"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

18.1120
18.7100

67669
SOV/126-8-6-17/24

AUTHOR: Yushkevich, P.M.

TITLE: The Nature of the Hardening of Hardened High-Speed Steel During Tempering

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 6, pp 896-903 (USSR)

ABSTRACT: There are two schools of thought on the cause of secondary hardening: one (Ref 1 to 4) attributes this effect to secondary martensite transformation, the second (Ref 5,6) includes other factors. The object of the present work was to elucidate the nature of secondary hardness and red hardness of high-speed steel, the more exact determination of carbide-transformation temperature-ranges and the study of changes in the fine crystal structure of the alpha- and gamma-phases. Three steels, types R 18, 150 R 18 (experimental) and EI 184 were used, the respective compositions being: 0.73, 1.50, 0.87% C; 4.2, 4.3, 7.5% Cr; 18.9, 18.0, 4.9% W; 1.2, 1.6, 1.2% V; 0.28, 0.26, 0.32% Mn; 0.16, 0.15, 0.17% Si; 0.011, 0.010, 0.016% S; 0.030, 0.027, 0.025% P. Specimens were hardened in oil and iced-water from austenization temperatures at 1290, 1200 and 1240°C for

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The Nature of the Hardening of Hardened High-Speed Steel During Tempering

R 18, 150 R 18 and EI 184, respectively. Measurement of crystal lattice parameters, blocks and II and III form of distortion was effected on 1 mm diameter round and 4 x 8 x 20 mm flat specimens in a powder camera (149 mm diameter holder) and a type URS-501 ionization installation with iron radiation. Fig 1 shows for R 18 steel as functions of temperature the hardness (curve 1), percentage of carbon in martensite (curve 2) (Ref 7), block size (curve 3), overall distortion (curve 4) and II type distortions (curve 5). The rate of block-growth for the same steel is shown in Fig 2 as a function of tempering temperature. Fig 3 gives a more detailed picture of the variation of the properties studied in relation to number and duration of temperings at 560°C after hardening from 1290 (continuous lines) and from 1280°C (interrupted lines). In Fig 4 similar information is given for 150 R 18 steel for the gamma (continuous lines) and alpha (interrupted lines) phases. The investigation of martensite decomposition in EI 184 steel showed the fine structure to be similar to that of

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The Nature of the Hardening of Hardened High-Speed Steel During Tempering

R 18 steel but the rate of block growth is greater in the former. Finally, the author discusses the red hardness of the steel. The author concludes that secondary hardness results not from transformation of residual austenite into secondary martensite but mainly from dispersion hardening of primary and secondary martensite. The softening which occurs in the first period of tempering is accompanied by a diffusion-less expansion of the residual austenite lattice followed by a contraction due to loss mainly of carbon but also of alloying elements. When the steel on tempering attains maximum hardness the II type distortions in the alpha and gamma phases become equal to $4.0 - 4.5 \times 10^{-3}$. The activation energy calculated from the alpha-phase block-growth rate is 60 kcal/mol and 80 kcal/mol for 540 to 620 and above 650°C, respectively. Two forms of concentration heterogeneity have been found: in tempering martensite at 380 to 520°C and in ferrite at 560 to 640°C. There are 4 figures, 1 table and 14 Soviet references.

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The Nature of the Hardening of Hardened High-Speed Steel During Tempering

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy trubnyy institut (Ukrainian Scientific Research Institute for Tubes)

SUBMITTED: May 4, 1959

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S/185/60/005/001/011/018
A151/A029

1110 2308, 1045 1416

AUTHOR: Yushkevich, P.M.

TITLE: On the Secondary Hardness and Red Hardness of High-Speed Steel

PERIODICAL: Ukrayins'kyy Fizychnyy Zhurnal, 1960, Vol. 5, No. 1, pp. 100 - 108

TEXT: The aim of this paper is to clarify the nature of the secondary hardness and red hardness of high-speed steel, to specify the temperature intervals of carbide conversions and to study the conversions in a thin crystalline structure of α- and γ-phases. The following three grades of high-speed steel were selected for investigations: P18 (R18), 150P18 (150R18) and ЭИ-184 (EI-184). The chemical composition of these steels is given in a table. The samples were hardened in oil with throwing them into cold water at temperatures of austenite treatment equalling 1,290°C for R18, 1,200°C for 150R18 and 1,240°C for EI-184. The tempering was conducted in a vacuum furnace. Lattice parameters, coherent dispersion zones (of blocks) and the distortions of the II and III type were measured on round samples with a diameter of 1 mm and a flatness of 4 x 8 x 20 mm. All this was done in a powder cell with an adapter measuring 149 m [Abstracter's note: the diameter of 149 m is probably a mistake and should be 149 mm],

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On the Secondary Hardness and Red Hardness of High-Speed Steel

and in an iron emission by using УРС-50И (URS-50I) ionization installation. The measurements of the sizes of blocks and of the distortions of the II type were made according to the lines (110) and (211) of the α-phase and (111) and (311) of the γ-phase on the basis of the method given in References 10 and 11 under the condition that the intensity distribution is described by Gauss' function. Lattice parameters and the quantity of the remaining austenite were checked according to the lines (110) and (111), as well as the lines (211) and (311). It was ascertained that the secondary hardness is not the result of the conversion of the remaining austenite into a secondary one, but the result of a dispersion hardening, both of the initial and secondary martensite. The dispersion hardening of the remaining austenite is of minor importance. The increase in the hardness of steel taking place in the starting period of tempering is accompanied by a diffusion-free widening of the remaining austenite lattice. Further, this widening is replaced by a compression of the lattice which occurs owing to a deconcentration of the remaining austenite chiefly by carbon and partly by alloying elements. When the maximum hardness is achieved in steel during the tempering process, the distortions of the II type in the α- and γ-phases coincide and become $4 - 4.5 \cdot 10^{-3}$ cm. The parameters of a fine crystal structure have been

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...the Secondary Hardness and Red Hardness of High-Speed Steel

...termined, which characterize a high hardness and red hardness of the tempered ...igh-speed steel. The activation energy was calculated according to the data of ... increase rate of α-phase blocks within the temperature range of 540 - 620°C; ... is 50 kcal/mole. At more than 650°C, the activation energy is 80 kcal/mole. Two types of concentration non-homogeneity were revealed in martensite within 380 - 520°C and in ferrite within 560 - 640°C. In the case of tempering at 560°C, the height of the concentration non-homogeneity in ferrite depends on the height of the temperature of tempering. There are: 1 table, 4 figures and 14 Soviet references.

ASSOCIATION: Ukrayins'kyy naukovo-doslidnyy trubnyy instytut (Ukrainian Scientific Piping Research Institute)

SUBMITTED: June 4, 1958

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77591
SOV/129-60-2-4/13

AUTHOR: Yushkevich, P. M., (Engineer)

TITLE: Alteration of Fine Crystal Structure of Residual Austenite at Tempering of High-Speed Steel

PERIODICAL: Metallovedeniye i termicheskaya obrabotny mettalov, 1960, Nr 2, pp 14-20 (USSR)

ABSTRACT: Tempering of high-speed steels changes the structure of residual austenite and, consequently, the transformation of the latter to martensite becomes retarded. The author studied the structure changes that took place when forged steels R18 and 150R18 and hot rolled steel EI184 (see Table below) were tempered at various temperatures. The first and third steels were austenitized in barium chloride salt bath at 1280 to 1290° C and the second steel in vacuum at 1190 to 1200° C. Then all three were quenched in oil, and a 0.5 mm thick surface layer etched off. The unit cell

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dimensions, size of blocks, structure distortions, and their changes were computed according to X-ray diffraction data obtained with camera URS-501, and measured with microphotometer MF-4. The identity period of unit cells of residual austenite in steel R18 proved to increase by maximum 0,016 Å (Fig. 1) regardless of the temperature of tempering, but the maximum was achieved in shorter time at higher

Identification (Brand) of Steel	Chemical Composition, %								Residual Austenite, %
	C	Cr	W	V	Mn	Si	S	P	
R18	0,73	4,2	18,9	1,2	0,28	0,16	0,011	0,030	18—22
150R18*	1,5	4,3	18	1,6	0,26	0,15	0,01	0,027	70—73
EI 184	0,87	7,5	4,9	1,2	0,32	0,17	0,016	0,025	55—60

* Experimental

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tempering temperatures. The increase of unit cell dimensions was not caused by diffusion. The maximum increase of austenite unit cells in steel EI184 was 0.006 A, Steel 150R18, tempered at 540° C or higher, showed decrease of the identity period of austenite by maximum 0.012 A. The increase of the unit cell dimensions of residual austenite in the first two steels seems to be accompanied by the decomposition of martensite whose diffraction lines become narrower, and by relocation of structure distortions as the result of which the volume per unit mass of martensite decreases. Having reached the maximum, the identity period of austenite begins to decrease apparently because of partial loss of its carbon content and of contaminated metals, by diffusion. The unit cells of austenite stabilize after a certain period of tempering if its temperature is below 500° C; if above 500° C, continuous loss of carbon leads

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Alteration of Fine Crystal Structure of Residual Austenite at Tempering of High-Speed Steel

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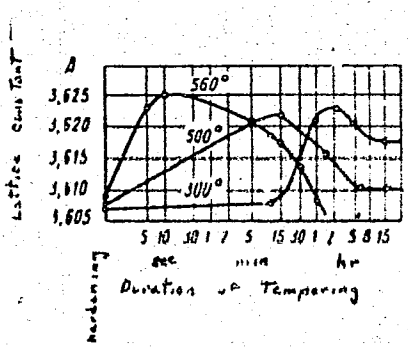

Fig. 1. Change of lattice constant of residual austenite in steel R18 during tempering.

