 167-172

TOPIC TAGS: material testing, fatigue strength, titanium, titanium alloy, plastic deformation, electron microscopy / AT4 alloy, 10 steel, IMP-1A titanium, T-40 titanium

ABSTRACT: Some properties of titanium in construction uses are discussed. Particular attention is given to the effects of surface conditions and stress concentrations. Comparative data on the fatigue resistance both in air and in vacuum are given. An unexpected outcome of these data (see Fig. 1) is that the effect of the air ambient on fatigue strength of titanium is about twice as great as that for iron. It is suggested that the level of chemical activity between titanium and oxygen in the air increases in conditions of cyclical loading. The plastic deformation behavior of titanium under both cyclical and static loads is also noted. The results

Card 1/3

L 42313-66

ACC NR: AP6019831

with a diameter of 10 mm and a working length of 100 mm were deformed by a 5% elongation and were annealed at 400, 450, 500, 550, and 600°C for a period of 25 hours, after which they were tested for creep at a temperature of 400°C and a stress of 20 kg/mm². All samples were subjected to a metallographic analysis. Results are shown in a series of curves. Orig. art. has: 5 figures.

SUB CODE 11,13,20/SUBM DATE: 15Jul65/ ORIG REF: 009/ OTH REF: 004

Card 2/2 *llh*

L 42313-66 EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HW

ACC NR: AP6019831 (A) SOURCE CODE: UR/0370/66/000/001/0113/0118

AUTHOR: Oding, I. A. (Deceased; Moscow); Zubarov, P. V. (Moscow) 37

ORG: none 36 B A

TITLE: Nature of metal hardening during mechanical and heat treatment

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1966, 113-118

TOPIC TAGS: metal hardening, mechanical heat treatment, plastic deformation, polygonization development

ABSTRACT: The effect of hardening by mechanical and heat treatment is due to the following structural processes which take place within the volume of the metal: 1) plastic deformation; 2) polygonization; and, 3) reaction of dislocations with atoms of the impurities. The present article describes the application of these processes to a number of metals and alloys. The process of mechanical and heat treatment ends with a relatively small degree of deformation (up to 10%), followed by subsequent (or simultaneous) annealing at temperatures below the recrystallization temperature. The experiments were carried out with Armco iron of the following composition, %: 0.03 carbon; 0.18 silicon; 0.12 manganese; 0.025 sulfur; 0.01 phosphorous; 0.25 copper. Samples

UDC: 669-157.9

Card 1/2

D. 40331-66

ACC NR: AP6014115

nomenclature as per first reference) and the coefficients of intergranular and intragranular stability, and the speed of stress relaxation. Analytical expressions are given for some of these and compared with the experimental values. Orig. art. has: 7 figures, 6 formulas, and 2 tables.

SUB CODE: 11, 2c/

SUBM DATE: 20Apr64/

ORIG REF: 012

Card 3/3

vmb

L 40331-66

ACC NR: AP601115

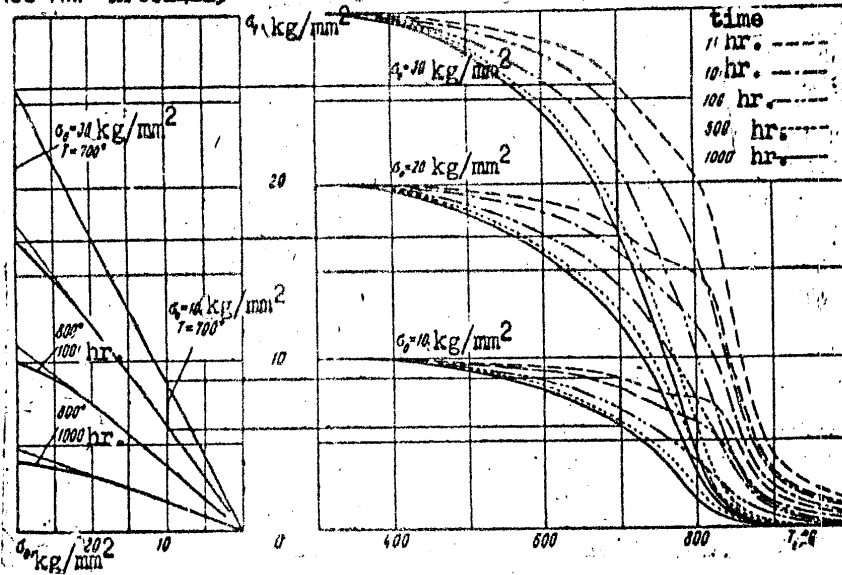


Fig. 1. Stress relaxation as a function of temperature and initial stress for alloy EL437B (generalized curves).

are defined in the first reference above is discussed, and curves of the behavior are presented. These include the "stress resource"

$$R_t^r = \frac{\sigma_t}{\sigma_0} \cdot 100\%$$

L 4002160 FRC(a)/SPR(a)/T/REF(t)/ETI LJP(c) JD
 ACC NR: AP601115 (N) SOURCE CODE: UR/0370/65/000/006/0097/010;

AUTHORS: Oding, I. A. (Deceased) (Moscow); Aleshkin, F. I. (Moscow) 48
 B

ORG: none

TITLE: Several peculiarities of the temperature dependence of stress relaxation /
 criteria for alloy E1437B 16

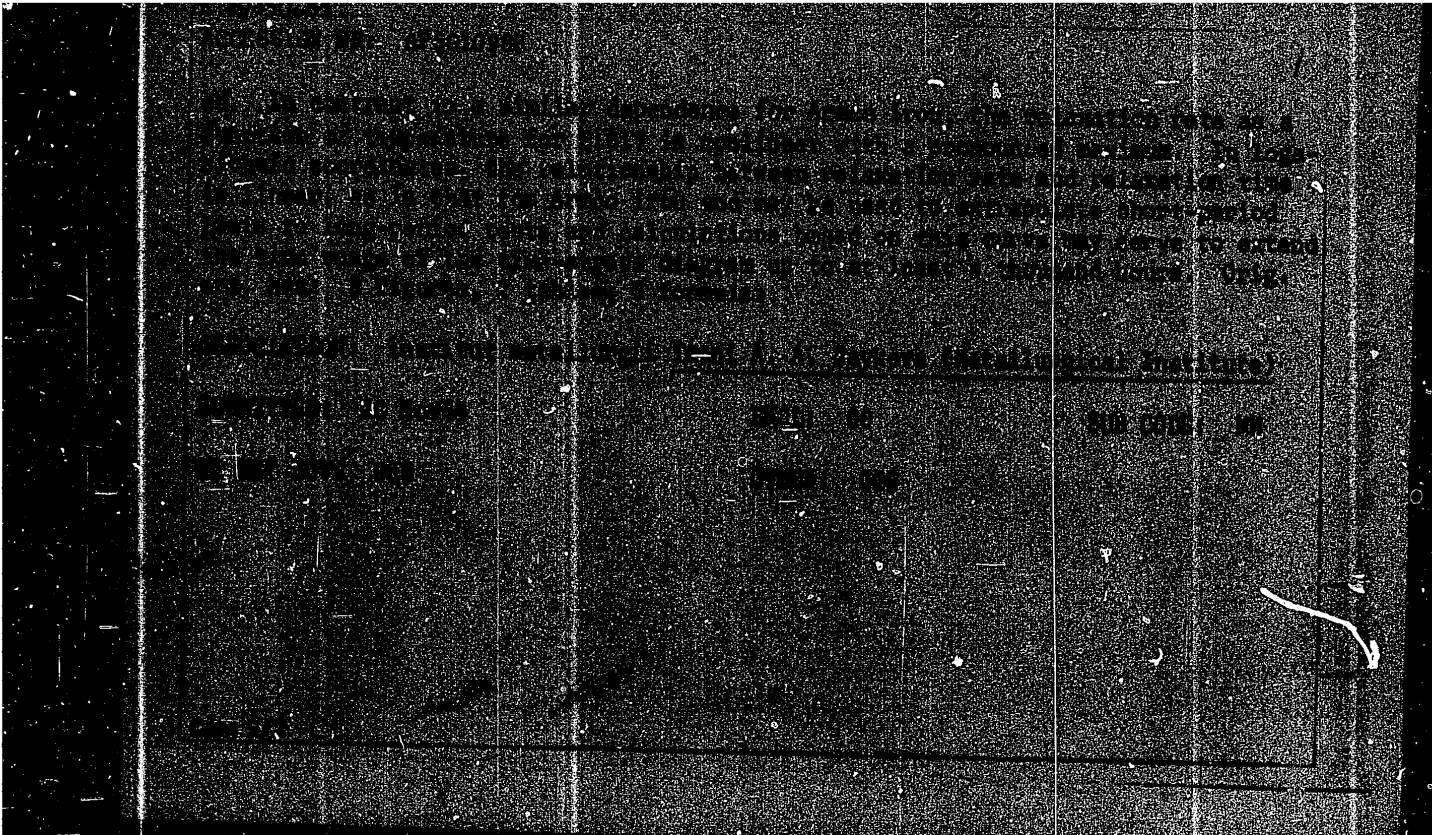
SOURCE: AN SSSR. Izvestiya. Metally, no. 6, 1965, 97-105

TOPIC TAGS: stress relaxation, metal property, relaxation process, steel alloy /
 E1437B steel alloy
 temperature dependence,

