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25904

S/123/61/000/013/001/025  
A052/A101

AUTHORS: Lebedev, T. A.; Kolosov, I. Ye.

TITLE: Fatigue test of steel annealed samples in a state near to maximum hardening

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 13, 1961, 15, abstract 13A119 (Nauchno-tekhn. inform. byul. Leningr. politekhn. in-ta, no. 5, 1960, 56-61)

TEXT: The effect of training on the fatigue strength of XBT (KhVG), Y10A (U10A) and 65T (65G) steel under conditions of a nearly maximum hardening has been investigated. The samples, which withstood 5-10 million cycles at the fatigue limit stress, have been subjected to a gradual increase of the load after a certain number of cycles. After the load causing destruction under such conditions has been determined for each grade of steel, a continuous training has been carried out at this load. It has been established, that at a stepwise increase of the load the training raises the cyclic strength by 40-50% over the fatigue limit. The magnitude of hardening depends on the training stress level.

V. Kolesnik

[Abstracter's note: Complete translation]

Card 1/1

KOBOLOV, I. YE.

45

PHASE I BOOK EXPLOITATION

SOV/6025

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

Tsklicheskaya 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. Odintsov, 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: This 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

45

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  
Card 2/4

3

4

Cyclic Metal Strength (Cont.)	SOV/6025
Ivanova, V. S. Structural-Energetic Theory of Metal Fatigue	11
Vsexolodov, G. N. On the Propagation of Fatigue Cracks	24
Kudryavtsev, I. V. and N. M. Savvina. On the Causes of the Lowering of Steel Fatigue Strength in Contact Zones	31
<u>Ezlikh, L. B.</u> Mechanism of Fatigue Fracture Under Contact Load	37
Lebedev, T. A. and <u>I. Ye. Kolosov.</u> Fatigue Test of Hardened Steels	42
Chernyak, N. I. On Prestrain-Induced Changes in Fatigue Strength of Steel	48
Kogan, R. L. Laws Governing Plastic Strain Propagation in Specimens Under Cyclic Bending	54

Card 3/9

S/126/62/014/002/008/018  
E193/E483

AUTHORS: Parshin, A.M., Kolosov, I.Ye., Marinets, T.K.,  
Pechnikov, I.I.

TITLE: Deflection points on the stress/time-to-rupture curves

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.2, 1962,  
244-251

TEXT: When data on creep strength of an alloy are plotted in the  $\log \sigma / \log \theta$  coordinates (where  $\sigma$  is the effective stress and  $\theta$  time-to-rupture), the resultant curves often have a deflection point, the change of slope occurring usually at low values of  $\theta$  not exceeding several hours. According to some workers, this effect (which should be taken into account when results of short-time tests are extrapolated to obtain the values of  $\sigma$  under conditions of prolonged loading) has some physical significance reflecting a change either in the mechanism of deformation, or in the structure of the material. To check this theory the present authors analysed the results of a large number of short-time creep tests conducted earlier by Parshin on austenitic, 1X18H9T (1Kh18N9T), and dispersion-hardening, EI696 (EI696), X18H22B2T2 (Kh18N22V2T2), steels at 650 to 950°C, <sup>3/1696</sup>  
Card 1/3

APPROVED FOR RELEASE: 09/18/2001

CIA-RDP86-00513R000823920019-7

Deflection points ...

S/126/62/014/002/008/018  
E193/E483

correlating these data with the results of metallographic examination and studies of solid state transformations taking place in these materials. Several conclusions were reached.

- (1) The position of the deflection points on the  $\log \sigma / \log \theta$  curves is independent of the grain size of the alloy, but is shifted towards the lower values of  $\theta$  with increasing test temperature.
- (2) There is no evidence that the presence of deflection points is associated either with a change in the mechanism of fracture (from intra- to inter-crystalline), or with any structural changes such as the formation of the  $\sigma$ -phase, precipitation and growth of the  $\text{Cr}_{23}\text{C}_6$  and  $\text{Fe}_3\text{Ti}$  phase particles, and the resultant changes in the composition of the solid solution matrix.
- (3) It can be assumed that the presence of deflection points on the  $\log \sigma / \log \theta$  curves is a characteristic common to all the oxidation-resistant alloys with high strength at elevated temperatures. Since, however, in most cases they correspond to low values of  $\theta$  (1 to 3 h), they have little practical importance in consideration of creep-strength under conditions of prolonged loading. There are 7 figures.

Card 2/3

S/659/62/008/000/028/028  
I048/I248

AUTHORS: Parshin, A.I., and Kolosov, I.E.

TITLE: Nature of the anomalous behavior of steel 1Kh18N9T during stress rupture tests

SOURCE: Akademiya nauk SSSR. Institut metalurgii, Issledovaniya po zharoprochnym splavam. v.8. 1962. 230-242

TEXT: Tests on steel 1X18H9T(1Kh18N9T) within the temperature range 650-950°C are reported. The steel was of an uniform austenitic structure, its chemical composition being: C 0.08-0.10, Si 0.31-0.65, Mn 0.97-1.10, Cr 17.0-17.98, Ni 9.85-10.40, S 0.010-0.016, P 0.028-0.033, Ti 0.41-0.65%, and the balance Fe. Experiments with specimens of different grain sizes (sizes 1-8 on GOST scale 5639-51) showed that in steels with a Ti/C ratio above 5 the rupture strength increased with decreasing grain size. The location of the break in the straight line representing the stress - rupture time relationship (log log plot) was independent of the grain size but depended on the temperature and the time, e.g., this break at 900°C for

Card 1/2

8/563/62/000/219/002/002  
E193/E383.

AUTHORS: Parshin, A.M. and Kolosov, I.Ye.

TITLE: Causes of some specific features in the performance of steel 1X18H9T (1Kh18N9T) during creep tests

SOURCE: Leningrad. Politekhnikheskiy institut. Trudy. no.218. Moscow. 1962. Mashinostroyeniye. 115 - 129

TEXT: Some time ago, one of the present authors studied the effect of the grain size of steel 1Kh18N9T on its UTS at 650-950 °C (A.M. Parshin, Khrupkoye razrusheniye norzheveyushchikh staley (Brittle fracture of stainless steels) Metallovedeniye, Sudpromgiz, 1960, no. 4). It was observed in the course of this work that different melts of the steel studied yielded different results; thus, in the case of two out of four experimental melts, the creep resistance of the steel decreased with increasing grain size. The object of the present investigation was to elucidate the nature of this anomalous effect. The experiments were carried out on hot-rolled rods, 20 - 35 mm in diameter, and on specimens of plate 16 and 25 mm thick. To eliminate the possibility of  $\delta$ -ferrite affecting the results of

Card 1/3

Causes of some specific ....

S/563/62/000/219/002/002  
E193/E383

creep tests, materials consisting of austenite only were used in the tests. The grain size of the test pieces ranged from 1 - 8 (on the OCT 5639-50 (GOST 5639-50) scale). The composition of the steel varied within the following limits (%): 0.08-0.1 C, 0.31-0.65 Si, 0.97-1.17 Mn, 17-17.9 Cr, 9.85-10.4 Ni, 0.010-0.016 S, 0.028-0.032 P and 0.41-0.65 Ti; the Ti/C ratio varied between 4.1 and 8.1. In the first series of experiments the time-to-rupture curves were constructed for various melts of steel 1Kh18N9T tested at 650 - 900 °C under stresses ranging from 1 - 28 kg/mm<sup>2</sup>; the elongation of each fractured test piece was also measured. In all, 750 tests were carried out. The results were inconclusive: a definite relationship was established between the time-to-rupture and the grain size of the test piece, but the creep-resistance of this steel increased with increasing grain size in some cases and decreased in others. Subsequently, the variation of the micro-structure of the test pieces during the creep tests was studied in relation to their grain size, and the concentration of impurities such as O, H, N, Pb, Sn, Sb, Bi, Zn and Al was determined. Conclusions: 1) Time-to-rupture of the steel depends on its plasticity, which, in turn, is a function of the grain size. As

Card 2/3

APPROVED FOR RELEASE: 09/18/2001

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Causes of some specific ....

S/563/62/000/219/002/002  
E193/E383

the grain size increases, both the plasticity of the steel and its creep-resistance decrease. 2) The Ti/C ratio is another factor on which the plasticity of steel 1Kh18N9T depends. Increasing this ratio above the value of 4 brings about a decrease in the plasticity of the steel, the harmful effect of excess Ti becoming more pronounced with increasing grain size. This explains the anomalous behaviour of the different melts tested. 3) The excess Ti is precipitated at the grain boundaries in the form of a secondary intermetallic compound. As a result, the strength of the grain boundaries decreases, the intracrystalline slip is suppressed and the plastic deformation is shifted to the grain-boundary regions, which leads to premature brittle fracture. 4) Excessive concentration of Ti (Ti/C > 5:6) is one of the main causes of impaired high-temperature properties of the steel studied. There are 11 figures and 2 tables.

Card 3/3



S/137/62/000/011/028/045  
A006/A101

AUTHORS: Lebedev, T. A., Kolosov, I. Ye.

TITLE: Fatigue tests of quenched steels

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 11, 1962, 67,  
abstract 11I433 (In collection: "Tsiklich, prochnost' metallov",  
Moscow AN SSSR, 1962, 42 - 47)

TEXT: The authors studied the behavior in fatigue tests of instruments steel grades Y 10 A (U10A), X B Γ (KhVG) and 9XC (9Khs). The specimens were subjected to conventional or isothermal quenching from 780°C (steel U10A) 830°C (steel KhVG) and 870°C (steel 9Khs), and tempering at 180°C for 1.5 to 2 hours. R of the specimens was 60 - 62. The tests were performed on bracket machines B<sup>cy</sup>-8 (VU-8) at a speed as high as 2,300 rpm.  $\sigma_w$  could not be established at the stresses used (from 120 - 130 to 65 - 75 kg/mm<sup>2</sup>). The specimens broke down after many millions of cycles. The results of the tests show that a continuous relationship exists, within a range of 500 - 1,000 million cycles, which is expressed by a straight line in logarithmic coordinates. Tests with recording of

Card 1/2

Fatigue tests of quenched steels

S/137/62/000/011/028/045  
A006/A101

the curve of deflection changes during the process of the cyclic effect, show that there are some differences between quenched steels and ductile materials in the process of fatigue failure.