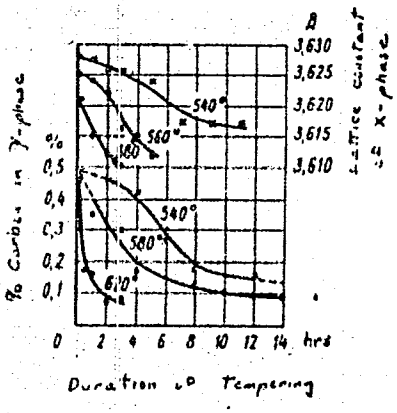

Fig. 4. Relationship between carbon content and lattice constant of residual austenite in steel 150R18, and the duration of repeated tempering 540, 560, 580, and 620° C.

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to the formation of secondary martensite. In steel 159R18, the decrease of unit cell dimensions of residual austenite, austenite decomposition by 18 to 22%, its partition into a larger number of blocks, the structure distortions, and the subsequent gain in strength, advance during early stages of tempering at 560° C; but after a time austenite blocks begin to grow at the expense of carbides and the strength reduces. Tempering at various temperatures proved the dependence of the austenite to martensite transformation in steel 150R18 on a certain point of structure distortions (0.31 A in this steel) above which the transformation point drops, and below, rises. Thus, the transformation point characterizes the degree of structure distortions. The latter hinder the coherent rearrangement of the structure from - to -phase, and stabilize residual austenite; the carbon content of austenite stabilizes after a certain drop (Fig. 4.). Tempering of steel EI184 below 500° C causes austenite partition into

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blocks until a certain stable stage is reached; the partition hardly takes place above 500° C. Hydrostatic compression of residual austenite displaces Fe atoms from their equilibrium positions by maximum 0.008 A. However, since compression stresses at tempering act for only 5 to 20 seconds, they hardly affect austenite to martensite transformation. There are 6 figures; 1 table; and 16 references, 12 Soviet, 2 German, 1 U.S., 1 U.K. The U.S. and U.K. references are: Cohen, M., Koh, K., "TASM", Vol 27, Nr 4 (1939); Goldschmidt, H., "Journal of the Iron and Steel Inst.", Vol 186 (1957).

ASSOCIATION: Ukrainian Scientific Research Pipe Institute (Ukrainskiy nauchno-issledovatel'skiy trubnyy institut)

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YUSHKEVICH, P.M.

S/021/60/000/008/008/011
D210/D305

AUTHOR: Yushkevych, P.M.

TITLE: On changes in the substructure of hardened high-speed steel when tempering

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 8, 1960, 1064 - 1069

TEXT: The aim of the paper is to study the fine-crystal structure of high speed steel. In his experiments the author used ЭИ-184 (EI-184), P-18 (R-18) and 150P18 (150R18) steels as shown in the Table. As the result of detailed studies of hardness, concentration of heterogeneity $\Delta a/a$, blocks of α-phase, distortions of second type and amount of carbon in α-solutions, the tempering of the martensite could be sub-divided in four stages. 1) For temperatures 20°-200°C, the mechanism is similar to carbide steel. 2) At temperatures 200°-540°C, the further precipitation of carbon from the martensite took place; starting with temperature 380° cementi-

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tes were enriched in chromium; chromium carbides together with the concentration of heterogeneity of martensite were formed. 3) At temperatures 540°-620°C, carbide of cementite type converted into carbide of vanadium and wolfram, followed consequently by a concentration of heterogeneity in ferrite. From 620°-650°C carbides were intensively enriched in vanadium and wolfram. Ties between α-hard solution and carbide lessens and blocks of α-phase split. From 650°-760° the blocks increase considerably, distortions of II type relax and transormation $\gamma \rightarrow \alpha + k$ takes place. The decrease of residual austenite took place at all stages, except the first. The lattice parameter of residual austenite increases in the first stage from 3607 - 3623 Å; because of the increase in II and II type distortions its growth slowly decreases in the other stages. At 500°C the lattice parameter stabilizes: this could be explained by the equilibrium between an oversaturated hard solution and carbides of the cementite type. The author compared the distortions of III-type, during multiple tempering at 540°, 560°, 580°C with the temperature of martensite transformations, and obtaining the fol-

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lowing results: 1) If point M_H decreases (540°) then $\sqrt{\bar{u}^2}$ = 0.37 Å; 2) If M_H does not change, then $\sqrt{\bar{u}^2}$ = 0.31 Å; 3) If M_H increases then $\sqrt{\bar{u}^2}$ = 0.25 Å. The position of the martensite point depends on the distortion of the III type which arises during the secondary martensite transformations. Therefore, distortions of II-type in the residual austenite, restrain considerably the transformation: austenite → martensite. By this property the tempering of residual austenite differs from overcooled austenite in which distortions of the III type are absent. There are 5 figures, 1 table and 9 references: 7 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: K. Kye, Journal of Iron and Steel Institute 174, 4, 365, 1953; G.D. Goldschmidt, Journal of the Iron and Steel Institute 186, 1, 1957.

ASSOCIATION: Ukr. n-d trubnyy instytut (Ukr n-d Pipe Institute)
PRESENTED: by K.F. Starodubov, Academician UkrSSR
SUBMITTED: July 13, 1959

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, P.M.

Secondary hardness and red hardness of high-speed steel. Ukr. fiz. zhur. 5 no.1:100-108 Ja-F '60. (MIRA 14:6)

1. Ukrainskiy nauchno-issledovatel'skiy trubnyy institut.
(Tool steel—Hardening)

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YUSHKEVICH, P. M.

Cand Tech Sci - (diss) "Study of processes of producing tempered fast-cutting steel." Dnepropetrovsk, 1961. 15 pp; (Academy of Sciences Ukrainian SSR, Inst of Ferrous Metallurgy); 180 copies; price not given; (KL, 7-61 sup, 249)

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S/137/62/000/003/141/191
A052/A101

AUTHOR: Yushkevich, P. M.

TITLE: On the methods of determining II kind distortions and block sizes

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 69, abstract 3I447 (V sb. "Proiz-vo trub". Khar'kov, Metallurgizdat, no. 4, 1961, 134-142)

TEXT: The existing methods of determining II kind distortions $\Delta\alpha/\alpha$ and block sizes D are connected with numerous calculations and require considerable time. The general principles of such calculations take into account the variation of geometric conditions of the survey and the relation between the broadening of interference lines affected by these conditions and physical factors. A simplified method of calculating characteristics of the fine crystalline structure is proposed for the case when investigations are carried out under constant or rarely changing geometric conditions of the survey. The calculation is reduced to computing the ratio β_2/β_1, where β is the true width of the interference line, index 1 corresponds to line (110) and index 2 corresponds to line (220). The values of β_1 and β_2 are found depending on the total experimentally

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established width of the interference line. For this purpose diagrams are given plotted for the given survey conditions. A further determination of $\Delta\alpha/\alpha$ and D is carried out by means of a family of curves representing the dependences of the said characteristics on β_2/β_1 for different values of β_1 and β_2.

M. Rabinovich

[Abstracter's note: Complete translation]

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E073/E535

18 7500

AUTHOR: Yushkevich, P.M., Engineer

TITLE: Compression from all Sides and Phase Hardening of Residual Austenite

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.7, pp.11-14

TEXT: The influence was investigated of martensite on the compression from all sides exerted on residual austenite and its fine crystalline structure. In the experiments, in which N. G. Mel'nikov participated, the following three grades of steel were used (contents in %):

	C	Cr	W	V	Mo	Mn	Si
У14А (U14A)	1.43	-	-	-	-	0.5	0.87
Х12М (Kh12M)	1.55	11.8	-	0.19	0.6	0.25	0.51
ЭИ184 (EI184)	0.87	7.5	4.9	1.2	-	0.32	0.17

Steel U14A was austenized at 1030°C for 15 min and quenched in water, the steels Kh12M and EI184 were heated respectively to

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Compression from all Sides ...

