Determination of the phase...

SUBMITTED: July 11, 1962

Legend to Table 7: (1) p, kg/cm^2; (2) graphite

(1) p, кГ/см²	β·10⁶							
	Pb	AgCl	(2) графит	BN	Tl	Bi		
	20—123°C	17—132°C	21—134°C	23—130 °C	22—133 °C	25—160 °C	по [1, 2]	
							θ	30—75 °C
1	90	28	25	35	92	40	40	40
5000	80	—21	25	20	88	23	32	38
10000	71	—56	21	9	85	22	27	46
15000	58	—74	15	1	80	32	22	62
20000	44	—73	8	—2	74	58	24	86
25000	45	—55	—5	—2	69		22	125
30000	37	—20		3	62			

Card 2/2

LIVSHITS, L.D.; GENSHAFT, Yu.S.; MARKOV, V.K.

Diagram of state of cerium in the range 20 to 350°C at pressures up to 80.10^3 Kg/cm^2. Zhur. eksp. i teor. fiz. 43 no.4:1262-1267 O '62. (MIRA 15:11)

1. Institut khimicheskoy fiziki AN SSSR.
(Phase rule and equilibirum)
(Cerium)
(High-pressure research)

LIVSHITS, L.D.; MARTYNOV, Ye.D.

Laboratory apparatus for compressing liquids at pressures up to 20 kat. Prib. i tekh. eksp. 8 no.3:161-164 My-Je '63. (MIRA 16:9)

1. Institut khimicheskoy fiziki AN SSSR.
(High-pressure research--Equipment and supplies)

L 10660-63
EWP(q)/EWT(m)/BDS--AFFTC/ASD--JD

ACCESSION NR: AP3001209 S/0078/63/008/006/1302/1306

AUTHOR: Livshits, L. D.; Genshaft, Yu. S.; Ryabinin, Yu. N. 56 54

TITLE: Phase diagram of crystal hydrates $MgSO_4$ at high pressures

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 6, 1963, 1302-1306

TOPIC TAGS: phase diagram, crystal hydrates of $MgSO_4$, polymorphic transition, phase transitions, $MgSO_4$

ABSTRACT: A phase diagram of the crystal hydrates of $MgSO_4$ was constructed from measurements obtained by the "piston displacement" method; data was obtained at 20 degrees by volume compressibility of salts which were previously dehydrated at 200 degrees. A polymorphic transition in the region of 4500 kg/sq.cm. pressure was discovered. The phase transition in the crystalline hydrates is sensitive to the quantity of water of crystallization; by decreasing the content of bonded water, the discontinuities in the volume upon compression are blurred, down to a complete disappearance of separate transitions. There is a limit in the piston displacement method above which the liberated water interferes with the measurement of change in volume decrease with pressure. Actual crystalline conditions of the salt under pressure can be studied by X-rays, but it may be assumed that

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L 10660-63

ACCESSION NR: AP3001209

2

significant volume change with the transitions indicates important structural changes in the material. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of chemical Physics, Academy of Sciences SSSR). Institut fiziki Zemli Akademii nauk SSSR (Institute of Earth Physics, Academy of Sciences SSSR)

SUBMITTED: 28May62 DATE ACQD: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 004 OTHER: 003

kes/Sw
Card 2/2

RYABININ, Yu.N.; PETROV, V.P.; MARKOV, V.K.; LIVSHITS, L.D.; DELITSIN, I.S.

Additional data on the conditions governing the formation of the dense modifications of silica at high pressures and temperatures. Izv. AN SSSR.Ser.geol. 28 no.8:3-10 Ag '63. (MIRA 17:2)

1. Institut fiziki Zemli AN SSSR i Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moskva.

ACCESSION NR: AP4025911 S/0056/64/046/003/0821/0824

AUTHORS: Livshits, L. D.; Genshaft, Yu. S.

TITLE: Nonlinear dependence of the magnetic transformation temperatures of two invar alloys on the hydrostatic pressure

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 821-824

TOPIC TAGS: Curie temperature, magnetic transformation temperature, phase transition, second order phase transition, invar, coelinvar, elinvar, Curie temperature pressure dependence, high pressure ferromagnetic transformation, ferromagnetic transformation

ABSTRACT: The pressure dependence of the Curie temperature of the elinvar and coelinvar alloys was studied at pressures up to 20 kbar as part of an investigation of second-order phase transitions under pressure. The relation

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ACCESSION NR: AP4025911

$$\Delta\Theta = \Theta_p - \Theta = -ap - bp^2,$$

(Θ_p -- temperature of magnetic transformation at pressure p, Θ -- temperature, a and b -- constants) is found to hold for both alloys. Although such a nonlinear relation follows from the theory, previous experiments yielded only linear relations, probably owing to the smallness of the range of variation of the pressures employed and in some cases to the smallness of the effect itself. A tentative value $d\Theta/dR = 3\text{--}3.5 \times 10^{11}$ deg/cm is obtained for both alloys (R -- interatomic radius, on the order of 2.5 Å). "The material for the samples was graciously furnished by G. I. Katayev, to whom the authors are deeply grateful. They also thank Yu. N. Ryabinin and R. Z. Levitin for interest in this work." Orig. art. has: 3 figures, 4 formulas, and 1 table.

Card 2/4 3

ACCESSION NR: AP4025911

ASSOCIATION: Institut fiziki zemli AN SSSR (Institute of Physics of the Earth, AN SSSR)

SUBMITTED: 14Aug63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: PH NO REF SOV: 006 OTHER: 001

Card 3/4 3

ACCESSION NR: AP4010755 S/0020/64/154/001/0086/0087

AUTHOR: Livshits, L. D.; Ryabinin, Yu. N.; Beresnev, B. I.; Marty*nov, Ye. D.

TITLE: A new relationship between the elastic limit and pressure

SOURCE: AN SSSR. Doklady*, v. 154, no. 1, 1964, 86-87

TOPIC TAGS: elastic limit, high pressure metallurgy, axial tension of materials, rate of deformation

ABSTRACT: The authors have investigated the elastic limits of various steels and of brass under high pressure. Their method of investigation differs from that previously used by a very high rate of deformation. The elastic limit E (the natural logarithm of the ratio of areas of the specimen cross sections before and after rupture) was measured as a function of pressure p. In the previous work (mainly by Bridgman), a proportionality between E and p has been

Card 1/2

ACCESSION NR: AP4010755

found in many metals and alloys. It is shown in the present work, that in some materials there is a relationship of a new type between E and p. At lower pressures, there is almost no effect of p on E. The rate of axial deformation has no effect on the dependence of the elastic limit on pressure. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki Zemli im O. Yu. Shmidta Akademii Nauk SSSR (Institute for the Earth Physics).

SUBMITTED: 05Apr63 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: PH, ML NO REF SOV: 003 OTHER: 001

Card 2/2

deformation of quartz

geological modeling superhigh mineral plastic deforma-

tion, quartz, silica

ABSTRACT: The authors review the results of an experimental study of the plastic deforma-

They then describe the occurrence of plastic deformation of quartz ob-

in a metastable state in the region of thermodynamic stability of dense modifications

at superhigh pressures and high temperatures. The samples used in the investi-

from a large, compl

chamber. The experimental method was described earlier (Vestn. AN SSSR, ser. geol., No. 8, 1963). The experiments produced plastic deformation of the samples of quartz monocrystals at superhigh pressures and high temperatures (above

Card 1/2

L 25621-65
ACCESSION NR: AP4049998

3

[illegible] The deformation within a single sample was quite complex, as can be judged [illegible]

develops for the most part either parallel to the plane of [illegible] terial or perpendicular to it. "The authors wish to thank [illegible] I. Lukin and V. F. Cherny*shev [illegible] examination of the polished sections and discussion of the paper." Orig. art. has: 4 figures.

ASSOCIATION: Institut fiziki Zemli AN SSSR (Institute of Physics of the Earth, AN SSSR); Institut geologii rudny*kh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moscow (Institute of the Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry AN SSSR)

SUBMITTED: 25Mar64 ENCL: 00 SUB CODE: [illegible]

[illegible] 005 OTHER: [illegible]

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000930310006-9"

L 27158-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-... IJP(c) JD/HW/JG
ACCESSION NR: AP5005241 S/0057/65/035/002/0348/0354

AUTHOR: Livshits, L. D.; Ryabinin, Yu. N.; Beresnev, B. I.

TITLE: Effect of pressure on the ductility of metals

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no.2, 1965, 348-354

TOPIC TAGS: chromium, chromium ductility, hydrostatic pressure, ductility pressure dependence

ABSTRACT: To determine the effect of high hydrostatic pressure on the ductility of metals, specimens of pure forged chromium were subjected to tensile tests at ambient hydrostatic pressures of up to 18,000 kg/mm^2. The curves of the ultimate deformation-pressure dependence showed that pressures of up to 4000—5000 kg/mm^2 have little or no effect on the ultimate elongation, but with a further increase in the pressure the elongation sharply increases. An analysis of the results showed that similar behavior is exhibited by a number of other brittle and low-ductility metals. The metal grain size appears to have no effect on the ε-p dependence. This indicates the major role of the condition of grains and the secondary importance of grain boundaries. To obtain a more exact evaluation of the effect of individual deformation-pressure factors, further investigation is required. Orig. art. has: 6 figures. [MS]

Card 1/2

L 27188-65

ACCESSION NR: AP5005241

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta AN SSSR, Moscow (Institute of Physics of the Earth, AN SSSR)

SUBMITTED: 09Mar64	ENCL: 00	SUB CODE: MM
NO REF SOV: 003	OTHER: 002	ATD PRESS: 3191

L 41068-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACCESSION NR: AP5010496 UR/0056/65/048/004/1050/1053

AUTHOR: Livshits, L. D.; Genshaft, Yu. S.