ABSTRACT: An investigation of the temperature dependence of stress relaxation criteria for alloy E1437B was performed, and the results were compared with completely analogous work performed previously by the authors for Armco iron (Vliyaniye temperatury na kritarii relaksatsii napryazheniy v metallakh. Izv. AN SSSR, Metallurgiya i gornoye delo, 1963, No. 5, 98--112). Stress relaxation as a function of time 0--1000 hours) was measured over a large temperature range (20--1000C) at 10, 20, and 30 kg/mm² initial stress, using the ring method (Oding, I. A. Issledovaniye relaksatsii i polzuchesti metallov pri pomoshchi kol'tsevogo obraztsa. Tr. TsNIITMASH, 1949, No. 23). Based on this data, the generalized curves for the stress as a function of temperature and initial stress (σ_0) were constructed as shown in Fig. 1. The temperature dependence of several coefficients which

Card 1/3

UDC: 669-157.8



L 2529-66

ACCESSION NR: AP5021499

yield strength $\sigma_{0.2}$, and true tensile strength S_k of vacuum-melted P1 and P2 heats tempered at 550 and 625C were very close to each other, but were somewhat lower than those of P and P3 heats. The vacuum had no clearly defined effect on the elongation and reduction of area, but appreciably improved the notch toughness. The use of a vacuum substantially increased the fatigue strength σ_{-1} of smooth specimens only in the steel tempered at 200C. The fatigue strength increase was 11 or 20 kg/mm² (20 or 37%) for P1 and P2 or P3 heats, respectively. However, in the presence of stress concentrations, the vacuum-melted steel showed no superiority in respect to the fatigue strength $\sigma_{-1\eta}$. All the investigated steels, regardless of the melting method, had the lowest notch sensitivity when tempered at 200C. This indicates that these steels can be used in the low-tempered condition for parts which have structural stress concentrators. It is noted that steels with a tensile strength above 120 kg/mm² do not show the usual horizontal portion of the σ -lg N curve up to 10⁸ cycles. Their σ -lg N dependence is expressed by a straight line whose slope increases with increasing steel strength. Orig. art. has: 6 figures and 3 tables.

(MS)

ASSOCIATION: none
 SUBMITTED: 08Aug64
 NO REF SOV: 005

ENCL: 00
 OTHER: 004

SUB CODE: MM AS
 ATD PRESS: 7/08

Card 2/2

beh

L 2529-66 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) LJP(c) MJW/JD/HW
 ACCESSION NR: AP5021499 UR/0370/65/000/004/0126/0136

539.43

AUTHOR: Guravich, B. Ye. (Moscow); Oding, I. A. (Deceased) (Moscow)

37
 34
 B

TITLE: Fatigue strength of high-strength steel melted by various methods and heat treated under various conditions

SOURCE: AN SSSR. Izvestiya. Metallurgy, no. 4, 1965, 126-136

TOPIC TAGS: high strength steel, superstrength steel, medium alloy steel, chromium containing steel, vacuum melted steel, steel mechanical property, steel fatigue strength /45Kh5GNMV steel, 45Kh5GNMV steel

ABSTRACT: The effect of vacuum arc melting on the tensile and fatigue strengths of 45Kh5GNMV (0.44—0.47% C, 1.00—1.24% Mn, 1.16—1.50% Si, 4.9—5.5% Cr, 1.85—2.15% Ni, 0.48—0.65% Mo, 0.73—0.96% W) and 45Kh5GNMV (0.42% C, 1.23% Mn, 0.07% Si, 5.9% Cr, 2.08% Ni, 0.65% Mo, 1.49% W) high-strength steels has been investigated. The 45Kh5GNMV steel was arc melted (heat P) in an open atmosphere and vacuum remelted (heats P1 and P2); the 45Kh5GNMV was vacuum arc melted (heat P3). After forging, the steels were heat treated to obtain the highest strength after quenching (hardness, $R_c 60$), and tempered at 625, 550, and 200C to obtain a minimum and medium hardness of 30—32, 41—43, and 51—55 R_c kg/cm², respectively. The tensile strength σ_b ,

Card 1/2

ODING, I.A. [deceased]; NIKONOV, A.G.; MAR'YANOVSKAYA, T.S.

Effect of tempering on the critical brittleness temperature of cyclically loaded carbon steel. Dokl. AN SSSR 161 no.3:577-579
Mr '65. (MIRA 18:4)

1. Institut metallurgii im. A.A.Baykova. 2. Chlen-korrespondent AN SSSR (for Oding).

ODING, I.A. [deceased] (Moskva); AIESHKIN, F.I. (Moskva)

Characteristics of the temperature dependence of stress
relaxation criteria in the EI437B alloy. Izv. AN SSSR.
Met. no.6:96-105 N-D '65. (MIRA 19:1)

1. Submitted April 20, 1964.

ILLEGIBLE

ODING, I.A. (Moskva) [deceased]; NIKONOV, A.G. (Moskva); MAR'YANOVSKAYA, T.S.
(Moskva)

Changes of rail metal properties in service conditions. Izv. AN SSSR.
Met. i gor. delo no.5:101-107 S-0 '64. (MIRA 18:1)

1000000
ACCESSION NO. AP4045621
number of the equations. Orig. art. has 9 equations.
ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University)
SUBMITTED: 05AP64 ENCL: 00
SUB CODE: MA, ME NO REF SCW: 001 CT EBR: 000

SOURCE: AN 6824, Doklady, v. 195, no. 2, 1964, 124-130, and in
ENR 1964, p. 328

NOTE: This document contains alloy, Al₂O₃ alloy, Al₂O₃ alloy design,
and for plastic deformation, plastic deformation mechanism, crack
formation mechanism

ABSTRACT: The mechanism of the plastic deformation of the Al₂O₃ alloy
with cyclic loading was studied. The specimens subjected to
cyclic loading, a reaction of dislocations, examination revealed the
complex nature of the deformation mechanism, involving in some grains
and slip in others, because of the presence of numerous obstacles
to the movement of dislocations, secondary phase, interstitial

CONT. 1/2

ACCESSION NO. AP404521

1500-85 0000/0000/0000/0000 0000 0000/00

ACCESSION NO. AP4040610

3/0010/04/158/002/0 28/0330

APPROVAL: [illegible] (Corresponding number AC 0000) 1/000 01, V. 111

TITLE: Investigation of the mechanism of plastic deformation of
a-zinc alloy under cyclic loading

SOURCE: J. Appl. Phys., v. 35, no. 2, 1964, 321-330, and in

ACCESSION NR: AP4044875

analysis is outlined and illustrated by an example. A way of simplifying the method by replacing the variable characteristics of the model by their averaged quantities is indicated, and the equation of the curvature of the neutral axis of the beam is given. The single terms in this equation show the amount of elastic, elastoplastic, and plastic deformation. The authors regret that because of lack of experimental data no conclusion can be made on the feasibility and applicability limits of this method. Orig. art. has: 4 figures and 12 formulas.

ASSOCIATION: none

SUBMITTED: 19Nov63

ATD PRESS: 3090

ENCL: 00

SUB CODE: AS

NO REF SOV: 002

OTHER: 000

Card 2/2

ACCESSION NR: AP4044875

S/0020/64/157/006/1325/1328

AUTHOR: Sorokin, O. V.; Samarin, Yu. P.; Oding, I. A. (Deceased,
Corresponding member AN SSSR)

TITLE: Design for creep of beams under flexure

SOURCE: AN SSSR. Doklady* v. 157, no. 6, 1964, 1325-1328

TOPIC TAGS: creep, beam flexure, beam creep, creep analysis,
bending creep, flexural creep

ABSTRACT: The creep of a beam under pure flexure is analyzed by linearizing the set of equations describing a four-element elasto-viscous model used in investigation of problems associated with deformation of materials at high temperatures. It is assumed that the elastic and viscous characteristics of the model materials are stress- and time-dependent (obtained by creep testing under constant stress) and can be represented by piecewise-constant functions. The initial set of equations is thus converted into a linear one with discontinuous coefficients. The procedure of the creep

Card 1/2

ACCESSION NR: AF4041398

ASSOCIATION: None

SUBMITTED: 10Dec63

SUB CODE: MM

DATE ACQ: 00

NO REF SOV: 005

ENCL: 00

OTHER: 002

Card 2/2

8/0020/64/156/006/1333/1335

ACCESSION NR: AP4041398

AUTHOR: Odling, I. A.

TITLE: Study of the effect of contact friction on energy criteria of cyclic strength and on physical fatigue limit

SOURCE: AN SSSR. Doklady*, v. 156, no. 6, 1964, 1333-1335

TOPIC TAGS: contact friction, cyclic fatigue, cyclic strength, physical fatigue limit, metal strength, alternating bending

ABSTRACT: The destruction of the machine parts at the coupling sites (contact corrosion) is caused by contact friction. The authors investigated the lowering of cyclic strength in the presence of contact friction. Flat samples of steels 65 T and St.10, pressed to each other by spring load, were subjected to alternating bending with the AMU-1-IMET electromagnetic resonance machine at frequency 80 to 90 Hz. It was found that the energy criteria ϵ and N_k remain meaningful in testing under contact friction, but the position of the discontinuity in the ϵ - N diagram is affected. The physical fatigue limit is absent even at very prolonged testing (over 100 million cycles). Orig. art. has: 2 figures.

Card 1/2

ACCESSION NR: AP4029833

lished for the applied tensile stress and the elongation in which the first sub-microcracks arose in slip bands at the places of dislocation build-up near obstacles. The experimental by determined values of the tensile stress and the length of the submicroscopic cracks agreed with the theoretically calculated values. During deformation in the supercritical region, the recrystallization annealing of the deformed samples did not lead to a complete return of the density of aluminum, copper, nickel, and Armco iron. The value of the tensile stress must be considered in the development of deformation treatment methods directed to the renewal of structure and the hardening of metals. Orig. art. has: 2 formulas, 7 figures, and 1 table. .

