East European Welding Research News

By Rudolph O. Seitz

CZECHOSLOVAKIA

Zvaranie 18, No. 11 (Nov. 1969)

• Sepita, M.: Complex measurements of welding electrodes.—Methods and instruments for determining the basic technological and economic properties of welding electrodes are described and the results of some practical measurements are reported (307-09).

• Zitnansky, B.: Metallurgical studies of welding problems with the aid of radioisotopes.—This particular study deals with the transfer of chromium and vanadium to the weld metal. In the case of chromium, certain relationships between the transfer and the nature of different chromium-bearing constituents were established. In the case of vanadium, a strong thermal dependence of the transfer was found, which accounts for its heterogeneous distribution in the weld metal (310-312).

• Pantucek, M.: The effect of filler metals on air contamination in manual arc welding.—The composition and the relative amount of smoke produced in manual arc welding have been investigated. It was found that the contamination of the atmosphere is due almost exclusively to the filler metal (electrodes) and that manganese and fluorides are the most harmful components of the fumes (322-25).

EAST GERMANY

Zis Mitteilungen 11, No. 10 (Oct. 1969)

• Domraum H. and Zech, H.: Hydraulic P40 HY ZIS 475 spotwelder.—The characteristics and performance of a newly developed medium capacity spotwelder are described (1631-39).

• Schadler, H. and Matthias, W.: New flash-butt welders.—A new line of flash-butt welders has been introduced by VEB LEW Henningsdorf (1640-51).

• Zech, H.: Multiple spotwelders for the fabrication of large concrete reinforcing mattings.—The principle feature of two types of multispot-welders designed for the fabrication of welded steel matting are described (1652-56).

• Matthias, W. and Rack, L.: The BSA 001 automatic strip welder.—This mash seam welder is able to join strip steel 0.1-1.5 mm in thickness and 750-1060 mm in width (1661-67).

• Martin, E. et al.: Gantry for spotwelding truck side-panels.—The authors describe a specialized plant for the fabrication, by spotwelding, of side panels for trucks and trailers (1668-78).

• Hentschel, H. and Strympe, H.: Economical fabrications of switch contacts by resistance welding.—An account is given of the tipping of switching elements with steel-backed precious metal contacts (1679-86).

• Schadler, H. and Nitzschke, G.: ELTROS type electronic control for resistance welding.—A new control system for spot-, projection- and seam welders has been developed which meets the requirements of modern industrial production (1687-94).

• Vandreike, W.: Secondary circuits in resistance welders.—The loss factors are discussed and practical suggestions for the design of secondary circuits are presented (1695-1702).

• Deubel, G. and Zabel, E.: The ZIS 541 electrode force meter.—A simple dial instrument has been developed for measuring the electrode force in the range of 60-300 kp (1703-06).

• Böhme, H.: Classification of welding parameters for the production of spotwelds in sheet metal and their application to different spotwelding machines.—The author presents the results of tests aimed at enlarging the accepted scope of the welding variables and suggests a revision of the criteria for rating spotwelders (1707-15).

• Kluge, D.: Spotwelded design in the automotive industry.—Some 20 typical spotwelded subassemblies are shown and technical data and cost comparisons are given. The relative amount of resistance welding per ton of welded steel construction in East Germany, West Germany, and U. S. is reported as 6:30:150 (1716-27).

• Deubel, G.: How much does a spotweld cost?—The various factors affecting the cost are discussed and pertinent data for determining the cost under different operating conditions and for different equipment are presented in the form of tables and diagrams (1728-37).

• Heller, K. H.: Spotwelding of St A-I and STA-III concrete reinforcing steel rods.—Spotwelding tests have shown that a penetration of at least 20% is required to obtain satisfactory cross joints between the two types of steel bars which differ with respect to carbon content and surface finish (A-I is smooth, A-III is ribbed) (1738-45).

• Heller, K. H. and Schulz, K.: Spotwelding of phosphatized sheet metal.—The optimum welding parameters for obtaining satisfactory joints between iron and zinc phosphatized sheets with different coating thicknesses were determined (1746-51).

• Schmiedgen, D.: Weld nugget formation during spotwelding and the effect of contact resistance.—Direct observation of the temperature fields by the "sectional pattern" method showed that the contact resistance and the current density imitiate the heat generation as a function of the electrode force, the amperage and the contact conditions and that the subsequent development of the temperature pattern is influenced by the constant redistribution of the current density (1787-1804).

• Hüttner, H. et al.: Calorimetric measurements during resistance spotwelding and the effect of the principal parameters on the nugget formation have been studied by means of calorimetric measurements (1805-17).

USSR

Avtomaticheskaya Svarka 22, No. 1 (Jan. 1969).

• Gurevich, S. M.: Stresses and deformation in the butt welding of thin niobium sheets.—The residual stresses after welding thin Nb sheets were measured with an ID-5 deformometer. It was found that heating at 1200° C for 1 hour under vacuum is

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sufficient to remove the residual longitudinal stresses (33-34).

• Turi, A.: Use of specimens with variable rigidity.—The possibilities of using test specimens with varying rigidity for determining the resistance of hot cracking due to welding are examined and some quantitative indicators obtained with the author's method are reported (35-39).