1100°C (3 min) and 1240°C (70 sec) and quenched in oil. The quenched steel Kh12M had an austenitic structure, whilst the steels E1184 and U14A contained 75 and 43% austenite, respectively. To remove the decarburized and the work-hardened layers, the specimens were ground to a depth of 0.7 mm and then electrolytically polished in a concentrated 60% nitric acid solution to a depth of 0.3 mm. The crystal lattice parameter of the residual austenite, the block dimensions, the magnitude of type II distortions and the ratios of the integral intensities of the (111) lines to those of the (311) lines were measured. Following that, the specimens were transferred into a thermostat for sub-zero treatment and held at a given temperature for 15 min. It was found that for the steel Kh12M with increasing quantity of martensite the lattice parameter of the residual austenite decreased, the blocks broke up and the types II and III distortions also increased. The decrease of the crystal lattice parameter of the residual austenite is due to the compression from all sides exerted by the martensite on the residual austenite. In the initial stage of transformation (to 20% martensite) an insignificant diffusionless increase occurs

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Compression from all Sides ...

in the lattice parameter of the residual austenite from 3.595 to 3.594 Å and also an intensive breaking up of the blocks and an increase in the types II and III distortions. During the second stage of transformation (20-53%), an intensive diffusionless decrease in the lattice parameter of the residual austenite from 3.594 to 3.590 Å is observed with a negligible phase hardening. During the third stage (over 53% martensite), the compression of the crystal lattice and breaking up of blocks is stopped but there is a strong increase in types II and III distortions, whereby an intensive increase in the lattice distortions begins in the middle of the second stage, i.e. prior to the cessation of the compression of the residual austenite (for about 43% martensite). The effect of compression from all sides was investigated on the steel EI184. After quenching (20% martensite), the residual austenite was in the compressed state. Therefore, sub-zero treatment produced less compression than for pure austenite. However, the lattice parameter decreased by 0.006 Å. Subsequent tempering of specimens originally treated with liquid nitrogen (50% martensite), at 360 C with a soaking time of 10 sec, led to

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an increase in the lattice parameter of the residual austenite from 3.5913 to 3.6012 Å, i.e. an increase almost twice as large as for the steel 12KhM. The lattice parameter of the pure austenite of this steel should equal 3.603 Å. A still greater increase in the lattice parameter as a result of tempering (250°C) was observed for the carbon steel U14. The here given results and also those published in an earlier paper of the author (Ref.3: Metallovedeniye i termicheskaya obrabotka metallov, No.2, 1960) indicate that braking of the martensitic reaction in absence of compression from all sides, particularly during the initial stage of transformation (to 20% austenite), may be due to type III distortions which prevent coherent transformation of the γ-lattice into the α-lattice. The following conclusions are arrived at:

1. During the initial stage of martensitic transformation "cold" plastic deformation of the austenite occurs. When the process of plastic deformation and compression of the residual austenite attenuates, an intensive growth of types II and III distortions will occur.

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Compression from all Sides ... S/129/61/000/007/003/016
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2. The decrease in the lattice parameter during martensitic transformation and the increase in this parameter during the first stage of tempering are diffusionless.
3. The parameter of the residual austenite in steels is always smaller than the parameter for pure austenite.
4. The total magnitude of the decrease in the lattice parameter of the residual austenite during martensite transformation can be determined during the first stage of tempering.
5. The presence of residual austenite in quenched steels is due to type III distortions in the austenite and to stresses caused by compression from all sides.
There are 3 figures and 1 table and 4 references: 3 Soviet and 1 non-Soviet.

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy trubnyy institut (Ukrainian Scientific Research Institute for Tubes)

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ACCESSION NR: AR4041592 S/0137/64/000/005/D037/D037

SOURCE: Ref. zh. Metallurgiya, Abs. 5D220

AUTHOR: Kovalevskiy, N. G.; Yushkevich, P. M.; Shepetovskiy, A. Ya.

TITLE: Cold processing and heat treatment of pipes of steel SN2 (EI904)

CITED SOURCE: Sb. Proiz-vo trub. Vy* p. 10. M., Metallurgizdat, 1963, 50-57

TOPIC TAGS: cold processing, heat treatment, steel pipe/SN2 steel

TRANSLATION: Investigation was conducted on billet shells with dimensions 41 by 3.5 by (1100 - 1200) mm, obtained by hot pressing of steel of grade SN2 (0.05-0.06% C, 0.28-0.31% Mn, 0.42% Si, 7.9-8.1% Ni, 16-16.1% Cr, 1.06-1.12% Al, traces of Ti). Results of mechanical tests of steel samples SN2 after normalization, the course and technological parameters cold rolling and drawing of steel pipes SN2 are listed. It was determined that cold rolling and drawing of steel pipes SN2 can be carried out normally with deformations close to

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ACCESSION NR: AR4041592

deformations allowed during rolling and drawing of steel 1Kh18N10T. Heat treatment of steel SN2 should be conducted at 1100° and holding for 5 minutes with cooling in air. In process of cold rolling and drawing of pipes of steel SN2 martensite of deformation will be formed, which strengthens metal in addition to strengthening caused by curshing of substructure of austenitic matrix.

SUB CODE: MM ENCL: 00

Card 2/2

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ACCESSION NR: AR4041539 S/0137/64/000/004/D044/D044

SOURCE: Ref. zh. Metallurgiya, Abs. 4D259

AUTHOR: Yushkevich, P. M.; Kovalevskiy, N. G.; Shepetovskiy, A. Ya.

TITLE: Phase hardening of stainless steel EI904 (1Kh15N9Yu) during cold drawing and rolling

CITED SOURCE: Sb. Proiz-vo trub. Vy*p. 11. M., Metallurgizdat, 1963, 100-103

TOPIC TAGS: Phase hardening, cold drawing, cold rolling, stainless steel/ EI904 steel

TRANSLATION: For study of hardening of steel EI904 from a forged rod there was prepared shells of dimension 27 x 2.5 x 300 millimeters with turned external and reamed internal surfaces. Shells were rolled on a laboratory two-high mill 200 in rollers with variable section of stream (principle of pilger rolling) on a conical mandrel. The initial billet in experiments of drawing was a pipe of dimension 20 x 1.25 millimeters, obtained from a shell by cold rolling. All shells and pipe before cold deformation were subjected to normalization at 1100° with holding

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ACCESSION NR: AR4041539

for 10 minutes. After normalization these shells were subjected to etching in a solution of hydrofluoric acid; then before cold rolling their surface was coated with oxalate. In process of investigation they studied influence of degree of cold deformation by rolling and drawing (from 5 to 70%) on mechanical properties of pipes, where it was, planned to conduct deformation of pipes by mandrel-less drawing within 5-40%, and cold rolling--within 30-70%. During drawing the following degrees of deformation were obtained: 5, 10, 15, 20, 30 and 37%, during rolling--32, 40, 43, 45, 58, 52, 58 and 68%. With increase of degree of deformation of rolling >30-40% there is observed gradual increase of σ_b; with deformation of 68% it attains 145-152 kilograms per square millimeter. σ_t here remains approximately on the same level (125-130 kilograms per square millimeter), and δ decreases from 13 to 5%. Increase of degree of hardening of the metal after tempering and deformation is more than 10%, caused by the fact that steel EI904 consists mainly of unstable martensite of deformation, which during tempering endures precipitation hardening. This is confirmed by decrease of period of the crystal lattice of martensite during tempering up to 500° from 2.864 to 2.855 A. Tempering of cold-rolled pipes at 400° leads also to insignificant change of mechanical properties. σ_t in this case increases by 10 kg/mm^2, σ_t by 3-4%, and

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ACCESSION NR: AR4041539

δ decreases by 1-4%. The basic difference of influence of tempering on mechanical properties of cold-rolled and cold-drawn pipes is the fact that in cold-rolled pipes after tempering δ decreases, and in cold-drawn it increases. This once again confirms opinion that the character of deformation (drawing and rolling) essentially affects mechanical properties of pipes, and to a significant extent this influence is hereditarily transmitted to steel in the process of tempering.

SUB CODE: MM ENCL: 00

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L 41361-65 EWP(k)/EWP(z)/EWA(c)/EWT(d)/EWT(m)/EWP(h)/EWP(b)/T/EWA(d)/EWP(l)/EWP(w)/
EWP(v)/EWP(t) Pf-4 MJW/JD/HW

ACCESSION NR: AR5000589 S/0137/64/000/008/I039/I040

SOURCE: Ref. zh. Metallurgiya, Sv. 8., Abs. 8D230

AUTHOR: Shepurko, M. I.; Kovalevskiy, N. G.; Yushkevich, P. M.; Verkhovod, V. K.; Shepetovskiy, A. Ya.