ASSOCIATION: none

SUBMITTED: 10Jul63

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: ML

NO REF SOV: 004

OTHER: 010

Card 2/2

ACCESSION NR: AP4029833

8/0279/64/000/002/0085/0091

AUTHOR: Oding, I.A. (Moscow); Liberov, Yu. P. (Moscow)

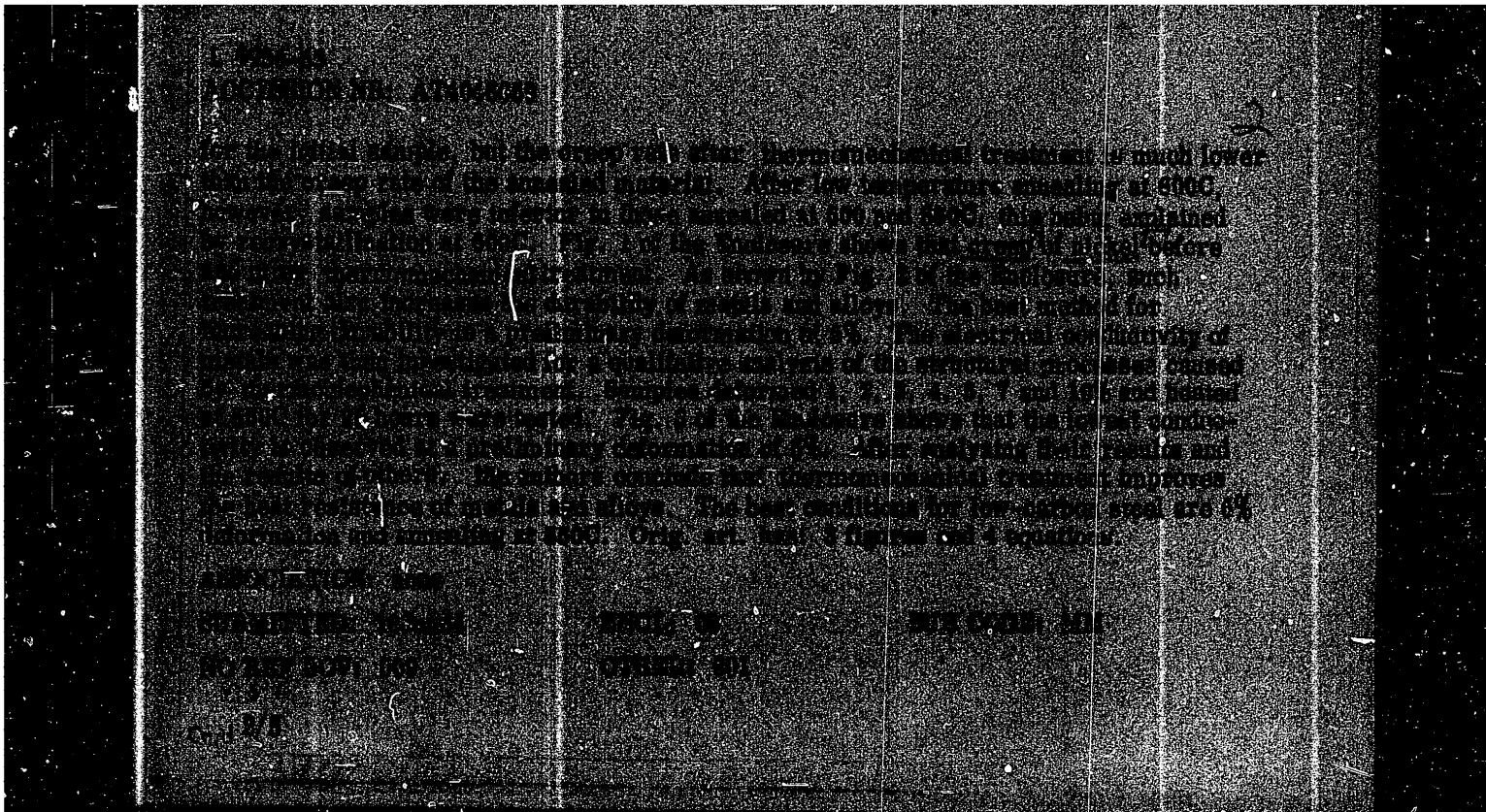
TITLE: The appearance of submicroscopic cracks in statically deformed plastic metals

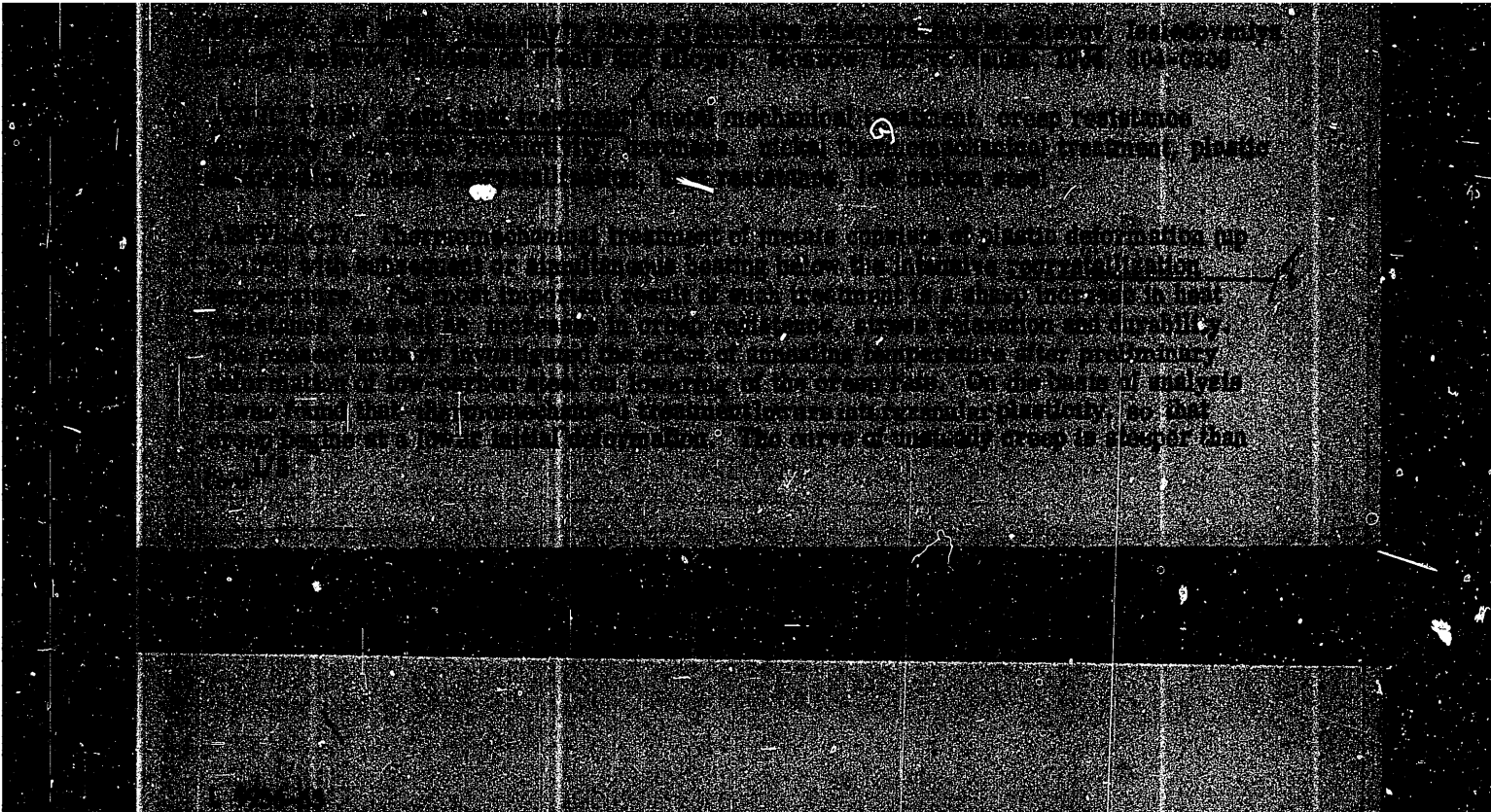
SOURCE: AN SSSR Izv. Metallurgiya i gornoye delo, no.2, 1964, 85-91

TOPIC TAGS: strength, plastic metal, deformed metal, density, electrical resistance, mechanical characteristic, aluminum, copper, nickel, Armco iron, stress

ABSTRACT: The authors investigated the density variations, specific electrical resistance, and mechanical characteristics of technically-pure metals such as aluminum, copper, nickel, and Armco iron for the purpose of determining the kinetics of the building up of crystal and lattice defects in the process of static tension at room temperature. This led to their hypothesis that the appearance of the first continuity of the breakdowns of the material in the form of submicroscopic cracks became established in advance of the final breakdown. The results were presented in a table. It was found that during static tension of technically-pure aluminum, copper, nickel, and iron, the first submicroscopic cracks arose long before the final disruption of the samples with residual expansions equal to 0.15-0.30 from the expansion value attained at the moment of breaking down. The critical values were estab-

Card 1/2





ACCESSION NR: AP4019812

the deformation of Armco iron led to the accumulation of crystalline lattice defects and to the formation of submicrocracks 400-900 Å long. The process of cracking started at the residual elongation of 7-9% under the force of 32-33 kg/mm². The accumulation of dislocations, and the development of cracks produced a variation in specific electrical resistivity and in the length of the curved section corresponding to the plastic region of the metal. At certain critical values of the residual elongation and of the stress applied, the metal plasticity was lowered due to the appearance of submicrocenters of metal failure. These critical values have to be accounted for during the selection of mechanical and thermomechanical methods of working the material. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 08Jun63

