

BA N V Y K H, O. A.

18(7) PHASE I BOOK EXPLOITATION SOV/3355
Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po
probleme zharoprochnykh splavov
Isledovaniya po zharoprochnym splavam, t. IV (Studies on Heat-Resistant Alloys, vol. 4), Moscow, Izd-vo AN SSSR, 1959. 400 p.
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Academician; M. V. Aseev; Corresponding Member, USSR Academy of
Sciences; I. A. Odintsov; I. M. Pavlov, and I. P. Zudin, Candidate
of Technical Sciences.

PURPOSE: This book is intended for metallurgists concerned with
the structural metallurgy of alloys.

COVERAGE: This is a collection of specialized studies of various
problems in the structural metallurgy of heat-resistant alloys.
Some are concerned with mechanical properties, others with des-
criptions of test methods and methods, others with properties
of specific materials. Various phenomena occurring under
specified conditions are studied and reported on. For details,
see Table of Contents. The articles are accompanied by a num-
ber of references, both Soviet and non-Soviet.

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BANNYKH, O. A.

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prochnykh splavov

Izdatel'stvo po zhurnalovym upravleniyu, t. 5 (Investigations of Heat-Resistant
Alloys, Vol. 5) Moscow, Izd-vo M SSSR, 1979. 425 p. Krasna ally inserted.
2,000 copies printed.

Ed. of Publishing House: V.A. Klyuzov, Tech. Ed.: I.P. Kuz'min; Editorial
Board: I.P. Mendis, Akademichesk. O.Y. Kuz'min; Corresponding Member, USSR
Academy of Sciences (Mosc. RA); I.A. Gidim, I.M. Pavlov, and I.P. Zudin, Candidates of Technical Sciences.

PURPOSE: This book is intended for metallurgical engineers, research workers
in metallurgy, and may also be of interest to students of advanced courses
in metallurgy.

CONTENTS: This book, consisting of a number of papers, deals with the proper-
ties of heat-resistant alloys. Each of the papers is devoted to
the study of the factors which affect the properties and behavior of alloys.
The effects of various factors such as C, Mo, and V on the heat-resisting
properties of various alloys are studied. The reliability and variability
of certain metals as related to the thermal conditions are the object of
another study described. The problem of hydrogen embrittlement, diffusion
and the deposition of ceramic coatings on metal surfaces are studied by
electrophoresis are examined. One paper describes the apparatus and methods
used for growing monocrystals of metals. X-ray-base serials are critically
examined and evaluated. Results are given of studies of interatomic bonds
and the behavior of atoms in metal. Tests of turbine and compressor blades are
described. No personalities are mentioned. References accompany most
of the articles.

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БАННУКН, О.А.

[illegible]

S/167/60/000/004/001/003
A006/A001

AUTHORS: Sharipkulov, R. S., Bannykh, O. A., Goncharov, I. Ye., Zudin, I. F.,
Linchevskiy, B. V., Prokoshkin, D. A.

TITLE: The Effect of Chromium and Manganese on Phase Transformations of
Chrome-Manganese Steels

PERIODICAL: Izvestiya Akademii Nauk UzSSR, Seriya tekhnicheskikh nauk, 1960,
No. 4, pp. 62-69

TEXT: In developing chrome-manganese stainless steels by replacing the nickel by manganese, investigations into structural phases had been carried out previously by A. V. Shultin, F. F. Khimushin, F. M. Becket (Ref. 1, 2, 7); G. V. Estulin (Ref. 3); A. T. Grigor'yev, D. L. Kudryavtsev (Ref. 4, 6) and foreign scientists (Ref. 8-10). In the present article information is given on the effect of manganese and chromium on phase transformations in steel. In a 12-kg induction furnace, 16 alloys with different chromium and manganese content and one chrome-nickel alloy containing Ti were melted. Changes in hardness after water quenching at 800, 900, 1,000, 1,100 and 1,200°C were studied. The dependence of the hardness on temperature is shown in Table 3. After quenching

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S/167/60/000/004/G01/003
AOC6/A001

The Effect of Chromium and Manganese on Phase Transformations of Chrome-Manganese Steels

the specimens were subjected to an analysis of the microstructure. The steels were tempered at 650, 700, 750 and 800°C. Changes in H_{BB} , depending on the tempering time of steels with 17% Cr, quenched at 1,100°C are given in Table 4. The connection of a possible δ -phase formation and higher hardness was determined by investigating the magnetic properties of the steel. Specimens of all steel melts were analyzed on an M. S. Akulov type anisometer at 20°C, after tempering at 750°C for 10 hours. The amount of a ferromagnetic phase was determined for various steel grades. Dilatometrical analysis was made on chrome-manganese specimens quenched at 1,100°C with subsequent annealing at 750°C for 10 hours. Curves of temperature versus linear expansion for three grades of steel with 10% Cr were plotted (Fig. 2). A phase analysis was made of precipitates out of an electrolyte on saturated potassium chloride base with addition of 5 to 50 mg/l hydrochloric acid and 5 to 25 g/l citric acid at a current density of 0.6 - 1.0 amp/cm² and a temperature not over 20°C. A copper cylinder was used as a cathode. 9 to 12 mm specimens were placed into a collodion bag filled with 100 - 130 ml of the filtrated electrolyte. The precipitates were

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separated from the electrolyte, washed and dried at 100°C in hydrogen atmosphere for 20 to 30 minutes. Roentgenograms were taken of the dried precipitates with a PKA (RKD) camera on Cr radiation without using a filter. Exposure time was 13 to 18 hours. A chemical analysis was made of precipitates separated out of 4 steel grades in an electrolyte composed of 250 g/l potassium chloride, 5 mg/l hydrochloric acid, 5 g/l citric acid, 0.6 - 0.8 amp/cm² current density and 18 - 22°C inside the collodion bag. The investigations performed yielded the following results: At a content of 11% Mn, independent of the chromium content, the steel contains in its structure austenite as well as ferrite. It is not possible to convert the steel into the austenitic state by heat treatment. Steel with 16 - 22% Mn and 8 - 10% Cr has a γ + ϵ -structure at temperatures below 140 - 210°C and an austenitic structure at a temperature over 210°C. The presence of the ϵ -phase was not observed in steel with 27% Mn. In steels with 13 and 17% Cr, independent of the manganese content, the structure is composed of ferrite and austenite after quench-hardening at a temperature over 900°C. The amount of ferrite in the steel group with 17% Cr is considerably higher than

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that of steels with 13% Cr. After heating to 600 - 900°C, the ferrite is decomposed and the δ -phase is formed (except X13Г11 (Kh13G11) and X17Г11 (Kh17G11) steels). Steels with 17 and 13% Cr contain carbide of the $Me_{23}C_6$ type which may be expressed by the formula (Fe, Mn, Cr) $_{23}C_6$. There are 5 tables, 2 figures and 11 references, 6 Soviet, 2 English and 3 German. ✓

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy AS USSR)
Gornyy otdel AN UzSSR (Mining Department of AS UzbekSSR)

SUBMITTED: December 23, 1959

Card 4/4

86076

18.1100 1045 S/180/60/000/005/017/033
E111/E135

AUTHORS: Bannykh, O.A., Zudin, I.F., Kashin, V.I., and
Prokoshkin, D.A. (Moscow)

TITLE: Some Properties of Iron-Aluminium Alloys Based on the
 α -Solid Solution

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
nauk, Metallurgiya i toplivo, 1960, No.5, pp.149-155

TEXT: The authors point to the advantageous properties (e.g.
low density, high corrosion- and scaling-resistance) of iron-
aluminium alloys, in spite of which comparatively little
industrial use is made of them. For their own investigation of
the strength and plasticity of such alloys the authors used the
following range of compositions, %: 4.87-16.82 Al; 0.005-0.094
Mn; 0.013-0.100 Si; 0.02-0.05 S; 0.002-0.012 P; 0.018-0.020 C;
0.002-0.015 O; 0.004-0.011 N; (not all the S and P analyses
were carried out). The alloys were melted in a vacuum induction
furnace described by Kashin et al. (Ref.9) or in air from
aluminium-deoxidized Armco iron and grade AB0000 (AV0000) aluminium.
Fig.1 shows alloy density as a function of aluminium content.
Impact strength as function of the test temperature is shown in
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Some Properties of Iron-Aluminium Alloys Based on the α -Solid Solution

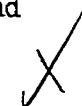
Fig.2 and the cold brittleness threshold (temperature at which the alloy acquired an impact strength of 2 kg/cm²) as a function of aluminium content in Fig.3 (air-melted alloys represented by interrupted lines in both figures). For tensile testing at 20-700 °C a type MM-4P machine was used. Tensile strength, yield point and relative elongations, as functions of aluminium content for various temperatures, are shown in Fig.4. Fig.5 shows relative elongation as a function of temperature for air- and vacuum-melted alloys (right- and left-hand graphs). Grain size as a function of holding time at 1100 °C for vacuum-melted alloys is shown in Fig.6. The influence of heating temperature on hardness for two alloys with 15% Al is shown in Fig.7 (air-melted, curve 1; vacuum-melted, curve 2): the hardness of both has a maximum at about 350-450 °C, but rises much more steeply and attains a higher value with vacuum melting. Vacuum melting also improves other high-temperature properties of Fe-Al alloys.