I. Strebkov

[Abstracter's note: Complete translation]

Card 2/2

KOLOSOV, I.Ye., kand.tekhn.nauk; LEBEDEV, T.A., doktor tekhn.nauk

Cyclic strength of hardened tool steels. Metalloved. 1 term. obr.  
met. no.10:15-19 0 '62. (MIRA 15:10)

1. Leningradskiy politekhnicheskoy institut.  
(Tool steel—Fatigue)

PARSHIN, A.M.; KOLOSOV, I.Ye.

Causes of some peculiarities in the behavior of steel  
1Kh18N9T during endurance tests. Trudy LPI no.219:115-129  
'62. (MIRA 15:12)

(Steel--Testing)

PARSHIN, A.I.; KOLOSOV, I.Ye,

Nature of the anomalous behavior of 1Kh18N9T steel during tests  
for stress-rupture strength. Issl.po sharopr.splav. 8:230-242 '62.  
(MIRA 16:6)

(Chromium-nickel steel--Testing) (Titanium)

PARSHIN, A.M.; KOLOSOV, I.Ye.; MARINETS, T.K.; PECHNIKOV, I.I.

Curvature of stress-rupture strength curves. Fiz. met. i metalloved.  
14 no.2:244-251 Ag '62. (MIRA 15:12)

1. Leningradskiy politekhnicheskoy institut imeni M.I.Kalinina.  
(Strains and stresses) (Curves)

ACCESSION NR: AP4010069

S/0129/64/000/001/0019/0023

AUTHOR: Lebedev, T. A.; Parshin, A. M.; Kolosov, I. Ye.; Pechnikov, I. I.

TITLE: Heat resistance of titanium-stabilized austenitic chrome-nickel steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 1, 1964, 19-23

TOPIC TAGS: steel plasticity, fine-grained steel, coarse-grained steel, X18H9T steel, austenitic steel, titanium-carbon ratio, arsenic, antimony, sulfur, phosphorus

ABSTRACT: An investigation of the durability and plasticity of X18H9T steel revealed that its coarse grain prolongs the durability in some cases, shortens it in others and leaves it unchanged in still others. It was also found that the durable stability and plasticity of the steel are to some extent determined by the titanium-carbon ratio ( $\frac{Ti}{C}$ ) in the steel. A ratio of  $\frac{Ti}{C} > 4 - 5$  tends to reduce the

Card 1/2

ACCESSION NR: AP4010069

durability and plasticity of coarse-grained steel. The durable plasticity of coarse-grained steel is considerably shorter than that of fine-grained steel. An increase in the titanium content of coarse-grained steel reduces its deformation capacity, but fine-grained steel, whether produced commercially or in laboratory, is not affected by excessive titanium. Such low-melting impurities as lead, tin, antimony and arsenic, even in small quantities, have an adverse effect on the heat-resisting properties of austenitic steel. Laboratory-produced steel is found to be more durable than commercial steel because it contains fewer impurities. The use of very fine-grained steel for durable products to be used at high temperatures is undesirable. Fine-grained steel becomes brittle at room temperature after prolonged aging at high temperatures. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 07Feb64

ENCL: 00

SUB CODE: ML, AP

NO REF SOV: 011

OTHER: 001

Card 2/2



L 20628-66 EPF(n)-2/ENT(m)/I/EWA(d)/ENP(w)/ENP(t) IJP(c) JD/JG

ACC NR: AP6010096

SOURCE CODE: UR/0129/66/000/003/0049/0053

AUTHOR: Parshin, A. M. Kolosov, I. Ye.

ORG: none

38  
37  
B

TITLE: Effect of grain size and the ratio of niobium:carbon content on the properties of Kh16N15M3B steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1966, 49-53

TOPIC TAGS: steel, chromium steel, nickel containing steel, niobium containing steel, molybdenum containing steel, heat resistant steel, steel grain size, steel rupture strength, steel ductility / Kh16N15M3B steel

ABSTRACT: The effect of grain size and the ratio of niobium:carbon content on the rupture strength and ductility of Kh16N15M3B chromium-nickel heat-resistant steel has been investigated. The steel contained 0.07-0.09% C, 16% Cr, 15% Ni, 2.8-2.9% Mo, 0.43-1.58% Nb; the Nb:C ratio varied from 5.5 to 22.6, the grain size from 6 to 2, and the test temperature from 20 to 1100 C. The room-temperature tensile strength of fine-grained steel was found to be higher and the ductility and

21 21

Card 1/2

UDC: 669.14.018.4:620.186.82

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ACC NR: AP6010096

notch toughness to be lower than those of coarse-grained steel. In both coarse- and fine-grained steels, the room-temperature tensile strength remained unchanged and the ductility and, especially, notch toughness decreased as the Nb:C ratio increased. At temperatures up to 650C, the grain size had practically no effect on the tensile strength, but at higher temperatures the strength increased with increasing grain size. Results of rupture strength tests at 550-950C showed the coarse-grained steel has a higher rupture strength at 650-950C than the fine-grained steel. The Nb:C ratio had no effect on the rupture strength of the fine-grained steel, but in coarse-grained steel the rupture strength decreased with increasing Nb:C ratio. The ductility of Kh16N15M3B steel in the 550-950C range decreased with increasing grain size, especially at temperatures above 650C. In 1000-hr tests at 800C, the fine-grained steel had a ductility of 15% and the coarse-grained steel, about 5%. The ductility also decreased with increasing Nb:C ratio, regardless of the steel grain size. The decrease in the ductility is not continuous however, and at a certain time before rupture, the ductility begins to increase. The higher the Nb:C ratio, the sooner the ductility begins to increase after continuously decreasing. Orig. art. has: 5 figures and 1 table. [MS]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 001/

ATD PRESS: 4224

Card 2/2 *cb*

~~KOLOSOV, K.A.~~ ISTOMIN, G.A.

Modern superminiature cameras. Zhur.nauch. i prikl. fot. i kin. 2  
no.1:72-75 Ja-F '57. (MIRA 10:3)  
(Cameras)

MARKHILEVICH, K.I.; SHEBERSTOV, V.I.; KIRILLOV, N.I., prof., doktor  
tekhn.nauk; MASLENKOVA, N.G.; KOLOSOV, K.A.; MEKHAYLOV, V.Ya.;  
MATIYASEVICH, L.M.; FRIDMAN, I.M.; SPASOKUKOTSIY, N.S.; KHAZHAN,  
S.M.; DEYCHMEYSTER, M.V.; BLYUMBERG, I.B., dotsent, retsenzent;  
LYALIKOV, K.S., prof., doktor khim.nauk, retsenzent; TELESHEV,  
A.N., red.; MALEK, Z.N., tekhn.red.

[Present-day developments in photographic processes; processing  
of light sensitive materials and new processes for obtaining the  
photographic image] Sovremennoe razvitie fotograficheskikh  
protssessov; obrabotka svetochuvstvitel'nykh materialov i novye  
protssessy polucheniia fotograficheskogo izobrazheniia. Pod red.  
N.I.Kirillova. Moskva, Gos.izd-vo "Iskusstvo," 1960. 341 p.  
(MIRA 14:4)

1. Leningradskiy institut kinoinzhenerov (for Blyumberg).  
(Photographic chemistry)

S/006/60/000/010/003/008  
B012/B054

AUTHOR: Kolosov, Kh. Ya.

TITLE: Experience Gathered in the Topographic Identification of Spectrozoal Aerial Photographs 10

PERIODICAL: Geodeziya i kartografiya, 1960, No. 10, pp. 33 - 34

TEXT: To determine the advantages of spectrozoal aerial photographs compared with black-and-white photographs, an attempt was made in 1959 to carry out a topographic identification in the field on spectrozoal aerial photographs of 1 : 25,000 in making a map of the same scale by the stereotopographic method. This suggestion had been made by an experimental and research laboratory, and the work was done by one of the teams of the Novosibirskoye AGP (Novosibirsk AGP). The section to be investigated was deliberately chosen with very complicated outlines. Results of identification of the individual map elements are pointed out. Buildings at inhabited points in the country are pictured green on the spectrozoal aerial photographs, and show a strong contrast as against other colors. The hill of an old fixed point, about 0.5 m high and covered with grass,

Card 1/2

KOLOSOV, K.

Manganese and chromium reducers. Sov.foto 22 no.1:33 Ja '62.  
(MIRA 15:1)

(Photographic chemicals)

Z/011/62/019/010/006/009  
E073/E535

AUTHOR: Kolosov K.

TITLE: On improving the light sensitivity

PERIODICAL: Chemie a chemická technologie. Přehled technické a  
hospodářské literatury, v.19, no.10, 1962, 483,  
abstract Ch 62-6513 (Sov.Foto.v.22, no.2, 1962, 35)

TEXT: Discussion of the results of development of films  
at an elevated temperature and in special developers which increase  
the sensitivity from the point of view of maximum utilisation of  
the sensitivity of the developed film.

[Abstracter's note: Complete translation.]

Card 1/1

KOLOSOV, L.

Soviet-Italian trade. Vnesh.torg. 30 no.1:9-11 '60.

(MIRA 13:2)

(Russia--Commerce--Italy) (Italy--Commerce--Russia)



KOLOSOV, L.V., inzh.-major

Method for conducting lessons on electronic apparatus. Vest.  
protivovozd.obor. no.2:59-62 F '61. (MIRA 14:2)  
(Radar in aeronautics)



KOLOSOV, M., inzh.-izobretatel' (Divnogorsk)

Conveyed ships. Izobr. i rats. no.12:20-22 '63.  
(MIRA 17:2)

KOLOSOV, M.