DATE ACQ: 31Mar64

ENCL: 00

SUB CODE: ML

NO REF SOV: 005

OTHER: 006

Card 2/2

ACCESSION NR: AP4019812

S/0279/64/000/001/0113/0119

AUTHORS: Oding, I. A. (Moscow); Liberov, Yu. P. (Moscow)

TITLE: Defect accumulation and the formation of submicrocracks during static elongation of Armco iron

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 1, 1964, 113-119, and insert facing p. 47

TOPIC TAGS: Armco iron, iron, iron defect, submicroscopic defect, static tension, submicroscopic fracturing of iron, iron plasticity, IM4-P testing machine, tensile test, MIM-8 microscope, Tesla BS-242 electron microscope

ABSTRACT: A series of experiments was conducted on Armco iron samples 63 mm long and 8 mm in diameter. The samples were annealed at 850C for 2 hrs and were stretched in the IM4-P testing machine at room temperature and at the deformation velocity of 2%/minute. The electrical resistivity of the samples was measured for the first time after this treatment, and then was measured again after the samples were annealed at 450C for 4 hours. The metal structure was studied with the MIM-8 microscope and with the Tesla BS-242 electron microscope. The results showed that

Card 1/2

AGEYEV Nikolay Vladimirovich, nagrazhden ordenom Lenina, dvuryna ordenami Trudovogo Krasnogo Znameni, medal'yu za doblestnyy trud v Velikoy Otechestvennoy voyne, otv. red.; KURDYUMOV, G.V., akademik, red.; ODING, I.A., red. [deceased]; PAVLOV, I.M., red.; ZUDIN, I.F., kand. tekhn. nauk, red.

[Study of steels and alloys] Issledovaniia staley i splavov. Moskva, Nauka, 1964. 390 p. (MIRA 17:8)

1. Moscow. Institut metallurgii. 2. Chlen-korrespondent AN SSSR (for Odin, Ageyev, Pavlov).

DRITS, Mikhail Yefimovich; ODING, I.A., ~~gtv. red.~~; MUKHIN, G.G.,
red.izd-va; KISELEVA, A.A., tekhn. red.; DOROKHINA, I.N.,
tekhn. red.

[Magnesium alloys for work at high temperatures; properties
of magnesium alloys depending on composition, structure and
temperature] Magnievye splavy dlia raboty pri povyshennykh
temperaturakh; svoistva magnievyykh splavov v zavisimosti ot
sostava, struktury i temperatury. Moskva, Izd-vo "Nauka,"
1964. 228 p. (MIRA 17:3)

1. Chlen-korrespondent AN SSSR (for Oding).

IVANOVA, Vera Semenovna; GORDIYENKO, Lev Kimovich; ODING, I.A.,
otv. red.

[New ways of increasing the strength of metals] Nove puti
povysheniia prochnosti metallov. Moskva, Izd-vo "Nauka,"
1964. 116 p. (MIRA 17:6)

1. Chlen-korrespondent AN SSSR (for Oding).

L 14216-63

ACCESSION NR: AP3004421

was, on the average, twice as high as that of the solid copper. The stress-strain curves of vacuum-deposited films have a sawlike shape, which is probably associated with the periodic discharge of dislocation groups accumulated at various obstacles. The creep curves of vacuum-deposited films also have a sawlike shape, which is especially marked in films aged at room temperature for 24 hr. Such films show deformation jumps twice as high as those of fresh films. Twisting or straightening of loose films observed during aging indicates the partial removal of internal stresses. Orig. art. has: 4 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 25Apr63

DATE ACQ: 21Aug63

ENCL: 00

SUB CODE: ML

NO REF SOV: 000

OTHER: 008

Card 2/2

14-00000
ACCESSION NR: AP000421
ENT(g)/ENT(l)/ENT(m)/BDS AFFID/ASR/ESD-3 60/13P(1)/JD/HM
8/0020/63/151/004/0329/0532

AUTHOR: Oding, I. A. (Corr. Member, AN SSSR); Aleksanyan, I. T.

65
64

TITLE: Mechanical properties of copper films

SOURCE: AN SSSR. Doklady, v. 151, no. 4, 1965, 829-832

TOPIC TAGS: thin copper film, vacuum-deposited copper film, electrolytic copper film, size effect, tensile strength, creep copper film, thin film, thin copper film strength, thin copper film creep, copper film size effect

ABSTRACT: A study has been made of the tensile strength and creep characteristics of copper films vapor-deposited on cold smooth glass substrates in a vacuum of 6×10^{-4} to 6×10^{-2} mm Hg or deposited electrolytically on polished stainless steel electrodes. The strength of vacuum-deposited films was found to drop sharply with increasing film thickness (e.g., strength dropped by about 90 to 45 kg/mm² as film thickness increased from 1.7 μ to 4.6 μ). Film strength decreases also with increasing film width and with increasing pressure during vacuum deposition. The maximum strength of the vacuum-deposited films was 80-90 kg/mm². Electrolytic films are less thickness-sensitive; their strength

Card 1/2

ACCESSION NR: AP3003511

obtained by the authors with nickel and amco iron. Orig. art. has: 2 formulas
and 3 figures. 2

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy). 27

SUBMITTED: 23Feb63

DATE ACQ: 30Jul63

ENGL: 00

SUB CODE: PH, ML

NO REF SOV: 009

OTHER: 001

Card 2/2

1/16/63

ACCESSION NR: AP300421

FVP(g)/EWT(1)/EWT(m)/BDS

APFIC/ASB/ESD-3 00/1JP(c)/JP/HM
S/0020/61/151/001/0020/0020

I 12624-63

BDB/BWP(g)/NWT(m) AFPC/ASD JD/RW-2

ACCESSION NR: AF3003511

S/0020/63/151/001/0092/0095

AUTHORS: Oding, I. A. (Col. mem. AS USSR); Ivanova, V. S.; Liberov, Yu. P. 59
57

TITLE: Basic assumptions for a correlation between the criteria for static and cyclic strength of metals.

SOURCE: AN BSR. Doklady, v. 151, no. 1, 1963, 92-95

TOPIC TAGS: metal fatigue strength, static strength, static-fatigue strength, correlation metallurgy, elasticity theory, nickel, armco iron

ABSTRACT: In their attempt at establishing a correlation between the static and cyclic strength, the authors use parameters which are indicative of equivalence of the energy state of metals subjected to mechanical stress under different loading conditions. They determine the conditions for cyclic rupture, which are equivalent to the static increase of stress, by using the diagram of fatigue rupture together with the damage curve, introduced earlier by Ivanova (DAN, 119, no. 1, 1958, 71), which gives the formation of the first submicroscopic cracks. Thus it becomes possible to predict the fatigue rupture on the basis of static data. There is good agreement between the theoretical and experimental values

Card 1/2

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001237800040-6

Card 2/2

L 12624-63

BBS/EMP(g)/EWT(m)

AFYTC/ASD

JD/HW-2

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001237800040-6

S/032/63/029/003/001/020
B117/B186

AUTHOR: Oding, I. A.

TITLE: Current problems of testing heat-resistant materials

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 3, 1963, 259-260

TEXT: The article refers to problems arising in the field of mechanical engineering in consequence of the high demands made upon materials in respect of high strength when exposed to various media at high temperatures. Specifically mentioned are the branches and the equipment of thermal power engineering, rocket engineering and deep-drilling equipment. Such problems include the testing of materials, development of new testing methods, and the corresponding apparatus and theories whereby the traditional time-consuming testing methods can be shortened. Statistical methods of analysis are to be developed for design work and to arrive at efficient testing conditions. Tests should be made under real or standard conditions to permit of directly assessing the behavior of metal during the working process on the basis of experience. Machines and apparatus for testing the properties of heat-resistant materials are to be improved and

Card 1/2

ACCESSION NR: AT4013919

annealing at 550C. Second, a new type of treatment of metals is proposed. This method of mechano-chemico-thermal treatment consists of polygonization with subsequent chemico-thermal treatment and low-temperature annealing. Grade 10 steel, after such treatment, has a life 10 times as long at 450C as steel which has been nitrided and annealed at low temperatures. Third, grade 10 steel, after γ -radiation (800 roentgen/sec for 6 hours), has a life 17 times as long at 450C as steel before treatment. Orig. art. has: 6 figures and 2 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: MM

NO REF SOV: 002

OTHER: 008

Card 2/2

ACCESSION NR: AT4013919

S/2659/63/010/000/0003/0008

AUTHOR: Oding, I. A.; Zubarev, P. V.

TITLE: Some methods for increasing the heat resistance of steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny^m splavam,
v. 10, 1963, 3-8

TOPIC TAGS: steel, heat resistance, heat treatment, atomic radiation, annealing,
low carbon steel, armco iron

ABSTRACT: An increase in the heat resistance of steels and alloys, i.e., an increase in the useful life in the presence of raised temperatures and lowered rates of creep, is an actual problem of contemporary physical metallurgy. This paper describes three treatments which increase the heat resistance of steels, specifically that of low-carbon steel and armco iron. The results of these treatments are as follows: First, the thermo mechanical treatment of grade 10 steel and armco iron, consisting of deformation of the metal at room temperature with subsequent low-temperature annealing, significantly increases the heat resistance. The creep rate drops by a factor of as much as 35, and the life of the metal is increased tens and hundreds of times. The optimal method for the thermomechanical treatment of low-carbon steel turns out to be a 5% deformation with subsequent

Card 1/2

ODING, I. A.; GORDIYENKO, L. K.; KOP'YEV, I. M.