TITLE: Shift of Curie temperature of gadolinium under hydraulic compression up to 35 kbar

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 4, 1965, 1050-1053

TOPIC TAGS: gadolinium permeability, gadolinium Curie point, gadolinium permeability pressure shift, gadolinium Curie temperature shift

ABSTRACT: The pressure dependence of permeability was plotted at a constant temperature at a frequency of 500 cps and an effective field intensity of [illegible]. The pressure was applied through a silver chloride medium by the piston displacement method. The specimens were miniature [illegible] of polycrystalline meta[illegible] turned from [illegible] of gadolinium with the [illegible] wing admixtures [illegible] and [illegible] (0.2%), Fe (0.01%), and Cu (0.005%). The temperature fluctuations during the experiment did not exceed 0.5–1C. The pressure dependence curve of the Curie point was plotted on the basis of twelve independent determinations of the pressure [illegible] at which the specimen changed to the paramagnetic state. As expected this

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L 41068-65

ACCESSION NR: AP5010496

curve was a straight line with a proportionality factor of 1.34 ± 0.06 degrees per kbar. The mean deviation of the experimental points from the straight line was [illegible] temperature and 0.6 kbar in pressure. A discontinuity of the curve within [illegible] kbar pressure range of the curve, as described by Robinson and others (Phys. Rev., 134, 1964, A187), was not observed. Orig. art. has [illegible] figures and 1 formula. (FP)

ASSOCIATION: Institut fiziki zemli Akademii nauk SSSR (Institute of Physics of the Earth, Academy of Sciences, SSSR)

SUBMITTED: 09Nov64	ENCL: 00	SUB CODE: SS EM
NO REF SOV: 005	OTHER: 007	ATD PRESS: 3232

Card 2/2

L 40284-65 EWT(m)/EWP(k)/EWA(c)/T/EWP(b)/EWA(d)/EWP(t)/EWP(z) Pf-4 IJP(c)
ACCESSION NR: AP5011530 UR/0020/65/161/005/1077/1080

AUTHOR: Livshits, L. D.; Beresnev, B. I.; Ryabinin, Yu. N.

TITLE: Ductility of the 50 at% Bi-50 at% Sn alloy in tension under a high pressure

SOURCE: AN SSSR. Doklady, v. 161, no. 5, 1965, 1077-1080

TOPIC TAGS: bismuth alloy, tin containing alloy, alloy ductility, pressure ductility relationship, brittleness ductility transition

ABSTRACT: Binary Bi-Sn alloy containing 50 at% Bi was air cooled or water quenched, naturally aged, and then subjected to tension tests at room temperature at pressures up to 21,600 kg/cm^2. At 300—350 kg/cm^2 the alloy fracture was brittle. With a further increase in pressure the fracture became more and more ductile. In the 1400—1500 kg/cm^2 range the alloy ductility sharply increased, the elongation reached 6.5%, and the reduction of area was 99.9%. With a further increase in pressure the alloy ductility decreased, passed through a minimum at a pressure of 6500 kg/cm^2, increased again to the second maximum at a pressure of 10,000—11,000 kg, and dropped practically to zero in the 11,000—11,500 kg/cm^2 range. With an increase in pressure from 12,000 to 18,000—20,000 kg/cm^2, the elongation again increased and the fracture became ductile, while above 20,000 kg/cm^2 the ductility dropped again

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L 49284-65
ACCESSION NR: AP5011530

and the fracture became brittle. Thus, the experimental results revealed a new phenomenon—the existence of pressure ranges within which a material can have a higher or a lower ductility. It is assumed that this phenomenon is associated with peculiarities of the ρ, T-diagram of the alloy. Orig. art. has: 2 figures. [MS]

ASSOCIATION: Institut fiziki zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Physics of the Earth, Academy of Sciences, SSSR)

SUBMITTED: 21Oct64 ENCL: 00 SUB CODE: MM

NO REF SOV: 008 OTHER: 004 ATD PRESS: 4005

BJB

Card 2/2

L 3400-66 EPA(s)-2/EWT(m)/EWP(w)/EPF(c)/EPF(n)-2/T/EWP(t)/EWP(b)
IJP(c) JD/JG

ACCESSION NR: AP5024209 UR/0020/65/164/003/0541/0544

AUTHORS: Livshits, L. D.; Beresnev, B. I.; Genshaft, Yu. S.; Ryabinin, Yu. N. 33 32 B

TITLE: Change in strength of several substances in the region of polymorphic transitions under pressure

SOURCE: AN SSSR. Doklady, v. 164, no. 3, 1965, 541-544

TOPIC TAGS: polymorphic transition, rubidium chloride, silver nitrate, limestone, calcium carbonate

ABSTRACT: The effect of pressure on RbCl, $AgNO_3$, and limestone was studied. The investigation is an extension of previous work on Bi-Sn alloys published by the authors (DAN, 161, 5, 1965). Axial compression of specimens was determined at high hydrostatic pressures. The specimens were of cylindrical shape, 8-10 mm in diameter, and had a length-to-diameter ratio of 1 to 1.5. Photographs of the deformed samples are presented and stress-strain curves are shown graphically (see Fig. 1 on the Enclosure). It is concluded that pressure affects the strength of different materials differently during polymorphic transitions. Thus the resistance to compression of RbCl increases with pressure, that of limestone

Card 1/3

L 3400-66

ACCESSION NR: AP5024209

increases also, but more slowly, and that of $AgNO_3$ shows a decrease with increase of pressure. Orig. art. has: 3 graphs and 1 photograph.

ASSOCIATION: Institut fiziki Zemli im. O. Yu. Shmidta, Akademii nauk SSSR (Institute of Geophysics, Academy of Sciences, SSSR)

SUBMITTED: 01Feb65 ENCL: 01 SUB CODE: SS

NO REF SOV: 003 OTHER: 001

Card 2/3

L 3400-66

ACCESSION NR: AP5024209

ENCLOSURE: 01

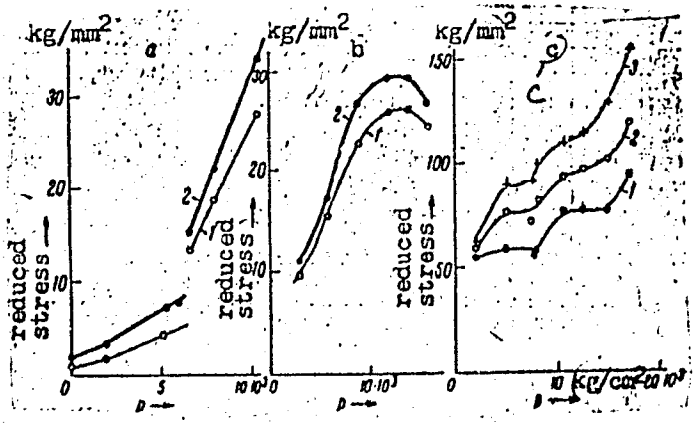


Fig. 1. Dependance of reduced stress on pressure for constant residual deformation (δ = const.). a- RbCl: 1 - δ = 3%; 2 - δ = 10%; b- $AgNO_3$: 1 - δ = 2%; 2 - δ = 10%; c- limestone: 1 - δ = 2%; 2 - δ = 5%; 3 - δ = 10%

MARKOV, V.K.; LIVSHITS, L.D.; DELITSIN, I.S.; RYABININ, Yu.N.; PETROV, V.P.

Conversions in magnesium metasilicate under high pressures and temperatures. Izv. AN SSSR. Ser. geol. 30 no.7:38-49 Jl '65.
(MIRA 18:7)

1. Institut fiziki Zemli AN SSSR, i Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii i geokhimii AN SSSR, Moskva.

LIVSHITS, L. G., Engr. Cand. Tech. Sci.

Dissertation: "Theoretical and Experimental Substantiation of the High Cooling Rates of Babbits B-83, B-N and B-T During Their Pouring into Bearings." All-Union Sci Res Inst of Mechanization and Electrification of Agriculture - "VIME" 1 Jul 47.

SO: Vechernyaya Moskva, Jul, 1947 (Project #17836)

USSR/Metals Dec 48
Steel, Chromium-Nickel
Steel, Structural

"Low-Alloy Structural Steel," L. G. Livshits, Cand Tech Sci, G. A. Torpanovc, Engr, TsNIICherMET, 4 pp

"Stal'" No 12

Some alloy structural steels (in particular, those containing molybdenum) can be successfully replaced in many cases by proposed low-alloy steels of low chromium and nickel content. Includes nine diagrams, one microphotograph, and three tables.

18/49T91

LIVSHITS, L. G.

O metodakh povysheniia iznosostoikosti detalei traktornykh dvigatelei. (Vestn. Mash., 1950, no. 10, p. 30-32)

Methods of increasing the resistance to wear of traction engine parts.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

LIVSHITS, L.G.

ARTEM'YEV, Yu.N., kandidat tekhnicheskikh nauk; ALEKSEYEV, I.A., inzhener; ASTVATSATUROV, G.G., inzhener; BISNOVATYY, S.I., inzhener; BONDARENKO, A.F., inzhener; GURAL'NIK, Ye.L., inzhener; GORBUNOV, M.F., inzhener; ZLATKOVSKIY, A.P., kandidat tekhnicheskikh nauk; KATTS, N.V., inzhener, KITAYEV, A.S., inzhener; KOZLOV, A.M., inzhener; LEONOV, P.T., inzhener; LIVSHITS, L.G., kandidat tekhnicheskikh nauk; LIBERMAN, A.R., inzhener; LINNIK, Ye.M., inzhener; LUKANOV, M.A., inzhener; MOROZOV, S.A., inzhener; POGORELYY, I.P., kandidat tekhnicheskikh nauk; PETROV, S.A., kandidat tekhnicheskikh nauk; PYATETSKIY, B.G., inzhener; RABOCHIY, L.G., kandidat tekhnicheskikh nauk; SELIVANOV, A.I., kandidat tekhnicheskikh nauk; FERBERG, B.S., kandidat tekhnicheskikh nauk; CHISTYAKOV, V.D., inzhener; CHUNIKHIN, V.M., inzhener; SHIRYAYEV, A.I., inzhener; SHCHUPAK, A.D., inzhener; KUCHUMOV, P.S., inzhener, redaktor; PETROV, S.A.; PESTRYAKOV, A.I., redaktor; BALLOD, A.I., tekhnicheskiy redaktor.