• Deev, V. A. and Koval, A. V.: Study of residual stresses in crank shafts reclaimed by welding.—The problem of the effect of residual stresses on the fatigue limit of crank shafts reclaimed by welding has been studied. It was found that the residual tensile stresses along the line of fusion promote the growth of fatigue cracks. The residual stresses can be relieved only by a normalizing treatment (40-42).

Avtomaticheskaya Svarka 22, No. 12 (Dec. 1969)

• Makara, A. M. et al.: Heat treatment of electroslag welded joints in the Ac_1—Ac_3 range. (1-5).—A study of the effect of the heat treating conditions in the critical temperature range on the properties of electroslag-welded joints in the low-alloy steels of G2S and 16 GS has shown that under optimum conditions (780° C/5 hrs./furnace) it is possible to obtain a refinement of the HAZ structure at subzero temperatures and after aging.

• Adamovich, V. K.: Formation of chemical heterogeneity in the grain of overheated metal. (6-9).—The author studied the process of contamination of the fusion boundaries of the HAZ as a function of the properties of the material and examined the conditions of the thermal effect on said material.

• Gorin, I. G.: Properties of welded joints between OT 4-1 and EI 894 alloys (10-13).—The results of fatigue-, prolonged heating- and corrosion tests of welded joints between OT 4-1 (=Ti alloy) and EI 894 (=heat-resistant Ni-base alloy) are discussed, and the results of X-ray analyses of the boundaries of separation are reported for different welding parameters.

• Dudko, D. A. and Kornienko, A. N.: Electrical characteristics of the a. c. plasma arc (14-19).—The external static and dynamic volt-ampere characteristics of the plasma arc operated with industrial frequency a. c. have been studied and the effect of gas flow and of the constricted arc on the electrical characteristics of the resulting plasma arc have been determined.

• Korzh, V. N. and Zhdanov, I. M.: Heat flow in spot-welding (20-23).—The effect of the size of so-called frame-paneling type joints produced by resistance spot-welding on the formation of the temperature field has been investigated.

• Koleshko, V. M. and Galkov, V. S.: Effect of the amplitude of vibration on the quality of ultrasonically soldered joints between semiconductor crystals and gold-plated supports (24-26).—It has been found that by selecting a tool of the proper size and shape high-quality joints can be made with small power input.

• Kovalev, I. M. and Akulov, A. I.: Relative motion of the drops of electrode metal in the plasma stream in gas-shielded arc welding (27-30).—It has been shown that the velocity of the metal drops being transferred is relative velocity of the plasma stream which carries them along.

• Naidenov, A. M.: Mechanical control of the transfer of electrode metal (31-33).—The dynamic forces acting on the drops of electrode metal during arc welding have been analyzed and the conditions for a synthesis of the wire feeding mechanisms for controlling the drop transfer are described. Relationships for calculating the velocity, acceleration and intertial forces acting on the drops of molten metal have been established.

• Trufyakov, V. I. et al.: Calculation of the fatigue strength of welded joints operating under conditions of variable loading (34-37).—A method for calculating the fatigue strength is described which is based on the experimentally determined relationship between O and N applicable to welded joints and takes into account the accidental nature of the variation of the maximum and minimum stresses produced by the operating loads.

• Ekhlakov, S. V.: Welding of polythylene with the aid of an electric heating element (38-41).—The special features of welding polythylene pipes with the aid of an insertable electric heating element and the experimental data necessary for calculating such elements are reported.

• Asnis, A. E. et al.: Welding of thermally hardened rolled sections of Og G2 (=0,09% C, 2% Mn) steel is described.

• Kharin, V. P. et al.: Automatic CO_2-shielded welding of nipples onto sheets (45-46).—Specialized automatic equipment for gas-shielded welding of nipples to plates (A-1077) developed by the Paton Institute of Welding has been introduced. It provides good quality welds and lowers production cost.

• Gerasimenko, I. N. et al.: The weldability of wrought VAD-1 aluminum alloy (47-50).—The weldability of this new wrought aluminum alloy was studied on the basis of the results of mechanical testing. Ways and means of improving the weldability of the alloy are suggested.

• Kulikov, F. R. et al.: Welding of heavy sections of VT6S, VT6 and VT14 titanium alloys (51-56).—The properties of welded joints in those alloys were investigated both in the annealed and in the hardened state. The respective welding procedures are described.

• Oparin, L. I. and Frumin, I. I.: Mechanized weld cladding with corrosion-resistant alloys using a cermet strip electrode (57-60).—A description is given of the method of submerged arc hardfacing with corrosion-resistant alloys of the Inconel and Monel type by means of cermet strip electrodes.

Other articles of interest:

• Mat'yakubov, B. M. et al.: Determniation of structural transformations in welded joints (61-62).

• Tkachuk, V. N.: One-sided welding of T-joints (62-64).

• Chenguraev, L. I. et al.: Wear-resistance of automobile valves hard-faced with high-boron nichrome alloys (64-65).

YUGOSLAVIA

Varilna Tehnika 18, No. 1 (Jan. 1969)

• Metelko, S.: Study of the effect of the design parameters on the performance of arc welding transformers.—After summarizing prior findings reported in the literature, the author gives an account of his investigations of transformers with magnetic shunt control. The magnetic and electrical conditions under no load and in short-circuit and the magnetic flux distribution are described and some observations concerning the variation of the design parameters of welding transformers are presented (1-7).