Obtaining very strong "whisker" crystals and their properties.
Trudy Inst. met. no.13:87-107 '63. (MIRA 16:4)

(Metal crystals—Growth)

ODING, I. A.; IVANOVA, V. S.

Mechanism of the fatigue failure of metals. Trudy Inst. met.
no.13:3-28 '63. (MIRA 16:4)

(Metals--Fatigue)
(Dislocations in metals)

ODING, I.A.; ZUBAREV, P.V.

Certain methods of increasing the heat resistance of steel. Issl. po
zharoprot.splav. 10:3-8 '63. (MIRA 17:2)

ODING, I.A. (Moskva); ALESHKIN, F.I. (Moskva)

Effect of temperature on the criteria of stress relaxation in
metals. Izv. AN SSSR. Met. i gor. delo no.5:98-112 S-O '63.
(MIRA 16:11)

ODING, I.A.; GORDIYENKO, L.K.; FRIDMAN, Z.G.

Certain regularities in the changes of electric conductivity
and structure of heat-resistant materials during their
thermomechanical treatment. Issl. splav. tsvet. met. no.4:
25-38 '63. (MIRA 16:8)

(Heat-resistant alloys--Hardening)
(Steel, Heat-resistant--Metallography)
(Electric conductivity)

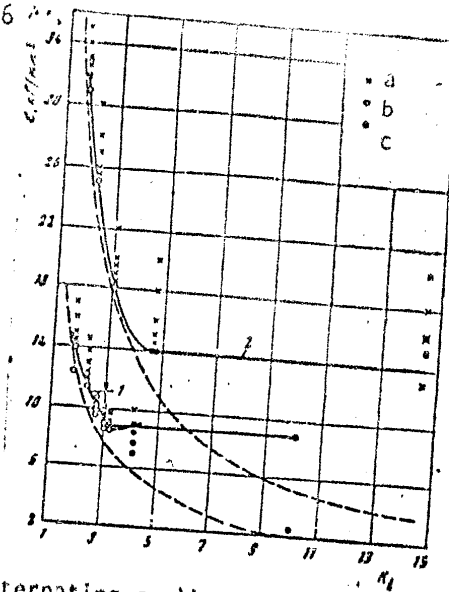
ODING, I.A. (Moskva); ZUBAREV, P.V. (Moskva)

Effect of thermomechanical treatment on certain properties of armor iron.
Izv. AN SSSR. Otd. tekhn. nauk. Met. i gor. delo no.1:113-118 Ja-F 1963.
(MIRA 1643)

(Iron---Hardening)

ACCESSION NR: AT4014046

ENCLOSURE: 01



Relationship between alternating cyclic stress in kg/sq. mm and the theoretical coefficient of stress concentration.
1 - steel 3; 2 - steel 30KhGSA; 2 - ruptured specimens; b - nonruptured specimens; c - nonruptured specimens in which the notches show nonpropagating microcracks due to fatigue.

Card 3/3

ACCESSION NR: AT4014046

calculation of an optimal notch radius. The existence of this limiting value is explained by the peculiarity of the stressed state in very sharp notches. An inverse straight-line relationship was obtained between $\log \sigma$ and K_t , and formulas are derived in the paper for the coefficient of notch sensitivity q and the cyclic coefficient of notch sensitivity v :

$$q = \frac{K_s - 1}{K_t - 1} \quad (1)$$

$$v = E \frac{\Delta_{-1p}}{\sigma_{-1p}} \quad (2)$$

As shown in Fig. 1 of the Enclosure, in the presence of large stress concentrators the graph of σ vs. K_t shows an area characterized by nonpropagating microcracks and the appearance of submicroscopic fatigue cracks; this indicates that notched samples have a cyclic limit of elasticity. The possible reasons for the appearance of nonpropagating cracks are discussed at length. Orig. art. has: 6 figures and 2 formulas.

ASSOCIATION: none

SUBMITTED: 00

Card 2/3 SUB CODE: MM

DATE ACQ: 20Feb64

NO REF SOV: 006

ENCL: 01

OTHER: 002

ACCESSION NR: AT4014046

S/3073/63/000/000/0075/0081

AUTHOR: Oding, I. A.; Gurevich, S. Ye.

TITLE: Cyclic strength of steel in the presence of sharp notches

SOURCE: Prochnost' metallov pri peremennykh nagruzkakh; materialy* tret'yego soveshchaniya po ustalosti metallov, 1962 g. Moscow, Izd-vo AN SSSR, 1963, 75-81

TOPIC TAGS: steel, steel fatigue, cyclic strength, bending stress, stress concentrator, notch toughness, notch radius, crack, nonpropagating crack

ABSTRACT: The creation of sharp stress concentrators is sometimes unavoidable in the design of machine parts. For this reason, the study of fatigue strength in steel specimens having notches with a theoretical coefficient of stress concentration (K_t) greater than 3 acquires practical importance. The present paper deals with the cyclic bending strength of cylindrical specimens of low-strength steel 3 and high-strength steel 30KhGSA in the presence of circular grooves having bottom radii of 0.02-0.80 mm (values of K_t from 1.8 to 14.5). The results show that the fatigue strength decreases with an increase in the sharpness of the notch up to a certain limit (the critical notch radius), after which it remains constant. The critical notch radius thus corresponds to a limiting minimal cyclic strength, which is of practical significance since further work may permit the

Card 173

ACCESSION NR: AR4041620

stretched on machine IM-12 to deformations of 3 and 5% and annealed at 500, 550 or at 600° for 25 hours, and then tested for creep on machine IP-5 at a temperature of 400° and stress of 21.5 kg/mm². Part of work hardened samples were tested for relaxation of stresses with initial stress of 10 kg/mm² and temperature of 400°. As a result of mechanical heat treatment the speed of creep at established stage is lowered ~35 times, voltage drop during relaxation is lowered almost 3 times, and period of service of metal is increased several tens of times. Optimum conditions of mechanical heat treatment of low-carbon steel ensuring maximum increase of heat resistant properties is preliminary deformation of 5% with subsequent annealing at 550°. New type of work hardening of steel is suggested -- mechanical chemical heat treatment, consisting of carrying out of polygonization of metal with subsequent chemical heat treatment (nitration and low-temperature annealing) for blocking dislocation walls with atomic impurities. Steel 10 subjected to such a work hardening treatment has a period of service in conditions of creep at 450° approximately 10 times longer than the same steel after usual nitration and low-temperature annealing. Bibliography: 7 references.

SUB CODE: MM, TD

ENCL: 00

Card 2/2

ACCESSION NR: AR4041620

S/0137/64/000/005/1072/1072

SOURCE: Ref. zh. Metallurgiya, Abs. 51415

AUTHOR: Oding, I. A.; Zubarev, P. V.

TITLE: Method of improvement of heat-resistant properties of materials

CITED SOURCE: Sb. Polzuchest' i dlitel'n. prochnost'. Novosibirsk, Sib. otd. AN SSSR, 1963, 70-74

TOPIC TAGS: metal, heat resistance, heat resistant property

TRANSLATION: Conditions of mechanical heat treatment which allow us sharply to increase heat resistance of metal are described. Mechanical heat treatments are conducted by means of active extension of billets at room temperature with subsequent low-temperature annealing (lower than temperature of recrystallization). Samples of steel 10 and Armco Fe with diameter of 8 mm and working length of 86 mm were

Card 1/2

ACCESSION NR: AT4014044

ed some peculiarities, however, in that the results of fatigue tests showed greater scatter at maximal strength than at lower strengths (or with weaker types of steel), and the sensitivity to notching was lower at maximal strength than at lower strengths. The sensitivity to stress concentration is therefore low, and all 3 types of steel can be recommended for use in machine parts. Orig. art. has: -7 figures, 1 table and 2 formulas.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 20Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 006

OTHER: 002

Card 2/2

ACCESSION NR: AT4014044

S/3073/63/000/000/0046/0054

AUTHOR: Oding, I. A.; Gurevich, S. Ye.

TITLE: Cyclic strength and sensitivity to stress concentration in some types of high-strength steel

SOURCE: Prochnost' metallov pri peremennykh nagruzkakh; materialy* tret'yego soveshchaniya po ustalosti metallov, 1962 g. Moscow, Izd-vo AN SSSR, 1963, 46-54

TOPIC TAGS: steel, high strength steel, stress concentration, cyclic strength, martensite, bending stress, impact strength, 30KhGT steel, 30KhGSA steel, SP steel

ABSTRACT: There are 3 generally used ways of obtaining high-strength metals: that is, by obtaining non-dislocated metals (filamentous crystals) in the form of "whiskers" and thin films; by obtaining metals with a definite distribution of dislocations (i.e., the polygonal structure resulting from mechanochemical treatment); or by obtaining a martensitic structure saturated with dislocations (thermomechanical treatment). In the present paper, 30KhGT, 30KhGSA and SP (Vasco Jet 1000) steel were subjected to heat treatment followed by mechanical stress, after which the parts were tested for tensile strength, impact strength, bending fatigue, microhardness and other physical properties. All 3 types of steel had satisfactory plasticity at maximal strength with static loads. The results of cyclic tests show-

Card 1/2

ODING, I.A., otv. red.; PLOTKIN, S.A., red.; CHERNOV, A.N., red.;
GUSEVA, A.P., tekhn. red.