Using brushwood panels in building fascine structures during the navigation period. Rech.transp. 19 no.8:44-45 Ag '60. (MIRA 14:3)

1. Prorab Vetluzhskogo tekhnicheskogo uchastka puti.  
(Rivers—Regulation)

KOLOSOV, M., prorab

Mechanization of pile driving in the building of hydraulic structures.  
Rech.transp. 20 no.4:48 Ap '61. (MIRA 14:5)

1. ~~Metl~~ushskiy tekhnicheskiy uchastok puti.  
(Piling (Civil engineering))

KOLOSOV, M., inzh.

Lockage of small rivers with the use of flexible dams. Rech.  
transp. 22 no.10:45 0 '63. (MIRA 16:12)

KOLOSOV, M., inzh.-gidrotekhnik (Krasnoyarsk)

Nylon sluice and a dam on cables. Izobr.i rats. no.5 (201):8 '63.  
(MIRA 16:7)

(Dams)

3

24460

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S/109/61/006/006/001/016  
D204/D303

AUTHORS: Armand, N.A., Vvedenskiy, B.A., Kalinin, A.I.,  
KolosoV, M.A., Sokolov, A.V., Shabel'nikov, A.V.,  
and Shirey, R.A.

TITLE: A survey of work on the tropospheric propagation of  
ultrashort radiowaves

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 6, 1961,  
876 - 885

J

TEXT: The large body of experimental work done in this field has  
been aided by the perfecting of apparatus and auxiliary instru-  
ments and given impetus by the need for more knowledge to assist  
the development of telephony, television and radio communications.  
The authors examine the following: 1) Relations between field  
strength and distance; 2) Signal level and frequency: the theoret-  
ical picture is confused, state the authors, but most experimen-  
tal work suggests that  $P_r/P_o$  ( $P_r$  - received power,  $P_o$  - value in

Card 1/8



24460

A survey of work on the ...

S/109/61/006/006/001/016  
D204/D303

free space) declines as the frequency rises. No uniform value of  $F_2(\lambda)$  has been found as yet, probably because of the changeability of the tropospheric structure and meteorological conditions; 3) Signal and time: Signal fading may be rapid or slow. Most information concerns 300 - 500 km traces. Slow fading is caused by the appearance or disappearance of inversion layers, large irregularities and changes in the value of  $d\epsilon/dh$ . Usually the signal strength is greater in the evening and at night, clearer in summer than in winter and at shorter (100-150 km) rather than longer (400 - 500 km) distances. The amplitude is related to frequency; also, as it combines with slow fading, the average amount of fading increases reaching, according to some sources, a maximum at 100-130 km. Others maintain that it declines with increase in distance to an equal summer and winter value of 3 - 10 db at 900 km; 4) Loss of antennae amplification: The phenomenon occurs beyond the horizon and means that for an antenna with an amplification coefficient  $G$ , exceeding 35-40 db, amplification is less than in free space. To account for this there are two hypotheses: (1) Spreading of radio-

Card 2/8

24460

A survey of work on the ...

S/109/61/006/006/001/016  
D204/D303

waves in a statistically non-homogeneous medium leads to distortion of the wave front in the plane of the receiving antenna and thus the energy absorbed is less than in the absence of amplitude and phase fluctuation, (2) elementary waves with various random angles of approach may reach the receiving antenna. These hypotheses have been investigated but comparison of results is hampered by differences in experimental conditions. For a 300 km trace the amplification loss increases with increase in the average amplification of receiving and transmitting antennae and with an increase of D to 300 - 500 km and  $f = 2290$  megacycles. At greater distances the loss falls; 5) Signal distortion: Work in this field either treats the troposphere as an ideal quadruple network or aims to determine the amplitude correlation of the signal components on different frequencies in the transmitted spectrum. If with antennae with low directivity the amplitude of delayed waves is diminished by diffraction weakening of the earth's surface and the "directivity" of the troposphere, then at antennae with narrow patterns the amplitude of these waves decreases because of the di-

Card 3/8

24460

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A survey of work on the ...

S/109/61/006/006/001/016  
D204/D303

rectivity of the antenna. The maximum transmitted frequency band depends on the width of the directivity pattern of the antenna. The random nature of the tropospheric radiation means that signal distortion has a random pattern as experiments in the USSR have confirmed. Two separated antennae in space diminish distortion and guarantee a large carrying capacity of tropospheric radio links;  
6) Radio-meteorological research: Refractometric measurements have dealt with the structure of the troposphere and, in particular, the value of  $\epsilon(h)$ ,  $(\Delta\epsilon)^2$  and the area of turbulence

$$1 \sqrt{(\Delta\epsilon)^2}$$

usually varies within the range 0.3 - 3N units and irregular layers are usually 1 - 300 m thick. "Jump" intensity in these regions is usually 2 - 50 or 60 N units, large especially in the "invisible clouds". It was stated that at a height  $h = 3000$  m and more  $(\Delta\epsilon)^2/1$  is too small to explain distant fields and its alteration with height does not give the necessary value of  $P_r(D)$ . The authors

Card 4/8

A survey of work on the ...

24460  
S/109/61/006/006/001/016  
D204/D303

gradient  $d\varepsilon/dh$ ; with this formula theory discrepancy concerns basically the value of  $\sigma$ .  $\sigma$ , moreover, can be expressed simply as

$$\sigma(\theta) = \frac{b}{\sin^m \left(\frac{\theta}{2}\right)}$$

where  $\theta$  - radiation angle, equal to the angular distance between transmitter and receiver;  $b$  - expression giving ratios of 1,  $d\varepsilon/dh$  and others to  $(\Delta\varepsilon)^2$ . For whole even numbers  $m > 2$  this accords well with a general formula and is integrated with formula 2 to give

$$\frac{P_r}{P_o} = Q b A_m D^{-m+3}, \quad (2)$$

where  $A_m$  depends on  $m$ . If  $b \approx h^{-n}$ , then  $D^{-m+3-2n}$  replaces  $D^{-m+3}$ ;  $m$  can be substituted by nearest even whole number, in cases of close approximation. Current theories give results approximate to

Card 6/8

24460

S/109/61/006/006/001/016  
D204/D303

A survey of work on the ...

then deal with incoherent scatter and globular irregularities: In the last few years much attention has been devoted to the conception of incoherent scatter. Two chief theories have been established: One which gives for the frequency subordinate of  $P_r/P_0$ , a coefficient of  $\lambda^{-7/3}$ , and the theory of "disturbance of the gradient", which gives  $\lambda$ . The second approaches more closely to the experimental facts, and is generally preferred. Maxwell's equations for statistically non-homogeneous layers above a spherical earth have not yet been resolved and a solution must combine the theory of diffraction spread with pereoptical theory. All theories, in essence, approach those of a "radar form type"

$$\frac{P_r}{P_0} = QD^2 \int_V \frac{\sigma(\theta)}{R_1^2 R_2^2} dV, \tag{1}$$



where Q is a constant factor;  $\sigma(\theta)$  - "scatter area" - a junction for the influence of fluctuation  $\epsilon$  and its relation to  $\lambda$  and the

Card 5/8

21460

A survey of work on the ...

S/109/61/006/006/001/016  
D204/D303

Eq. 2. Finally mentioned are: a) incoherent scatter and turbulency layers, and b) coherent reflecting layers. On a) it is pointed out that the use of tropospheric layers for wave reflection has been extensively studied and that in 1955 V.N. Troitskiv (Ref. 107: Radiotekhnika, 1956, 11, 5, 3) obtained a calculated formula which accorded with experimental observations. On b) it is noted that stable layer reflection has met with two objections: The first concerns the incompatibility of the existence of great changeability patterns over long distances with the idea of stable tropospheric layers; the second, is, however, theoretical and hardly affects the practical aspect of the problem; the existence of layers has been firmly established and it is positive that a diffraction approach to the problem of spread along the earth's curvature will be of value. A simplification of reported formulae was attempted and

$$\frac{P_r}{P_0} = \frac{1}{D} \Phi(\lambda, [\frac{d}{dh}]_0, h_1, h_2) \exp[-\alpha D],$$



Card 7/8

KOLOSOV, M.A.

B.A.Vvedenskii; on his 70th birthday. Radiotekh. i elektron. 8  
no.7:1287-1288 J1 '63. (MIRA 16:8)  
(Vvedenskii, Boris Alekseevich, 1893-)





the maximum possible rate of ... over  
distance in interplanetary space. A comparison of these  
of American ... data being  
The meter-based ...  
lower. (2) ...  
(3) Widening of the ... process.  
indicates that a solar activity influence on a ... level  
possible. Orig. art. Enc. 2 figures.

ENCLOSURE

NO REF SOV.

KROKHIN, O.N.; KOLOSOV, M.A., doktor tekhn.nauk

Problems of quantum radiophysics and radio wave propagation; session  
of the Department of General and Applied Physics. Vest.AN SSSR 35  
no.6:101-103 Ja '65. (MIRA 18:8)

L 5094-56 SMT(d)/EBC(k)-2 RB/MS-2  
ACCESSION NR: AP5020117

UR/0109/65/010/008/1401/1409  
621.371.242

AUTHOR: Armand, N. A.; Kolosov, M. A.

39

TITLE: Radio wave refraction in the troposphere

3

SOURCE: Radiotekhnika i elektronika, v. 10, no. 8, 1965, 1401-1409

TOPIC TAGS: electromagnetic wave refraction, tropospheric refraction

ABSTRACT: Formulas are developed for calculating, on the basis of meteorological data, the angle of refraction caused by the troposphere and stratosphere. A high correlation between the radiowave-refraction angle and the ground air refraction index is noted. However, the formulas that include parameter A may prove inaccurate when applied to other than American conditions as the value of this parameter depends on climatic conditions (cf. B. R. Bean and G. D. Thayer, Proc. IRE, 1959, v. 47, no. 5, p. 740). Hence, further experiments are urged. The final formulas are not guaranteed in the interval  $\vartheta = 89-90^\circ$  as the initial formulas were based on the concepts of geometrical optics. Orig. art. has: 3 figures, 45 formulas, and 1 table.