[Handbook of equipment for repairing tractors and agricultural machinery] Spravochnik po oborudovaniiu dlia remonta traktorov i sel'skokhoziaistvennykh mashin. Moskva, Gos. izd-vo selkhoz. lit-ry, 1954. 646 p. (MLRA 7:11)

(Tractors--Repairing) (Agricultural machinery--Maintenance and repair)

KUTOVOY, I.D.; DEPARMA, V.N.; LIVSHITS, L.G.; KOROLEV, N.V.; DEMIN, V.S., inzhener, redaktor; OGIOBLIN, K.S., redaktor; MAYBORODA, M., tekhnicheskiy redaktor.

[Repair equipment for machine-tractor stations. Apparatus, devices and tools shown at the All-Union Agricultural Exhibit; a reference manual] Remontnoe oborudovanie masterskoi MTS. Pribory, prisposobleniia i instrumenty, eksponiruemye na VSKhV; spravochnik. Moskva, Gos.izd-vo kul'turno-prosvetitel'noi lit-ry, 1955. 175 p. (MLRA 9:6)

1.Moscow. Vsesoyuznaya sel'skokhozyaystvennaya vystavka, 1954- .
(Agricultural machinery--Repairing)

LIVSHITS, L.G., kand.tekhn.nauk

Is such a book needed? ("Repair of tractor parts" by V.A. Kozin, A.A. TSyrin and O.U. Chapskii). Reviewed by L.G. Livshits. Mekh. i elek.sots.sel'khoz. no.4:62-63 '57. (MIRA 12:4)
(Tractors—Maintenance and repair)
(Kozin, V.A.) (TSyrin, A.A.) (Chapskii, O.U.)

LIVSHITS, L.G., kand.tekhn.nauk; KOROLEV, N.A., inzh.

Cold welding of cast iron agricultural machinery parts. Svar. proizv. no.10:38-40 O '61. (MIRA 14:9)

1. Gosudarstvennyy soyuznyy nauchno-issledovatel'skiy tekhnologicheskiy institut.
(Agricultural machinery--Maintenance and repair)
(Cold welding)

ARTEM'YEV, Yu.N., kand. tekhn. nauk; ASTVATSATUROV, G.G., inzh.;
BARABANOV, V.Ye., inzh.; BARYKOV, G.A., inzh.; BISNOVATYY, S.I.,
inzh.; GALAYEVA, L.M., inzh.; GAL'PERIN, A.S., kand. tekhn. nauk;
GAL'CHENKO, I.I., inzh.; GONCHAR, I.S., kand. tekhn. nauk;
DEGTYAREV, I.L., kand. tekhn. nauk; DYADYUSHKO, V.P., inzh.;
YERMAKOV, I.N., inzh.; ZHOTKEVICH, T.S., inzh.; ZUSMANOVICH, G.G.,
inzh.; KAZAKOV, V.K., inzh.; KOZLOV, A.M., inzh.; KOROLEV, N.A.,
inzh.; KRIVENKO, P.M., kand. tekhn. nauk; LAPITSKIY, M.A., inzh.;
LEBEDEV, K.S., inzh.; LIBERMAN, A.R., inzh.; LIVSHITS, L.G., kand.
tekhn. nauk; LOSEV, V.N., inzh.; LUKANOV, M.A., inzh.; LYUBCHENKO,
A.M., inzh.; MAMEDOV, A.M., kand. tekhn. nauk; MATVEYEV, V.A.,
inzh.; ORANSKIY, N.N., inzh.; POLYACHENKO, A.V., kand. tekhn.nauk;
POPOV, V.P., kand. tekhn. nauk; PUSTOVALOV, I.I., inzh.;
PYTCHENKO, P.I., inzh.; PYATETSKIY, B.G., inzh.; RABOCHIY, L.G.,
kand. tekhn. nauk; ROL'BIN, Ye.M., inzh.; SELIVANOV, A.I., doktor
tekhn. nauk; SEMENOV, V.M., inzh.; SKOROKHOD, I.I., inzh.; SLABODCHIKOV,
V.I., inzh.; STORCHAK, I.M., inzh.; STRADYMOV, F.Ya., kand. tekhn.
nauk; SUKHINA, N.V., inzh.; TIMOFEYEV, N.D., inzh.; FEDOSOV, I.M.,
kand. tekhn. nauk; FILATOV, A.G., inzh.; KHODOV, L.P., inzh.;
KHROMETSKIY, P.A., inzh.; TSVETKOV, V.S., inzh.; TSEYTLIN, B.Ye.,
inzh.; SHARAGIN, A.M., inzh.; CHISTYAKOV, V.D., inzh.; BUD'KO, V.A.,
red.; PESTRYAKOV, A.I., red.; GUREVICH, M.M., tekhn. red.

(Continued on next card)

ARTEM'YEV, Yu.N.--- (continued) Card 2.

[Manual on the repair of machinery and tractors] Spravochnik po remontu mashinno-traktornogo parka. Pod red. A.I.Selivanova. Moskva, Sel'khozizdat. Vols.1-2. 1962. (MIRA 15:6)
(Agricultural machinery--Maintenance and repair)
(Tractors--Maintenance and repair)

LIVSHITS, L.G., kand. tekhn. nauk; POLYACHENKO, A.V., kand. tekhn. nauk; DMITRIYEV, I.N., red.; MAKHOVA, N.N., tekhn. red.; SOKOLOVA, N.N., tekhn. red.

[Reconditioning motor-vehicle and tractor parts]Vosstanovlenie avtotraktornykh detalei. Moskva, Sel'khozizdat, 1962. 319 p. (MIRA 15:10)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy tekhnologicheskiy institut remonta i ekspluatatsii mashinno-traktornogo parka (for Livshits, Polyachenko).
(Tractors—Maintenance and repair)
(Motor vehicles--Maintenance and repair)

ABELEVICH, A.A.; ARTEM'YEV, Yu.N.; VLASOV, A.P.; GAL'PERIN, A.S.; YEVSIKOV, A.V.; IVANOV, G.P.; KOROLEV, N.A.; LEVITSKIY, I.S.; LIVSHITS, L.G.; MELKOV, M.P.; NAZAROV, N.I.; NOVIKOV, M.P.; POPOV, V.Ya.; TEPLOV, A.G.; BAKHAREV, A.P., inzh., retsenzent; SAVEL'YEV, Ye.Ya., red. izd-va; MODEL', B.I., tekhn. red.; EL'KIND, V.D., tekhn. red.

[Technological aspects of the repair of crawler vehicles] Tekhnologiia remonta gusenichnykh mashin. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry 1960. 466 p. (MIRA 14:7)
(Crawler vehicles--Maintenance and repair)

214. **Special Features of Myocardial Infarction (and Cardiac Aneurysms) in Essential Hypertension.** (К вопросу об особенностях клиники инфаркта миокарда (и аневризмы сердца) при гипертонической болезни)

L. I. LIVSHITS. Терапевтический Архив [*Terap. Arkh.*] 21, No. 5, 54–62, Sept.–Oct., 1949. 5 figs., 6 refs.

The author investigated during 1936–41 and 1945–8 special features of 270 cases of myocardial infarction. They were divided into 2 groups: (1) 170 cases with hypertension; (2) 100 without hypertension. The male to female ratio was 6 : 1. In group (1) 55% developed a myocardial infarction between the ages of 50 and 59, in group (2) 51% were in the same age-group; 23% in group (1) developed an infarct before the age of 50 as against 30% in group (2). An atypical picture of myocardial infarction was seen in 42·9% of group (1) and 24% of group (2), probably because in group (1) anterior infarction developed less often (25·3%) than in group (2) (33%). Combined anterior and posterior infarction occurred in 18·8% of group (1) and in 16% of group (2). Posterior infarction was seen in 30·6% of group (1) and in 22% of group (2). Arrhythmias developed in 21·8% of group (1) and in 14% of group (2). In group (1) gross heart failure developed in 54·1%, and in group (2) moderate heart failure in 33%. Cardiac aneurysms were seen in 9·4% of group (1) and 11% of group (2).

Myocardial infarction in group (2) was associated with a low-voltage QRS wave in the electrocardiogram (E.C.G.) and moderate left ventricular hypertrophy. In group (1) the E.C.G. showed a combined picture of hypertension and infarction—high-voltage QRS, left ventricular hypertrophy, with ST and T (where not altered by the infarct) characteristic for hypertension (ST in leads I and II negative, diphasic or negative T). In cases where hypertension, myocardial infarction, and heart failure were present, as well as in cases with a

previous history of infarction, the E.C.G. showed a typical picture of hypertension in at least one of the chest leads.

In cases of hypertension, heart failure, and fibrillation the E.C.G. often showed some characteristic feature of hypertension in one of the chest leads. In a case of left ventricular aneurysm and hypertension the electrode was put directly over the area of maximal pulsation. The E.C.G. showed an absent R wave, very deep Q wave (20 mm.), and a dome-shaped ST wave above the isoelectric line. An E.C.G. of the same patient 6 months later showed the same features as the previous one. When looking through some old (1941) electrocardiograms the author found that other patients had the same E.C.G. picture in the lead which was nearest to the aneurysm. It is thought that the above-mentioned E.C.G. may prove to be characteristic of cardiac aneurysm.

N. Chatelain

Abstracts of World Medicine
Vol 8 1950

215. case.