[Strength of metals under cyclical variations of stress]
Prochnost' metallov pri peremennykh nagruzkakh; materialy.
Moskva, Izd-vo AN SSSR, 1963. 299 p. (MIRA 17:1)

1. Soveshchaniye po ustalosti metallov, 3d, 1962. 2. Chlen-
korrespondent AN SSSR (for Oding).

Increase of the heat resistance ...
content in the steel after such treatment was 0.47%. Fe₄N needles had
formed in the steel which considerably increased its strength. There are
2 figures and 1 table.

S/C20/62/144/003/C16/030
B108/B102

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy
of Sciences USSR)

SUBMITTED: January 10, 1962

Card 2/2

S/020/62/144/003/016/030
B108/B102

AUTHORS: Odins, I. A., Corresponding Member AS USSR, and Zubarev, P.
V.

TITLE: Increase of the heat resistance of low-carbon steels by
mechanical, chemical, and thermal treatment

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 548-550

TEXT: Mechanical and thermal treatment of steel causes dislocations to arise at the domain walls which form various polygons. Impurity atoms at the walls of these dislocations can increase the heat resistance considerably. Experiments were made with low-carbon steel containing (in per cent by weight) 0.8 C, 0.05 Si, 0.26 Mn, 0.03 S, 0.01 P, 0.008 N. The specimens were annealed in evacuated ampoules (10^{-5} mm Hg) for 3 hours at 910°C . Some of the specimens were extended by 2.1% in an Mi-34 Shevenard machine and were then kept at 600°C for 6 hours. Following this, the specimens were saturated with nitrogen by keeping them for 6 hours in a nitrogen atmosphere. Annealing for 110 hours at 550°C made the nitrogen atoms form a "Kotrell sheath" at the polygon walls. Nitrogen

Card 1/2

Effect of gamma irradiation on the heat ... B104/B102 S/020/62/144/002/013/028

metal. The fatigue strength rose from 19.2 to 20.7 kg/mm² after 100 hours of irradiation, whereas the useful life was prolonged by about 17 times. Results corroborate the hypothesis that owing to the interaction of vacancies and dislocated atoms with dislocations, and because of certain lattice distortions, more energy is needed to create fixed dislocations than to create dislocations in tempered material. There are 2 figures and 2 tables. X

ASSOCIATION: Institut metallurgii im. A. A. Baykova
(Institute of Metallurgy imeni A. A. Baykov)

SUBMITTED: January 20, 1962

Card 2/2

38104

S/020/62/144/002/013/028
B104/B102

18.8100
AUTHORS: Oding, I. A. Corresponding Member AS USSR, and Zubarev, P. V.

TITLE: Effect of gamma irradiation on the heat resistance of low-carbon steels

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 325-326

TEXT: Steel samples (C 0.08%, Si 0.05%, Mn 0.26%, S 0.03%, P 0.01%) were annealed for three hours at 910°C and irradiated for six hours by 1.25-Mev photons at gamma dose rates of 800 r/sec (integral dose: $17.28 \cdot 10^6$ r). According to formulas taken from P. N. Kharadzha (Obshchiy kurs rentgenotekhniki - General course on X-ray technology - 1956, p. 401) it was calculated that 94% of the photons are scattered, part of their energy being transferred to the scattering electrons. Another 5% of the photons generate electron-positron pairs, and less than 1% of them knock out electrons from atoms of the absorbing material. Partial ionization of the atoms, formation of vacancies and dislocated atoms, as well as certain interactions between vacancies and dislocations raise the stability of the

Card 1/2

X

Effect of cyclical loading on the ...

S/020/62/143/006/013/024
B164/B101

macroscopic cracks after relatively short durations of loading (30-60·10³ cycles), but cracks of considerable size were noted after 150·10³ cycles. These, however, do not affect the position of the cold-brittleness threshold. An explanation of the increased embrittlement may be sought in the theory of dislocations, it being supposed that the loading produces stresses in the steel, which cause dislocations; these accumulate at obstacles so that heavy local stresses arise, which lead to fracture. There are 4 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy imeni A. A. Baykov)

SUBMITTED: December 29, 1961

Card 2/2

S/020/62/143/006/013/024
B164/B101

AUTHORS: Odintsov, I. A., Corresponding Member AS USSR, Nikonov, A. G.,
and Mar'yanovskaya, T. S.

TITLE: Effect of cyclical loading on the cold-brittleness threshold
in carbon steel

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 6, 1962,
1332-1335

TEXT: The effect of the duration of cyclical loads on the critical temperature for failure of carbon steel containing 0.68% of C and 0.68% of Mn was examined. This critical point was determined from the change in impact strength that occurred within the temperature range -60 to +60°C. Round specimens were subjected to fatigue by cyclical loading and then to Charpy impact tests. The critical temperature for failure steadily increases with the duration of loading, from -50°C initially to -20°C after $30 \cdot 10^3$ cycles, +30°C after $60 \cdot 10^3$ cycles, and to +50°C after $150 \cdot 10^3$ cycles. Examination of the fractures of the specimens showed no

Card 1/2

Variation in the properties...

S/020/62/143/005/008/018
B104/B102

H and an increase of δ_B . σ_B and σ_S of I show a sharp increase at 500-hr annealing up to its initial value, while plasticity is reduced. At longer annealing periods, σ_B and σ_S exhibit an oscillatory character. If II is annealed for 400 hrs, σ_S (but not σ_B) behaves similarly to I. Variations in the mechanical properties are not accompanied by a variation in micro-structure. There are 3 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences USSR)

SUBMITTED: December 29, 1961

S/020/62/143/005/006/018
B104/B102

AUTHORS: Gaing, I. A., Corresponding Member AS USSR, Zubarev, P. V.

TITLE: Variation in the properties of low-carbon steel in long-time annealing

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 5, 1962, 1082-1084

TEXT: Two types of low-carbon steel were investigated:

	C	Si	Mn	S	P	N
Steel I:	0.13	0.215	0.775	0.009	0.029	0.03
Steel II:	0.08	0.05	0.26	0.03	0.01	0.03

Samples 1.5 mm in diameter were annealed at 930°C for 3 hrs. Subsequently, they were deformed (0.2 - 30%), soldered in ampoules (10⁻⁵ mm Hg), and again annealed at 690 ± 50°C up to 7000 hrs. Ultimate strength σ_B , creep strength σ_S , relative elongation δ_B , and microhardness H were determined at room temperature. At first, both types show a decrease of σ_B , σ_S , and

Card 1/2



The relation between the ...

S/020/62/143/004/015/027
B104/B102

formation, the authors conclude that activated dislocations and trapped dislocations are related by a constant factor which is probably unit. Result: the trapped dislocations have a power-law distribution over the activation levels. There is 1 figure.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy
of Sciences USSR)

SUBMITTED: December 29, 1961

Card 2/2

S/020/62/143/004/015/027
B104/B102

AUTHORS: Oding, I. A., Corresponding Member AS USSR, and Geminov, V.N.

TITLE: The relation between the dislocation distribution in the activation energy levels and the amount of deformation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 4, 1962, 836 - 839

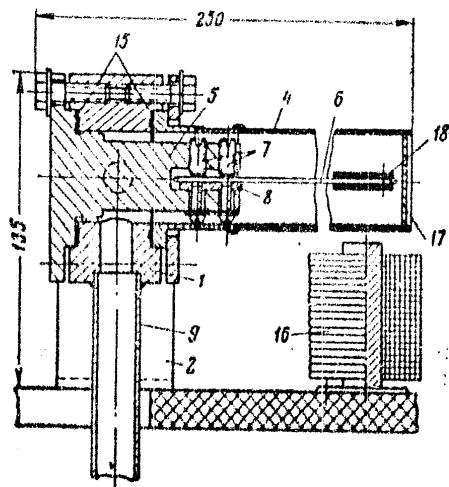
TEXT: In previous papers I. A. Oding (Sborn. Issledovaniya po metallovedeniyu, M.-L., 1932; Prochnost' metallov, M.-L., 1936) has proposed the

empirical relation $\delta = A \frac{B^{\sigma} - 1}{B - 1}$ between true deformation δ and true tension σ , where A is the plasticity factor, B the deformation factor. By assuming a power-law distribution $N = N_0 \exp\{\alpha(\sigma - \sigma_0)\}$ of the dislocations in a crystal, a deformation equation is derived which is well confirmed by experiments. σ_0 is the minimum dislocation activation tension, N_0 the number of dislocations corresponding to σ_0 . From the experimentally proved linear dependence of the density of trapped dislocations from de-
Card 1/2

An electromagnetic apparatus...

S/032/62/028/009/008/009
B104/B102

Fig. 1. Fatigue testing device.



S/032/62/028/009/008/009
B104/B102

AUTHORS: Odin, I. A., Ivanova, V. S., Gordiyenko, L. K., and
Stepanov, V. N.

TITLE: An electromagnetic apparatus for fatigue tests on flat
specimens bent in alternate directions

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 9, 1962, 1126 - 1128

TEXT: This device described (Fig. 1) provides for the fatigue testing of flat specimens in vacuo (10⁻⁵ mm Hg) or in various gases. The specimen is clamped in a holder (5) surrounded by the glass tube (4) and mounted on a brass head (1). Thus the space around the specimen is hermetically sealed by the sample holder, glass tube and observation window (17). The tube (9) serves for evacuation. Bending vibrations are excited in the specimen at its natural frequency by the electromagnet (16) with the aid of the special plate (18). The device is reliable and gives very accurate results. There are 3 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of
Metallurgy imeni A. A. Baykov)

Card 1/2

ODING, I.A.; KOSYAKINA, Ye.S.

Methods of detecting dislocations in crystals (survey).
Zav.lab. 28 no.4:450-458 '62. (MIRA 15:5)
(Dislocations in crystals)

ODING, I.A.