TITLE: Production of pipes from high strength stainless steel Kh17N5M3

CITED SOURCE: Sb. Proiz-vo trub, vyp. 12. M., Metallurgiya, 1964, 44-51

TOPIC TAGS: pipe, stainless steel, metal ductility, drawing steel Kh17N5M3, steel Kh18N10T

TRANSLATION: To determine the ductility of steel Kh17N5M3, samples were subjected to hot torsion and piercing tests according to the method of the Ukrainian Pipe Research Institute. The torsion tests were carried out at 975-1225°, the piercing tests at 950-1250°, with a sprinkage of 1.6-15.5%. The data obtained show that the steel investigated has the highest ductility in the interval 1150-1250°.

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L 41361-65
ACCESSION NR: AR5000589

Comparison of test results for hot torsion of steel Kh17N5M3 and steel Kh18N10T, which is widely used in pipe production, show that the former is characterized by a considerable lower ductility than the latter, and that the former is consequently related to the low ductility difficult drilling steels. It was established by an investigation of the microstructure of steel Kh17N5M3 under different heating conditions (from 1000 to 1350°) that the quantity of ferrite in the steel increases starting with 1200° but that grain boundary fusion takes place only at 1340-1350°. Pipes with dimensions 20 x 1.5, 18 x 1, and 12 x 1 mm made of Kh17N5M3 were prepared by hot pressing tubular billets on a vertical hydraulic 600 ton press with subsequent rolling on cold rolling mills (KhPT-75 and KhPTR-15-30) and drawing on drawing mills. To reduce cold hardening of the metal after pressing, conditions for normalizing were worked out. A mixture of castor oil (70%) and talc (30%) was used as a lubricant in rolling on mill KhPT-75 and castor oil was used for rolling mill KhPTR-15-30. Rolling of pipes with dimensions 25 x 2.5 mm proceeded in a satisfactory manner. An attempt to roll pipes with dimensions 25 x 2 mm, that is, with a higher degree of deformation (86%), was not crowned with success since the mandrel failed because of the

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L 41361-65
ACCESSION NR: AR5000589

considerable increase in the load on the working instrument. To alter pipes with dimensions of 23 x 1.95 mm and 20 x 1.45 mm, parts were rolled into pipes with finished dimensions of 20 x 1.5 and 18 x 1 mm. To decrease bending, the drawing was done through two draw plates at the same time. The diameter of the intermediate draw plate used in drawing full size pipes with dimensions 18 x 0.98 was 16 mm, but in drawing from dimensions 14.5 x 0.98 mm to finished dimensions of 12 x 1 it was 13 mm. During this process pipes with dimensions of 14.5 x 0.98 mm were not subjected to hot working before drawing. The lubricant for them was the oxalate film which they retained from the coating received before the first drawing. Cold rolling of such pipes is feasible with consecutive deformations up to 60%, but rolling is feasible with only a single deformation up to 30%. Heat treatment of full size pipes made of the steel under investigation should be carried out at 1100-1150° with air cooling. K. Ursova

SUB CODE: MM ENCL: 00

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

CHERNENKO, M.I., kand. tekhn. nauk; KOVALEVSKIY, N.G., kand. tekhn. nauk; YUSHKEVICH, P.M., kand. tekhn. nauk; VERKHOVOD, V.K., inzh.; SHEPETOVSKIY, A.Ya., inzh.

Manufacture of pipe of high-strength, stainless, Kh17N5M3 steel. Proizv. trub no.12:44-51 '64. (MIRA 17:11)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

GUL'MEDOV, Kh.; YUSHKEVICH, S.S.

Structure and diffusion of meteor trails from photographic observations. Geomag. i aer. 4 no.5:965-968 S-O '64. (MIRA 17:11)

1. Otdel geofiziki i seysmologii AN Turkmenskoy SSR.

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

MAKSIMOVA, I.; MASHOVETS, V.; YUSHKEVICH, V.

Conductance of sodium aluminate solutions at high temperatures.
Zhur.prikl.khim. 38 no.6:1400-1403 Je '65.
(MIRA 18:10)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

MAKSIMOVA, I.N.; YUSHKEVICH, V.F.

Electric conductance of NaOH solutions at high temperatures.
Zhur. fiz. khim. 37 no.4:903-907 Ap '63. (MIRA 17:7)

1. Leningradskiy tekhnologicheskiy institut.

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

MAKSIMOVA, I.N.; YUSHKEVICH, Y.F.

Electric conductivity of sodium metaborate solutions at high temperatures. Zhur.fiz.khim. 37 no.8:1859-1863 Ag '63. (MIRA 16:9)

1. Leningradskiy tekhnologicheskiy institut im. Lensoveta.
(Sodium borates--Electric properties)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

BOBROVSKIY, P.A.; YUSHKEVICH, V.I.

Methods for calculating the economic effictiveness of the mechanization and automation of the processes used in the plastic goods. Plast.massy no.4:39-42 '61. (MIRA 14:4)
(Plastics industry—Automation)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

BOBROVSKIY, P.A., YUSHKEVICH, V.I.

Economic effectiveness of the use of plastics in agriculture.
Plast.massy no.8:47-51 '61. (MIRA 14:7)
(Plastics) (Agriculture)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, V.I.

Problems in determining the economic effectiveness of new techniques used in tire factories. Kauch.i rez. 21 no.4:31-35 Ap '62. (MIRA 15:4)

1. Institut ekonimiki AN SSSR.
(Tires, Rubber)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, V.N.

Investigating stresses in members of braceless trusses under loading out-of-units. Trudy LPI no.254:101-105 '65.
(MIRA 19:1)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P.

Practices in the economic use of fabrics. Shvein.prom. no.2:27 Mr-Ap '62. (MIRA 15:4)
(Garment cutting)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P. (Leningrad)

Efficiency promoters struggle to improve the quality of production.
Shvein.prom. no.1:27-29 Ja-F '64. (MIRA 17:3)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P.

New methods of traffic organization for fast-freight trains. Zhel. dor.transp. 42 no.6:13-15 Je '60. (MIRA 13:7)

1. Zamestitel' nachal'nika Belorusskoy dorogi, g. Minsk.
(White Russia--Railroads--Freight)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P., inzh., starshiy prepodavatel'

Selecting the most advantageous train weight for lines converted to diesel traction. Trudy BIIZhT no.9:29-44 '61. (MIRA 16:9)
(Railroads—Management) (Railroads—Freight)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P., inzh., starshiy prepodavatel'

Investigating the problem of the lengthening of station tracks on railroad lines converted to diesel traction. Trudy BIIZHT no.9:45-56 '61. (MIRA 16:9)
(Railroads—Management) (Railroads—Tracks)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

TIKHOMIROV, I.G., prof., doktor tekhn.nauk; YUSHKEVICH, Ya.P., inzh.; SYTSKO, P.A., inzh.

Lengthening of hauls and possibilities of a further acceleration of car turnover. Zhel.dor.transp. 43 no.6:17-22 Je '61. (MIRA 14:7)

1. Zamestitel' nachal'nika Belorusskoy dorogi (for Yushkevich).
2. Nachal'nik Gomel'skogo otdeleniya Belorusskoy dorogi (for Sytsko).

(Railroads--Rolling stock) (Railroads--Traffic)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P., inzh. (Brest); YAKOVLEV, T.V., inzh. (Brest); REZER, D.M., starshiy inzh. (Brest)

Concentration of freight operations and new methods in the organization of freight transportation. Zhel.dor.transp. 44 no.4: 25-31 Ap '62. (MIRA 15:4)

1. Zamestitel' nachal'nika Belorusskoy dorogi (for Yushkevich). 2. Nachal'nik Brestskogo otdeleniya Belorusskoy dorogi (for Yakovlev). 3. Brestskoye otdeleniye Belorusskoy dorogi (for Rezer).

(Railroads--Freight)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P., kand. tekhn. nauk; VOROBEY, A.K., kand. tekhn. nauk; TRUSHIN, A.M., inzh.; POTAPOV, V.P., inzh., retsenzent; SHISHKIN, G.S., inzh., red.; DROZDOVA, K.D., tekhn. red.