Category : USSR/Magnetism - Experimental methods of magnetism F-2

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1389

Author : Korsunskiy, M.I., Fogel', Ya.M., Bykova, G.A., Livshits,L.I., Lozovskiy, N.S. Chovnik, A.A.

Title : Investigation of the Topography of the Inhomogeneous Plane Magnetic Field of a Six-Pole Electromagnet.

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 2, 1222-1232

Abstract : A procedure is described for the investigation of the topography of an inhomogeneous plane magnetic field of a six-pole electromagnet, used to focus particles that have a magnetic moment. The cited measurement results show that the above field can be produced without substantial distortion in a circle 10 cm in radius.

Card : 1/1

SHUL'MEYSTER, Boris Iosifovich; LIVSHITS, L.M., inzh., retsenzent; MELEYEV, A.S., inzh., red.; SAVEL'YEV, Ye.Ya., red.izd-va; TIKHANOV, A.Ya., tekhn.red.; EL'KIND, V.D., tekhn.red.

[Repair and assembling of stationary diesel engines] Remont i montazh statsionarnykh dizelei. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit.lit-ry, 1959. 267 p. (MIRA 13:1)
(Diesel engines--Maintenance and repair)

LIVSHITS, L.M.

Redesigning the slag cars by changing the cinder ladle from 11 to 16.5 m^3. Metallurg 9 no.1:12-14 Ja '64 (MIRA 18:1)

1. Metallurgicheskiy zavod im. Petrovskogo.

KOVALENKO, N.I., inzh. (Minsk); LIVSHITS, L.M. (Minsk)

Gutter spout funnels on the sloping roofs of industrial buildings. Vod. i san. tekh. no.3:9-11 '64 (MIRA 18:2)

LIVSHITS, L.N., inzh.; PETROV, V.P., inzh.; VALGE, I.A., inzh.; BERESNEV, A.T., inzh.

Manufacture of welded beams of the V92-T aluminum alloy. Prom. stroi. 40 no.12:23-28 '62. (MIRA 15:12)

1. Chelyabinskiy zavod metallokonstruktsiy imeni Ordzhonikidze (for Livshits).
(Aluminum alloys) (Beams and girders)

LIVSHITS, L.M.; BERDYANSKIY, A.G.

Improving the design of a rotary car dumper. Met. i gornorud. prom. no.3:79 My-Je '65. (MIRA 18:11)

LIVSHITS, L.M., inzh.

Mechanization of labor-consuming operations in a metallurgical plant. Mekh. i avtom. proizv. 18 no.10:17-20 O '64.
(MIRA 17:12)

LIVSHITS, L.N., inzh.

Practices in manufacturing ventilating ducts of AD-1M alloy.
Prom. stroi. 43 no. 11:42-43 '65. (MIRA 18:12)

L 14510-66 EWT(m)/EWA(d)/T/EWP(v)/EWP(t)/EWP(k)/EWP(z)/EWP(b) LJP(c) JD/RM/MJW

ACC NR: AP6003285 SOURCE CODE: UR/0135/66/000/001/0026/0028

48
B

AUTHOR: Livshits, L. N. (Engineer)

ORG: Chelyabinsk Metal Structural Elements Plant im. Ordzhonikidze (Chelyabinskiy zavod metallokonstruktsiy)

TITLE: Instances of the prevention and elimination of deformations during the fabrication of welded structural elements of aluminum 44,55 27

SOURCE: Svarochnoye proizvodstvo, no. 1, 1966, 26-28

TOPIC TAGS: fabricated structural metal, aluminum, welding technology, material deformation

ABSTRACT: The fabrication of welded structural elements of aluminum alloys involves difficulties due to the easy deformability of aluminum -- a metal that, compared with steel, displays a lower modulus of elasticity, greater shrinkage on solidification, and a higher coefficient of linear expansion. In this connection, the effect of various design and technological factors on the deformation of welded structural elements of AMg6, AMg61 and V92T aluminum alloys was investigated at the Chelyabinsk Metal Structural Elements Plant and, as a result, the following techniques for the prevention and elimination of deformations have been developed: 1. The welding is 44,55 K

Card 1/4 UDC: 621.791.015:624.014.25:669.715

L 11510-66
ACC NR: AP6003285

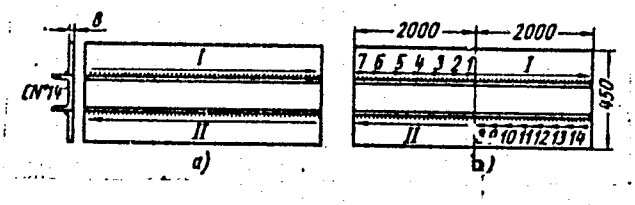


Fig. 1. Sequence of welding passes during the welding of elements of V92T alloy

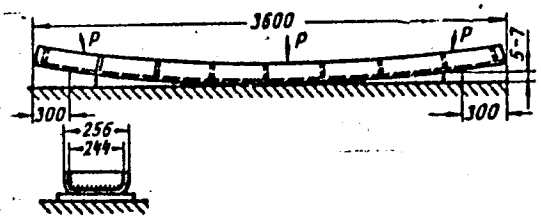


Fig. 2. Welding of a curved channel bar with prior bending and rigid attachment

Card 2/4

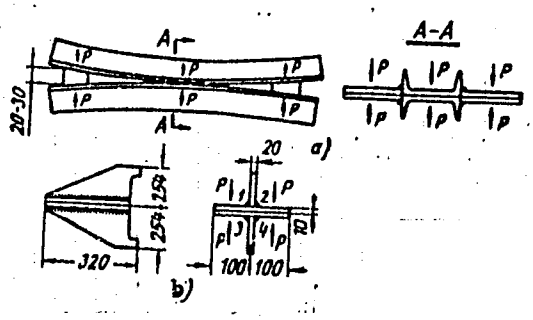


Fig. 3. Welding of elements of AMg6l alloy, attached in pairs

L 14510-66

ACC NR: AP6003285

commenced at center of the element and proceeds toward its ends (Fig. 1, b). This confines the deformation to permissible limits (10-15mm) compared with the 120-150 mm deformation produced by conventional welding sequence (Fig. 1, a). 2. The welding is carried out in a rigid strap assembly and with prior bending of the H-beam (Fig. 2). This technique reduces residual deformation 3-5 times. 3. Welding of elements attached in pairs, e.g. T-beams (Fig. 3). Further, the effect of the combination of parts of various thickness in the weldment on its residual deformation was investigated. The welding of such parts is complicated, since then the thinner parts, with their smaller rigidity, greatly overheat so that residual deformations increase considerably. In this case it is best to perform welding by the semiautomatic consumable-electrode method which results in a more intensive local heating and hence in a faster welding rate which, in its turn, leads to a contraction of the zone of plastic deformations and the concomitant general decrease in residual deformations. The most effective method of preventing any marked residual deformations is the component-by-component method of fabricating structural elements which involves the division of the product into the largest possible number of symmetric or insignificantly asymmetric components which are separately assembled and welded together. Moreover, since it is not always practical to carry out the cold straightening of deformed loadbearing structural elements of aluminum, it is advisable to apply hot straightening as based on the use of three heat sources: gas flame, electric arc and, particularly,"idle welds" applied by means of nonconsumable (tungsten) electrodes. Orig. art. has: 8 figures.

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 000/ OTH REF: 000

Card 4/4

L 11310-67 EWP(k)/EWT(m)/EWP(w)/EWP(v)/EWP(t)/ETI IJP(c) JD/HM

ACC NR: AR6022164 SOURCE CODE: UR/0137/66/000/003/E016/E016

AUTHOR: Livshits, L. N.

TITLE: Prevention and elimination of deformations in manufacturing welded aluminum structures

SOURCE: Ref. zh. Metallurgiya, Abs. 3E111

REF SOURCE: Sb. Novoye v tekhnol. svarki stroit. konstruktsiy. M., 1965, 47-51

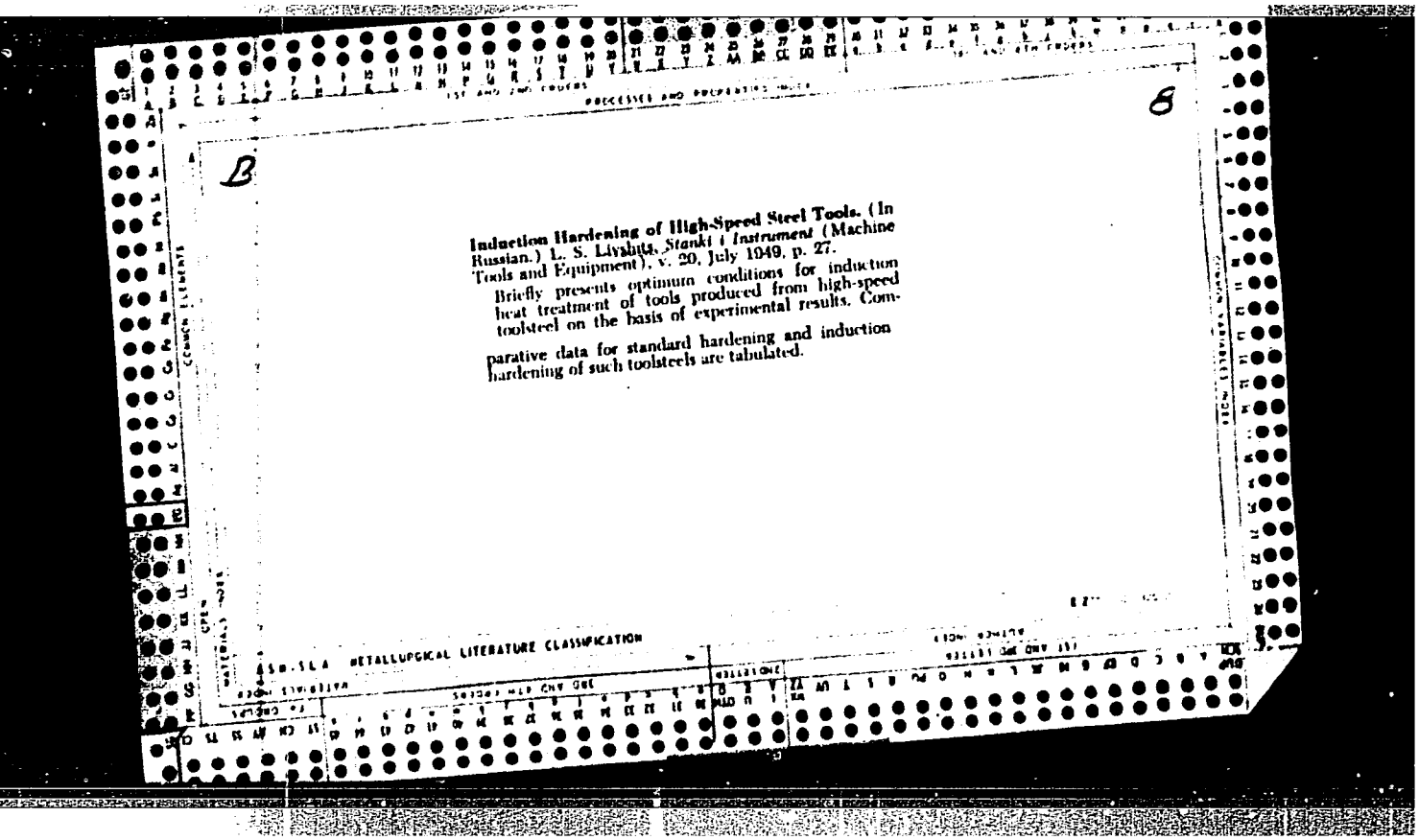
TOPIC TAGS: aluminum welding, metal deformation, consumable electrode