Card 1/2

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L 2884-66

ACCESSION NR: AT5023589

or by the random rotation of the polarization plane due to the Faraday effect. This irregular character is therefore attributed to the effect of the interplanetary medium. An assumption is also advanced that during the propagation of radio waves at such distances a change in their spectrum may occur. Orig. art. has: 2 figures and 1 table. [JR]

ASSOCIATION: none

SUBMITTED: 02Sep65

ENCL: 00

SUB CODE: AA, EC

NO REF SOV: 012

OTHER: 018

ATD PRESS: 4/09

Card 2/2 *JP*

L 2881-66 EWT(d)/FBD/FSS-2/EWT(1)/EBC(k)-2/EWA(d) TT/RB/GS/GW/WS-4  
ACCESSION NR: AT5023589 UR/0000/65/000/000/0227/0233

AUTHOR: Kolosov, M. A.; Yakovlev, O. I.; Yefimov, A. I.

TITLE: Propagation of radio waves in interplanetary and near solar space <sup>55</sup> <sup>55</sup> 44 BH

SOURCE: <sup>55</sup> Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 227-233

TOPIC TAGS: radio emission, <sup>55</sup> radio wave propagation, radio wave absorption

ABSTRACT: A study of radio wave propagation from Mars-1 at 183.6 Mc and reception at distances of up to 50 million km is reported. The study included analysis of radio wave propagation at distances of the order of 300 million km on the basis of radio emission data from Taurus A. In particular, an attempt was made to determine 1) the maximum possible values of monochromatic radio wave attenuation in interplanetary space, 2) the attenuation of radio waves with a white spectrum in the near solar region, 3) the effect of the interplanetary medium on radio wave propagation, and 4) the possible mechanism of monochromatic radio wave attenuation. Analysis of signals from Mars-1 indicates signal fadings have an irregular character which cannot be entirely explained either by the effect of ionospheric inhomogeneities

Card 1/2

L 5094-66

ACCESSION NR: AP5020117

ASSOCIATION: none

SUBMITTED: 01Jun64

ENCL: 00

SUB CODE: EC

NO REF SOV: 004

OTHER: 006

Card 2/2. *hd*

L 4420-66 EWT(d)/EWT(1)/EEC(k)-2 CW/WS-2

ACC NR: AP6016331 (✓) SOURCE CODE: UR/0026/65/000/012/0016/0024

AUTHOR: Vvedenskiy, B. A. ; Kolosov, M. A.

72  
B

ORG: Radiotechnology and Electronics Institute, AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: UHF wave propagation in the troposphere ✓

SOURCE: Priroda, no. 12, 1965, 16-24

TOPIC TAGS: troposphere, UHF wave propagation, wave refraction, wave diffraction, waveguide, millimeter wave, submillimeter wave, tropospheric radio wave, laser, wave scattering

ABSTRACT: The authors review experimental and theoretical developments in the history of the study of UHF wave propagation in the troposphere, dividing the study into six periods. The first period covers the twenties and deals with primitive equipment and short-wave transmission, the second, extending through the thirties, with UHF waves, which were found to penetrate beyond the horizon line, leading to the development of the theories of refraction and diffraction. The

Card 1/2

L 44420-66

ACC NR: AP6016331

third period, covering the forties, is characterized by detailed elucidation of UHF wave propagation which eventually led to the discovery of tropospheric waveguides and long-range tropospheric propagation. This was the beginning of the fourth period in the study of UHF wave propagation. The authors examine two of the theories on UHF mechanisms proposed at that time: incoherent and coherent scattering. They consider that a combination of the two is needed. The fifth period overlaps the fourth, as it goes back to prewar years. It is the period of the discovery of short, centimeter, millimeter, and submillimeter waves for which the troposphere is not a "transparent" medium. The authors consider the current sixth period as that of the development of research on UHF waves in the troposphere; it is closely related to the rapid development of laser technology. Orig. art. has: 2 figures. [GC]

SUB CODE: 04, 20, 09/ SUBM DATE: none/

Card 2/2



ACC NR:

AM5027749

Monograph

UR/

20

Armand, N. A.; Vvedenskiy, B. A.; Gulyatinskiy, I. A.; Igoshev, I. P.;  
 Kazakov, L. YA.; Kalinin, A. I.; Nazarova, L. G.; Nemirovskiy, A.  
 S.; Frosin, A. V.; Nyskin, E. YA.; Sokolov, A. V.; Tarasov, V. A.;  
 Tashkov, P. S.; Tikhomirov, YU. A.; Troitskiy, V. N. Fedorova, L. V.;  
 Chernyy, F. B.; Shabel'nikov, A. V.; Shirey, R. A.; Shifrin, YA. S.;  
 Shur, A. A.; Yakovlev, O. I.; Kolosov, H. A.; Levshin, I. P.; Lomakin, A. M.

Upper tropospheric propagation of ultrashort radio waves (Dal'noye  
 troposfernoye rasprostraneniye ul'trakovotkikh radiovoln) Moscow,  
 Izd-vo "Sovetskoye radio", 1965. 414 p. illus., biblio. 4000  
 copies printed.

TOPIC TAGS: radio wave propagation, tropospheric radio wave, radio  
 communication, space communication, tropospheric scatter communicat-  
 ion, signal processing, signal distortion, field theory

PURPOSE AND COVERAGE: This monograph is intended for specialists  
 working in the field of radiowave propagation, designers of long-  
 distance radio communication systems, and teachers and students of  
 the advanced courses in schools of higher technical education. The  
 monograph contains, for the most part, heretofore unpublished  
 results of Soviet experimental and theoretical investigations in the  
 field of long-distance tropospheric ultrashortwave propagation.

Card 1/10

UDC: 621.37.24

ACC NR: AM5927749

Problems of investigating the troposphere by means of refractometers, the mean level of signals, meteorological conditions and topography, fluctuation of arrival angles and distortions of antenna directivity patterns, losses in antenna gain, and quick and slow fading of signal levels are discussed. The statistical characteristics of the signals at diversity reception in time, space, frequency and angle as well as the distortion of signals in the communication systems are also investigated. The long-distance propagation theory is analyzed, and the engineering method of calculating field intensity at long-distance tropospheric propagation is given. At present, there is no theory of Long-Distance Tropospheric Propagation which can be applied effectively enough in practice. Thus, in the investigation of that propagation, considerable attention has to be paid to experiments. The special characteristics of geographical conditions of the territory involved should be taken into consideration during the analysis of experimental data and in their practical application because the conditions of propagation in arctic and tropical climates differ from those existing over seas and continents. A considerable part of the monograph deals with the investigations of long-distance tropospheric propagation carried out over dry land routes, 800 km long, in the central part of the USSR under the general supervision of B. A. Vvedenskiy and A. G. Arenberg (up to 1957). V. I. Siforov investigated problems con-

Card 2/10

ACC NR: AM5027749

ected with distortions and fluctuations of signals. References follow each chapter.

TABLE OF CONTENTS:

Foreword --

Ch. I. Radio Engineering Methods of Investigating the Troposphere Dielectric Constant -- 5

Bibliography -- 16

Ch. II. Results of Troposphere Dielectric Constant Measurements -- 17

1. Relationship between the mean value of the air refraction index and altitude, Standard radio-atmosphere -- 17
2. Fluctuations of the air refraction index -- 24
3. Some notions on the troposphere model -- 43

Bibliography -- 45

Ch. III. Average (mean) Signal Levels in Long Distance Tropospheric Propagation of Ultrashort Waves ( L T F U S W ) -- 48

Card 3/10

ACC NR:

AM5027749

1. Equipment and measuring methods for the mean signal level -- 48
2. Signal attenuation function in LTP USW -- 54
3. Relationship between mean signal level and the distance -- 57
4. Relationship between mean signal level and the wavelength -- 63
5. Relationship of mean signal level and the shadow angles of both transmitting and receiving antennas -- 65
6. Diurnal and seasonal variations of mean signal level -- 72

Bibliography -- 75

Ch. IV. Effect of Air Refraction Index at the Earth Surface on the Mean Field Level in LTP USW -- 77

1. Correlation of the mean field level with the air refraction index at the Earth Surface, -- 77
2. Possibility of predicting field intensity variations -- 81

Bibliography -- 86

Ch. V. Fluctuation of Radiowave Arrival Angles and Instantaneous Patterns of Antennas Directivities -- 88

1. Methods of measuring radiowave arrival angles and recording of instantaneous antenna directional patterns -- 89

Cord 4/10

ACC NR:

AM5027749

2. Fluctuation of radiowave arrival angles in horizontal and vertical planes -- 92
3. Instantaneous antenna directional patterns -- 92

Bibliography -- 102

Ch. VI. Losses in Antenna Gain of LTP USW -- 103

1. Determination and methods of measuring losses in antenna gain - 103
2. Experimental data on losses in antenna gain -- 108
3. Theoretical investigations on losses in antenna gain -- 114

Bibliography -- 120

Ch. VII. Theories of Long Distance Tropospheric Propagation of USW -- 122

1. Introductory remarks -- 122

Bibliography -- 129

2. Theory of scattering radiowaves by tropospheric turbulent nonhomogeneities -- 130

Card 5/10

ACC NR.