[Centralized freight transportation; experience of railroad and automotive transportation in White Russia] TSentralizovannye perevozki gruzov; opyt zheleznodorozhnogo i avtomobil'nogo transporta Belorussii. Moskva, Transzheldorizdat, 1963. 66 p. (MIRA 16:10)
(White Russia--Freight and freightage)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH, Ye.P. (Minsk); LEVYANT, G.A. (Minsk)

Efficient utilization of locomotives. Zhel.dor.transp. 47 no.12:24-26 D '65. (MIRA 18:12)

1. Zamestitel' nachal'nika Belorusskoy zheleznoy dorogi (for Yushkevich). 2. Zamestitel' nachal'nika otdela sluzhby dvizheniya Belorusskoy zheleznoy dorogi (for Levyant).

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

KHATETOVSKIY, G.I.; YUSHKEVICH, Ye.V.

Assembly of turbine units and auxiliary equipment of the machine hall. Energ.stroi. no.24:60-64 '61. (MIRA 15:4)

1. Starshiy proizvoditel' rabot montazhnogo uchastka tresta "Severozapenergomontazh" (for Khatetovskiy). 2. Proizvoditel' rabot montazhnogo uchastka tresta "Severozapenergomontazh" (for Yushkevich).
(Narva region--Electric power plants--Design and construction)
(Steam turbines)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

S/125/61/000/004/012/013
A161/A127

AUTHORS: Langer, N. A., Yagupol'skaya, L. N., Yushkevich, Z. V.

TITLE: On the method of investigating the tendency of welded joints to caustic embrittlement

PERIODICAL: Avtomaticheskaya svarka, no. 4, 1961, 86 - 87

TEXT: Brief information is given on a new method of caustic embrittlement tests requiring no special tension devices. Formerly, the Institut elektrosvarki im. Ye. O. Patona (Electric Welding Institute im. Ye. O. Paton) employed test specimens consisting of ribs welded to plates, and then the plates joined by butt welding, and later horseshoe-shaped specimens, or specimens loaded with a special device. Reference is made also to a recommendation of G. L. Shvarts and M. M. Kristal' to use a specimen 100 by 20 by δ (mm) in size, cut from welded plate with removed projections and loaded by the application of a bending or stretching force. The authors have used a method requiring no application of devices for the loading. Detailed information on the new technique will be published later in "Avtomaticheskaya svarka". The method consists in using welded plates 500 x 400 x δ (mm) in size and holding them in a boiling solution of 45% calcium nitrate and

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S/125/61/000/004/012/013
A161/A127

35% ammonium nitrate until the appearance of cracks. The solution is being conventionally used for testing the tendency of steel to caustic embrittlement. The article includes a photograph of a cracked specimen. Heat treatment had a high effect on the results of the tests, e.g. in one specimen that had not been heat-treated the crack appeared after 24 hours, in two others after 48 hours, and in a heat-treated specimen only after 240 hours. There is 1 figure..

SUBMITTED: January 16, 1960

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

34458
S/125/62/000/003/003/008
D040/D113

18.1130

AUTHORS: Kakhovskiy, N.I., Fartushnyy, V.G., and Yushkevich, Z.V.

TITLE: Welding Kh18N2AG5 thin sheet steel

PERIOCICAL: Avtomaticheskaya svarka, no. 3, 1962, 27-31

TEXT: The techniques and results are given of welding experiments with a new austenite-ferritic steel, Х18Н2АГ5 or ЭП-26 (Kh18N2AG5, or EP-26), developed by the Moskovskiy aviatsionnyy tekhnologicheskiy institut (Moscow Aviation Technological Institute) and suggested for use in the manufacture of chemical, textile and food-processing equipment. The composition of Kh18N2AG5 per ЧМТУ 57-58 (ChMTU 57-58) is: ≤ 0.1% C, ≤ 0.8% Si, ≤ 0.030% S, ≤ 0.035% P, 4÷6% Mn, 17÷20% Cr, 1.5÷2.5% Ni, and 0.15÷0.25% N. Steel used in experiments was 3 mm thick. About 40% α phase was revealed in it by X-ray structural analysis. Automatic subarc and gas-shielded arc welding was tried and an АН-26 (AN-26) welding flux and two standard electrode wire grades were used. Welds were tested for mechanical properties and corrosion.

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The test results show that embrittlement occurs at 475°C, there is no tendency to intercrystalline corrosion before heat treatment, and a very high tendency to it after 2.5 hrs heating at 650°C with subsequent air cooling. Subsequent heating for 2.5 hrs at 850°C eliminated the tendency to intercrystalline corrosion but did not completely restore the general corrosion resistance in boiling 56% nitric acid. The following conclusions were drawn: (1) The Kh18N2AG5 (EP-26) steel can be used as a substitute for 18-8 type steels in the fabrication of welded equipment for chemical and food-processing machinery; (2) any arc welding process can be used for welding this steel; (3) welds produced under normal conditions (with moderate power per unit length) need no subsequent heat treatment. However, a tendency to intercrystalline corrosion develops after long-term holding within the critical temperature range (500÷800°C). Minimum possible current at maximum speed must be used; (4) the 0Х18Н9ф2С (ЭИ-606) [OKh18N9F2S (EI-606)] and Св-10Х 20Н 15 (Sv-10Kh20N15) wire grades can be used for subarc process and for CO_2 welding; (5) further investigations are necessary for welding Kh18N2AG5 steel of more than 3 mm thickness. There

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

Welding Kh18N2AG5 ...

are 4 figures and 2 tables.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O.Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" im. Ye.O.Paton, AS UkrSSR)

SUBMITTED: July 18, 1961

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

35658

S/125/62/000/005/005/010
D040/D113

1.2300

AUTHORS: Langer, N.A., Yagupol'skaya, L.N., Yushkevich, Z.V., Koryagin, Yu.A. and Lebedev, B.F.

TITLE: Improving the corrosion resistance of low-carbon and low-alloy steel welds in an alkaline medium

PERIODICAL: Avtomaticheskaya svarka, no. 5, 1962, 36-43

TEXT: Since equipment used in the aluminum industry has to be frequently repaired because of caustic embrittlement of low-carbon and low-alloy steel, and since alternative steels cost too much, the effect of stress-relieving on the resistance of low-alloy steel welds to caustic embrittlement was studied, using a method described by T.W. Green and A.A. Holzbaur ("The Welding Journal", No. 3, 1946). The experimental equipment comprised a carriage with 4 gas burners producing a 120 mm-wide flame, and a water-cooling device 150 mm behind the flame. Five steel grades were tested. Calcium and ammonium nitrate solutions were used for corrosion tests. The electrode potential in specimens was measured. The experimental results show that the best ratio between Mn and C in the base

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metal was 1.7 : 3.0, and the highest potential was found in the 14Г2 (14G2) steel - 61 mv before heat treatment, and 30 mv after. The anode zone was always revealed directly at the welds and appears to be the result of stress concentration. It is presumed that caustic embrittlement of low-carbon steel in strong alkali solutions begins with the destruction of the protective surface film, and this process is most intensive in metal at welded joints, where the anode potential is highest, but weld defects such as pin holes, slag inclusions, or spills also cause stress concentration and anode potential. Conclusions: (1) Thermo-mechanical treatment considerably improved the resistance of low-carbon and low-alloy steels to caustic embrittlement; (2) welds in 19Г (19G), М16С (M16S) and Ст.3 (St.3) steels have better resistance to caustic embrittlement than М (M) and 14Г2 (14G2) steels; (3) the result of electrode potential measurements show that residual welding stresses intensify the anode processes in the weakness zone. There are 7 figures and 3 tables.

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

Improving the corrosion resistance of low....

S/125/62/000/005/005/010
D040/D113

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O. Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" im. Ye.O. Paton, AS UkrSSR)

SUBMITTED: September 22, 1961

Card 3/3

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

KAKHOVSKIY, N. I.; YUSHCHENKO, K. A.; YUSHKEVICH, Z. V.; ISTRINA, Z. F.

Electric arc welding of corrosion resistant OKh21N6M2T ferritic-austenitic steel. Avtom. svar. 15 no.11:16-24 N '62. (MIRA 15:10)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki imeni Ye. O. Patona AN UkrSSR (for Kakhovskiy, Yushchenko, Yushkevich). 2. Vsesoyuznyy nauchno-issledovatel'skiy i konstruktorskiy institut khimicheskogo mashinostroyeniya (for Istrina).

(Steel, Stainless—Welding)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

LANGER, N.A.; YAGUPOL'SKAYA, L.N.; YUSHKEVICH, Z.V.; KORYAGIN, Yu.A.; LEBEDEV, B.F.

Effect of residual stresses on the corrosion resistance of welded equipment operating in alkali media. Vliian.rab. sred na svois. mat. no.2:87-96 '63. (MIRA 17:10)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 10302-63 EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD/HM/JT

ACCESSION NR: AP3001116 S/0125/63/000/007/0021/0028

AUTHOR: Kak...vskiy, M. ...; ...; Fartushnyy, ...; Yu...