ABSTRACT: The author studies the effect of various design alternatives and technological factors on deformability in making structural elements for bridges from AMg-6, AMg-61 and V92-T aluminum alloys. Among the factors investigated were the sequence in which the joints were made, selection of the welding method, welding in clamping fixtures and jigs, prebending, welding elements fastened in pairs, eliminating the effect of differences in thickness between the sheets to be welded, breaking down finished assemblies into separate subunits and straightening the finished product. It is concluded that tilting jigs should be used in making welded aluminum structural elements. The subunit method should be used for making complex aluminum structures. Deformation may be reduced by welding with a consumable electrode. Heating is effective for straightening aluminum structural elements although the work capacity of the element must be checked after this method is used. V. Fomenko. [Translation of abstract]

SUB CODE: 11, 13

Card 1/1 bab

UDC: 621.791.011:539.4.014.13.669.715



Induction Hardening of High-Speed Steel Tools. (In Russian.) L. S. Livshits, *Stanki i Instrument* (Machine Tools and Equipment), v. 20, July 1949, p. 27.

Briefly presents optimum conditions for induction heat treatment of tools produced from high-speed toolsteel on the basis of experimental results. Comparative data for standard hardening and induction hardening of such toolsteels are tabulated.

C. A.

Properties of low-carbon cemented and medium-carbon surface hardened steel I. N. Livshits. *Zavodsk. Lab. Instrumenty* 21, No. 5, 49–51(1955). The hardness and strength of the 2 kinds of steel were compared. The hardness was approx. equal but impact and bending strength of the surface-hardened steel was higher M. Hosch

LIVSHITS, L. S.

PA 233T35

USSR/Metallurgy - Welding, Steel, Electrodes Jul 52

"Welding Pipes Made of Kh5M Steel," A.G. Mazel', L.S. Livshits, Candidates Tech Sci, M. Ya. Chushenkova, Engr, NIIStroyneft' /Sci Res Inst for Construction of Enterprises of the Gas and Petroleum Ind?7

"Avtogen Delo" No 7, pp 1-6

Investigates several types of electrodes for welding pipelines made of Kh5M Cr-Mo steel, widely used at petroleum refineries and working under pressure up to 70 atm and at temps up to 550° C.

233T35

Experimentally establishes that electrodes made of 18-8 steel provide for obtaining welds with lowest tendency to hot crack formation and with highest erosion resistance without preheating of pipes to be welded. Editors disagree with authors, stating that their conclusions relate only to certain heats of 18-8 steel and cannot be generally accepted without preliminary test of electrodes.

233T35

LIVSHITS, L. S. , Mazel, A. G., and Chushenkova, M. Ya.

"The Welding of Chromium (4½ per cent)-Molybdenum Steel Tubes" (Avto. Delo, 1952, 23, July, p. 1)

Type Kh5M (4½ per cent Cr-Mol) steel is a creep-resisting steel used in the oil industry for tubular assemblies working at up to 70 atmospheres and 550 degrees C. In assembly shops, it may be welded with electrodes of the same wire composition and a low hydrogen lime-ferritic coating, but must be fully heat treated after welding. For site-welding, a molybdenum-bearing 18-8 austenitic electrode giving a duplex weld metal structure (i.e., containing some ferrite) must be used.

A hot cracking test is described, in which newly completed welds are impact tested; the criterion is the number of seconds during which the cooling weld still fractures brittle (cf. hot cracking test in ref. 18)

KISLYUK, F.I., doktor tekhnicheskikh nauk; MAZEL', A.T. kandidat tekhnicheskikh nauk; FAL'KEVICH, A.S. inzhener; ANUCHKIN, M.S., kandidat tekhnicheskikh nauk; LIVSHITS, L.S: kandidat tekhnicheskikh nauk; NEYFEL'D, I.Ye., inzhener; [redacted], L.P., inzhener; POLYAKOVA, P.B., inzhener.

Welding with electrode cluster. Section of the All-Union Scientific Engineering Technological Association of Welders in the All-Union Scientific Research Institute for Petroleum Industry Construction. Avtog. delo 24 no.6:30 Je '53. (MLRA 6:5)
(Electric welding)

LIVSHITS, L.S., kandidat tekhnicheskikh nauk; MAZEL', A.G., kandidat tekhnicheskikh nauk; CHUSHENKOVA, M.Ya., inzhener; BAKHRAKH, L.P., inzhener

Welding pipes of 12Kh5MA heat-resistant chromium molybdenum steel. Svar. proizv. no.3:8-10 Mr 55. (MLRA 8:9)

1. VNIIStroyneft'
(Pipe, Steel--Welding)

LIVSHITS, L.S., kandidat tekhnicheskikh nauk

Austenite and perlite fusion zones. Svar.proizv. no.10:14-16 O'55.
(MLRA 8:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut Stroyneft'
(Austenite--Welding) (Perlite--Welding)

FAL'KEVICH, A.S., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; PANICH, S.I.

Methods of assessing the susceptibility of steel to brittle fracture in welded storage tanks. Svar.proizv.no.12:8-10 D '55. (MLRA 9:2)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut stroitel'stva nefti.
(Tanks--Welding) (Steel--Brittleness)

AL'TGAUZEN, O.N., kandidat fiziko-matematicheskikh nauk; BERNSHTEYN, M.L., kandidat tekhnicheskikh nauk; BLANTER, M.Ye., doktor tekhnicheskikh nauk; BOKSHTEYN, S.Z., doktor tekhnicheskikh nauk; BOLKHOVITINOVA, Ye.N., kandidat tekhnicheskikh nauk; BORZDYKA, A.M., doktor tekhnicheskikh nauk; BUNIN, K.P., doktor tekhnicheskikh nauk; VINOGRAD, M.I., kandidat tekhnicheskikh nauk; VOLOVIK, B.Ye., doktor tekhnicheskikh nauk [deceased]; GAMOV, M.I., inzhener; GELLER, Yu.A., doktor tekhnicheskikh nauk; GORELIK, S.S., kandidat tekhnicheskikh nauk; GOL'DENBERG, A.A., kandidat tekhnicheskikh nauk; GOTLIB, L.I., kandidat tekhnicheskikh nauk; GRIGOROVICH, V.K., kandidat tekhnicheskikh nauk; GULYAYEV, B.B., doktor tekhnicheskikh nauk; DOVGALEVSKIY, Ya.M, kandidat tekhnicheskikh nauk; DUDOVTSEV, P.A., kandidat tekhnicheskikh nauk; KIDIN, I.N., doktor tekhnicheskikh nauk; KIPNIS, S.Kh., inzhener; KORITSKIY, V.G., kandidat tekhnicheskikh nauk; LANDA, A.F., doktor tekhnicheskikh nauk; LEYKIN, I.M., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; L'VOV, M.A., kandidat tekhnicheskikh nauk; MALYSHEV, K.A., kandidat tekhnicheskikh nauk; MEYERSON, G.A., doktor tekhnicheskikh nauk; MINKEVICH, A.N., kandidat tekhnicheskikh nauk; MOROZ, L.S., doktor tekhnicheskikh nauk; NATANSON, A.K., kandidat tekhnicheskikh nauk; NAKHIMOV, A.M., inzhener; NAKHIMOV, D.M., kandidat tekhnicheskikh nauk; POGODIN-ALEKSEYEV, G.I., doktor tekhnicheskikh nauk; POPOVA, N.M., kandidat tekhnicheskikh nauk; POPOV, A.A., kandidat tekhnicheskikh nauk; RAKHSHTADT, A.G., kandidat tekhnicheskikh nauk; ROGEL'BERG, I.L., kandidat tekhnicheskikh nauk;

(Continued on next card)