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Some Properties of Iron-Aluminium Alloys Based on the α -Solid Solution

Increasing aluminium content to about 15% increases strength at 20-600 °C; at 700 °C it has little effect. Maximum strength and adequate plasticity are obtained at 400 °C; above 600 °C strength falls sharply while plasticity increases. There are 7 figures, 1 table and 16 references: 5 Soviet, 10 English and 1 German. 

SUBMITTED: May 27, 1960

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BANNYKH, O.A.

PHASE I BOOK EXPLOITATION

SOV/5947

Prokoshkin, Dmitriy Antonovich, Ivan Feofanovich Zudin, Rustan Salikhovich Sharipkulov, and Oleg Aleksandrovich Bannykh

Legirovaniye khromomargantsovistoy nerzhaveyushchey stali (Alloying Chromium-Manganese Stainless Steel) Moscow, Izd-vo AN SSSR, 1961. 74 p. Errata slip inserted. 3000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii im. A.A. Baykova.

Resp. Ed.: N.N. Kurnakov, Professor, Doctor of Chemical Sciences; Ed. of Publishing House: A.N. Chernov; Tech. Ed.: V.Ye. Volkova.

PURPOSE: This book is intended for metallurgists and mechanical engineers.

COVERAGE: Problems connected with the effect of different alloying elements on the phase composition, transformation, and mechanical

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Alloying Chromium-Manganese (Cont.)

SOV/5947

and corrosion properties of chromium-manganese stainless steels are discussed, with particular attention given to the alloying of steel containing 17 to 18% Cr and 12 to 15% Mn. The present work is based on results of investigations carried out at the Institute of Metallurgy, Academy of Sciences USSR, and on experimental data published in Soviet and non-Soviet literature. No personalities are mentioned. There are 53 references: 18 Soviet, 18 English, 16 German, and 1 Czech.

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34529
S/659/61/007/COC/016/044
D217/D303

18.1130
AUTHORS:

Bannykh, O.A., and Zudin, I.F.

TITLE:

Influence of quenching temperature on the formation of the σ -phase in chromium-manganese steel (18 % Cr, 14 % Mn)

SOURCE:

Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 159 - 168

TEXT: Yu.I. Kiselev participated in the experimental work. A steel of the following chemical composition was studied: 0.07 % C, 0.53 % Si, 13.91 % Mn, 18.59 % Cr, 0.03 % N, 0.009 % S and 0.032 % P. This was melted in an induction furnace. The ingot (12 kg) was forged into cylindrical billets of 12 mm diameter. These were water quenched from 1100° and 1200°C. The quenched metal was tempered in the interval 500 - 900°C for period of 10 minutes to 130 hours. The change in hardness and microhardness of a steel containing the ferromagnetic phase, and the microstructures after tempering were studied; an X-ray analysis was also carried out. It was found, that af-

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ter quenching from 1100°C, the σ -phase forms directly from the ferrite on tempering. In X-ray pictures taken of specimens after quenching from 1100°C and tempering for various periods of time, lines for ferrite, austenite and the FeCr-type σ -phase were obtained. The hardness of the steel is directly proportional to the quantity of decomposed ferrite. After quenching from 1200°C, the formation of σ -phase from ferrite during tempering passes through intermediate stages. In the first stage 'excess' austenite precipitates from the ferrite. The change in hardness of the steel is not directly proportional to the ferrite content. There are 6 figures, 2 tables and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: G.F. Tisinai, J.K. Stanlev and C.A. Samans, J. Metals, February, 1956; R.P. Frerich and C.U. Clark, Trans. ASM, 46, 1954; A.L. Bindari, P.K. Koh and O. Zmeskal, Trans ASM, 43, 1951; W.D. Pearson and J.W. Christian, Acta, 5, 1952.

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X

34550
S/659/61/007/000/039/044
D205/D303

18.11.50
AUTHORS:

Korneristyy, Yu.K., Bannykh, O.A., Zudin, I.F., and
Prokoshkin, D.A.

TITLE:

Influence of aluminum and carbon on properties of
steel with 10 % Cr and 13 % Mn, at elevated tempera-
tures

SOURCE:

Akademiya nauk SSSR. Institut metallurgii. Issledo-
vaniya po zharoprochnym splavam, v. 7, 1961, 317-328

TEXT: The influence of Al addition in the range of 2.35 - 4.67 %
and of C in the range of 0.1 - 0.8 % was investigated in 10 % Cr
and 13 % Mn steel in which the appearance of the σ -phase is exclu-
ded. The samples were prepared by smelting in a magnesite crucible,
in an induction furnace, and consisted of Armco iron, Cr, Mn (96.5%
pure) and Al metal. C was introduced by addition of synthetic cast
iron. The ingots were forged into cylinders of 12 and 20 mm diame-
ter, starting the forging at 1150° - 1200°C ending at 750°C. The
samples were then hardened by quenching in water from 950°C for 2

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hours prior to testing. The resulting structures were: Without Al and with 0.1 % (I), with 2.5 % Al, 0.4 % C (V) and with 2.5 % Al, 0.8 % C (VI). These steels were austenitic. With 2.35 % Al and 0.1 % C (II) the structure was 65 % austenite 35 % ferrite; with 3.12 % Al, 0.1 % C (III) - 90 % ferrite; with 4.67 % Al, 0.1 % C (IV) - 100 % ferrite. The temperature dependence of strength and plasticity was examined, using an MM-4P (IM-4R) machine. The hot hardness was examined at 700°, 800° and for samples V and VI also at 900°C, on the ВМ-ИМ (VIM-IM) apparatus, using a sapphire indentor. Resistance to creep was examined on the ИП-2 (IP-2) and IP-5 machines, using stresses of 9 kg/mm² in the temperature range of 550 - 750°C. Resistance to scaling was examined by the weight gain of samples heated for various times in muffle furnaces in the 900 - 1200°C temperature range. The austenite of the 10 % Cr, 13 % Mn and 0.1 % C steel is unstable and is transformed into martensite under the action of plastic deformation. Aluminum exerts a high ferrite-forming action and lowers the high-resistance characteristics. Exploiting the γ -forming ability of carbon, the austenitic structure can be achieved in steel containing aluminum. 0.4 % of C in the presence

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of 2.5 % Al gives a stable austenitic structure. The resistance of this steel (V) is higher than that of the other investigated steels. The resistance to scaling increases sharply with an increase of Al content. The increase of C up to 0.4 % lowers the resistance to scaling. Further increase of C to 0.8 % has little bearing in this respect. Steel (V) has good heat and scale resistances up to 700°C and can be used for durable service under stress up to 650°C, instead of Cr-Ni steel 1X18H9T (1Kh18N9T). There are 7 figures, 1 table and 12 references: 10 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: Brady and Baughner, Iron Age, 194, no. 7, 1959; A.J. Schmatz, Metal Progr. 76, no. 4, 1959.

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X

KOVNERISTYY, Yu.K.; BANNYKH, O.A.; ZUDIN, I.F.; PROKOSHAIN, D.A.

Effect of aluminum and carbon on the properties of steel with
10 % Cr and 13 % Mn at high temperatures. Issl. po zharopr.
splav. 7:319-328 '61. (MIRA 14:11)
(Steel alloys--Metallurgy) (Metals at high temperatures)

34554

S/659/61/007/000/043/044

D231/D303

18.11.30

AUTHORS: Sharipkulov, R.S., and Bannykh, O.A.

TITLE: Investigating the effect of alloying elements on the kinetics of decomposition of ferrite in chromium-manganese stainless steel

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 362 - 369

TEXT: The present work was carried out to investigate the effect of the following alloying elements: Mo (0.63; 1.52; 3.69), Ti (0.2; 0.42; 0.69 %), Nb (0.06; 0.28; 0.84 %), Ni (0.89; 2.63; 3.65 %) and Cu (0.56; 0.81 %) on the rate of decomposition of ferrite in steels containing: 0.1 % C, 17 - 20 % Cr, 10 - 15 % Mn during tempering after quenching. A charge consisting of Armco iron, standard ferroalloys, electrolytic copper and nickel was melted in an induction furnace. Castings (8 kg each) were shaped by forging to form specimens 12 mm in dia. The temperature at the beginning of forging was 1150 - 1200°C and at the end 800 - 900°C. After forging, the steel

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specimens were quenched from 1100°C then tempered at 650 and 750°C. The duration of tempering varied from 30 min. to 100 hrs. Investigated were: 1) Hardness of the steel in the quenched state and after tempering for different times. 2) Changes in the microstructure. 3) For several steel specimens only the predominating phases were electrolytically deposited and subjected to X-ray analysis. In order to have a better idea of the effect of the concentration of a particular alloying element on the stability of the ferrite during the tempering of quenched steels, relative (not absolute) changes of hardness were compared. For that purpose tempering at 750°C was carried out for a period from 0 to 50 hours and the change in hardness at 50 hours was taken as 100 %. The results obtained for the above-mentioned alloying elements were tabulated. Under these conditions of tempering Ti and Nb slowed down considerably the change in hardness of the steels. In case of Nb the retardation increased with its concentration whereas in the case of Ti 0.42 % slowed down and 0.69 % somewhat increased the change in hardness. Consequently, at a given concentration of Ti in the steel the rate of decomposition of ferrite reaches a minimum at a given temperature and at a

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trations of an alloying element noticeable amounts of the intermetallic (the Laves type) phase are formed during tempering together with the σ -phase. If the rate of separation of this phase is higher than that of the σ -phase then the rate of decomposition of the ferrite measured by variation in hardness can increase with the amount of the alloying, ferrite-forming element. 3) The austenite-forming elements, Ni, and Cu, by decreasing the amount of the ferrite have practically no effect on its decomposition. There are 4 figures, 1 table and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: H. T. Shirley, J. Iron a. steel. Inst., 174, 1953.