TITLE: Welding of corrosion-resistant austenitic OKh17N5G9AB (EP55) chromium [illegible]

SOURCE: Avtomaticheskaya svarka, no. 7, 1963, 21-28

TOPIC TAGS: OKh17N5G9AB steel, nitric-acid-resistant steel, welding of OKh17N5G9AB steel, Ch18N10T steel

ABSTRACT: Effects of short-time welding heating and provoking heating at 650C on [illegible]

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 1[illegible]-63

ACCESSION NR: AP3001116

S

detrimental to the corrosion resistance of welds in nitric acid. The OK-[illegible]

SUBMITTED: 27Sept62	DATE ACQD: 02Aug63	ENCL: 00
SUB CODE: 00	NO REF SOV: 002	OTHER: 000

Card 1/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

KAKHOVSKIY, N.I.; YUSHCHENKO, K.A.; YUSHKEVICH, Z.V.; BABAKOV, A.A.; KAREVA, Ye.N.; SHARONOVA, T.N.

Electric arc welding of corrosion-resistant ferrite-austenite steels of the type 21-3 and 21-5. Avtom. svar. 16 no.12:49-57 D '63. (MIRA 17:1)

1. Institut elektrosvarki imeni Patona AN UkrSSR (for Kakhovskiy, Yushchenko, Yushkevich). 2. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (for Babakov, Kareva). 3. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut azotnoy promyshlennosti i proiduktov organicheskogo sinteza (for Sharonova).

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 39041-65 EWT(m)/EWA(d)/EWP(t)/EWP(z)/EWP(b) MJW/JD/HB
ACCESSION NR. AP5009176 S/0125/64/000/011/0093/0094

AUTHOR: Medovar, B. I.; Langer, [illegible]; [illegible]shkevich, Z. V.; Lutsyuk-Khudin, V. A.; [illegible]esik, N. I.

TITLE: Corrosion resistance of weld joints of low-carbon steel type 00Kh25N20

SOURCE: Avtomaticheskaya svarka, no. 11, 1964, 93-94

TOPIC TAGS: corrosion resistance, metal welding, nitric acid, steel, weld heat treatment, corrosion resistant, [illegible] steel

ABSTRACT: Chromium-nickel austenitic steel type 1Kh18N9T and aluminum type A[illegible] are used in equipment designed for the manufacture of concentrated nitric acid.

By following the optimum welding technology and techniques for joining type 1Kh18N9T steel the welds are stable to nitric acid at concentrations of up to 60% and temperatures of 70°C. At higher acid concentrations or higher temperatures the steel loses its corrosion resistance and weld joints frequently undergo extensive crack-type corrosion.

Attempts were made to use type EI654 steel for work under the indicated

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conditions. However, weld joints of the steel tend to pitting, which reaches a depth of 3 mm/year.

Low-carbon austenitic steels type 00Kh25N20 can be used for work with oxidizing media. The maximum decrease in the carbon of the steel must provide the necessary corrosion resistance for the steel and its weld joints under the indicated conditions.

Four samples of extremely low-carbon vacuum-thermal ferrochrochromium steel were prepared in induction furnaces at the Yushnot uonyy Metallurgical Plant and the Dneprospetsstal' Plant. The chemical content of the steels is shown in Table 1.

After the steel was poured into ingots it was rolled into sheet billets. Welding was done by argon arc with a tungsten electrode. The welds were tested for corrosion resistance in a 65% solution of HNO_3 for 144 hours (solution replaced after 48 hours) and for 100 hours in a 98% solution of boiling HNO_3. The results of the tests are shown in Table 2. For purposes of comparison, results are shown in the table of tests made on weld joints of type EI417 steel (0.11% C, 23.3% Cr, 20.4% Ni, 0.22% Si, 0.67% Mn, 0.013% S, 0.033% P). The samples were compared under the same conditions as the test steels.

The tested weld samples M, P, and Sh did not change in external appearance, but the surfaces of P-steel samples exhibited extensive corrosion.

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Welds of E1417 steel samples exhibited the greatest corrosion attack. The high carbon content invited extreme corrosion. It is interesting to note that the stability of type E1417 steel to an oxidizing medium such as a 65% solution of HNO_3 increased considerably after cold working. The unaffected portions of the steel deformed during stamping were distinctly evident.

Microstudy of the samples after corrosion tests revealed that welds of M, R, and Sh steels do not tend to crack or intercrystalline corrosion. Weld joints of E1417 steel typically exhibit intercrystalline corrosion.

A decrease in the carbon content of the test steels, along with increasing their corrosion resistance to oxidizing media should also increase their corrosion resistance under stress. Our experiments confirmed this assumption. The sample steels Sh and P were tested for tendencies to stress corrosion in boiling 42% magnesium chloride. The tests were conducted on samples specially stressed to 90% of the yield strength. The results of these investigations are shown in Table 3.

Orig. art. has: 3 figures, 3 tables.

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

ACCESSION NR: AP5000126

ENCLOSURE: 01

Table 1

Symbol of Heats	Content %						
	C	Mn	Si	P	S	Cr	Ni
M	0,018	0,60	0,60	0,020	0,007	25,14	21,00
R	0,030	1,60	0,41	0,005	0,008	24,90	18,90
Sh	0,045	1,54	0,60	0,008	0,016	23,95	19,94
P	0,053	1,50	0,91	0,011	0,006	24,90	16,65

TABLE 3

Designation of Samples	Time Before Appearance of Cracks
Sh	after [illegible] hours no cracks were found
P	after [illegible] hours no cracks were found
EI417	62 - 86

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

ENCLOSURE

Table 2

Symbol of Steels	Heat treatment of weld	Corrosion rate (mm/year) in HNO_3 65% sol.	98% sol.
M	none	0,77	0,83
	650°C, 2 hrs.	1,40	1,21
2	none	0,53	0,47
	650°C, 2 hrs.	1,11	1,18
5b	none	0,61	0,55
	650°C, 2 hrs.	1,32	1,47
P	none	0,35	1,19
	650°C, 2 hrs.	5,81	15,65
[illegible]	none	2,53	3,27
	650°C, 2 hrs.	38,85	28,00

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 27544-65

ACCESSION NR: AP5009176

ASSOCIATION: none

SUBMITTED: 00 ENCL: 02 SUB CODE: MM, IE

NO REF SOV: 000 OTHER: 000 JPRS

Card 1/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

[illegible] /EWP(c) MJW/JD/HB
ACCESSION NR: [illegible] UR/0125/65/000/006/0077/0077
672.3:620.191/.193.001.4

AUTHOR: Medover, B. I. (Doctor of technical sciences); Langer, N. A. (Candidate of technical sciences); Yushkevich, Z. V. (Engineer); Kikot, V. A. (Engineer)

TITLE: [illegible] tests of welded joints of [illegible]Kh25N20 steel in nitric acid

SOURCE: Avtomaticheskaya svarka, no. [illegible], 1965, 77

TOPIC TAGS: stainless steel, austenitic stainless steel, intercrystalline corrosion [illegible] knife [illegible] susceptibility, low carbon stainless [illegible] steel, 1Kh18N9T steel

ABSTRACT: [illegible]-treated [illegible] for [illegible] hr and untreated TIG-welded joints of [illegible] steel containing 0.018, 0.030, 0.045, or 0.055% C were tested for corrosion [illegible] specimens were [illegible] submerged in 5[illegible]—55% nitric acid [illegible] hr. Other specimens were placed in the vapor of [illegible]—[illegible]% ni-[illegible] hr. [illegible] comparison, welds of 1Kh18N9T [illegible] steel were tested under identical conditions. The submerged 25-20 type steel [illegible] their [illegible] appearance and exhibited no susceptibility to intercrystalline [illegible]. The corrosion rate varied from 0.01 to 0.0[illegible] g/m^2 hr and was [illegible]

Card [illegible]

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

[illegible]
ACCESSION NR: [illegible]

[illegible] high for heat-treated specimens ([illegible].02—[illegible].10 g/m^2 hr). The welds [illegible] were susceptible to knife corrosion. After testing in the gas phase [illegible] containing less than [illegible] preserved their appearance, [illegible] the surface [illegible] other steel was corroded, particularly steel with 0.055% [illegible] and [illegible] In tests in the vapor phase, the corrosion rate varied from [illegible] 2.37 g/m^2 hr for steel containing 0.055% C and 1.12 g/m^2 hr for [illegible] steel. Thus, the test under [illegible] conditions showed that welds of [illegible] steels of the [illegible]-type containing less than [illegible] intercrystalline and [illegible] corrosion in reactive and [illegible]% nitric [illegible] [MS]
[illegible] has: 1 table.