AM5027749

Bibliography -- 150

3. Reflection of radiowaves from dielectric nonhomogeneities of definite dimensions -- 151

Bibliography -- 171

4. Reflections of radiowaves from laminated tropospheric nonhomogeneities of random character -- 172

Bibliography -- 179

Ch. VIII. Engineering Method of Design-Calculation of Field Intensity

Attenuation -- 180

1. Basic rules of calculation method -- 181
2. Diffraction horizon ( a distance, beginning of which, the value of the field intensity, calculated according to the diffraction formulas is smaller than the measured intensity) -- 182
3. Determination of field standard attenuation -- 182
4. Meteorological conditions correction -- 184
5. Local topography correction -- 185
6. Estimate of losses in antenna gain -- 185

Card 6/10

ACC NR. AM5027749

7. Estimate of fadings -- 186

Bibliography -- 188

Ch. IX. Statistical Characteristics of the Envelope, Phase and Frequency of the Random Signal in LTP USW -- 189

1. Statistical characteristics of atmosphere dielectric constant signal components in LTP -- 189
2. Distribution laws for the envelopes and phase of various signal components -- 193
3. Distribution laws of sum-signal envelope --
4. Multi-dimensional distribution functions of instantaneous value of envelopes and phases of the spaced signals in minute intervals 207
5. Parameters of multi-dimensional amplitude and phase distribution functions of spaced signals -- 210
6. Statistical characteristics of instantaneous values of the envelopes of spaced signals in minute intervals -- 222
7. Statistical characteristics of instantaneous values of spaced signal phases in minute intervals -- 239
8. Statistical characteristics of instantaneous value of phase first derivatives of spaced signals in minute intervals -- 248

Card 7/10

ACC NR: AM5027749

9. Statistical characteristics of instantaneous values of the first derivative of phase in minute intervals -- 257

Bibliography -- 260

Ch. X. Experimental Investigations of Rapid and Slow Fadings in ITP USW -- 262

1. Methods of measuring and processing experimental data -- 262
2. One-dimensional distribution functions of signal instantaneous values -- 264
3. One-dimensional distribution functions of signal averaged values -- 278
4. Period and frequency in rapid fluctuations of signal envelope--283

Bibliography -- 287

Ch. XI. Experimental Investigation of Signal Statistical Characteristics at Space, Frequency, Time and Angle Diversity Reception - 288

1. Space-diversity reception -- 288
2. Frequency-diversity reception -- 295
3. Time-diversity reception -- 299
4. Frequency-time diversity reception -- 305
5. Angle-diversity reception -- 307

Cord 8/10



ACC NR: AM5027749

Bibliography -- 312

- Ch. XII. Investigation of Amplitude-Frequency and Phase-Frequency Signal Characteristics at LTP -- 314
1. Measuring and processing methods of experimental data -- 314
  2. Amplitude-frequency characteristics -- 321
  3. Phase-frequency characteristics of LTP channel -- 325
  4. Frequency characteristics of signal group time delay -- 334

Bibliography -- 350

- Ch. XIII. Signal Distortion in LTP USW -- 351
1. Theoretical investigation of distortions appearing in multi-channel FM LTP communication systems -- 352
  2. Experimental investigation of distortion in LTP -- 384
  3. Distortions appearing during TV transmission over tropospheric radio links -- 389

Bibliography -- 392

- Appendix Automation of Signal Statistical Processing -- 394
1. Quantification of continuous signals and coding -- 395
  2. Signal quantification instruments -- 397

Card 9/10

Card 1/1

UDC: 626.51

KOLOSOV, M. A.

1(2);25(1)

PHASE I BOOK EXPLOITATION SOV/2687

Zorokhovich, Aleksandr Abramovich, and Mikhail Aleksandrovich Kolosov

Tekhnologiya mekhanicheskoy obrabotki aviatsionnykh detaley.  
(Machining Technology of Aircraft Components) Moscow, Oborongiz,  
1959. 287 p. (Series: Bibliotekha rabocheho aviatsionnoy  
promyshlennosti) Errata slip inserted. 10,000 copies printed.

Reviewer: V.P. Firago, Candidate of Technical Sciences, Docent;  
Ed.: Ya. M. Rozenblit, Engineer; Ed. of Publishing House: P. B.  
Morozova; Tech. Ed.: V.P. Rozhin; Managing Ed.: A. I. Sokolov,  
Engineer.

PURPOSE: This book is intended for skilled workers and foremen of  
machine shops in the aviation industry.

COVERAGE: The book contains indispensable information for the  
analysis and evaluation of technological processes, characteris-  
tics of equipment used, and instructions for the choice of attach-  
ments, instruments, and machining regimes. Various methods of  
machining of parts are explained. Soviet and, to some extent,  
non-Soviet experience of many years in the aviation industry is  
Card 1/4

Machining Technology of Aircraft Components

SOV/2687

generalized. The development of technological processes is discussed in detail. The book contains a number of examples from the industrial practice of past years and of the present day. In chapter I. definitions of some 30 technological terms are given. No personalities are mentioned. There are 22 Soviet references.

TABLE OF CONTENTS:

Introduction	3
Ch. I. Technological Terminology	5
Ch. II. General Principles of Development of a Technological Process	7
Ch. III. Operational Tolerances and Allowances	14
Ch. IV. Precision of Machining	20
Card 2/4	

Machining Technology of Aircraft Components

SOV/2687

Ch. V. Example of Development of a Technological process	26
Ch. VI. Technological Documentation	29
Ch. VII. Equipment	38
Ch. VIII. Cutting Instrument	63
Ch. IX. Attachments	88
Ch. X. Choice of Cutting Regimes	114
Ch. XI. Machining Bodies of Revolution on Lathes	128
Ch. XII. Machining Plane Surfaces	147
Ch. XIII. Machining Openings	153
Ch. XIV. Machining Shaped Surfaces	167

Card 3/4

Machining Technology of Aircraft Components	SOV/2687
Ch. XV. Thread Cutting	205
Ch. XVI. Machining Gear Teeth and Splines	231
Ch. XVII. Finishing Processes	275
Bibliography	289
AVAILABLE: Library of Congress	IS/ec
Card 4/4	12-1-59

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 between the zero-point junction and the active junction. The calibration is described and  
 both a circuit diagram and an illustration of the apparatus are given. Subject headings:  
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KOLOSOV, M. I.

HA 1/4QT18

USSR/Engineering  
Metallurgy, Ferrous  
Ball Bearings

Jun 48

"Comments on the Article 'Production of Ball Bearing Steel' by S. Z. Yudovich and V. G. Speranskiy," M. I. Kolosov, Engr,  $\frac{1}{2}$  p

"Stal'" No 6

Kolosov states that original article did not discuss methods of determining content of nonmetallic matter in bearing steel. Briefly discusses permissible limits for these nonmetallic inclusions and methods for keeping them as low as possible.

1/4QT18

X

KOLOSOV, M. I.

EA 1/49T15

USSR/Engineering  
Metallurgy, Ferrous  
Ball Bearings

Jun 48

"Test of Optimum Technology for Smelting Ball Bearing  
Steel," M. I. Kolosov, I. Ya. Ayzenshtok, N. V.  
Kays, Engineers, Chelyabinsk Metallurgical Works,  
84 pp

"Stal'" No 6

Series of tests determined that best method  
consists of terminal oxidation of steel with  
calcium silicate and introduction of ferrous  
chromate at beginning of refining process. This

1/49T15

USSR/Engineering (Cont'd)

Jun 48

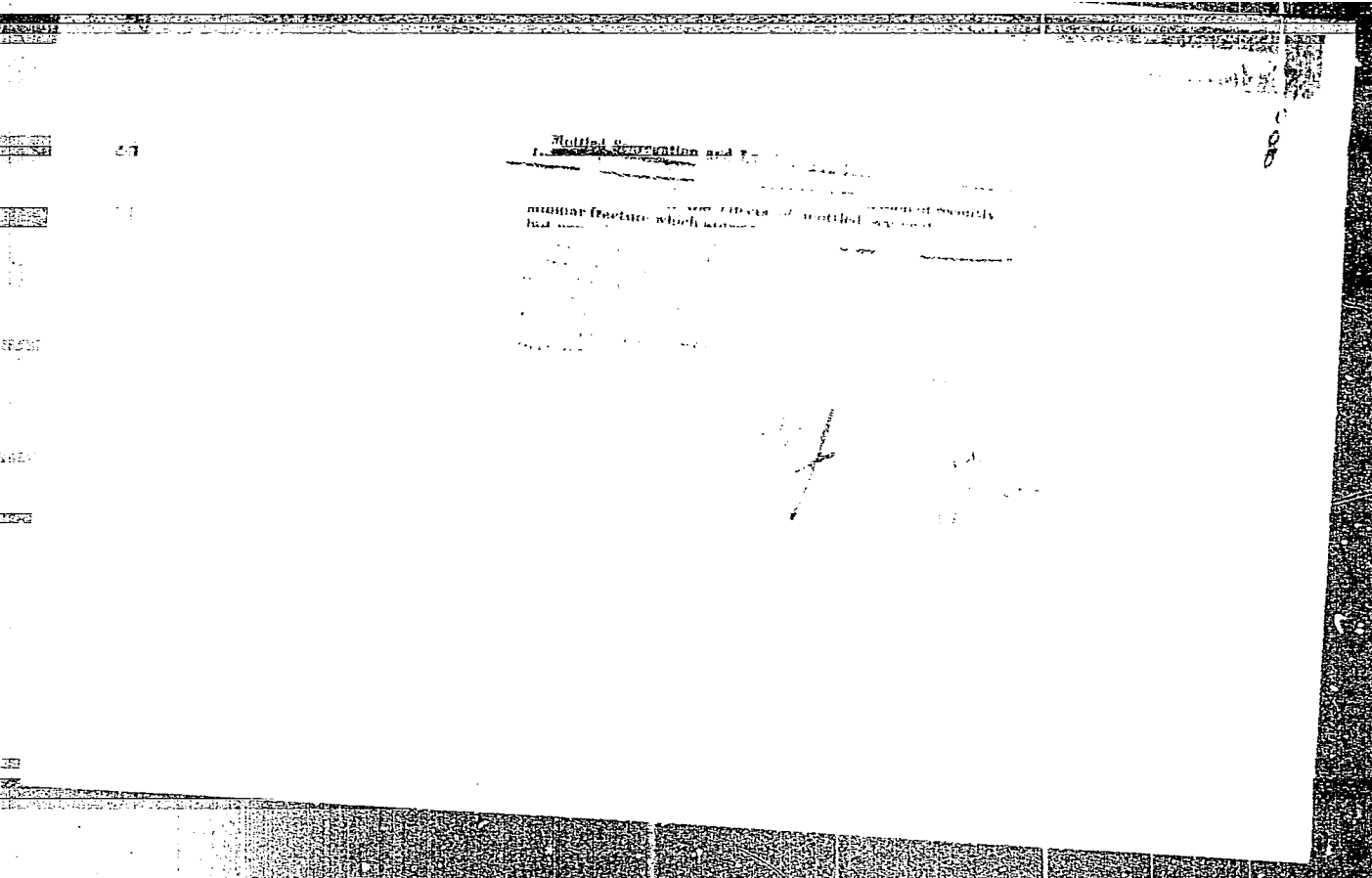
greatly increased quality, decreased cost and in-  
creased productivity of equipment