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X

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Investigating some heat-resistant ...

and α -solid solution to be investigated. The investigation consisting of two parts was carried out with the following steels: 1) 0 % Mo; 2) 1 % Mo; 3) 3 % Mo; 4) 5 % Mo (part I); 5) 3 % Mo + 0.001 % B; 6) 3 % Mo + 0.004 % B; 7) 3 % Mo + 0.008 % B (part II). Part I: Tests carried out were: 1) Dependence of the hardness of various steels on the quenching temperature; 2) Microstructure after quenching from 1000°C; 3) Dependence of the ultimate strength and corresponding elongation on temperature in the range 600 - 900°C; 4) Measurement of creep resistance at 700°C and 750°C; 5) A steel quenched (from 1100°C) in water, then subjected to ageing (at 750°C) for 10 hours was investigated for strength and ductility when tested to fracture (20 - 900°C) also for temperature dependence of the impact strength, long-time thermal stability and long-time strength under a load. The results are fully discussed. Part II: According to S.M. Vinarov (Ref. 10: Trudy MAI, no. 123, Oborongiz, 1960) the ability of small amounts of B to increase the heat resistance of steels depends on the method of introducing B into the steel and the chemical composition of the latter. The steels chosen were those previously investigated in part I which showed small creep resistance. All the investigated steels after quenching (from 1150°C) X
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Investigating some heat-resistant ...

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in eater then subjected to ageing at 700°C (for 10 hrs) had $\gamma + \sigma$ structure. In order to obtain maximum information on the effect of B at higher temperatures, the mechanical properties were investigated in the temperature range 20 - 700°C. Studied were: 1) Dependence of strength and ductility of steel with various additions of B on the temperature; 2) Impact strength (resilience); 3) Creep resistance; 4) Heat resistance at 700°C. The authors concluded that steels 1 and 2 of the austenite structure possess a much higher heat resistance than other steels (3, 4, 5, 6, 7) having two-phase ($\gamma + \sigma$) structure. Molybdenum increases the heat resistance of steels of both austenitic and two-phase structure. Alloying with Mo in amounts which do not cause formation of the second phase is useful. The optimum amount of Mo is that near to the saturation limit for a given concentration of N in the steel. Additions of B improve the heat resistance of steel. Of the alloys investigated those containing 0.001 % B showed the best effect. There are 3 figures and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.T. Brown, Metal progr., 74, 2, 1958.

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X

SHARIPKULOV, R.S.; BANNYKH, O.A.

Investigating the effect of alloying elements on the kinetics of
ferrite decomposition in chromium-manganese stainless steel. Issl.
po zharopr. splav. 7:563.569 '61. (MIRA 14:11)
(Chromium-manganese steel--Metallography)

BANNYKH, O.A.; MODIN, S.; MODIN, Kh.

Growth of cementite particles during the tempering of hardened carbon steel with a eutectoid composition. Izv. AN SSSR. Otd. tekhn. nauk. Met. 1 topl. no.2:71-77 Mr-Ap '62. (MIRA 15:4)
(Steel--Metallography) (Tempering)

BANNYKH, O.A., kand.tekhn.nauk; MODIN, Kh.; MODIN, S.

Structural changes during the tempering of eutectoid carbon steel.
Metalloved. term. obr. met. no.9:17-19 S '62. (MIRA 16:4)

1. Institut metallurgii imeni A.A.Baykova i Metallograficheskiy
institut v Stokgol'me.
(Steel—Metallography) (Tempering)

BANNYKH, O.A., kand.tekhn.nauk

Scientific and Technical Conference on Highly Resistant Metals,
Steel, and Alloys. Metalloved. i term. obr. met. no.9:62-63
S '62. (MIRA 16:5)

(Metals—Congresses)

ACCESSION NR: AT4009495

S/2509/63/000/014/0068/0077

AUTHOR: Banny*kh, O. A.; Zudin, I. F.; Kashin, V. I.; Prokoshkin, D. A.;
Samarin, A. M.

TITLE: Properties of ferrite aluminum-iron alloys

SOURCE: AN SSSR. Institut metallurgii. Trudy*, no. 14, 1963. Metallurgiya,
metallovedeniye, fiziko-khimicheskiye metody* issledovaniya, 68-77

TOPIC TAGS: aluminum alloy, iron alloy, aluminum-iron alloy, ferrite alloy, melting,
forging, heat treatment

ABSTRACT: Some properties of aluminum-iron alloys are of industrial importance, but they are not commonly used as construction materials. In the present work a number of these alloys were exposed to melting, forging and heat treatment, after which they were studied for specific gravity, impact strength, rupture strength and plasticity under various conditions. The chemical composition of the alloys used in the investigation is given in Table 1 of the Enclosure. Two series of alloys were melted: one group in air and the other in a vacuum. It was found that vacuum melting of the alloy improves the mechanical properties, especially under high-temperature conditions. Figure 1 of the

Cord

1/6

ACCESSION NR: AT4009495

Enclosure shows the dependence of the rupture strength and plasticity of the alloy on the aluminum content. The curves show that an increase in the aluminum content to about 15% increases the strength of the alloy between 20-600C; at 700C the strength does not depend on the aluminum content. The alloy has a maximum strength and satisfactory plasticity at 400C; the strength drops sharply and the plasticity simultaneously increases at temperatures over 600 C. Aluminum-iron alloys may thus be used under stress without adding a third element at temperatures below 600C. Figure 2 of the Enclosure shows that an increase in the aluminum content in the alloy increases grain size at 1,100C. Additional studies on the effect of admixtures (Ti, Zr, B, Ni, W) on the properties of the Al-Fe alloys shows that the introduction of titanium, zirconium, and boron into alloys with 10% Al does not change the strength of the alloy. Zirconium and boron lower the scaling resistance of the alloy while additions of nickel and tungsten to an alloy with 15% Al lowers the strength and plasticity of the alloy. Orig. art. has: 7 figures and 6 tables.

ASSOCIATION: Institut metallurgii, AN SSSR. (Metallurgical Institute, AN SSSR)

SUBMITTED: 00

DATE ACQ: 25Jan64

ENCL: 04

SUB CODE: MM

NO REF SOV: 008

OTHER: 011

Card 2/6

ACCESSION NR: AT4009495

ENCLOSURE: 01

Alloy No.	Content %				
	Al	Mn	Si	O	N
Air-melted alloys					
1	4,87	0,023	0,032	0,0150	0,0048
2	9,80	0,004	0,065	0,0052	0,0090
7	8,70	0,010	0,047	0,0051	0,0040
8	12,70	0,005	0,046	0,0097	0,0090
9	15,00	0,018	0,013	0,0033	0,0090
Vacuum-melted alloys					
3	10,38	<0,010	0,030	0,0031	0,0110
4	12,19	<0,010	0,030	0,0048	0,0070
5	14,92	<0,010	0,030	0,0028	0,0070
6	16,82	<0,010	0,030	0,0020	0,0040

TABLE 1 - Chemical composition of the alloys tested.