AL'TGAUZEN, O.N.---- (continued) Card 2.
SADOVSKIY, V.D., doktor tekhnicheskikh nauk; SALTYKOV, S.A., inzhener; SOBOLEV, N.D., kandidat tekhnicheskikh nauk; SOLODIKHIN, A.G., kandidat tekhnicheskikh nauk; UMANSKIY, Ya.S., kandidat tekhnicheskikh nauk; UTEVSKIY, L.M., kandidat tekhnicheskikh nauk; FRIDMAN, Ya.B., doktor tekhnicheskikh nauk; KHIMYSHIN, F.F., kandidat tekhnicheskikh nauk; KHRUSHCHEV, M.M., doktor tekhnicheskikh nauk; CHERNASHKIN, V.G., kandidat tekhnicheskikh nauk; SHAPIRO, M.M., inzhener; SHKOL'NIK, L.M., kandidat tekhnicheskikh nauk; SHRAYBER, D.S., kandidat tekhnicheskikh nauk; SHCHAPOV, N.P., doktor tekhnicheskikh nauk; GUDTSOV , N.T., akademik, redaktor; GORODIN, A.M. redaktor izdatel'stva; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor

[Physical metallurgy and the heat treatment of steel and iron; a reference book] Metallovedenie i termicheskaia obrabotka stali i chuguna; spravochnik. Pod red. N.T.Dudtsova, M.L.Bernshteina, A.G. Rakhshtadta. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 1204 p. (MLRA 9:9)

1. Chlen -korrespondent Akademii nauk USSR (for Bunin)
(Steel--Heat treatment) (Iron--Heat treatment)
(Physical metallurgy)

LIVSHITS, L.S., kandidat tekhnicheskikh nauk (Moskva)

Welding alloy steel refinery pipelines. Strei.pred.neft.prom.1 no.5: 3-6 Jl '56. (MLRA 9:9)
(Pipe, Steel--Welding)

ANUCHKIN, M.P., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk.

Causes for the cracking of welded joints in pipelines. Trudy VNII Stroinefti no.4:5-25 '56. (MLRA 10:1)
(Petroleum--Pipelines) (Pipelines--Welding)

MAZEL', A.G., kandidat tekhnicheskikh nauk; LIVSHITS, L.S., kandidat tekhnicheskikh nauk; CHUSHENKOVA, M.Ya., inzhener.

Welding Kh5M steel pipes. Trudy VNII Stroinefti no.4:26-45 '56. (MLRA 10:1)

(Pipe, Steel--Welding)

LIVSHITS, L.S., kandidat tekhnicheskikh nauk; MAZEL', A.G., kandidat tekhnicheskikh nauk; CHUSHENKOVA, M.Ya., inzhener; BAKHRAKH, L.P., inzhener.

Welding 12Kh5MA steel pipes. Trudy VNIISTROINEFT' no.7:86-97 '56. (MLRA 9:11)

(Pipe, Steel--Welding)
(Heat resistant alloys)

LIVSHITS, L.S.

123-1-539

Translation from: Referativnyy Zhurnal, Mashinostroyeniye, 1957, Nr 1, p. 86 (USSR)

AUTHORS: Livshits, L.S., Chushenkova, M.Ya.

TITLE: Welding Pipes Made of Non-Molybdenum Substitutes of 12 X 5 MA Steel (Svarka trub iz bezmolibdenovykh zameniteley stali marki (2 X 5 MA).

PERIODICAL: Tr. Vses. n.-i. in-ta po str-vu, 1956, Nr 7, pp.98-107

ABSTRACT: The authors present results of their study of properties of welded joints of non-molybdenum steels 12 X 5 and 12 X 5ВФ grades, which are designated as the material for pipe-lines in refineries in replacement of the 12 X 5 MA steel which contains Mo (molybdenum). The evaluation of welded joint properties was conducted according to the indices for hardness and toughness in various spots of the welded joints after their technological ageing at 400° during 1,000 hours and without ageing, and according to a critical temperature of brittleness

Card 1/2

VNIISTROINEFT

Welding Pipes Made of Non-Molybdenum Substitutes (Cont.)

in the area with lowest properties. The welding was done by austenite electrodes with the ЦЛ-3М and ЭНТУ-3 coatings, and by the ЦЛ-17 electrodes. They have established that the properties of welded joints of the 12 X 5 and 12 X 5ВФ steels are equivalent to those of the 12 X 5МА steel. It is recommended to weld the above-named steels in pipe lines with austenite electrodes having core of the Х25Н15 or 0Х18Н9 steels without subsequent heat-treatment of the welded joints, or weld them by the ЦЛ-17 electrodes; in the latter case heat treatment of welded joints is imperative.

Z.V.N.

Card 2/2

LIVSHITS, L.S., kandidat tekhnicheskikh nauk; BAKHRAKH, L.P., inzhener; LUNIN, I.I., inzhener; POLYAKOVA, R.B., inzhener.

Arc welding of high-pressure pipelines. Trudy VNIISTROINEFT' no.7: 108-124 '56. (MLRA 9:11)

(Pipe, Steel--Welding)

Livshits, L. S.

AID P - 5604

Subject : USSR/Engineering

Card 1/2 Pub. 107-a - 4/12

Authors : Livshits, L. S., Kand. of Tech. Sci., N. M. Savvina, Kand. of Tech. Sci., L. P. Bakhrakh, Eng. and I. I. Lunin, Eng.

Title : Endurance of welded joints of 20 and 30KhMA steels

Periodical : Svar. proizv., 12, 14-16, D 1956

Abstract : The authors present the results of tests given to two types of welded pipes: a) the 35mm thick, 229mm in diameter, 20-steel pipes automatically butt-welded by Sv-08A electrode wire of 2mm gage, the AN-348 flux, and tempered at 550-560°C [in which the weld has higher strength than the base metal] and b) the 52mm thick 30KhMA-steel pipes of the same diameter, automatically butt-welded by the Sv-Kh5M electrode of the 2mm gage, using AN-15 flux, and tempered at 650-660°C in which the joint turned out to be lower in strength than the

AID P - 5604

Svar. proizv., 12, 14-16, D 1956

Card 2/2 Pub. 107-a - 4/12

welded pipes]. Three tables, 2 graphs, 1 macro-picture and 1 drawing.

Institutions: All-Union Scientific Research Institute for Building of Petroleum Enterprises (VNIIStroyneft'), Central Scientific Research Institute of Machine-Building Technology (TsNIITMASh).

Submitted : No date

LIVSHITS, L. S.

DUDA, R.I., inzhener (Moskva); LIVSHITS, L.S., kandidat tekhnicheskikh nauk (Moskva); TARAN, V.D., doktor tekhnicheskikh nauk (Moskva); PAL'KEVICH, A.S., kandidat tekhnicheskikh nauk (Moskva).

Investigating sheet steel for reservoirs. Stroi. pred.neft.prom. 2 no.1:13-16 Ja '57. (MLRA 10:3)
(Petroleum--Storage) (Plates, Iron and steel)

LIVSHITS, L.S., kand.tekhn.nauk (Moskva); RAKHMANOV, A.S., inzh. (Moskva)

Welding of industrial pipe for use at temperature minus 70°.
Stroi.pred.neft.prom. 2 no.7:9-11 Jl '57. (MIRA 10:10)
(Pipe, Steel)
(Electric welding)

Livshits, L.S.

SUBJECT: USSR/Welding 135-8-11/19

AUTHORS: Livshits, L.S., Candidate of Technical Sciences, and Bakhrakh, L.P., Engineer.

TITLE: Arc Welding of Thick-Walled High-Pressure Pipes (Dugovaya svarka tolstostennykh trub vysokogo davleniya).

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, #8, pp 29-31 (USSR)

ABSTRACT: The article represents recommendations by VNIIStroyneft' for welding pipes of steel "20" and "30ХМА", with 229 mm outside diameter and 52 mm wall thickness. The recommendations are based on experimental investigations of butt joints welded under various technological conditions.

The illustrations show the chamfering of butts and the special flux-retaining arrangement used. Experimental welding was performed without supporting rings.

It is recommended to use multi-layer welds with section areas of single beads not over 70 mm^2. For manual welding of steel "20" electrodes "УОНИ-13/45", and for steel "30ХМА" electrodes "ЦЛ-19ХМ" are recommended. The proper electrode diameter for straight butts is 3 mm, for butts on bends - 4 mm. For semi-

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TITLE: Arc Welding of Thick-Walled High-Pressure Pipes (Dugovaya svarka tolstostennykh trub vysokogo davleniya).

automatic welding of steel "20" the wire "СВ-08А" and flux "АН -348" for semi-automatic welding of steel "30ХМА" wire "СВ -18ХМ" and flux "АН-15" are recommended.

Mechanical properties of welded joints equal to properties of base metal can be required, with the additional condition that impact resistance at temperature of -50°C is to be not below 4 kg /cm^2.

The article contains 4 sketches, 2 photographs, and 4 tables.

ASSOCIATION: "VNIIStroyneft".

PRESENTED BY:

SUBMITTED:

AVAILABLE: At the Library of Congress.

Card 2/2

DUDA, R.I.; TARAN, V.D.; PAL'KEVICH, A.S.; LIVSHITS, L.S.

High-level capacity of steel tanks in the winter. Neft.khoz. 35 no.2:51-56 F '57. (MLRA 10:3)
(Petroleum--Storage)

LIVSHITS, Lev Semenovich, kand. tekhn. nauk; BAKHRAKH, Lidiya Petrovna, inzh.; RAGAZINA, M.F., inzh., ved. red.; SHTERLING, S.Z., dots., red.; SOROKINA, T.M., tekhn. red.

[Welding of EI578 and EI579 steel structures]Svarka konstruktsii iz stalei EI578 i EI579. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 9 p. (Peredovoi nauchno-tekhn. i proizvodstvennyi opyt. Tema 12. No.M-58-281/24) (MIRA 16:3)
(Steel, Heat-resistant--Welding)

Livshits, L.S.

129-1-6/14

AUTHORS: Livshits, L.S., Candidate of Technical Sciences, and Bakhrakh, L.P., Panich, S.I., Engineers.

TITLE: On the Non-uniformity in the Zone of Fusion of Welded Joints (O neodnorodnosti v zone splavleniya svarnykh soyedineniy)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No. 1, pp. 26 - 29 (USSR).