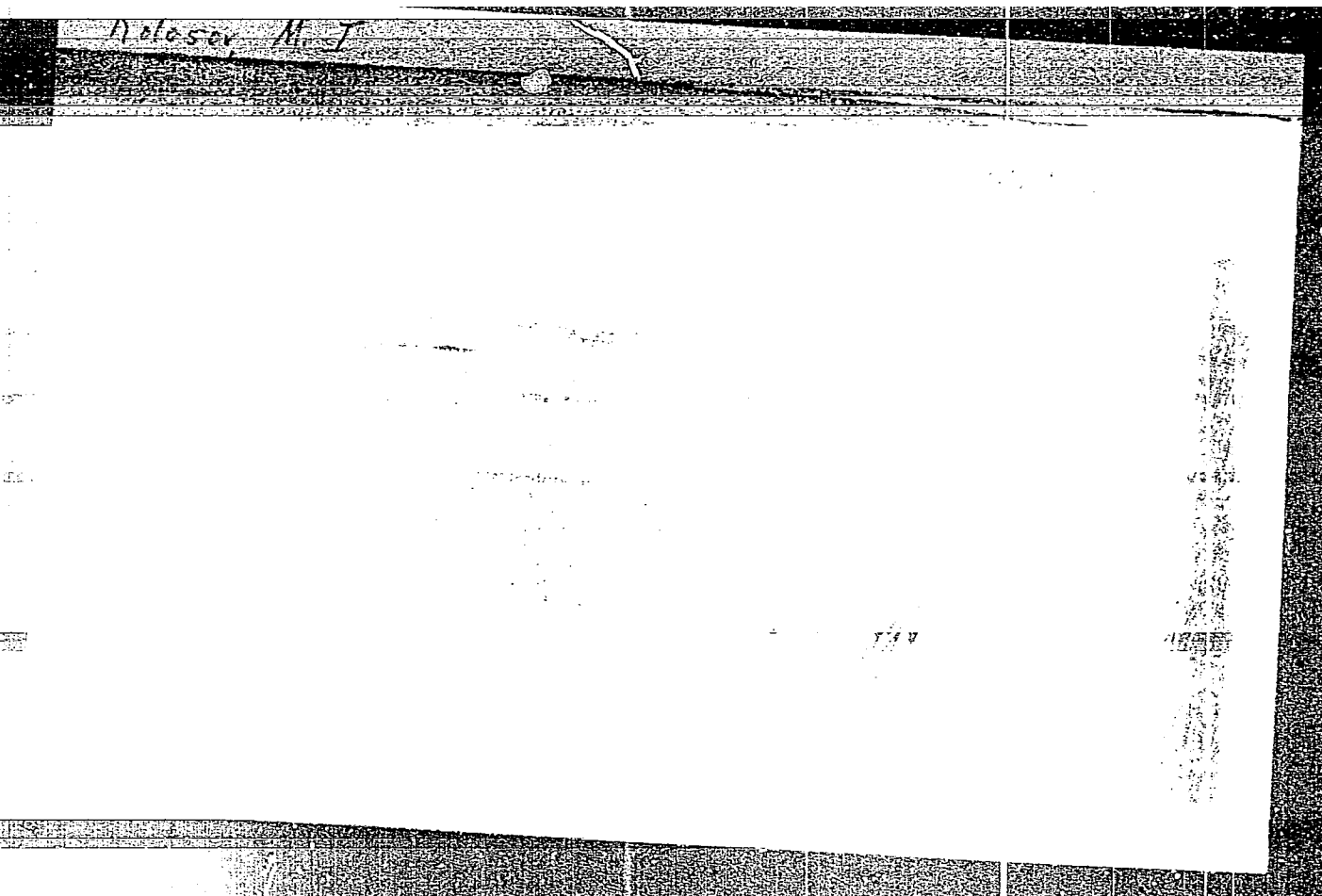
1/49T15

CA

Search for the best technology in the production of ball-bearing steel. M. I. Kolesov, I. Ya. Alzenstok, and N. V. Kels. *Stal* 6, 621-0(1948).—Three methods of decarburization were studied for their effect on non-metal inclusions and quality of surface of ball-bearing steel. The methods studied were: (1) decarburization with carbidic slag and addn. of FeSi lumps at the end of the refining period, (2) decarburization with carbidic slag and then with ground FeSi, and (3) preliminary decarburization with FeSi and Al, then with carbidic slag, and finally in the ladle with CaSi. Of these, method (3) proved the best; it improved the quality of the steel, lowered its cost of production, somewhat, and raised the output. Four variations of this method were tried: (3a) Into an emptied furnace were charged limestone 800, Fe ore 800 kg. and then metal consisting of coarse scrap (4-7)%, fine scrap 20, and conversion pig 10-25%. During the melt enough limestone and fluorite was added to slag P and Si and to produce an active slag. After drawing off the oxidizing slag, FeSi was added to the metal in an amt. to provide 0.07-0.10% of Si and Al in an amt. to provide 0.5 kg./ton. Then the refining slag was caused to form and after 15 min. of this refining period were added FeCr and FeMn, and then carbidic slag was formed by adding ground coke and more limestone and fluorite. The decarburization under this slag was continued for 40-60 min. Twenty min. before tapping the metal, more FeSi was added, calcd. to add 0.03-0.05% of Si. The heat was tapped without slag, adding CaSi calcd. to make 3 kg./ton. The CaSi was in 40-50 mm. lumps and contained Ca 27-29, Si 55-62, and Al 3%. (3b) differed from the foregoing by not having ore in the original charge; it was added later in the run. After drawing off the oxidizing slag 0.07% Si and 0.5 kg./ton Al and FeCr were added. The refining slag after becoming fluid was converted to an oxidizing slag by addn. of ground coke. In the 2nd half of the refining period was added charcoal and coarsely ground coke. In (3c) in addnl. 0.25 kg./ton of metal was added 1 hr. before tapping. (3d) was like (3b) except that no Al was used. Of these variations (3b) was the preferred and was adopted for production.

M. Hosh





Improving the Quality of Rail-Beaming Steel  
I. Ya. Aizenstok, N. S. Aiv and M. A. K. ...  
1955, 5, 431-438. In Russian. The article discusses  
various methods of desulfurizing the steel, the  
most promising being infrared irradiation of  
carbide slag and ferrochrome. The article also  
includes the time at which ferrochrome should be added,  
temperature and the method of pouring. The quality  
of the steel is determined by the number of inclusions.

KOLOSOV, M. I.

~~The Work of the Central Works Laboratory of the Chelyabinsk Metallurgical Works, M. I. Kolosov. (Zavodskaya Laboratoriya, 1955, Bl. (8), 355-374). (In Russian). The central works laboratory of the Chelyabinsk works is made up of laboratories dealing with (i) research on blast-furnaces, steel-making, rolling and metallurgy; (ii) routine control tests; (iii) chemical problems; (iv) by-product coking; (v) refractories. The general role of the works laboratory in the improvement of plant efficiency is considered and educational and inter-works activities are briefly indicated. —S. K.~~

*metal*

*4*  
*8*

*1*  
*2*



KOLOSOV, M. I.

"Analysis of gases, nonmetal inclusions, and carbides in steel." Iu.A. Kliachko and others. Reviewed by M.I.Kolosov. Zav.lab.21 no.8:1012-1013 '55. (MIRA 8:11)

1. Nachal'nik Tsentral'noy zavodskoy laboratorii Chelyabinskogo metal-lurgicheskogo zavoda  
(Steel--Analysis) (Kliachko, Iu.A.)

KOLOSOV, M.I., MOROZOV, A.N., POVOLOTSKIY, D.Ya., KOSSOVSKIY, L.D., STROGANOV, A.I.,  
VAYNSHTEYN, O.Ya.,

"Behaviour of Hydrogen in Steel During its Production and Remelting,"  
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of  
Metallurgy, Moscow, July 1-6, 1957

KOLOSOV, M.I., MOROZOV, A.M., STROGANOV, A.I., KEYIS, N.V., VAYESHTSEYN, O.Ya.

*AIZENSHTEK, I.Ya,*

"Influence of Blast Humidity on the Cast-Iron Hydrogen Content and the Quality of Steel,"  
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of Metallurgy, Moscow, July 1-6, 1957

KOLOSOV, M.I., STROGANOV, A.I., MOROZOV, A.N., KEIS, N.V., VAYNSHTEYN, O.Y.

"Rate and Sequence of killed steel ingot Crystallisation,"  
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov, Institute of  
Metallurgy, Moscow, July 1-6, 1957

KOLOSOV, M. I.

PHASE I BOOK EXPLOITATION

257

Kolosov, Mikhail Ivanovich, and Kul'batskiy, Aleksey Pavlovich.

Razlivka stali (Steel Pouring) Moscow, Metallurgizdat, 1957. 211 p.  
4,800 copies printed.

Ed.: Smolyarenko, D. A.; Ed. of Publishing House: Zinger, S. I.

**PURPOSE:** This book is written to make known the work methods of leading Soviet steel plants, especially those producing high-grade steel. The book is intended primarily for engineers and technicians at steel plants, but can also be used by laboratory personnel at plants and institutes and by students of steel-production methods.

**COVERAGE:** The authors discuss the following topics: demands made upon refractory materials and conditions to which they are exposed; preparing equipment for pouring steel; pouring methods; crystallization of killed and rimmed steel; ingot defects and means of dealing with them. Chapters I, II, III, and VII were written by Kul'batskiy, A.P.; Chapters IV, V, VI, and VIII, by Kolosov, M. I. The authors express

Card ~~1/5~~

Steel Pouring (Cont.)