Card 3/6

ACCESSION NR: AT4009495

ENCLOSURE: 02

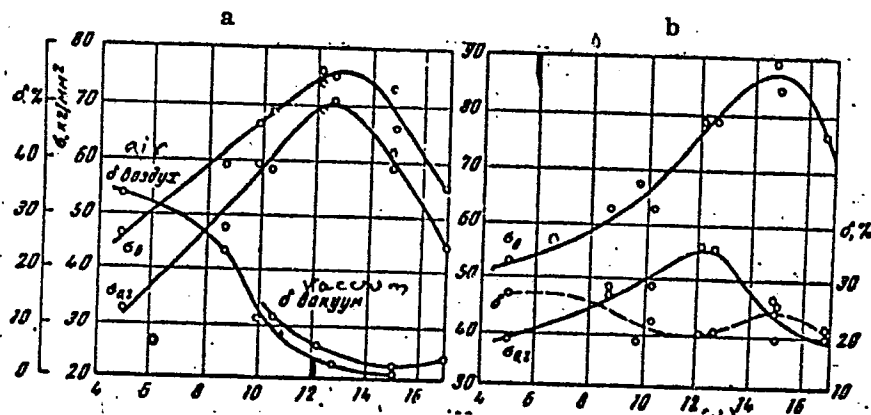


Fig. 1 - Dependence of rupture strength and plasticity of alloys on aluminum content
a - at 20°C; b - at 400°C; c - at 500°C; d - at 600 and 700°C

Card 4/6

ACCESSION NR: AT4009495

Fig. 1 (Continued)

ENCLOSURE:03

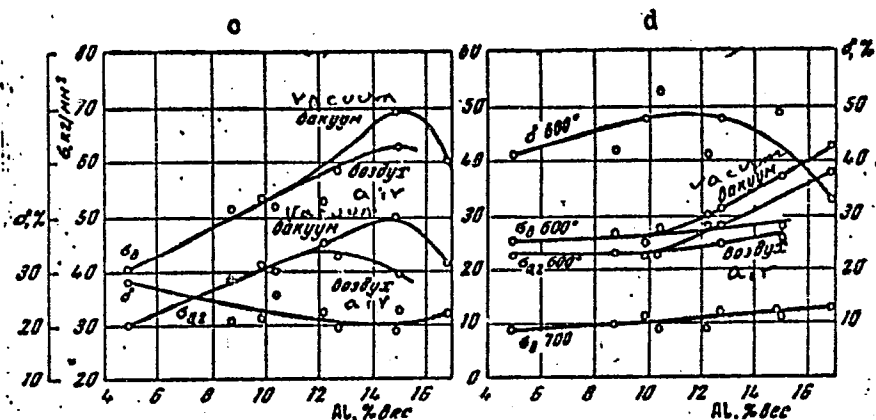


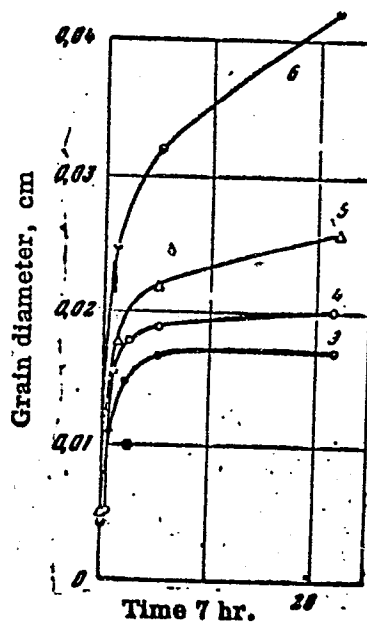
Fig. 1 - Dependence of rupture strength and plasticity of alloys on aluminum content
a - at 20°C; b - at 400°C; c - at 500°C; d - at 600 and 700°C

Card 5/6

ACCESSION NR: AT4009495

ENCLOSURE: 04

Fig. 2 - The dependence of the average grain size on the duration of treatment at 1,100C for vacuum-melted alloys 3-6 - alloy nos. (see Table 1 of the Enclosure)



Card 6/6

ACCESSION NR: AT4013939

S/2659/63/010/000/0138/0143

AUTHOR: Prokoshkin, D. A.; Banny*kh, O. A.; Kovneristy*y, Yu. K.; Zudin, I. F.

TITLE: Investigation of the phase composition of chromium-manganese-aluminum steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 138-143

TOPIC TAGS: steel phase composition, steel, chromium alloy, manganese alloy, aluminum alloy, steel property carbon dependence

ABSTRACT: Chromium-nickel austenite steels are being replaced by chromium-manganese steels, both in the SSSR and in other countries. The influence of carbon (0.1-0.8%) and aluminum (3-7.5%) on the position of the α , ($\alpha + \gamma$) and γ phases for steel with 10% Cr and 14% Mn was investigated at 800, 950, 1100 and 1250C. It was shown that the content of the ferro-magnetic phase in the steel increases in direct proportion to the aluminum concentration (for constant carbon content) and decreases as the carbon content increases (for a constant aluminum content). The top concentration of aluminum in the austenite rises together with an increase of carbon in the steel. The carbon concentration required for complete change of the α -crystalline lattice into γ

Cord 1/2

ACCESSION NR: AT4013939

remains practically the same when the aluminum content in the steel changes. The effectiveness of aluminum for α -formation is lowered and that of carbon for α -formation increases as the temperature rises. Using metallographic analysis, it can be shown that the diffusion temperature of carbides rises with an increase in the aluminum and carbon content. Orig. art. has: 5 figures and 2 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 004

OTHER: 001

2/2

Card

BANNYKH, O.A.; MODIN, Kh.; MODIN, S.

~~XXXXXXXXXX~~
Electron microscopy of carbon steel having an eutectoid constitution after hardening and quenching. Trudy Inst. met. no.12: 106-112 '63. (MIRA 16:6)

(Steel—Metallography)
(Electron microscopy)

BANNYKH, O.A.

Double etching as a method of preparing carbon steel specimens
for electron microscopy. Trudy Inst. mst. no. 12:113-117 '63.
(MIRA 16:6)

(Steel---Etching)
(Metallography---Equipment and supplies)
(Electron microscopy)

PROKOSHKIN, D.A.; BANNYKH, O.A.; KOVERNITSYY, Yu.K.; ZUDIN, I.F.

Investigating the phase constitution of chromium-manganese-aluminum steel. Issl. po zharoproch. splav. 10:138-143 '63.

Chromium-manganese-aluminum austenitic steel. Ibid.:144-148
(MIRA 17:2)

PROKOSHIN, D.A.; MOLDAVSKIY, O.D.; BANNYKH, O.A.; KOVNERISTYY, Yu.K.

Effect of phosphorus and aluminum on the mechanical
properties of austenitic chromium-manganese steel. Izv. vys.
ucheb. zav.; chern. met. 6 no.12:147-151 '63.
(MIRA 17:1)

ACCESSION NR: AT4013940

S/2659/63/010/000/0144/0148

AUTHOR: Prokoshkin, D. A.; Bannykh, O. A.; Kovneristy, Yu. K.; Zudin, I. F.

TITLE: Chromium-manganese-aluminum austenite steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 10, 1963, 144-148

TOPIC TAGS: steel, austenite steel, chromium-manganese-aluminum steel, austenite steel magnetic property, steel strength carbon content dependence

ABSTRACT: Austenitic steels with an Fe-Cr-Mn base are finding an ever-widening range of industrial application. The authors point out that the alloying of chromium-manganese steel with carbon and aluminum yields a satisfactory complex of strength properties at both normal and high temperatures. This paper gives the results of a study of the mechanical properties, as well as certain other properties, of chromium-manganese-aluminum steel. The study was based on an alloy of 9-10% Cr and 13-15% Mn, with a varying content of aluminum and carbon. Strength tests were made on IM-4P machines (tensile strength tests) and IP-5 machines (tests for creep and fatigue strength). The data obtained on short-term mechanical properties indicate that carbon definitely strengthens chromium-manganese-aluminum steel. An increase in plasticity results from increasing the amount of the plas-

Cord 1/3

ACCESSION NR: AT4013940

tic structural component (austenite) in the steel. The maximum is attained with a carbon concentration which provides for a 100% austenitic condition. An increase in the carbon content from 0.5 to 0.9% has no effect on the notch toughness of the steel, after annealing at temperatures of 1050-1150C. At temperatures of 700-750C, steel containing approximately 3% Al has reduced creep resistance when the carbon content is increased over the amount necessary for the creation of a stable austenitic structure. In the initial condition (after annealing), all the steels were non-magnetic. The long-term effect of temperature and stress led to the formation of up to 34-36% ferromagnetic phase in steel with 10% Cr, 14% Mn, and 0.1%C. When the aluminum concentration was increased from 3 to 6%, the authors noted a considerable rise in the ultimate strength value. This rise results from a certain strengthening of the austenite and from a considerable reduction of the grain that occurs with the appearance of small quantities of ferrite phase. In the fatigue-strength test, failure time was shortened drastically as the aluminum concentration was increased. A sample of austenitic steel with 3% Al did not fracture after 6000 hours of testing, and the total deformation was less than 1.1%. In the case of steel with 4.5% Al, the austenite partially decays under the influence of high temperature deformation. Although this steel was non-magnetic prior to the test, it was found to be about 35% magnetic after a failure time of 134 hours. The authors conclude that it is possible to obtain a metal with satisfactory heat resistance by the aluminum-alloying of Fe-Cr-Mn-C austenitic steel. However, the aluminum con-

Card 2/3

ACCESSION NR: AT4013940

tent must not exceed that which causes the appearance in the structure of a ferrite component, either in the initial (tempered) state, or after an extended exposure to high temperatures and stress. It was also noted that an addition of 6-8% aluminum reduces the density of Cr-Mn steel by about 10-12%. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: INSTITUT METALLURGI AN SSSR (Institute of Metallurgy, AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 004

OTHER: 001

Card. 3/3

BANNYKH, G.A.; ZUDIN, I.F.; KASHIN, V.I.; PROKOSHIN, D.A.; SAMARIN A.M.