ABSTRACT: For studying the influence of manganese in the seam on the non-uniformity of fusion, strips of "Steel 3" (0.18% C, 0.45% Mn) were welded by means of a wire under flux. The manganese content in the seam was varied by introducing different quantities of ferro-manganese in the coating and thus a number of weld joints were obtained containing different quantities of manganese, whilst the content of other elements remained approximately unchanged. Some of the results obtained are given in Table 1, p.27. Experiments were also made with welding the chromium-manganese steel 30XMA with electrodes of such composition as to obtain an equal strength of the welds and the base material; the chemical compositions of the base metal and the welds are given in Table 2, p.28. Some of the results are entered in Table 3, p.28. On the basis of the

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On the Non-uniformity in the Zone of Fusion of Welded Joints.

obtained results, the following conclusions are arrived at: in welds of pearlitic steels with differing chemical compositionsof the metal in the weld and the base metal, the formation is possible of a structural and chemical non-uniformity in the melting zone which is characterised by the formation of decarburised and carburised zones; the formation of these non-uniformities proceeds in the solid state due to displacement of carbon atoms from one zone of the weld into the other, whereby the carbon displacement takes place only in the sections which are close to the fusion zone, namely, it proceeds from the sections containing elements which produce less stable carbides to those sections which contain elements producing more stable carbides, i.e. from the sections with lower content of carbide-forming elements into the section with higher content of such elements. The direction of displacement of the carbon does not depend on its relative concentration in the neighbouring regions and is determined by the qualitative and quantitative difference in the content of carbide-forming elements in the weld and in the base metal and, therefore, frequently the carbon moves away from zones with low carbon content; immediately after welding, the weld

On the Non-uniformity in the Zone of Fusion of Welded Joints.

does not always have an appreciable non-uniformity in the fusion zone. The non-uniformity occurs during heating to temperatures slightly below the Ac_1 point. Displacement of carbon and formation of the above mentioned type of non-uniformities take place at heating temperatures at which the iron is in the α state. There are 3 tables and 3 figures, and 4 Slavic references.

ASSOCIATION: VNIISTROYNEFT'

AVAILABLE: Library of Congress.

Card 3/3

Livshits, L.S.

135-58-4-7/19

AUTHORS: Livshits, L.S., Candidate of Technical Sciences, and Panich, S.I., Technician

TITLE: Formation of Non-Homogeneity in Fusion Zones of Welds in Heating up to 500 - 700° C (Obrazovaniye neodnorodnosti v zone splavleniya svarnykh soyedineniy pri nagreve do 500 - 700°)

PERIODICAL: Svarochnoye Proizvodstvo, 1958, Nr 4, pp 22-25 (USSR)

ABSTRACT: In the works published thus far on the problem [Ref 1-5], the non-homogeneity of metal structure of welded joints is explained by the difference in the content of the carbide-forming elements in portions of weld joints. This article gives information of the results of experimental investigation carried out recently by VNIIStroyneft', which prove that the aforementioned conception is wrong. The conclusion is that the non-homogeneity, forming at the temperature of 500 - 700° C, is caused by the presence and migration of excessive atoms (not bound in carbides) from one portion of the weld joint into another, i.e. when there is an excess of free atoms of a carbide-forming element in one portion of the weld, and an excess of free carbon atoms

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Formation of Non-Homogeneity in Fusion Zones of Welds in Heating up to 500 - 700° C

in the other. A calculation principle is suggested which permits the determination of the possibility of the formation of carbon non-homogeneity in the fusion zone by the content (in atomic percentage) of the alloying elements in the seam and in the base metal. The uniform distribution of carbon and liquidation of the non-homogeneity can be obtained by a subsequent (after heating to 500 - 700° C) heating to 950° C. The information includes a detailed description of the processes as observed in experiments, and microphotographs. The chemical composition of the alloy steel is shown in tables.
There are 5 figures, 2 tables and 5 references, 2 of which are Soviet, 2 English and 1 Japanese.

ASSOCIATION: VNIIStroyneft'

AVAILABLE: Library of Congress

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SOV-125-58-10-10/12

AUTHORS: Livshits, L.S., and Bakhrakh, L.P.

TITLE: On the Relation Between the Hardness and the Microstructure of the Fusion of Austenitic Joint in Perlite Steel and the Chemical Composition of the Steel and Weld Joints (O svyazi mezhdu tvërdost'yu i mikrostrukturoy splavleniya austenitnykh shvov na perlitnykh stalyakh i khimicheskim sostavom stali i shvov)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 10, pp 81 - 85 (USSR)

ABSTRACT: Problems relating to the transition of carbon in the fusion zone in solid condition, and the passage of metals in various structure classes are discussed. The microstructure and microhardness of the fusion zone in commerially pure iron (about 0.03% C), carbon steel (up to 22% C), and "12Kh5M" steel (up to 0.15% C, 5 - 6 % Cr, 0.45 - 0.65 % Mo) were investigated. It was proved that hardness and structure of the fusion zone in austenitic seams on perlite steel can be controlled in a large range by changing the chrome and nickel content in the seams and the carbide forming elements in the base metal. It is concluded that hardness and probably also brittleness in the fusion zone

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On the Relation Between the Hardness and the Microstructure of the Fusion of Austenitic Joints in Perlite Steel and the Chemical Composition of the Steel and Weld Joints

are reduced by a smaller carbon content in the steel and chromium content in the austenitic seam, as well as by an increased content of nickel in the seam, and of elements forming in the base metal stabler carbides than chromium. To reduce hardness and improve homogeneity in the fusion zone, the use of "18 Cr-8 Ni" electrodes, which do not contain niobium, titanium, molybdenum and tungsten, is recommended for welding steel alloyed with molybdenum, tungsten and vanadium (separately or in combination) in quantities ensuring binding of the carbon into carbide. There are 5 microphotos, 1 graph and 7 references, 3 of which are Soviet and 4 English.

SUBMITTED: January 6, 1958

Card 2/2

1. Steel alloys--Arc welding 2. Arc welding--Metallurgical effects
3. Steel--Chemical properties 4. Welds--Chemical properties

LIVSHITS, L.S.; RAKHMANOV, A.S.

Determination of the resilience of steel at low temperatures.
Zav. lab. 24 no.5:622-625 '58. (MIRA 11:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut po stroitel'stvu predpriyatiy gazovoy i neftyanoy promyshlennosti.
(Steel—Testing)

SOV/135-59-1-6/18

AUTHORS: Livshits, L.S., Candidate of Technical Sciences, and Bakhrakh, L.P., Engineer

TITLE: The Radiographic Investigation of Niobium Distribution in Stainless Steel (Radiograficheskoye issledovaniye raspredeleniya niobiya v nerzhaveyushchey stali)

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 1, pp 20-22 (USSR)

ABSTRACT: In connection with intercrystalline corrosion in the use of "18-9 Ti" and"18-9 Nb" stainless steels, it was assumed that the stabilizing effect of Nb and Ti depends on their condition in the alloy and that satisfactory corrosion resistance is obtained if Nb (or Ti) is present in the form of carbide, binding the contained carbon. Information is given on the effect of heating conditions for "18-9" grade stainless steel containing Nb, on the formation and dissolving of Nb-carbides, with the

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The Radiographic Investigation of Niobium Distribution in Stainless Steel

use of an Nb-95 radioactive isotope. The tests led to the following conclusions: to ensure intercrystalline corrosion resistance in heating up to temperatures of 550 - 650°C, the use of stainless steel with a higher Nb content

$$\left(\frac{Nb}{C} \approx 10 - 13\right)$$

is recommended. In hardening stainless steel with a reduced Nb content, heating over 1200°C must be avoided. In the case of heating up to 1300°C, zones adjacent to the weld are less resistant to corrosion than remote portions. Best results in raising corrosion resistance can be obtained, by heating up to 850 - 900°C for 3 hours, ensuring a satisfactory Nb carbide formation. Maximum temperatures for steels containing Ti are lower

The Radiographic Investigation of Niobium Distribution in Stainless Steel

than for Nb-containing steels. There are 5 microphotos, 1 table and 4 references, 3 of which are Soviet and 1 English.

ASSOCIATION: VNIIST

LIVSHITS, L.S., kand. tekhn. nauk; RAKHMANOV, A.S., inzh.

Using aluminum alloys pipes for building pipelines. Svar. proizv. no.2:16-17 F '59. (MIRA 12:1)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut tverdykh splavov.
(Pipelines) (Aluminum alloys--Welding)

SOV/129-59-6-3/15

AUTHOR: Livshits, L.S. (Cand.Tech.Sci.)