Fabric made of metal. Nauka i zhyttia 12 no.9:17 S '62.
(MIRA 16:1)

1. Direktor Instituta metallurgii AN SSSR, chlen-korrespondent
AN SSSR.

(Wire netting)

ODING, I.A.; GUREVICH, S. Ye.

The superstrength metal. Tekhnika Bulg 11 no.9:353-354 '62.

1. Chl. kor. AN SSSR (for Oding).

Investigation of

S/509/62/000/011/005/019
2071/2351

increase to 0.5 atm. leads to the formation of thin, short crystals (optimum hydrogen velocity not given). The shape of the whiskers depends on temperature and gas-flow conditions and on the conditions for growth of the individual crystals. The shape of the transverse cross-section of whiskers depends on the reduction temperature, the crystallographic orientation of the axis of whiskers and the form of the halide salt. From a thermodynamic consideration of the effect of the activity of the metal (α), the formation of whiskers will depend, to a first approximation, on the reduction temperature and the velocity of flow and the pressure of hydrogen:

$$\alpha = C \cdot \frac{T (P_{H_2})^{n/2}}{V (P_{H_X})^n}$$

where C - constant, T - reduction temperature, V - velocity of hydrogen flow, P_{H_2} - partial pressure of hydrogen, P_{H_X} - partial pressure of hydrogen halogenide. There are 10 figures.
Card 2/2

5/509/62/000/011/005/019
E071/E351

AUTHORS: Odina, L.A. and Kop'yev, I.M.

TITLE: Investigation of the preparation of thread-like crystals by reduction of halide salts

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Trudy. no. 11. Moscow, 1962. Metallurgiya, metallovedeniye, fiziko-khimicheskiye metody issledovaniya. 99 - 108

TEXT: The factors affecting the growth of thread-like crystals (whiskers) during the reduction of cuprous and ferrous chlorides with hydrogen were investigated. A stream of purified hydrogen was passed over a sample (4.5 g) of the salt in an alundum boat (100 mm long) placed in a silica tube, heated by a thermostatically controlled ($\pm 5^{\circ}\text{C}$) furnace. The growth of thread-like crystals depends on many factors (humidity, purity and amount of salt, stability of reducing conditions, etc.) but the determining factors are the reaction temperature and the hydrogen velocity. The optimum temperature range for copper is $520 - 530^{\circ}\text{C}$ and for iron is $650 - 670^{\circ}\text{C}$. Changes in hydrogen pressure from 0 - 300 mm w.g. has no influence on the crystal growth but an

Card 1/2

40978

S/659/62/009/000/009/030
1003/1203

188100
188200

AUTHORS Oding, I. A. and Fridman, Z. G

TITLE

Increase in long-time strength by a combined mechanical and thermal treatment

SOURCE

Akademiya nauk SSSR. Institut metallurgii. issledovaniya po zharoprochnym splavam v 9. 1962. Materialy Nauchnoy sessii po zharoprochnym splavam (1961 g.), 66-72

TEXT The aim of this work is to investigate the possibility of increasing the long-time strength of alloys by creating mosaic structures. Samples of austenitic stainless steel 1 x 18H9(1Kh18N9) and of two Cr-Ni-base alloys 5 mm in diameter and 15 mm in length were heated to 600°C, stretched to a 10% deformation at a rate of 25 mm/min and kept at this temperature for 100 hours, after unloading. The long-time strength of these samples at various temperatures was investigated and the conclusion was reached that up to a 30-fold increase in the long time strength can be achieved by this method. This is due to a breaking-up of the crystals into small blocks (~ 0.3μ), which takes place as a result of the plastic deformation and the annealing which follows. In the discussion, M. L. Bernshtein emphasized the great value of this work, but suggested that it might be interesting to investigate the dislocation movements in the zone of stress in processes in which no phase transformations take place, or in cases when phase transformations take place together with a breaking-up of the crystals into blocks. There are 4 figures.

Card 1/1

S/030/62/000/008/004/005
I003/I242

Superstrong metals

because of their high sensitivity to notching under cyclic stresses. However, this sensitivity increases only when the hardness rises to 35-40 R_c , and decreases with further increase in strength when the hardness of the metal reaches 50-60 R_c .

Card 2/2

S/030/62/000/008/004/005
I003/I242

AUTHORS: Oding, I.A., Correspondent Member of AS USSR and
Gurevich, S.Ye., Candidate of Technical Sciences

TITLE: Superstrong metals

PERIODICAL: Akademiya nauk SSR. Vestnik, no.8, 1962, 53-56

TEXT: Great interest is shown in the development of superstrong metals both in the USSR and abroad. The main tendencies in the theoretical and practical approaches to the development of these metals and to their properties are outlined. Opinions are divided and the problems involved have not been fully investigated. Another very urgent problem is the development of new methods and the modernization of the apparatus to allow testing under higher temperatures, more rapid and less uniform loading, higher stresses, and actual service conditions. Superstrong metals will find application in the construction of machinery despite their poor plasticity. The usefulness of superstrong metals has been doubted

Card 1/2

S/180/62/000/006/011/022
E040/E451

Susceptibility to cracking ...

500 Å wide. These submicroscopic cracks developed on reaching a 7 to 9% residual elongation while at failure the residual elongation was 40 to 45%. The true stress corresponding to the deformation at which the incipient submicroscopic cracks developed was of the order of 23 ± 0.5 kg/mm². A method was developed for determining the critical value of true stress and of the residual deformation corresponding to the appearance of the first irreversible micro-cracks: this point is indicated by a break in the curve obtained by plotting the specimen cross-section area against its elongation under varying stress. There are 6 figures.

SUBMITTED: May 11, 1962

S/180/62/000/006/011/022
EO40/E451

AUTHORS: Oding, I.A., Liberov, Yu.P. (Moscow)

TITLE: Susceptibility to cracking of nickel under static tensile loading

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.6, 1962, 125-130

TEXT: An investigation was made of the irreversible damage produced in 99.7% pure nickel specimens under static tensile loading at room temperature. The test specimens, 63 mm long, 8 mm gauge diameter, were annealed at 900°C for 2 hours under a vacuum of 5×10^{-5} mm Hg and then tested in VM-4P (IM-4R) test machine. The cracking of test specimens was studied 1) by measurement and subsequent analysis of changes in the density after tensile loading and after recrystallization annealing; 2) by examining the stress vs. elongation curves; 3) by metallographic analysis of unetched surfaces by optical and electron microscopy. The results showed that the damage started long before the moment of failure. The nuclei of cracking are in the form of submicroscopic cracks 400 to Card 1/2

Fatigue strength of high-strength.... S/180/62/000/003/001/016
E111/E152

satisfactory plasticity in static tests and impact strength. Cyclic strength criteria showed the following peculiarities: fatigue tests produced a greater scatter of results than obtained in tests at lower specimen strength levels; notch sensitivity was good for the maximum-strength state. However, it was considered that the latter effect should be treated with caution and requires further investigation. Progress of machine construction on the basis of the above high-strength steels needs the participation of all relevant research organizations. Need of extensive testing of the above steels, prior to use, is stressed.

There are 6 figures and 2 tables.

SUBMITTED: March 7, 1962

Card 2/2

S/180/62/000/003/001/016
E111/E152

AUTHORS: Oding, I.A., and Gurevich, S.Ye. (Moscow)
TITLE: Fatigue strength of high-strength grades of steel

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye
tekhnicheskikh nauk. Metallurgiya i toplivo,
no.3, 1962, 10-19

TEXT: This material was presented at a plenary session of
the sections of the OTN AN SSSR.
Investigation of the fatigue strength, notch-sensitivity and
micro-heterogeneities of high strength steels 30XГТ (30KhGT),
30XГСА (30KhGSA) and СП (SP) (vasco-jet 1000) is described.
Specimens, heat treated to give various hardness and strength
values, were re-tempered (in vacuum) after machining to remove
the resultant stresses. In addition to strength, plasticity and
hardness testing, the endurance limit and sensitivity to stress
concentrations were determined and some micro-structure
observations made. All the steels in the maximum-strength state
(i.e. with carefully eliminated or distributed dislocations or
with dislocation-saturated martensitic structures) had
Card 1/2

S/124/63/000/001/075/080
D234/D308

AUTHORS: Oding, I.A. and Kostochkin, Yu.V.

TITLE: Effect of variable temperature on the strength of
the metal of gas turbine blades

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 1, 1963, 77,
abstract 1V599 (In collection: 'Tsiklich. prochnost'
metallov. M., AN SSSR, 1962, 257-275)

TEXT: The authors study the effect of thermal fatigue on
the character of crack formation in prismatic specimens of alloys
ЭИ-765 (EI-765) EI-607 and of EI-612 steel, as well as on the dura-
ble strength characteristics.
[Abstracter's note: Complete translation]

Card 1/1

Effect of variable temperature on...

S/285/63/000/001/002/002
A052/A126

temperature stress levels at the edges are determined. Maximum stresses during the tests reached 52 kg/mm^2 for EI-612 steel and 58 kg/mm^2 for EI-765 alloy. Time-stress diagrams are presented. As a result of testing samples and blades subjected to preliminary heat change cycle (up to 6,000 cycles) a dependence of the long-time strength of material on the number of heat change cycles is obtained, which is adequately approximated by a parabolic equation. The values of constant coefficients and formulas for different testing times are given. The conclusion drawn in the study is that the damageability of gas turbine blades should be evaluated by the long-time test of samples subjected to preliminary thermal fatigue tests.

I. Kuznetsov

[Abstracter's note: Complete translation]

Card 3/3

Effect of variable temperature on...