Properties of ferritic iron-aluminum alloys. Trudy Inst. met. no.14:
68-77 '63 (MIRA 17:8)

1. Chlen-korrespondent AN SSSR; otvetstvennyy redaktor zhurnala
"Trudy Instituta metallurgii" (for Samarin).

BANIKH, O.A.

Electron microscopy of the precipitation of carbides and the decomposition of ferrite in Kh18G14 steel at high temperatures. Metalloved. i term. obr. met. no.4:6-8 Ap '64.

(MIRA 17:6)

1. Institut metallurgii im. A.S. Baykova.

$$+ 11.009 \cdot \Delta C \quad \text{EMP}(a) = \text{EMP}(1) / \text{EMP}(2) / \text{EMP}(3) / \text{EMP}(4) \quad \text{PP-1} \quad \text{ASD-2} / \text{AFTTC} / \text{ASD}(m) - 2$$

ACCESSION NR: A14043770

\$7,000,000; \$4,000,000, 000,000,000

Адрес: г. Харьков, ул. А.; Коваленко, О. И.

Figure 1. Temperature of austenitic-martensitic transition in polycrystalline steel.

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya metallov v zhidkom i tverdom sostoyaniyakh (Research of metals in liquid and solid states). Moscow, Izd-vo Nauka, 1964, 202-206

TOPIC TAGS: chromium manganese molybdenum steel, austenitic martensitic steel
 304 316 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268

[illegible]

1. The first group of people who are not in the military are the people who are not in the military.

the patient's physical treatment, some of which are

Coru 1/2

L 11777-65

ACCESSION NR: AT4045996

-196C and rolling at -196C. All specimens were tempered. The best results were obtained with high-temperature low-temperature (500C) thermomechanical treatment followed by rolling at -196C. In steel so treated, the tensile strength reached 170--190 kg/mm²; the yield strength, 148--153 kg/mm²; and the elongation, 8--10%. Orig. art. has: 4 tables.

ASSOCIATION: none

SUBMITTED: 18May64

ENCL: 00

SUB CODE: MM

NO REF SOV: 004

OTHER: 002

Card 2/2

1. D. A. Kopylovskiy, Yu. K. Bannykh, O. I. ...

... 100, and 300 nsec. ...
... were investigated in 26 melts of ...

Page 2

L 15197.65

ACCESSION NR: AT4046847

was found to possess a high impact toughness (16-22 lb/in²)

SUBMITTED: 16Jun64

ENCL: 00

SUB CODE: 122

NO REF SOV: 006

OTHER: 000

Card 12

L 19053-55 EWT(m)/EWA(d)/ENP(t)/ENP(b) AED(m)-3 JB/MLY

ACCESSION NR: AT4046848

S/0000/64/000/000/0236/0242

AUTHOR: Banny*kh, O. A., Zudin, I. F., Candidate of technical sci. and Eng. Tech. Sci.
G. P. Dzhurav, Ya. A., Doronin, V. M., Topilin, V. V.

TITLE: Investigation of the phase composition and properties of organo-

SOURCE: AN SSSR. Nauchnyy sovet po probleme zharnoprochnykh splavov. *Technical Council on the Problem of the Study of the Properties of Steels and Alloys*. Moscow, 1964. 100 p. 100,000 copies. 100,000 rubles.

TOPIC TAGS: steel structure, steel phase composition, alloy steel

The integral intensity of the austenite γ phase (111), (200), (211), (212), and (419), δ -phase lines were determined using a

L 13053-65

ACCESSION NR: AT4046848

URS-50I apparatus for angles of 27-30° in samples quenched from 1100C and aged at 700C

6-phases; 2) steel with less than 18% chromium retains adequate plasticity after aging at

700C and 3) scale resistance at 900C is greater in samples with an abundance of

6-phases; 2) steel with less than 18% chromium retains adequate plasticity after aging at

700C and 3) scale resistance at 900C is greater in samples with an abundance of

6-phases; 2) steel with less than 18% chromium retains adequate plasticity after aging at

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6-phases; 2) steel with less than 18% chromium retains adequate plasticity after aging at

700C and 3) scale resistance at 900C is greater in samples with an abundance of

6-phases; 2) steel with less than 18% chromium retains adequate plasticity after aging at

700C and 3) scale resistance at 900C is greater in samples with an abundance of

4 figures and 1 formula.

ASSOCIATION: None

SUBM. TYPE: 1404684

FNCL 00

NO REF SOV: 005

OTHER: 001

Card 2/2

L 12046-66 TWP(t)/TWP(t)/TWP(t) AFMDQ/AS(t)/AS(t)/AS(t) 12/14

ACCESSION NO. 12046850

S/0000/64/000/000/0247 0250

AUTHOR: Bannikov, O. A., Kovalenko, O. I.

TITLE: Influence of carbon and manganese on the phase transformation of
manganese steel

SOURCE: *Problemy metallofiziki*, No. 1, 1966, pp. 147-150, 247-250.
In: *Problemy metallofiziki*, Studies on steels and alloys. Moscow, 1966.

TOPIC: *metallurgy*; *chromium*; *manganese steel*; *stainless steel*; *phase transformation*; *carbon steel*; *steel hardness*

ABSTRACT: Steel with a constant carbon content of 3%, chromium content of 10% and
manganese content of 10%, 15% and 20% was investigated.

L 1301-1-1

ACCESSION NUMBER

the temperature of annealing. Manganese contents up to 4.5% did not shift the range of

ASSOCIATION: None

SUBMITTED: 16Jun64

ENCL: 00

SUB CODE: MM

NO REFERENCE

OTHER: 003

Card

L 11309-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) MJW/JD

ACCESSION NO: AP4010659

5/0129/64/000/000/000

AUTHOR: Bannykh, O. A.

TITLE: Plenary microscopic study of carbide precipitation in steel
after heat treatment

SOURCE: Metall. zhurnal i termicheskaya obrabotka metallov
1964, No. 1, p. 1-4, 11 figs.

REMARKS: Steel, carbide precipitation, heat treatment, structure, heat treatment

ABSTRACT: Structural transformations occurring in a steel
after heat treatment

Card 1/2

L 11309-65

ACCESSION NR: AP4030639

ume, and austenite after hardening from 1100C. Briefly holding the medium
steel with 10% Cr and 10% Mn at 500-800C leads to precipitation of carbide parti-
cles (Mn-Cr) at the boundary between the α - and γ -phases. In case

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

Card 2/2

L 44557-65

ACCESSION NR AM5012700

engineers and technicians interested in heat resistant and scale resistant steel

TABLE OF CONTENTS (abridged):

Introduction — 5

Ch. I. Phase transformations in iron-chromium manganese steel alloyed with aluminum -- 7

Ch. II. Mechanical properties of chromium manganese aluminum steel -- 23

Ch. III. Effect of aluminum and carbon on heat resistance of steel -- 40

Ch. IV. Change of phase composition and properties during supplementary alloying of chromium manganese aluminum steel -- 60

Ch. V. Scale resistance of chromium manganese aluminum steel -- 77

Bit 1 gms

NO REF

NO REF

NO REF

NO REF

Card 2/2

L 54499-65 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) JD

ABSTRACT NO. 1050112

IR/0370/65/001

ENG. 1113

ATTN: Mr. J. E. ... Metallurgy, ...

... Metallurgy, ...

... Metallurgy, no. 1, 1965, 114-115

TOPIC TAGS: martensitic transformation, low carbon steel

ABSTRACT: It was previously shown that low carbon steels with 10% Mn show a hexagonal phase after quenching. The aim of the present work is to study the influence of carbon (0.1-0.5%) and manganese on the martensitic transformation and on the strength properties. Amounts of martensite and retained austenite were determined by the relative intensities of the diffraction lines. The results are as follows:

steel containing about 0.26% C, 10% Cr and 4% Mo increases with increasing Mn: from 7-10% for 3.59% Mn to 100% for 8.2% Mn (after quenching from 1100°C) and from 2-3% for 3.59% Mn to 100% for 9.0% Mn (after quenching from 900°C). The temperature at which martensite transformation begins falls from 290°C at 3.59% Mn to 0°C

Card 1/1

L 54499-65

ACCESSION NR: AP5013113

0

at 6.8% Mn after quenching from 1100°C. Increasing carbon content was found to sharply increase the amount of retained austenite in steel containing 6% Mn, 10% Cr and 4% Mo after quenching from 1100°C. The point at which martensite transformation begins falls from 1.1% C to 0.12% C to 0% at 0.88% C. Full suppression

Card 2/2

L 56080-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWF(z)/EWP(l)/EWA(f) P1-1

Authors: Fedorov, L. A.; Ivanov, L. I.; Bannykh, G. A.

thermomechanically treated steel

С.Я.П.Р. Plazma metalloy i metallovedeniye, v. 10, no. 5, 1988, 71

TOPIC TAGS: electron irradiation, medium alloy steel, thermomechanical treatment, mechanical properties, crystallographical process, electron accelerator, visid point, hardening, irradiated steel

At least one of the two systems is required for the heavy metal to be mobilized. The second system is the one that is most important in the mobilization of heavy metals.