TITLE: Displacement of Carbon in α-Iron and Solubility of Carbon in Ferrite (Peremeshcheniye ugleroda v al'fa-zheleze i rastvorimost' ugleroda v ferrite)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1959, Nr 6, pp 13-17 (USSR)

ABSTRACT: As a result of heating in the temperature range 500 to 700 °C, displacement of carbon and side by side formation of decarburized and carbon-enriched zones can be observed in certain weld joints of perlitic steels; thereby the iron was in the α-state (Refs 1-3). Such a displacement of the carbon is attributed to differing contents of carbide-forming elements in the metal of the weld joint and the weld metal. For the purpose of establishing the laws governing the displacement of carbon in the α-iron, the fusion zones of several weld joints were investigated for six steels with compositions, as given in the table on page 13, which also contains the composition of the weld metal. The direction of the displacement of the carbon was evaluated metallographically from the formation and change in the dimensions of the decarburized and

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Displacement of Carbon in α-Iron and Solubility of Carbon in Ferrite

carburized zones. The specimens were investigated after welding and also after welding followed by heating for 2, 10, 100, and 1000 hours at 600 and 700 °C. The obtained results have shown that presence in one of the parts of the weld joint of small quantities of more 'potent' carbide-forming elements (Mo and W) than in other parts, is insufficient for causing displacement of carbon atoms in the α-iron. However, a great difference in the contents of elements which can produce carbides of higher stability than iron carbides, does bring about a displacement of the carbon into the zone of accumulation of carbide forming atoms (Fig 1). On the basis of the obtained results the following conclusions are arrived at: 1) solubility of carbon in the ferrite depends on the character and the degree of alloying of the steel. 2) Provided that the content of the alloying carbide forming element is high enough and the entire carbon is combined into stable carbides and there are excess carbide forming atoms, the content of carbon in the ferrite should be lower than the limit of solubility. However, if the

content of the alloying element is low and is insufficient for combining the available carbon, the content of carbon in the ferrite reaches the limit of solubility. 3) The more stable the carbides formed by an alloying element, the lower will be the carbon concentration of the ferrite, provided that the content of the alloying element in the alloy is high enough. 4) In metallic joints (produced by welding or cladding) with differing contents of carbide forming alloying elements of the sections in contact, conditions are created which are favourable for the displacement of the carbon from the spots containing less stable carbides (high concentration of carbon in the ferrite) into spots containing more stable carbides (lower concentration of carbon in the ferrite). 5) Displacement of the carbon in the ferrite from the higher concentration to the lower concentration is appreciable at 550 to 700 °C and is accompanied by the

Displacement of Carbon in α-iron and Solubility of Carbon in Ferrite

decomposition of less stable and the formation of more stable carbides.
There are 3 figures, 1 table and 3 references, 2 of which are Soviet and 1 English.

ASSOCIATION: VNIIST

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AUTHOR: Livshits, L. S. SOV/126-8-1-6/25

TITLE: On the Mechanism by Which Carbon Dissolves in and Diffuses Through Ferrite

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 1, pp 31-37 (USSR)

ABSTRACT: An investigation carried out by the authors on the diffusion of carbon in α-iron has led them to assume that the solubility of carbon in ferrite and its rate of diffusion does not depend only on the qualitative difference in alloy elements; on alloying with the same carbide-forming elements these properties are associated with the concentration of the latter. The level of solubility of carbon in alloy ferrite most frequently determines the possibility of occurrence of reaction diffusion of carbon in α-iron. These assumptions are based on the following facts: It was noticed that in welded joints, in which the seam and the welded metal differ in their carbide-forming element contents, transfer of carbon, on lengthy heating in the range 500-700°C, takes place in the direction of elements forming more stable carbides (Refs 3 and 4). In the zone

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On the Mechanism by Which Carbon Dissolves in and Diffuses Through Ferrite

in which the seam unites with the basis metal, regions of considerable carburization form in those parts where there is an element capable of forming the most stable carbides in a given system, and a sharp de-carburization occurs in that part where decreasing element contents give less stable carbides (Fig 1). In the example shown in Fig 1 of a chromium steel weld, the presence of molybdenum in the seam led after 10 hours' heating (700°C) to transfer of carbon from the welded steel to the seam. In a welded carbon steel containing 0.15% carbon two types of seam were made, one containing 0.4 and the other 0.9% V. For seams of the first type no signs of transfer of carbon from the welded steel into the seam could be observed after lengthy heating at 700°C. (Fig 2). In the second case a considerable transfer of carbon had taken place from the basis metal into the seam and a drastic structural non-uniformity in the welded portion was observed (Fig 3). The same transfer of carbon was observed also in other experiments when a seam with high vanadium content was obtained in chromium and molybdenum

On the Mechanism by Which Carbon Dissolves in and Diffuses Through Ferrite

steels. Zav'yalov et al. (Ref 2) have published data for the solubility of carbon in ferrite after lengthy heating at various temperatures, of several steels containing separately manganese, chromium, tungsten, molybdenum and vanadium. If the atomic composition of the alloys and the types of carbides found by the authors in each of these alloys are considered, it can be seen that in all cases there is a considerable excess of carbon as compared with that which can be associated with the alloy element contents. That is why an increased solubility of carbon in ferrite was found in all cases. As an example, a case is considered where a seam has been obtained on a carbon steel which contained more vanadium than required for the formation of stable carbides (Fig 4). The relationship between the absorbed energy and the relative increase in electrical resistance of sulphur is shown as another example. The author arrived at the following conclusions:

Card 3/4 Migration of carbon atoms in ferrite takes place if there

On the Mechanism by Which Carbon Dissolves in and Diffuses Through Ferrite

is a difference in concentration. The difference in concentration of carbon in ferrite in various portions of the steel is due to the non-uniformity in carbide-forming alloy element content. In portions containing a high percentage of a stable carbide-forming element a ferrite zone, impoverished in carbon, forms in low-carbon steel because of the great affinity of this element to carbon. Carbon atoms migrate into this zone from the remaining ferrite. If a steel, containing carbide-forming elements, has a high carbon content, equilibrium conditions between combined and free carbon lead to an increase in the quantity of carbon dissolved in the ferrite.
There are 4 figures and 4 Soviet references.

SUBMITTED: March 13, 1958

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14(11) SOV/32-25-2-32/78

AUTHORS: Livshits, L. S., Rakhmanov, A. S.

TITLE: Mechanical Testing Methods (Mekhanicheskiye metody ispytaniy). On the Low Temperature Resilience Determination and the Tendency of Metals to Form and Develop Cracks (Ob opredelenii udarnoy vyazkosti pri nizkikh temperaturakh i sklonnosti metalla k zarozhdeniyu i razvitiyu treshchin)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 2, pp 190 - 192 (USSR)

ABSTRACT: The causes which led to the destruction of a 5000 cu. m cylindrical steel container were investigated, and a number of peculiarities were observed which may be used for determining the brittleness after resilience (R) changes at low temperatures. The article explains the advantages of the described method for the determination of the deformation and tearing process in impact-bending tests as criteria for the brittleness. The container mentioned above consisted of dead melt steel MSr.3 (0.20% C, 0.19-0.20% Si, 0.35-0.38% Mn, 0.042% S and 0.019% P). The air temperature at the

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moment of destruction was -27°, soil temperature -31°. The metal properties were as follows: σ_B = 45.9 kg/mm^2, σ_S = 27 kg/mm^2, δ = 27% and ψ = 61.4%. Serial (R) tests at different temperatures of the two container rings furnished varying results (Fig 1); of the first container ring, however, only longitudinal, while of the second ring only transversal samples could be produced. Investigations of the samples of the first container ring (Fig 2) showed that the main component of the deformation process is the plastic deformation process, while the share of elastic deformation is small. Investigations regarding the dependence of the tearing process of the temperature prevailing during the test (Fig 3) point to the fact that the container was destroyed by decomposition due to brittleness. A high (R) value of a metal is in such cases nothing but proof of great tensile strength, if the values of the deformation and tearing process are also high. Otherwise, there may be little resistance to cracking (high tearing process but little

deformation process), or a tendency towards a fast development of cracks (high deformation process, little tearing process). There are 4 figures and 2 Soviet references.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut po stroitel'stvu magistral'nykh truboprovodov (All-Union Scientific Research Institute for the Construction of Trunk Pipe Lines)

LIVSHITS, L. S.

PHASE I BOOK EXPLOITATION SOV/5596

Neyfel'd, I. Ye., A. S. Fal'kevich, and L. S. Livshits

Kontrol' kachestva svarki na stroitel'stve (Quality Control in Field Welding) Moscow, Gostroyizdat, 1960. 163 p. 8,000 copies printed.

Scientific Ed.: V. L. Tsegel'skiy, Engineer; Ed. of Publishing House: L. S. Lytkina; Tech. Ed.: T. M. Gol'berg.

PURPOSE : This book is intended for engineers, technicians, and skilled weldors engaged in field welding and its quality control.

COVERAGE: Modern welding methods, types of welded joints used in construction and erection, and specifications for weldments are described. Particular attention is given to the following methods of weld inspection: X-ray, gamma-ray, magnetic, ultrasonic, mechanical, metallographic, and corrosion. Data concerning methods of inspecting welds for tightness are also

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presented. The author thanks L. P. Bakhrakh, S. I. Panich, G. N. Shubert, and V. M. Lubov for their assistance in the work performed at VNIIST (Vsesoyuznyy nauchno-issledovatel'skiy institut po stroitel'stvu magistral'nykh truboprovodov -- All-Union Scientific Research Institute for the Construction of Main Pipelines). Chapters I, II, III, VI, VII, and X were written by A. S. Fal'kevich, Candidate of Technical Sciences; Chapters IV, V, and IX, by I. Ye. Neyfel'd, Engineer; and Chapter VIII, by L. S. Livshits, Candidate of Technical Sciences. There are 33 references, all Soviet.

TABLE OF CONTENTS:

S/125/60/000/05/02/015

18.7210

AUTHORS: Livshits, L. S., Grinberg, N. A., Panich, S. I., Shamonov, S. I.

TITLE: The Nature of Chemical Non-Homogeneity of the Fusion Zone in Some Pearlite Steels

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 5, pp. 11-16

TEXT: Local spectral analysis with "three standards" was employed in investigating the distribution of carbon and other elements in the fusion zone of welded joints. The article gives the most characteristic results of investigation of welds with 1.9% Cr, and with 1.7% V. A "PMT-3" apparatus (Fig. 2) was slightly changed for local analysis with the use of a manganese needle electrode, i. e. the diamond was replaced by this electrode. The other electrode was a lead cone. The cylindrical needle 1-mm in diameter was of pure magnesium produced by electrolysis with 10-12 volt, a-c in electrolyte consisting of 90 cm^3 of 10% Na_2HPO_4 solution and 10cm^3 H_2SO_4. Sharpening the needle to 0.01-0.015 mm took 20 to 25 sec. After every photograph with the "ISP-28" spectrograph, the needle was immersed for 2-3 sec into 10% HNO_3 solution to remove oxides, then was

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