ASSOCIATION: none

SUBMITTED: [illegible] ENCL: 00 SUB CODE: MM

NO REF SOV: [illegible] OTHER: 000 ATD PRESS: 4034

Card [illegible]

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 35811-66

ACC NR: AP6015254 (A, N) SOURCE CODE: UR/0125/66/000/005/0076/0077

AUTHOR: Tabidze, A. I.; Pinchuk, N. I.; Us, V. I.; Yushkevich, Z. V.

ORG: none

TITLE: Stress corrosion cracking resistance of austenite chromium-manganese steels and alloys in chloride solutions

SOURCE: Avtomaticheskaya svarka, no. 5, 1966, 76-77

TOPIC TAGS: low nickel steel, stainless steel, chromium steel, manganese steel, corrosion resistance, chloride / Kh14G30 steel, 1Kh18N10T austenitic steel

ABSTRACT: Austenitic stainless steels of the 18-8 type are prone to stress corrosion cracking in chloride-containing solutions whereas high-Ni alloys (containing >40-45% Ni) resist corrosion of this kind. In this connection it was of interest to investigate the corrosion resistance of these alloys in chloride solutions on partial replacement of Ni with Mn. Accordingly, the authors investigated alloys of the Kh14G30 types containing from 1 to 23% Ni, which, to enhance their resistance to general corrosion, were additionally alloyed with 2.5-3.35% Mo, 0.23-0.3% Ti, 0.25-0.38% Al and 0.23-0.4% B. Variously stressed specimens of these steels were tested for stress corrosion cracking in boiling (+154°C) 42% $MgCl_2$ solution, on first undergoing heat treatment (1100°C for 1 hr, cooling in air). Specimens of 1Kh18N10T austenitic

UDC: 621.791:620.193:669.15-194

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

steel were also investigated for purposes of comparison. Findings: the stress corrosion cracking of 1Kh18N10T steel in the $MgCl_2$ solution sets in within the first 24 hr, and the same happens for specimens of Kh14G30 steel containing 8-23% Ni. On the other hand, specimens of Kh14G30 steel containing <8% Ni take more time to corrode; for specimens containing 3.68% Ni the time to corrosion is 143-169 hr, and for specimens with <2% Ni, more than 400 hr (Fig. 1).

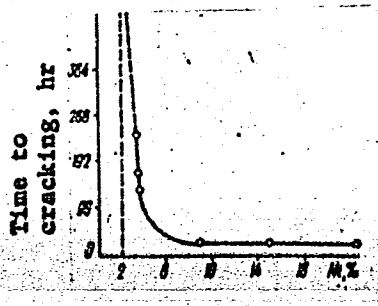

Fig. 1. Effect of Ni on corrosion resistance of Kh14G30-type austenitic Cr-Mn alloys in boiling 42% solution of $MgCl_2$

Thus, the replacement of Ni with Mn further contributes to enhancing the resistance of austenitic steels to stress corrosion cracking. Orig. art. has: 4 figures, 1 table.

SUB CODE: 13, 11/ SUBM DATE: none/ ORIG REF: 003/

Card 2/2

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKEVICH-GAVERDOVSKAYA, M.V., LAVROVSKIY, K.P., MIKHNOVSKAYA, A.A., ZINOV'YEVA, Z.M., AND YAKIMOCHKINA, V.I.

"Contact Transformations of Hexene and Cyclohexane Over an Aluminosilicate Catalyst." Vestnik Moskovskogo universiteta, no. 11, 1948

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

AUTHORS: Yushkevichyute, S. S.; Shlyapnikov, Yu. A. 4281

[illegible] AN Lithuanian SSR (Institut

[illegible] infinite time (i.e., uniform

UDC: 532.72+678.742

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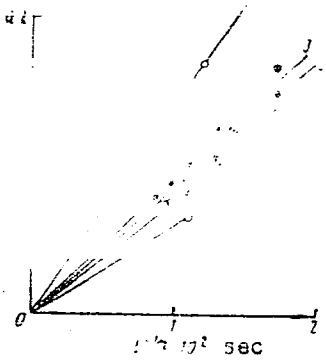

Fig. 1. Change in specimen activity

found that D = [illegible] (exp - 13100/RT), that the diffusion of ionol increases with degree of elongation of the specimen, and that annealing of specimens causes a further increase in the diffusion

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKHOVSKIY, M.A.

USSR/General Problems of Pathology - Tumors U-4

Abs Jour : Ref Zhur - Biol., No 7, 1958, No 32612

Author : Sinev A.V., Dobin M.A., Yushkhovskiy M.A.
Inst : Not Given
Title : On the Problem of Leukemia in Agricultural Animals.

Orig Pub : Sb. rabot Leningr. vet. in-t, 1957, vyp. 16, 4-9

Abstract : No abstract

Card : 1/1

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

ACC NR: AP7003917 SOURCE CODE: UR/0239/67/053/001/0123/0124

AUTHOR: Katrushenko, A. G.; Yushkin, A. A.

ORG: Department of Comparative Physiology and Pathology, Institute of Experimental Medicine, AMN SSSR, Leningrad (Otdel sravnitel'noy fiziologii i patologii Instituta eksperimental'noy meditsiny AMN SSSR)

TITLE: Technique for investigating the effect of ionized air and electrical fields on animals

SOURCE: Fiziologicheskiy zhurnal SSSR, v. 53, no. 1, 1967, 123-124

TOPIC TAGS: animal experiment, ~~aeroionization~~ ionized gas, electric field, ~~electromagnetic field~~ electromagnetic, biologic effect, ~~ionizing~~ ionizing radiation biologic effect

ABSTRACT: A technique is proposed for conducting physiological experiments on animals to study the effect of ionized air and electrical fields under controlled physical conditions. The technique employs the principle of hemispherical shielding chambers in the center of which is a generator which produces an equipotential field in the experimental chambers. The components of the system for studying the effect of aero-ionization and electric fields on small animals are shown in Fig. 1. Orig. art. has: 1 figure.

Card 1/2 UDC: 615.847(018)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

ACC NR: AP7003917

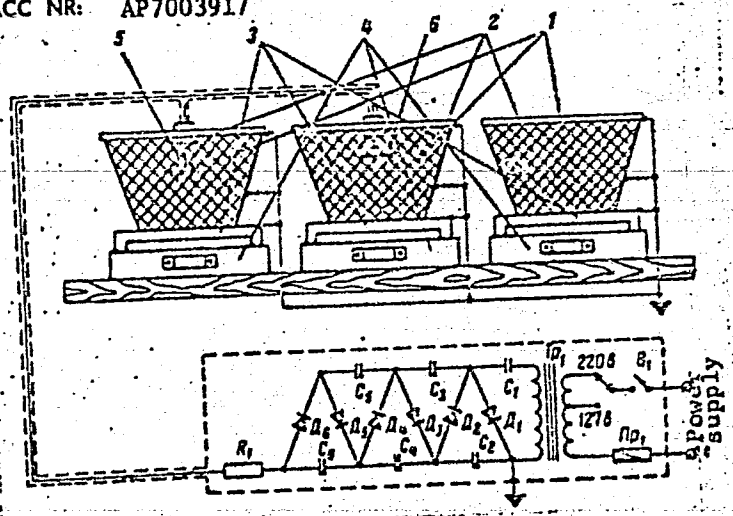

Fig. 1. Diagram of a system for studying the effects of aeroionization on small animals

1 - Wire cages; 2 - steel tops; 3 - raised wire platforms; 4 - litter trays; 5 - Air-2 aeroionizer; 6 - disc electrode. [26]

SUB CODE: 06/ SUBM DATE: 30Jul65/ ATD PRESS: 5117

Card 2/2

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

Yushkin, A.R.

LYAMIN, A.A., inzh.; ZAKHARENKO, S.Ye., inzh.; SHAL'NOV, A.P., kand. tekhn.nauk; IUSHKIN, A.R., inzh.; FILIMONOV, V.A., inzh. OSTAL'TSEV, P.P.

The technical and economic expediency of the simultaneous installation of underground equipment by engineering teams. Gor.khoz.Mosk. 31 no.11:30-35 N '57. (MIRA 10:12)

1.Mosenergoproyekt (for Lyamin). 2.Mosteploset'stroy (for Zakharchenko). 3.Mospodzemproyekt (for Shal'nov, Yushkin, Filimonov, Ostal'tsev)

(Municipal engineering)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

ALIKHASHKIN, Ya. I., YUSHKIN, A.R.