Card 1, 3

L 56080-65

ACCESSION NRL: AP5013816

properties of a medium-alloy chrome-manganese steel toughened by PMN. The
 results show that the initial alloy elements of
 PMN can improve the toughness of the steel at 10³°C. rock strength and
 the results show that the initial alloy elements of PMN can improve the toughness of the steel at 10³°C. rock strength and

a linear accelerator in the air, 24 hours following the irradiation the specimens were subjected to tensile tests. The irradiation dose was

It is interesting that, following the DPA, the number of defects during the irradiation process is reduced, and there is evidence to suggest that the material is in an equilibrium state. Thus, the effect of the DPA anneals, together with the effect of low-temperature annealing, is

Case 24:

I. 56030-65

ACCESSION NR: AP5013816

1 figure, 1 table.

ASSOCIATION: Institut metallurgii im. A. A. Baykova

(Institute)

OTHER: 001

Card 3/3

BANNYKH, Oleg Aleksandrovich; KOVNERISTYY, Yuliy Konstantinovich;
~~ZHIDIN, Ivan Feodorovich.~~ PRIDANTSEV, M.V., prof. doktortekhn. nauk
otv. red.; CHERNOV, A.N., red.
[Heat-resistant chromium-manganese steel with aluminum]
Khromomargantsovistye toploustoichivye stali s aliuminiem.
Moskva, Nauka, 1965. 101 p. (MIRA 18:3)

SHAVRIN, S.V.; CHENTSOV, A.V.; ZAKHAROV, I.N.; PASHKEYEV, G.G.;
USHAKOV, D.I.; BANNYKH, S.S.; LEKONTSEV, Yu.A.

Blast furnace smelting of high basicity sinter. Stal' 24
no.8:680-684 Ag '64. (MIRA 17:9)

1. Institut metallurgiii v g. Sverdlovske i Chusovskoy
metallurgicheskiiy zavod.

BANNYKH, V.F.; KHSHEV, Ya.I.

Modernizing and putting into production new electromedical apparatus
at the Sverdlovsk plant. Med.prom. 11 no.7:44-47 J1 '57. (MLRA 10:8)
(ELECTRIC APPARATUS AND APPLIANCES)
(MEDICAL INSTRUMENTS AND APPARATUS)

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
COMMON ELEMENTS																										COMMON ELEMENTS																									
CA BANNYKH, Z.S. Vacuum evaporation of magnesium chloride solutions. VA. VILNYANSKII, Z. BANNIKH and N. HAIDUKOV. <i>Kel'm</i> (U. S. S. R.) 3, 15-19(1932). - The vapor-pressure curves of $MgCl_2$ solns. of concns. of 10-90 g. $MgCl_2$ in 100 cc. of H_2O and temp. range 10-180° were detd. Cold and hot methods of sepn. of $MgCl_2$-KCl-$NaCl$-H_2O system are given. Vacuum evapn. is more economical than open-pan evapn. The final product is $MgCl_2 \cdot 6H_2O + MgCl_2 \cdot 4H_2O$, contg. 55% $MgCl_2$. The product is pure enough to use in materials of construction and for producing metallic Mg. JAMES SORREL.																										ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION																									

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BANNYKH, Z-S.

Graphic calculations of carnallite technology. YA. E. VILNYANSKII AND Z. S. BANNIKH. *Kali* (U. S. S. R.) No. 5-6, 42-9(1932).—A study in graphs of the equilibria of the $MgCl-KCl-NaCl-H_2O$ system.

JAMES SORREL

111 AND 110 CODES

PROCESSING AND PROPERTIES INDEX

2

M
BANNYKH, Z. S.

Methods of Graphic Representation of Four-Component Systems. Ya. E. Vilnyanskii and Z. S. Bannykh (*Kolil*, 1933, (5), 23-35; *C. Ab.*, 1933, 87, 5625).—The construction of diagrams for the graphic representation of the system $MgCl_2-KCl-NaCl-H_2O$ is discussed. Regular and right-angle tetrahedra are found best suited for the graphic solution of problems of a four-component system.—S. O.

ASME-ILA METALLURGICAL LITERATURE CLASSIFICATION

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1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
BANNYKH, Z. S. Microchemical investigation of the potassium chloride crystals obtained on treatment of sylvite. Va. E. Vilyanakis and Z. S. Bannykh. <i>Kolli</i> (U. S. S. R.) 1935, No. 8, 19-24. Photomicrographs of different intermediate products (vacuum salt, tower salt and dry salt) are reproduced. The manuf. of vacuum salt is recommended as a means to decrease the caking of KCl in storage. A. Postoff																			
ASS. S. L. A. METALLURGICAL LITERATURE CLASSIFICATION																			

BANNYKH, Z. S.

"Obtaining Potash by the Magnesium Method." Sub 28 Feb 47, Sci
Res Inst of Fertilizers and Insectofungicides.

Dissertations presented for degrees in science and engineering
in Moscow in 1947.

SO: Sum. No. 457, 18 Apr 55

Cand. Tech. Sci.

"APPROVED FOR RELEASE: 06/09/2000

CIA-RDP86-00513R000103410019-2

APPROVED FOR RELEASE: 06/09/2000

CIA-RDP86-00513R000103410019-2"

SOV/137-58-9-18753

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 86 (USSR)

AUTHORS: Bannykh, Z.S., Sachko, A.P.

TITLE: The Quality of Metallic Potassium Obtained by the Thermal Process, and the Behavior of Certain Impurities Therein (O kachestve poluchayemogo termicheskim sposobom metalliche-skogo kaliya i povedenii nekotorykh yego primesey)

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1957 (1958), Nr 5, pp 25-35

ABSTRACT: The thermal method of producing metallic K consists of the reduction of KCl by Ca carbide at 950-1000°C in vacuo in accordance with the reaction $2\text{KCl} + \text{CaC}_2 = \text{CaCl}_2 + 2\text{C} + 2\text{K}$. When metallic K is produced in this manner, the required quality of metal (in terms of Na content, which should be $\leq 1.5-2\%$) is provided by the use of technical KCl not inferior to Grade 1. Removal of undissolved oxide compounds of KCl and other insoluble impurities will be facilitated by the separation of metal therefrom in the molten state by decantation.

Card 1/1 1. Alkali metals--Production 2. Alkali metals--Impurities G.S.
3. Alkali metals--Quality control

SOV/137-58-9-18876

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 102 (USSR)

AUTHORS: Bannykh, Z.S., Sachko, A.P.

TITLE: Distillation of Metal From Residues of Metallic-potassium
Production (Distillyatsiya metalla iz otkhodov proizvodstva
metallicheskogo kaliya)

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1957, (1958), Nr 5,
pp 81-90

ABSTRACT: Laboratory and industrial investigations were conducted of the process of distilling metal from the residues of metallic-potassium production. A vertical vacuum furnace was employed in the investigations. The residues were charged into a retort which is immersed in the furnace. The total duration of the furnace-heating and metal-distillation process ranges from 1 hour 50 minutes to 2 hours 40 minutes depending upon the weight of the charge, the initial temperature in the furnace, and the duration of further heating at constant temperature after distillation of the main mass of metal. When the residues are charged into a furnace that has not been permitted to cool, the duration of the experiment is 1 hour 35 minutes. The

Card 1/2

SOV/137-58-9-18876

Distillation of Metal From Residues of Metallic-potassium Production

distillation of K from residues when the residual pressure in the furnace is 4 to 20 mm Hg proceeds at 415-490°C. During the distillation process the temperature is maintained approximately constant. The recovery of metal during this period is 5.5-6.8 g/cm²hr. The yield of metal in terms of the weight of pure residue charged (without kerosene and paraffin) is ~40% upon practically complete distillation. The consumption of electrical energy per kg distilled metal is 19-25 kwh, of which 16-23 kwh goes to heat the furnace.
G.S.

1. Potassium--Production
2. Slags--Processing
3. Metals--Recovery

Card 2/2

BANNY, G.M.

AUTHOR: Banny, G.M.

130-10-10/18

TITLE: Rolling Mill Men of the Works (Prokatchiki zavoda)

PERIODICAL: Metallurg, 1957, No.10, p. 22 (USSR).

ABSTRACT: The author mentions some of the rolling-mill operators at the "Dneprospetsstal'" Works who have distinguished themselves: Krylov, Makeyev, Sapronov, Yelizarov, Engineer Vasilyevich, Bondarenko, Fedchenko, Chernyak (photograph), Vereshchak, Udalov, Ryazantsev, Shvets, Manusov, Shalimov, Ukholin, Magda, Zhekhovanov, Loktionov, Yatsenko, Guba. He enumerates successes attained by the works and outlines measures taken to increase production. He states that of the 10 000 tons of high-quality rolled products which the rolling-mill staff undertook to produce over the 1957 target, 6 952 had already been produced in the first five months of the year.

ASSOCIATION: "Dneprospetsstal'" Works (Zavod "Dneprospetsstal'")

AVAILABLE: Library of Congress.