257

their thanks for help in compiling the volume to Vaynshteyn, O.Ya.; Ayzenshtok, I.Ya.; Keys, N.V.; Ipatov, N.K.; Stroganov, A.I.; Morozov, A.N., Professor, Doctor of Technical Sciences; Lubenets, I.A., Chief Engineer, Chelyabinsk Metallurgical Plant; Smolyarenko, D. A., Scientific Editor; and the steel melters of the Chelyabinsk Metallurgical Plant. There are 88 references, of which 83 are Soviet, 4 English, and 1 German.

TABLE OF CONTENTS:

Preface	5
Ch. I. Refractory Materials Used in Pouring Steel	7
1. Properties	8
2. Classification	17
3. Storage	19
Ch. II. Equipment for Pouring Steel	23
1. Pouring spouts	23

Card ~~2/5~~

KOLOSOV, M. I.

SOV/137-58-8-16552

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 46 (USSR)

AUTHORS: Kolosov, M.I., Morozov, A.N., Stroganov, A.I., Isayev, V.F.,  
Keys, N.V., Vaynshteyn, O.Ya.

TITLE: The Rate and Sequence of Crystallization in Ingots of Killed Steel (Skorost' i posledovatel'nost' kristallizatsii slitkov spokoynoy stali)

PERIODICAL: V sb.: Primeneniye radioaktivn. izotopov v chernoy metal-  
lurgii. Chelyabinsk, Knigoizdat, 1957, pp 95-105

ABSTRACT: Radioactive Fe<sup>59</sup> (introduced in the form of Fe oxide) was employed in conjunction with the method of overturning of molds in order to investigate crystallization processes in ingots of steel ShKh15SG (2.65 t) and of steels 10 and 45 (6.2-t ingots). The radioactivity of various zones of the ingot was determined from the radiation intensity of 3.5-g specimens of metal drilled out on different levels of a longitudinal templet of the ingot. As the crystallization progresses, the two-phase region on the sides of the ingot amounts to 30-50 mm. After the formation of a zone of columnar crystals, a two-phase region fed with liquid metal from the central part is formed in the lower part.

Card 1/2

SOV/137-58-8-16552

The Rate and Sequence of Crystallization in Ingots of Killed Steel

of the ingot. In a 6.2-ton ingot, the height of this zone extends to 850 mm. Up to a certain time (approximately 80 min in the case of the 6.2-t ingot) the thickness of the crystallized layer (including the two-phase region) taken in a horizontal section of the ingot is proportional to the square root of the crystallization time. Deviations from this relationship, which occur toward the end of the crystallization period, are attributable to a more rapid formation of a two-phase region at the center of the ingot. Extension risers, employed in production of high-quality steel ingots, may be removed only after the crystallization of the ingot has been completed. Bibliography: 19 references.

Ya.L.

1. Steel--Crystallization
2. Iron isotopes (Radioactive)--Applications

Card 2/2

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 62 (USSEU) SOV/137-58-7-14377

AUTHORS: Kolosov, M.I., Stroganov, A.I., Vaynshteyn, O.Ya., Khryukina, V.A.

TITLE: Silicon-chromium in the Smelting of Chrome Grades of Steel in the Open Hearth (Primeneniye silikokhroma pri vyplavke khromistykh marok stali v martenovskikh pechakh)

PERIODICAL: Tekhn.-ekon. byul. Sov. nar. kh-va Chelyab. ekon. administrat. r-na, 1957, Nr 2, pp 8-9.

ABSTRACT: In 11 experimental heats of medium-carbon chromium steels: 37KhS, 40Kh-45Kh, 35KhGS, and 40KhS, and 8 of low-carbon steels 20Kh and 2KhNZA run in 100-t furnaces with high molten-pig-iron charges, Fe-Cr was replaced by two grades of Si-Cr, containing respectively 56.6 and 46.9% Cr, 14.5 and 18.7% Si, and 4.5 and 3.4% C. No preliminary deoxidation of the metal in the furnace was performed. Loss of Cr by oxidation in experimental heats of medium-carbon steels (St) was 10.6% versus 12.5% in standard heats, while the respective figures for mild St were 19.5 and 26.3%. The duration of heats with Si-Cr is diminished by 2.5%, and there is no change in the quality of the steel. Working conditions are also improved.

Card 1/1

A.S.

1. Steel alloys--Production 2. Chromium-silicon alloys  
--Metallurgical effects 3. Chromium--Oxidation



SOV/137-58-7-14467

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 77 (USSR)

AUTHOR: Kolosov, M.I.

TITLE: Lubrication of Molds During Casting of Stainless Steel  
(Smazka izlozhnits pri razlivke nerzhavayushchey stali)

PERIODICAL: Trudy Nauchno-tehnicheskogo o-va chernoy metallurgii,  
1957, Vol 18, pp 600-606

ABSTRACT: An account of the experience of the Chelyabinsk metallurgical plant which had investigated various types of mold-lubrication compounds in an effort to improve the surface of ingots made of steels 1Kh13-4Kh13 and 1Kh18N9T. Steel ingots weighing 1.2, 2.8, and 4.5 tons were prepared by the bottom-casting method. The following factors contributed to the improvement of the surface of ingots made of steel 1Kh13-4Kh13: A higher exit temperature of metal and a higher temperature during casting; accelerated bottom casting in conjunction with the employment of wooden frames; the employment of CCl<sub>4</sub>; a reduction of the amount of volatile ingredients contained in the mold-lubricating compounds; and introduction of NaCl. By modifying the production technology in accordance with measures

Card 1/3

SOV/137-58-7-14467

### Lubrication of Molds During Casting of Stainless Steel

listed above, the scraping of high-Cr steel ingots was completely eliminated. The employment of combined lubricants and pastes was investigated. It was established that conditions most suitable for the achievement of a high surface quality, in the case of steel 1Kh18N9T, may be attained when the temperature of the metal in the ladle lies between 1590° and 1610°C; the molds must be thoroughly clean and maintained at a temperature of 30-60°; CCl<sub>4</sub> in amounts of approximately 150 cm<sup>3</sup>/t is poured into the corners of the mold one or two minutes before the process of bottom casting is begun. With a 65-mm neck diameter of the ladle and siphon passages with a diameter of 50 mm, the molds must be filled rapidly and completely. The ingots produced in this fashion weighed 1.2 and 4.5 tons. By employing the above technology, blisters and defects in the oxidized layer were eliminated. Compared with the old technology, the amount of spoilage due to surface defects was reduced to 1/7 of its previous value when CCl<sub>4</sub> was employed, while the amount of tears was reduced by 60 percent. It is pointed out that a "smallpox" defect is observed on the surfaces of individual ingots; this is attributable to the employment of old, worn-out molds. The employment of CCl<sub>4</sub> as a mold lubricant played a major role in the elimination of the defect known as the "titanium porosity". A high casting rate (900-1000 mm/min) is recommended for the 1Kh18N9T steel. During casting the riser extension must be

Card 2/3

SOV/137-58-7-14467

Lubrication of Molds During Casting of Stainless Steel

tightly covered with a metal lid in order to keep the heavy  $CCl_4$  vapors in the mold. The new technology increased the output of sound rolled stock by 8.5 percent and, in 1956, saved approximately 3 million rubles for the plant at which it has been adapted.

- V. P.
1. Stainless steel--Casting
  2. Molds--Lubrication
  3. Lubricants--Effectiveness

Card 3/3

PETROV, A.K.; SPERANSKIY, V.G.; KHIZHNICHENKO, A.M.; SHILYAYEV, B.A.;  
DANILOV, A.K.; BORODULIN, G.M.; ZAMOTAYEV, S.P.; MARKARYANTS, A.A.;  
SOLNTSEV, P.I.; SMIRNOV, Yu.D.; VAYNBERG, G.S.; OKOROKOV, N.V.;  
KOLOSOV, M.I.; SEL'KIN, G.S.; MEDOVAR, B.I.; LATASH, Yu.B.;  
YEFROYMOVICH, Yu.Ye.; VINOGRADOV, V.M.; SVEDA-SHVETS, N.N.;  
SKOROKHOD, S.D.; KATSEVICH, L.S.; SHTROMBERG, Ya.A.; MIKHAYLOV,  
O.A.; PATON, B.Ye.

Reports (brief annotations). Biul. TSNIICEM no.18/19:67-68 '57.

(MIEA II:4)

1. Zavod Dneprospetsstal' (for Speranskiy, Borodulin).
2. Chelyabinskii metallurgicheskiy zavod (for Khizhnichenko).
3. Uralmashzavod (for Zamotayev).
4. Trest "Elektropech'" (for Vaynberg).
5. Moskovskiy institut stali (for Okorokov).
6. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (for Sel'kin, Sveda-Shvets).
7. Institut elektrosvarki AN USSR (for Paton, Medovar, Latash).
8. Tsentral'naya laboratoriya avtomatiki (for Yefroymovich, Vinogradov).
9. Gissogneupor (for Skorokhod).
10. Trest "Elektropech'" (for Katsevich).
11. Tbilisskiy nauchno-issledovatel'skiy institut okhrany truda Vsesoyuznogo tsentral'nogo soveta profsoyuzov (for Shtromberg).

(Steel--Metallurgy)

61487

SOV/137-59-5-9962

18.3200

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 75 (USSR)

AUTHORS: Kolosov, M.I., Morozov, A.N., Stroganov, A.I., Isayev, V.P.,  
Keys, N.V., Vaynstejn, O.Ya.