S/285/63/000/001/002/002
A052/A126

allowance for different mechanical properties, heat conductivity coefficients and Bio criteria under different test conditions. The conclusion is drawn that the difference in the process of crack formation in carbon and heat-resisting steels is connected with temperature fields in the samples and the character of ductility change depending on the temperature. Cracks appear on the grain boundaries, and their appearance is preceded by an expansion of boundaries which increases with the growing number of heat changes. The investigation of the process of increase of sample dimensions was carried out on EI-612 steel heated to 800°C . After 100 cycles the length of a sample increases by 2%. The increase of length is conditioned by temperature stresses exceeding the limit of elasticity of the material. A detailed description is given of the process of residual strain expansion and of increase of absolute sample dimensions at a constant level of heat changes. An investigation of metal resistance to thermal fatigue was carried out on an installation simulating near-to-working conditions for gas turbine blade materials. Material samples and blade models were heated to 750°C and cooled in a gas flow. In the process of heating the most abrupt temperature change is 530°C and it takes place during the first seconds. The gas and blade metal temperatures were recorded by an oscillograph according to 8 thermocouples incorporated in the blades. Temperature field measurements of blade models at heating and cooling are given and Card 2/3.

S/285/63/000/001/002/002
A052/A126

AUTHORS: Oding, I. A., Kostochkin, Yu. V.

TITLE: Effect of variable temperature on the strength of gas turbine blade metal

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk, 49. Turbostroyeniye, no. 1, 1963, 19, abstract 1.49.115 (In collection: Tsiklich. prochnost' metallov. M., AN SSSR, 1962, 267 - 275)

TEXT: The effect of a variable temperature on the character of crack formation, change of dimensions and mechanical properties of materials is investigated. The following materials were tested: ЭИ-765 (EI-765) (chromium-nickel alloy), ЭИ-612 (EI-612) (austenitic steel) and ЭИ-607 (EI-607) (nickelbase alloy). Prismatic 23 x 16 mm samples were heated to temperatures below those of phase conversions (700 - 800°C) and cooled in an oil bath at 40°C. The tests have shown that after a sufficient number of heat changes thermal fatigue cracks appear in tested materials on flat sides of prismatic samples and not on edges as is the case in carbon steel samples. A detailed analysis of this phenomenon is made with an

Card 1/3

The sensitivity to notching of...

S/123/62/000/023/003/008
A004/A101

grade steel, the sensitivity to notching rises in the beginning, at σ_b exceeding 125 kg/mm^2 the sensitivity decreases, however. The sensitivity of the steel at $\sigma_b = 186 \text{ kg/mm}^2$ is somewhat lower than the sensitivity at $\sigma_b = 95 \text{ kg/mm}^2$. It is assumed that the cause of the low sensitivity to notching of high-strength steel is its high cyclic toughness. Workhardening does not change the nature of the dependence of the sensitivity to notching on the strength, but merely affects the absolute value of the sensitivity index.

[Abstracter's note: Complete translation]

Card 2/2

8/123/62/000/023/003/008
A004/A101

AUTHORS: Oding, I. A., Gurevich, S. Ye.

TITLE: The sensitivity to notching of high-strength steels at cyclic loads

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 23, 1962, 14, abstract 23A100 (In collection: "Tsiklich. prochnost' metallov". Moscow, AN SSSR, 1962, 169 - 176)

TEXT: Fatigue bending tests were carried out on smooth specimens and on notched specimens of the 30 XPCA (30KhGSA) structural steel grade to elucidate the dependence of the criteria of the sensitivity-to-notching ratio q and v ($q = \frac{k_{\sigma} - 1}{k_t - 1}$, where k_{σ} - effective coefficient of concentration; k_t - theoretical coefficient of concentration, and $v = \frac{\Delta_{-1p}}{\sigma_{-1p}}$, where E - modulus of elasticity; Δ_{-1p} - index, characterizing the cyclic toughness; σ_{-1p} - endurance limit of the smooth specimens during tensions - compression) on the strength and hardness. It is shown by experiments that, with an increase in strength of the 30KhGSA

Card 1/2

S/137/62/000/011/025/045
A052/A101

AUTHOR: Oding, I. A.

TITLE: Diffusionless mechanism of fatigue crack formation and growth

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 11, 1962, 46, abstract
11I293 (In collection; "Tsiklich. prochnost' metallov." Moscow,
AN SSSR, 1962, 3 - 10)

TEXT: Possible mechanisms of fatigue crack formation and growth are considered. The diffusion mechanism of crack formation is possible at temperatures securing a sufficiently vivid diffusion process in metals. For the majority of metals such temperatures are room and higher temperatures. The diffusionless mechanism of crack formation is conditioned by the interaction of dislocations. The fatigue rupture of metals can take place in this or that way depending on conditions (e.g. temperature) under which cyclic loads act on metals. Depending on the nature of a metal, this or that mechanism can prove more effective. The process of fatigue crack growth is analyzed.

V. Srednogorska

[Abstracter's note: Complete translation]

Card 1/1

Cyclic Metal Strength (Cont.)

SOV/6025

and growth of fatigue cracks, the role of plastic deformation in fatigue fracture, an accelerated method of determining fatigue strength, the plotting of fatigue diagrams, and various fatigue test methods. New data are presented on the sensitivity of high-strength steel to stress concentration, the effect of stress concentration on the criterion of fatigue failure, the effect of the size factor on the strength of metal under cyclic loads, and results of endurance tests of various machine parts. Problems connected with cyclic metal toughness, internal friction, and the effect of corrosion media and temperature on the fatigue strength of metals are also discussed. No personalities are mentioned. Each article is accompanied by references, mostly Soviet.

TABLE OF CONTENTS:

NATURE OF FATIGUE FRACTURE

Oding, I. A. Diffusionless Mechanism of Formation and Growth of a Fatigue Crack
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ODING, I.A.

PHASE I BOOK EXPLOITATION

SOV/6025

Soveshchaniye po ustalosti metallov. 2nd., Moscow, 1960.

Tsiklicheskaya prochnost' metallov; materialy vtorogo soveshchaniya po ustalosti metallov, 24 - 27 maya 1960 g. (Cyclic Metal Strength; Materials of the Second Conference on the Fatigue of Metals, held May 24 - 27, 1960) Moscow, Izd-vo AN SSSR, 1962. 338 p. Errata slip inserted. 2800 copies printed.

Resp. Ed.: I. A. Oding, Corresponding Member of the Academy of Sciences of the USSR; Ed. of Publishing House: A. N. Chernov; Tech. Ed.: A. P. Guseva.

PURPOSE: This collection of articles is intended for scientific research workers and metallurgists.

COVERAGE: The collection contains papers presented and discussed at the second conference on fatigue of metals, which was held at the Institute of Metallurgy in May 1960. These papers deal with the nature of fatigue fracture, the mechanism of formation

Card 1/1

ODING, Ivan Avgustovich; MARKOVETS, M.P., doktor tekhn. nauk, prof.,
retsenzent; ARONOVICH, M.S., kand.tekhn.nauk, red.; MERENSKAYA,
I.Ya., red. izd-va; UVAROVA, A.F., tekhn. red.

[Permissible stresses in the manufacture of machinery and cyclic
strength of metals] Dopuskaemye napriazhenia v mashinostroenii i
tsiklicheskaia prochnost' metallov. Izd.4. ispr.i dop. Moskva,
Mashgiz, 1962. 259 p. (MIRA 15:7)

1. Chlen-korrespondent Akademii nauk SSSR (for Oding).
(Strength of materials) (Machinery--Construction)

28899

S/129/61/000/010/001/012
E193/E480

A study of the mechanism ...

deformation which indicated that, under the experimental conditions employed, creep is associated mainly with intercrystalline slip with very little deformation taking place within the grains.

(3) The total elongation depended upon the applied stress and varied between 17.5 and 25% in steel EKhl8N9 and between 8 and 16% in steel 4Kh14N14V2M. This difference was attributed to the larger grain-size of the latter material.

(4) For an equal stress of 2.5 kg/mm², the time-to-rupture was 5.5 and 24 minutes on steels EKhl8N9 and 4Kh14N14V2M respectively. This difference was also attributed to the difference in the grain-size, since the total length of the grain boundaries which determine the strain accumulated prior to fracture is smaller in a coarse-grained material. There are 9 figures and 3 Soviet-bloc references.

ASSOCIATION: Institut metallurgii i Institut mashinovedeniya
AN SSSR (Institute of Metallurgy and Institute of
Science of Machines AS USSR)

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28899

S/129/61/000/010/001/012
E193/E480

A study of the mechanism ...

(50 microns) microhardness indentations, was facing a window through which microcinephotographs were taken throughout the duration of each test. This made it possible to study each stage of the deformation process by measuring the increase in the distance between the diamond pyramid indentations, and by following the changes in the microstructure. To overcome the difficulties caused by volatilization of the test piece material and its subsequent condensation as a metallic film on the window of the vacuum chamber, a special device was constructed whose detailed description is given in the paper. Some of the typical results are reproduced in Fig. 9, showing the strain (ϵ , %) versus time (minutes) curves for steel 4Kh14N14V2M tested at 1100°C under a stress of 5.5 kg/mm²; broken curve relates to the total elongation of the test piece, curves marked by numbers give the elongation of microregions bounded by the corresponding diamond indenter marks as shown in the insert in Fig. 9. Other observations can be summarized as follows.

- (1) The microstructure of the steels studied was revealed after one minute at 1100°C; this was most likely caused by preferential volatilization of the metal in the grain boundary regions.
- (2) Intergranular cracks appeared in the very early stages of

Card 2/4