Card 1/1

BANNYY, M., inzhener-pilot pervogo klassa

Mysteries of methods. Grazhd. av. 19 no.11:6-8 N '62.
(MIRA 16:1)

1. Nachal'nik Ul'yanovskoy shkoly vysshey letnoy podgotovki.
(Ul'yanovsk—Flight training)

BANNYY, N. P.

CA

Supply of homogeneous ore to the metallurgical plants of the south of the U.S.S.R. L. M. Tsylev and N. P. Bannyi. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, 534-61 (in Russian).—Due to varying compn. of the Krivorog Fe ores, the Robins system of homogenization is recommended. N. Thon

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ASB-ILA METALLURGICAL LITERATURE CLASSIFICATION

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BANNYY, N. P.
CA

PROCESSES AND PROPERTIES INDEX

9

Rational utilization of manganese ores. I. M. Tsylev and N. P. Jannuy. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, No. 12 (in Russian). -- Losses of Mn in the process of ore concn. can be reduced from the present 18% in the sludge to 7-11%. On the other hand, it is planned to utilize the sludge, contg. 25-35% Mn, by agglomeration. Particles of less than 5 mm. size in the agglomerate, depending on the process, constitute from 33.5 to 10.1%. Addn. of CaO favors reduction and prevents losses in slags; decompn. of the silicate takes place in the lower part of the furnace, following: $2\text{MnO} \cdot \text{SiO}_2 + 2\text{CaO} + 2\text{C}$

$= 2\text{Mn} + \text{Ca}_2\text{SiO}_4 + 2\text{CO}$. The amt. of CaO should conform to $(\text{CaO} + \text{MnO})/\text{SiO}_2 = 1.1$ to 1.2. Agglomeration will prevent losses in smokes amounting to 15-25% in smelting natural ore.

N. Thon

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

GROUPS

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BANNYY, N. P.
CA

1ST AND 2ND ORDERS

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1ST AND 4TH ORDERS

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7

Production of a self-melting agglomerate of iron ores. I. M. Tsylev and N. P. Bannyl. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, 1001-7. — The Krivof Rog ores contain up to 60% of fines smaller than 10 mm. Proper agglomeration greatly improves the performance of the blast furnace. It allows a better contact of the slagging components thereby insuring a smooth run of the furnace; it reduces the vol. of the charge thereby enabling a better utilization of the furnace capacity; it reduces fuel consumption; it raises the CO content in the furnace (the CO₂ of the flux is driven out by the agglomeration process); and it reduces the loss of heat in the exhaust gas. The addn. of limestone to the agglomerated ore lowers the FeO content particularly the FeO assoc. with SiO₂. It raises the degree of indirect reduction of Fe ore and this in turn lowers the required quantity of coke. The addn. of limestone should be noted, so that the ratio CaO:MgO:SiO₂ is 0.70-0.80. Since the limestone used in agglomeration should not exceed 5 mm. diam., it permits the utilization of quarry fines which otherwise are wasted. Care should be taken that the agglomerate contains no free CaO particles. For smelting bessemer pig iron magnesian limestone should be used. MgO (5-6%) improves the phys. properties of the slag, the latter is more fluid, conserves heat better, and facilitates desulfurization. The use of self-melting agglomerate raises the furnace output by 5% and lowers the consumption of coke by 0.05 and that of limestone by 0.2 units per unit of pig iron. M. Hosh

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

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BANNY, N. P.
CA

21

Preparation of coke for blast furnaces. L. M. Tsylev and N. P. Banny (Inst. Metallurgii, Akad. Nauk S.S.S.R.). *Bull. Acad. Sci. U.S.S.R., Classe sci. tech.* 1946, 115-20.— The importance of proper prepn. of coke for a blast furnace and the quality of metal is discussed. To reduce the loss of coal in the tailings, coal washing should be combined with flotation. The coke should be fractionated into 0-40 and > 40-mm. fractions. The 0-40 mm. fraction should be further graded into 0-25 and 25-40 mm. fractions. The latter can be utilized in furnaces having a vol. below 1000 cu. m. When so used, it may make up approx. 10% of the wt. of the coke round. The most desirable fraction for blast furnaces is 40-80 mm. For clean pig iron the ash in the coke should not exceed 8, the S 0.9, and the P 0.008%.

M. Hosh

ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION

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BANNYY, N. P.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

35

Chernaya Metallurgiya v Novoi Pятиletke. (Ferrous Metallurgy in the New Five-Year Plan.) I. P. Bannyy and N. P. Bannyy. 178 pages. 1947. Institute of Metallurgy, Academy of Sciences of the USSR, Moscow and Leningrad.

Comparatively reviews the present position of ferrous metallurgy in the USSR and in foreign countries. On the basis of available data on raw material reserves in different parts of the Soviet Union, the goal and the means of achievement of the new 5-year plan are indicated. Data concerning planned production of ferrous metal at the end of 1950 are indicated. Contains little concrete data concerning past performance.

ASR-51A METALLURGICAL LITERATURE CLASSIFICATION

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[Establishing technical norms at iron and steel metallurgical enterprises] Tekhnicheskoe normirovanie na predpriyatiyakh chernoi metallurgii. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1954. 78 p. (MLRA 7:10)
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BANNYY, N.P.

ROYTBURD, Lazar' Nisonovich, kandidat ekonomicheskikh nauk, dotsent;
BANNYY, N.P., redaktor; RAVDEL', P.G., retsenzant; AVRUTSKAYA, R.F.,
redaktor; EVINSON, I.M., tekhnicheskii redaktor

[Development of ferrous metallurgy in the U.S.S.R.] Razvitie
chernoi metallurgii SSSR. Moskva, Gos.nauchno-tekhn. izd-vo
lit-ry po chernoi i tsvetnoi metallurgii, 1956. 123 p.
(Russia--Metallurgy) (MIRA 9:3)

PRIYMAK, Ivan Andreyevich; RYABIN'KIY, Branislav Yakovlevich; MOSHKOVICH, Isay Yevseyevich; BARNYY, N.P., redaktor; PINEGIN, I.I., redaktor izdatel'stva; SHPAK, Ye.G., tekhnicheskiy redaktor

[The organization of steel industry] Organizatsiya metallurgicheskogo proizvodstva. Pod nauchnoi red. I.A.Priimaka. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 438 p. (MIRA 9:9)
(Steel industry)

BANNY, N. P.

PRIYMAK, Ivan Andreyevich; BANNY, N. P., redaktor; AVRUTSKAYA, R.F.,
redaktor izdatel'stva; EVENSON, I.M., tekhnicheskiy redaktor

[Principles in organizing continuous production and their
application to open-hearth furnace plants]. Osnovy organizatsii
proizvodstvennykh potokov i organizatsiia ikh v martenovskikh
tsekhakh. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po cherno
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(Open-hearth process)

18(5)

PHASE I BOOK EXPLOITATION

SOV/2295

Moscow, Institut stali

Primeneniye kisloroda v staloplavil'nom proizvodstve (Use of Oxygen in Steelmaking), Moscow, Metallurgizdat, 1957. 415 p. (Series: Itsa: Sbornik, 37) Errata slip inserted. 3,500 copies printed.

Ed.: Ye. A. Burko, Ed. of Publishing House; Ye. D. Rozentveyts, Tech. Ed.; A. G. Vaynshteyn, Editorial Board of the Institute of Technical Sciences, Docent; M. N. Grigorash, Cand. of Technical Sciences, Docent; M. I. Gudimov, Academician; V. P. Yelutyn, Doctor, Professor; A. A. Zhukovitskiy, Doctor, Professor; I. M. Kidin, (Resp. Ed.) Doctor, Professor; B. G. Livshits, Doctor, Professor; A. F. Lyubimov, Doctor, Professor; I. M. Pavlov, Corresponding Member, Academy of Sciences, USSR; K. G. Trubin, Doctor, Professor; and A. M. Fokhtvasser, Doctor, Professor

PURPOSE: This collection of articles is intended for scientific, industrial, chemical, and metallurgical engineers, physicists and students.

CONTENTS: This book is a collection of scientific research papers on the utilization of oxygen in steelmaking. The use of oxygen blast for the intensification of fuel combustion and the introduction of oxygen into liquid metal in order to oxidize admixtures are among the topics discussed. The use of oxygen in scrap-ore processes for making steel from pig iron with a high phosphorus content is also discussed. Several articles deal with the heating and processing fundamentals of steelmaking in a recirculation steel-melting furnace with oxygen-blast and deal with the economics of steelmaking with oxygen-blast and the optimum conditions for effective utilization of oxygen. No personal data are mentioned. References follow each article.

Ye. A. Burko, (Candidate of Technical Sciences), R. M. Ivanov, (Engineer), and K. G. Trubin (Engineer). Gas content in the

Open-hearth bath 98

The authors discuss the content of oxygen, hydrogen, and nitrogen present in the open-hearth bath at various stages of the heat

Ye. A. Burko, (Candidate of Technical Sciences), R. M. Ivanov, (Engineer), and K. G. Trubin (Engineer). Gas content in the

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SOV/137-58-7-14370

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 61 (USSR)

AUTHORS: Bannyi, N.P., Romenets, V.A.