TITLE: The Rate and Sequence of Crystallization in Killed Steel Ingots

PERIODICAL: V sb.: Metallurgiya i metallovedeniye, Moscow, AS USSR, 1958,  
pp 133 - 137

ABSTRACT: The authors investigated the crystallization in "ShKh15SG" steel ingots of 2.65 t weight and in syphon-cast "10" and "45" grade steel ingots of 6.2 ton weight. The location of the crystallization front was determined at various moments by a consecutive multiple introduction of a thermic mixture of radioactive iron and Al-powder into the non-solidified section of each ingot. Subsequently, the concentration of the radioactive iron over the cross-section and the length of the solidified ingot was determined by radiometric means. Moreover, the non-solidified sections of "10" steel ingots were tapped at time intervals corresponding to the moments of

Card 1/3

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SOV/137-59-5-9962

The Rate and Sequence of Crystallization in Killed Steel Ingots

introducing the radioactive iron. The thickness of the solidified layer on the section of the ingot body (ostov) was measured. Results obtained by the described methods were compared and it was revealed that the cavity in the body of an overturned ingot was wider and deeper than the area of expansion of the radioactive iron introduced at the same moment. This discrepancy is explained by the presence of a two-phase zone located between the border of the radioactive iron expansion and the solidified layer. The two-phase zone consists of suspended (partially intergrown) crystals and liquid metal. The width of the two-phase zone at the lateral crystallization fronts does not exceed 30 - 50 mm; however, its expansion along the height in the lower axial section of the solidified ingot attains 850 mm. It is assumed that the two-phase zone is developed periodically during interrupted crystallization (in particular, at the moment of the completed growth of columnar crystals). The development of a two-phase zone in the lower axial section of the ingot is connected with the fact that crystals originating at the lateral crystallization fronts, are carried away by the descending flows of cooled-off metal and are accumulated in the bottom section of the solidified ingot. This explains

Card 2/3

SOV/137-58-9-18676

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 75 (USSR)

AUTHORS: Morozov, A.N., ~~Kolosov, M.I.~~, Stroganov, A.I., Isayev, V.F.,  
Keys, N.V., Vaynshteyn, O.Ya.

TITLE: A Nucleonic Study of the Rate and Sequence of Steel-ingot  
Crystallization (Izucheniye skorosti i posledovatel'nosti  
kristallizatsii stal'nykh slitkov pri pomoshchi radioaktivnykh  
indikatorov)

PERIODICAL: V sb.: Staleplavil'n. proiz-vo. Moscow, Metallurgizdat,  
1958, pp 203-217

ABSTRACT: Radioactive tracers were used to investigate the crystalliz-  
ation of 2.65-t ingots of ShKh15SG and 6.2-t ingots of Nrs-10  
and 45 steels, bottom poured. 3-5 batches of Fe<sup>59</sup> (4.5-14.5  
millicuries per t steel) were introduced as Fe<sub>2</sub>O<sub>3</sub> mixed with  
Al powder. The tops of the ingots were held in the liquid state  
by periodic additions of lungerite pipe eliminator. At the same  
time, crystallization of Nr-10 steel was also studied by over-  
turning three ingots on single stool at different time intervals  
after pouring. The isotope was introduced at the moments when  
the residual liquid metal from each of these ingots was ~~filled~~

Card 1/3

SOV/137-58-9-18676

A Nucleonic Study of the Rate and Sequence of Steel-ingot Crystallization

into a fourth on the same stool. The thickness of the frozen layer as determined by radiography was greater than when determined by pouring out the liquid residue of the metal. This is explained by the fact that the zones of isotope distribution describe the region of the ingot occupied by liquid metal, whereas the thickness of the crystallized layer determined by pouring out defines the region of solid metal phase alone. The difference between them is the magnitude of the region in which two phases exist. The length of that region along the sides of the ingot in the course of crystallization does not exceed 30-40 mm. At the conclusion of the formation of the zone of columnar crystals in the bottom of the 6.2-t ingot there arises a two-phase region attaining 850 mm in height. This region comes into being as the result of the accumulation of equiaxed crystals that have torn away after formation on the interface between the solid and liquid phases. The crystallization of the two-phase region is intermittent in nature. The development of V-segregation and axial porosity are dependent upon the taper of the ingot and the conditions under which the two-phase zone is fed liquid metal from the upper portion of the ingot. In the making of high-quality steel, the hot top should be removed only after the body of the ingot has completely hardened. Within given time limits, the thickness of the crystallized layer is proportional to the square root of the crystallization time; the proportionality factor therein,

Card 2/3



SOV/137-58-9-18676

A Nucleonic Study of the Rate and Sequence of Steel-ingot Crystallization  
which is  $21-29 \text{ mm/min}^{0.5}$  for carbon steels, declines with reduction in the  
[ C ] of the steel.

L.K.

1. Steel--Processing    2. Steel--Crystallization    3. Radioisotopes--Performance

Card 3/3

Kolosov, M.I.

133-1-7/24

AUTHORS: Kolosov, M.I., Engineer, Morozov, A.N., Doctor of Technical Sciences, Stroganov, A.I., Candidate of Technical Sciences, Popov, Yu.A., Engineer, Vaynshteyn, O.Ya., and Keys, N.V.

TITLE: The Quality of Steel from Pig Iron Produced with a Constant Moisture Blast (Kachestvo stali iz chuguna, vyplavlennogo na dut'ye postoyannoy vlazhnosti)

PERIODICAL: Stal', 1958, No.1, pp. 24 - 27 (USSR).

ABSTRACT: The influence of moisture content of blast on the hydrogen content in pig iron and the influence of hydrogen content of pig iron on the hydrogen content of steel as well as flake sensitivity of steel on the hydrogen content in the liquid metal were investigated. Nos. 1 and 3 blast furnaces on the above works were transferred to operation with a constant moisture blast (15-20 g/m<sup>3</sup>). This resulted in the smoother operation, higher blast temperatures 750 - 800 °C (against previous 450 - 500 °C), increase in output (No.1 - 3%; No.3 - 1.3%) and a decrease in the coke rate (No.1 - 6.5%; No.3 - 1.3%). As the works produce quality steel it was considered necessary to check the possible effect of higher moisture in blast on the steel quality. It was found that with increasing moisture content in blast, the hydrogen content of pig iron increases but not proportionally. However, the mean content of hydrogen in the

Card1/3

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The Quality of Steel from Pig Iron Produced with a Constant Moisture Blast

133-1-7/24

open-hearth bath after melting and on teeming was found to be practically independent of the hydrogen content of pig or moisture content in the blast (Fig.1), The final hydrogen content of steel on teeming was not correlated to its content in the corresponding pig (Table 1, Fig.2). The comparison of hydrogen content in pig, steel and rolled products of various levels of moisture content in blast is shown in Table 2; the comparison of the degree of flaking in semis and their hydrogen content and the mechanical properties of finished steel at various levels of moisture in blast - Tables 3 and 4, respectively. It is concluded that the hydrogen content of pig iron has no influence on the hydrogen content of quality steel after melting and on teeming. The direct relationship between the flake sensitivity and hydrogen content of liquid metal was not established. The methods of heating and cooling flake-sensitive steels used on the works secure the absence of flakes in finished products at any level of moisture in the blast. The macro-structure of rolled semis is independent from the moisture content of the blast. There are 4 tables, 2 figures and 6 Russian references.

Card2/3

*Koloso, M.I.*

133-1-18/24

AUTHORS: Koloso, M.I., Ayzenshtok, I.Ya., and Konissarov, A.I.,  
Engineers.

TITLE: Rational Conditions of Annealing Quality Rolled Products  
in Batch Furnaces with Mechanical Charging of Piles  
(Ratsional'nye rezhimy otzhiga sortovogo prokata v kamernykh  
pechakh s mekhanizirovannoy posadkoy paketov)

PERIODICAL: Stal', 1958, No.1, pp. 71 - 74 (USSR).

ABSTRACT: In 1946, two new batch furnaces for annealing structural  
rolled steel, designed by Gipromez, were erected. Character-  
istic feature of these furnaces (Fig.1): under bottom firing  
with additional ports for recirculation of the combustion pro-  
ducts; mechanised charging of piles. The initial operation of  
these furnaces was found to be unsatisfactory and in order to  
establish a correct annealing practice, a number of investi-  
gations of the heating of metal were carried out. On the basis  
of the results obtained, correct annealing practice was dev-  
eloped. This results in a 100% increase in the amount of  
annealed metal (from 1946-1956), in addition fuel and power  
consumption decreased by 30 and 15%, respectively, and the cost  
of annealing a ton of metal decreased from 700 to 75 roubles.  
It is stated that the annealing furnaces on the Chelyabinsk

Card 1/2

133-1-18/24

Rational Conditions of Annealing Quality Rolled Products in Batch  
Furnaces with Mechanical Charging of Piles

Works as well as similar furnaces on the Dneprospetsstal'  
Works are superior to furnaces on other works with sliding  
bottoms. The following participated in the investigation:  
V.N. Shvetsov, N.K. Ipatov, A.A. Khuden'kikh, G.Ye. Mysina,  
R.P. Syromolotova, M.Ye. Anisimova, Z.A. Tavakina, A.A. Tsvetkova,  
Z.A. Monastyrskaya. There are 2 figures and 2 tables.

ASSOCIATION: Chelyabinsk Metallurgical Works (Chelyabinskiy  
metallurgicheskiy zavod)

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: ~~Koloso~~<sup>133-58-5-9/31</sup>~~v M. I.~~ Ayzenshtok, I. Ya., Komissarov, A. I.,  
Mysina, G. Ye. and Povolotskaya, M. S.

TITLE: The Influence of the Weight of Ingots on the Quality of  
Structural Steels (Vliyaniye vesa slitka na kachestvo  
konstruktsionnykh staley)

PERIODICAL: Stal', 1958, Nr 5, pp 411-414 (USSR)

ABSTRACT: An investigation of the possibility of increasing the  
weight of ingots of steels 18KhVA, 40KhNMA, 12Kh2N4A  
and 30KhGSA from 1.2 and 2.65 t to 4.5 t was carried out.  
This increase in weight of ingots was necessary in order  
to increase the throughput of the casting pit and blooming  
mill as well as to increase the degree of deformation on  
rolling profiles of a large cross-section (250 to 300 mm).  
The investigation was carried out on eight heats made in  
a 30-ton electric furnace. The experimental metal was  
teemed into 1.18, 2.65 and 4.5 t ingots. In order to  
study the character of crystallisation three ingots of  
various sizes from each melt of each of the steels  
investigated were selected. After slow cooling and a  
softening heat treatment from the twelve selected ingots  
axial longitudinal plates were cut. The experimental  
ingots of 2.65 and 4.56 (charged hot into soaking pits)

Card 1/4