Using electronic calculating machines for hydraulic calculations of water-supply systems. Gor. khoz. Mosk. 34 no.11:17-18 N '60. (MIRA 13:11)

1. Uchenyy sekretar' Vychislitel'nogo tsentra Akademii nauk SSSR (for Alikhashkin). 2. Glavnyy inzhener proyekta instituta "Mosinzhproyekt" (for Yushkin).
(Electronic calculating machines)
(Water-supply engineering)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

MIL'KOV, F.N.; YUSHKIN, F., red.; KLYUCHKIN, Ya., tekhn.red.

[From Vishnevaya Mountain to the Caspian Sea; geographical study] Ot gory Vishnevoi do Kaspiiskogo moria; geograficheskii ocherk. Chkalov, Chkalovskoe izd-vo, 1950. 63 p. (MIRA 14:4)

(Ural Valley--Physical geography)
(Ural Valley--Afforestation)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

Yushkin, G.

AID P - 1002

Subject : USSR/Aeronautics

Card 1/1 Pub. 58 - 3/16

Author : Yushkin, G.

Title : Education of students according to the heroic traditions of Soviet aviators

Periodical : Kryl. rod., 1, 6-7, Ja 1955

Abstract : The author writes about the education of young members of the aeroclub. He examines the history of his aeroclub for examples to follow. Names are mentioned. Photos.

Institutions: All-Union Voluntary Society for the Promotion of the Army, Aviation and the Navy (DOSAAF); Aeroclub of Tula

Submitted : No date

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

VOLKOVA, L.A.; YUSHKIN, G.V.

Tularemia in Orenburg Province; preliminary report. Zhur.mikrobiol., epid.i immun. 32 no.12:56-60 D '61. (MIRA 15:11)

1. Iz Orenburgskoy oblastnoy sanitarno-epidemiologicheskoy stantsii.
(ORENBURG PROVINCE--TULAREMIA)

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"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

L 38467-66 EWI(1)/T JK

ACC NR: AP6029184 SOURCE CODE: UR/0016/66/000/005/0014/0017

AUTHOR: Volkova, L. A.; Yushkin, G. V.

ORG: Orenburg Oblast' Sanitary-Epidemiological Station (Orenburgskaya oblastnaya sanitarno-epidemiologisheskaya stantsiya)

TITLE: Tularemia in Orenburgskaya Oblast, I.

SOURCE: Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 5, 1966, 14-17

TOPIC TAGS: tularemia, epidemiology, pathology, rodent, disease incidence

ABSTRACT: On the basis of a study conducted between 1960 and 1962, the authors concluded that the boundaries of the natural focus of tularemia in Orenburgskaya Oblast (a floodplain swamp) have tended to expand since the disease was first reported in this area in 1928. In 1960, six cultures of F. tularensis were isolated from Arvicola terrestris L., Cricetus cricetus L., Apodemus sylvaticus, and Citellus maximum. The number of rodents caught in enzootic and nonenzootic regions was about the same, but the tularemia pathogen was not isolated from any of the rodents caught in the nonenzootic regions.

The pathological changes characteristic of tularemia were found mainly in the water voles, e.g., enlargement of the lymph nodes of the liver and marked splenomegaly. Orig. art. has: 2 tables. [JPRS: 36,932]

SUB CODE: 06 / SUBM DATE: 15Jun64 / ORIG REF: 002

Card 1/1 MLP UDC: 616.981.455-036.21(470.56)

APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9"

"APPROVED FOR RELEASE: 09/19/2001 CIA-RDP86-00513R001963230008-9

YUSHKIN, L.G.

85130

S/182/60/000/004/001/007
A161/A029

1.1400

AUTHORS: Brun, M.P., Vinokur, B.B., Mirovskiy, R.I., Geller, A.L., Mar'yushkin, L.G.

TITLE: The Effect of Hot Forging Conditions on the Properties of Large Forgings

PERIODICAL: Kuznechno-shtampovochnoye proizvodstvo, 1960, No. 4, pp. 8-14

TEXT: To analize the effect of heating temperature on the properties of large forgings, a statistical analysis of two years shop records and data of previous investigations (Refs. 1-12) were used and experiments with 30 to [illegible]-ton steel ingots were carried out. Ingots of 55X (55Kh), 55XH (55KhN) and 35XHM (35KhNM) steel were heated to higher temperature than usual and forged into stepped pieces with diameters of 960, 670 and 480 mm. Due to the higher temperature forging could be completed with a single heating, whereas in the established shop practice metal has to be heated twice with intermediate reheat. The effect of overheat and holding time at forging temperature was studied. It was stated that the compulsory longer heating time did not spoil the metal properties even when metal was heated to 30 to 40°C above the established limit. Macrostructure

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analysis revealed the same destruction of dendrites as is observed in forging with the accepted lower forging temperature; microstructure analysis with etching by a heated saturated aqueous solution of picric acid revealed no austenite grain growth. Test results proved that the tensile strength was slightly higher after a 30-hour holding at forging temperature than after a 10-hour holding; the cold brittlenessthreshold (i.e., the temperature at which impact resistance drops to 50 %) was at -100°C after a 30-hour holding and at -60°C after 10 hours (diagram, Figure 1) in 35KhNM steel; about -20°C in 50KhN (Fig. 2), and -[illegible]°C in 55Kh (Fig. 3); which means that the cold brittleness point was the same as usual in 35KhNM and 50KhN steel, and only by 5°C lower than usual in 55 Kh after a 10-hour holding. Increased forging temperature generally resulted in a slight drop of the cold brittleness threshold. The conclusion is drawn that heating to 30-40°C higher temperature than practiced (to 1,250°C for 55Kh, and 1,230°C for 50KhNM steel) did not impair the metal plasticity in deformation as well as the mechanical properties, provided that the entire forging process was completed with a single preheating, and the metal temperature at the end of the forging process was not too high (forging with intermediate reheats in same conditions

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has not been studied), and there is no reason for worry if ingots have to be held at forging temperature for a longer time. As to the tensile strength of steel, increased heating temperature and longer holding at this temperature does not impair it, and in separate cases it is even increased. There are 3 figures, 6 tables and 12 Soviet references.

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137-58-6-11575

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 48 (USSR)

AUTHORS: Yushkin, N., Novikov, M., Vystavkin, A., Kotyuzhinskiy, G.

TITLE: The Shorter Working Day and New Methods of Wage Payment in Ferrous Metallurgy (Sokrashchennyy rabochiy den' i novyye usloviya oplaty truda v chernoy metallurgii)

PERIODICAL: Sots. trud, 1957, Nr 12, pp 103-118

ABSTRACT: The shorter working day and the new methods of wage payment at ore mines and at metallurgical and coke-and-chemical plants should be closely coordinated with available productive resources, more complete employment of equipment, fuller use of working time, elimination of breakdowns and down time, introduction of modern working methods and new equipment, and improvement in wage systems. A discussion is presented of the experience at the Krasnyy Oktyabr' Plant at Stalingrad, of the Nizhniy Tagil Metallurgical Kombinat, of the Moscow "Hammer and Sickle" Plant, and of ferrous metallurgy plants in the Chelyabinsk ecological area. It is shown that the pay of workers under the new rates for the 7-hour working is considerably more stable and is a major material stimulus to

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The Shorter Working Day (cont.)

improvement in labor productivity. It has been observed at a number of establishments that increase in productivity and successful fulfillment of work quotas has been a result of conversion to the shorter work day and the new system of payment of labor.

M.M.

1. Industry--USSR 2. Labor--Performance

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Signs of hydrothermal activity in oil-bearing regions of Central Asia. Geol. nefti i gaza 6 no.1:58-59 Ja '62. (MIRA 15:1)

(Soviet Central Asia—Petroleum geology)
(Soviet Central Asia—Gas, Natural—Geology)

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Role of flotation in mineral-forming processes. Analele geol geogr 15 no.4:19-28 O-D '61.

(Minerals) (Flotation)

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(Flotation) (Minerals)

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Characteristics of the recent deposition of sulfur from underground waters. Geokhimiia no.8:698-706 '62. (MIRA 15:9)

1. Komi filial AN SSSR, Institut geologii.
(Uzbekistan--Water, Underground)
(Uzbekistan--Sulfur)

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Genesis of the Shor-Su sulfur deposit. Uzb.geol.zhur. 6 no.3:37-44 '62. (MIRA 15:6)

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Geochemistry of strontium and barium in sulfur sedimentation. (MIRA 16:9)
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1. Institute of Geology, Komi Branch, Academy of Sciences, Syktyvkar.
(Geochemistry) (Strontium) (Barium)

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Flotation transportation of sand particles by the running waters of the Korotaikha and Mezen' River Basins. Izv. Komi fil. Geog. ob-va SSSR no.9:76-78 '64. (MIRA 18:5)

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Recrystallization of gypsum by sulfur depositing solutions. Zap. Vses. min. ob-va 93 no.1:93-96 '64 (MIRA 18:2)

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