TITLE: Technical and Economic Effectiveness of the Use of Oxygen in Open-hearth Production (Tekhniko-ekonomicheskaya effektivnost' primeneniya kisloroda v martenovskom proizvodstve)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 37, pp 124-137

ABSTRACT: The effect of use of O₂ in the production of St is expressed in a reduction of the duration of a heat by 12-18% and by a reduction in unit fuel consumption by 11-14%. As indicated by experimental heats, either of these indices may be raised to 40-50%, i.e., when the proper methods of procedure and process are applied, O₂ makes it possible to double the output of open hearths and halve the unit fuel consumption. Use of O₂ shortens the life of open hearths, but in the authors' opinion, this is made good by the reduction in heat time. Of the various types of heats explored, the most efficient is that employing a 30%-O₂ blow and delivery thereof in two ways: In the flame jet during the charging, heating, pig-iron addition, and melting periods, and in the bath during the working period.

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SOV/137-58-7-14370

Technical and Economic Effectiveness of the Use of Oxygen (cont.)

The employment of O₂ becomes economically unprofitable at establishments with low conversion indices and also in shops where the auxiliary shops (other than the furnace) are not operating smoothly. The technical and economic efficiency of O₂ employment will be furthered by a cheapening of O₂ and an increase in the output of oxygen-making units to 20,000 m³/hr in the case of modern open hearths.

M.P.

1. Open hearth furnaces--Performance
2. Steel--Production
3. Oxygen--Thermal effects
4. Oxygen--Economic aspects

Card 2/2

SOV/137-58-8-16493

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 37 (USSR)

AUTHORS: Aleksandrova, A.I., Oyks, G.N., Bannyy, N.P.

TITLE: Manufacture of Steel From High-P Cast Iron (Proizvodstvo stali iz vysokofosforistogo chuguna)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 37, pp 281-304

ABSTRACT: An analysis of 120 experimental smeltings performed in metallurgical furnaces employing air with 25-30% of O₂. By employing O₂ the duration of the smelting process is reduced by 8% in the case of silica-brick furnace crowns (SC) and by 33% in the case of furnaces with basic crowns (BC); this reduction in time is accomplished primarily through a shortening of the melting and finishing stages. As the content of O₂ is increased from 25 to 30%, the duration of the smelting process diminishes continuously by 6.5-10.7% (in case of SC) and 14-36% (in the case of BC). Introduction of O₂ into the flame, increasing the amount of ore in the upper layers of friable ingredients, smelting procedures which allow slag to remain on the bottom of the hearth - all these measures speed up the processes of slag formation, dephosphorization, and

Card 1/2

*Steel, Economics Orgn., Moscow Steel Inst.
in I.V. Stalin*

SOV/137-58-8-16493

Manufacture of Steel From High-P Cast Iron

saturation of slag with P_2O_5 . Compared with smelting operations performed without oxygen in furnaces with SC's, the introduction of O_2 into the flame reduced the fuel consumption in furnaces with BC's by 15-18%. Annual output of furnaces employing O_2 increased by 5% in the case of SC furnaces and by 30.8% in the case of BC furnaces in comparison with BC furnaces employing no oxygen. The production cost of steel smelted in BC furnaces employing O_2 is less by 3 rubles than the cost of regular steel. Employment of phosphate slags will reduce the production costs by 17.6 rubles. Additional capital expenditures connected with the employment of O_2 can be recovered within approximately four years.

Ye.T.

1. Steel--Production
2. Furnaces--Operation
3. Cast iron--Properties
4. Phosphorus--Oxidation
5. Oxygen--Performance

Card 2/2

BANNY, NIKOLAY PAVLOVICH

PHASE I BOOK EXPLOITATION

413

Banny, Nikolay Pavlovich

Tekhniko-ekonomicheskiye raschety v chernoy metallurgii (Technical and Economic Estimates in Ferrous Metallurgy) Moscow, Metallurgizdat, 1958. 162 p. 3,200 copies printed.

Ed.: Lebedev, A.I.; Ed. of Publishing House: Avrutskaya, R.F.;
Tech. Ed.: Evenson, I.M.

PURPOSE: This book is for metallurgists and can be used as a manual for students in metallurgical vuzes.

COVERAGE: The author of this book points out that in solving technical problems, the extent of expenditures and capital investments constitutes the criterion for the economic effectiveness of technical improvements. With this criterion in view, he offers methods for evaluating economic effectiveness and gives comparative evaluations of various possible solutions of problems in fields of pig iron, crude steel, and rolled stock production. A few examples of

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Technical and Economic Estimates (Cont.)

413

solving general problems connected with the location of interrelated industries are also given. No personalities are mentioned. There are no references.

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PHASE I BOOK EXPLOITATION

SOV/2161

Banny, Nikolay Pavlovich

Effektivnost' primeneniya kisloroda v martenovskom proizvodstve
(Effectiveness of Using Oxygen in Open-hearth Processes) Moscow,
Metallurgizdat, 1959. 165 p. Errata slip inserted. 5,000 copies
printed.

Eds.: A. I. Lebedev, and I. I. Pinegin; Tech. Ed.: V. V. Mikhaylova.

PURPOSE: This book is intended for engineering and technical personnel
in ferrous metallurgy and may also be used by students of
metallurgical and engineering and economics vuzes in the study of
the economy of metals production.

COVERAGE: The book presents a technical and economic analysis of
experimental investigations and industrial practices involving the
use of oxygen in open-hearth production of steel by the scrap and
scrap - ore processes. The author discusses the effect of using
oxygen on the basic technical and economic characteristics of open-

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Effectiveness of Using Oxygen (Cont.)

SOV/2161

hearth furnace performance, the limiting conditions for the efficient application of oxygen, and steps being taken to improve efficiency. No personalities are mentioned. There are 6 references, all Soviet.

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9-14-59

ROYTBURD, Lazar' Nisonovich; VERESHCHAGIN, I.K., prof., doktor ekon.nauk, retsenzent; BANNYY, N.P., dotsent, kand.ekon.nauk, red.; PINEGIN, I.I., red.; KLEYMAN, M.R., tekhn.red.

[Outline of the economic aspects of ferrous metallurgy] Ocherki ekonomiki chernoi metallurgii. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 564 p.

(MIRA 13:9)

(Steel industry--Finance)

BANNYY, Nikolay Pavlovich

Ekonomika chernoy metallurgii SSSR (by) N.P. Banny
(i dr.) Moskva, Metallurgizdat, 1960.
566 p. charts, tables.
Bibliographical footnotes.

PHASE I BOOK EXPLOITATION

SOV/5323

Banny, Nikolay Pavlovich, Viktor Borisovich Brodskiy, Iosif
Grigor'yevich Gorelik, Yakov Antonovich Oblomskiy, Vyacheslav
Viktorovich Rikman, and Lazar' Nisonovich Roytburd

Ekonomika chernoy metallurgii SSSR (Economics of Ferrous Metallurgy
in the USSR) Moscow, Metallurgizdat, 1960. 566 p. Errata
slip inserted. 5,700 copies printed.

Eds. (Title page): I. P. Bardin, Academician (Deceased), Ya. A.
Oblomskiy, Docent, and V. V. Rikman, Docent. Ed. of Publishing
House: Ye. S. Khutorskaya; Tech. Ed.: A. I. Karasev.

PURPOSE : This textbook is intended for students at metallurgical
schools of higher education, in divisions of metallurgy at
schools of higher technical education, and at engineering and
economic schools of higher technical education. It may also
be useful to engineering, technical, planning, and economic
personnel in scientific, economic, and planning bodies, and
in industry.

Card ~~1~~/16

Economics of Ferrous Metallurgy (Cont.)

SOV/5323

COVERAGE: The book discusses the role of ferrous metallurgy in the Soviet national economy. Principal laws of the development of ferrous metallurgy, the organization of management, planning principles, and problems of raw-material and fuel-and-power supply bases are examined. Considerable attention is given to the problem of technical progress and its effect on the economics of blast-furnace, steelmaking, and rolling production. The development of ferrous metallurgy in the Soviet Union, capitalist countries, and People's Democracies is briefly described. The introduction and Chs. 13,14, and 15 were written by Ya. A. Oblomskiy, Candidate of Economic Sciences, Docent, Moskovskiy gosudarstvennyy ekonomicheskij institut (Moscow State Institute of Economics); Chs. 1,2,3,4,11 (Sections 3,4, and 5), and 12, by I. G. Gorelik, Candidate of Economic Sciences, Docent, Moskovskiy inzhenerno-ekonomicheskij institut (Moscow Institute of Engineering Economics); Chs. 5,20,21, and 22, by L. N. Roytburd, Doctor of Economic Sciences, Professor, Moscow Institute of Engineering Economics; and Chs. 6,9, 11 (Sections 1 and 2), 18, 19,23, and 24, by N. P. Bannyi, Candidate of Economic Sciences, Docent, Moskovskiy institut stal' (Moscow

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